

KENDRIYA VIDYALAYA SANGATHAN, CHENNAI REGION



तत् त्वं पूषन् अपावृणु
केन्द्रीय विद्यालय संगठन

Session 2022-23

Class XII

Informatics Practices

Based on Latest CBSE Exam Pattern

**KENDRIYA VIDYALAYA SANGATHAN
CHENNAI REGION**

OUR PATRONS

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KVS RO CHENNAI**

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MEMBERS AND DETAILS OF TOPICS ALLOTTED			
Name of the co-ordinator – Sh. Shemeer K A, KV Coimbatore			
S.No.	Name of the Teacher	Name of the KV	Name of the Chapter allotted
1	Smt. M.Umaselvi	KV.No.2, Port Blair	Data Handling Using Pandas (Up to Boolean Indexing)
2	Sh. Rahul Agarwal	No.1 Trichy	Database query using SQL (Math Functions, Text Functions, Date Functions) and aggregate functions.
3	Smt. Greeshma P Prakash	KV Island Grounds	Introduction to Computer Networks
4	Smt. Sunitha Krishnan K S	KV No 1 Port Blair	Importing and exporting data between CSV files and dataframes, and data visualization.
5	Sh. Febin E Jalal	KV No.1, Madurai	Societal Impacts and querying and manipulating data using group by, having and order by.
With support of other contractual PGT CS of different KVs of Chennai Region			

COURSE DIRECTOR

Sh. N. RAKHESH

PRINCIPAL

KV VIJAYANARAYANAM, CHENNAI

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Informatics Practices
CLASS XII
Code No. 065
2022-2023

1. **Prerequisite:** Informatics Practices – Class XI

2. Learning Outcomes

At the end of this course, students will be able to:

- Create Series, Data frames and apply various operations.
- Visualize data using relevant graphs.
- Design SQL queries using aggregate functions.
- Import/Export data between SQL database and Pandas.
- Learn terminology related to networking and internet.
- Identify internet security issues and configure browser settings.
- Understand the impact of technology on society including gender and disability issues.

3. Distribution of Marks and Periods

Unit No	Unit Name	Marks	Periods Theory	Periods Practical	Total Period
1	Data Handling using Pandas and Data Visualization	25	25	25	50
2	Database Query using SQL	25	20	17	37
3	Introduction to Computer Networks	10	12	0	12
4	Societal Impacts	10	14	-	14
	Project	-	-	7	7
	Practical	30	-	-	-
	Total	100	71	49	120

4. Unit Wise syllabus

Unit 1: Data Handling using Pandas -I

Introduction to Python libraries- Pandas, Matplotlib.
Data structures in Pandas - Series and Data Frames.

Series: Creation of Series from – ndarray, dictionary, scalar value; mathematical operations; Head and Tail functions; Selection, Indexing and Slicing.

Data Frames: creation - from dictionary of Series, list of dictionaries, Text/CSV files; display; iteration; Operations on rows and columns: add, select, delete, rename; Head and Tail functions; Indexing using Labels, Boolean Indexing;

Importing/Exporting Data between CSV files and Data Frames.

Data Visualization

Purpose of plotting; drawing and saving following types of plots using Matplotlib – line plot, bar graph,

histogram

Customizing plots: adding label, title, and legend in plots.

Unit 2: Database Query using SQL

Math functions: POWER (), ROUND (), MOD ().

Text functions: UCASE ()/UPPER (), LCASE ()/LOWER (), MID ()/SUBSTRING ()/SUBSTR (), LENGTH (), LEFT (), RIGHT (), INSTR (), LTRIM (), RTRIM (), TRIM ().

Date Functions: NOW (), DATE (), MONTH (), MONTHNAME (), YEAR (), DAY (), DAYNAME ().

Aggregate Functions: MAX (), MIN (), AVG (), SUM (), COUNT (); using COUNT (*).

Querying and manipulating data using Group by, Having, Order by.

Unit 3: Introduction to Computer Networks

Introduction to networks, Types of network: LAN, MAN, WAN.

Network Devices: modem, hub, switch, repeater, router, gateway

Network Topologies: Star, Bus, Tree, Mesh.

Introduction to Internet, URL, WWW, and its applications- Web, email, Chat, VoIP.

Website: Introduction, difference between a website and webpage, static vs dynamic web page, web server and hosting of a website.

Web Browsers: Introduction, commonly used browsers, browser settings, add-ons and plug-ins, cookies.

Unit 4: Societal Impacts

Digital footprint, net and communication etiquettes, data protection, intellectual property rights (IPR), plagiarism, licensing and copyright, free and open source software (FOSS), cybercrime and cyber laws, hacking, phishing, cyber bullying, overview of Indian IT Act.

E-waste: hazards and management.

Awareness about health concerns related to the usage of technology.

Project Work

The aim of the class project is to create tangible and useful IT application. The learner may identify a real-world problem by exploring the environment. e.g. Students can visit shops/business places, communities or other organizations in their localities and enquire about functioning of the organization, and how data are generated, stored, and managed.

The learner can take data stored in csv or database file and analyze using Python libraries and generate appropriate charts to visualize.

If an organization is maintaining data offline, then the learner should create a database using MySQL and store the data in tables. Data can be imported in Pandas for analysis and visualization.

Learners can use Python libraries of their choice to develop software for their school or any other social good.

Learners should be sensitized to avoid plagiarism and violation of copyright issues while working on projects. Teachers should take necessary measures for this. Any resources (data, image etc.) used in the project must be suitably referenced.

The project can be done individually or in groups of 2 to 3 students. The project should be started by students at least 6 months before the submission deadline.

Practical Marks Distribution

S. No.	Unit Name	Marks
1	Programs using Pandas and Matplotlib	8
2	SQL Queries	7

3	Practical file (minimum of 15 programs based on Pandas, 4 based on Matplotlib and 15 SQL queries must be included)	5
4	Project Work (using concepts learned in class XI and XII)	5
5	Viva-Voce	5
	TOTAL	30

5. Suggested Practical List

5.1 Data Handling

1. Create a panda's series from a dictionary of values and a ndarray
2. Given a Series, print all the elements that are above the 75th percentile.
3. Create a Data Frame quarterly sales where each row contains the item category, item name, and expenditure. Group the rows by the category and print the total expenditure per category.
4. Create a data frame for examination result and display row labels, column labels data types of each column and the dimensions
5. Filter out rows based on different criteria such as duplicate rows.
6. Importing and exporting data between pandas and CSV file

5.2 Visualization

1. Given the school result data, analyses the performance of the students on different parameters, e.g subject wise or class wise.
2. For the Data frames created above, analyze, and plot appropriate charts with title and legend.
3. Take data of your interest from an open source (e.g. data.gov.in), aggregate and summarize it. Then plot it using different plotting functions of the Matplotlib library.

5.3 Data Management

1. Create a student table with the student id, name, and marks as attributes where the student id is the primary key.
2. Insert the details of a new student in the above table.
3. Delete the details of a student in the above table.
4. Use the select command to get the details of the students with marks more than 80.
5. Find the min, max, sum, and average of the marks in a student marks table.
6. Find the total number of customers from each country in the table (customer ID, customer Name, country) using group by.
7. Write a SQL query to order the (student ID, marks) table in descending order of the marks.

UNIT - I

DATA HANDLING USING PANDAS

Pandas:

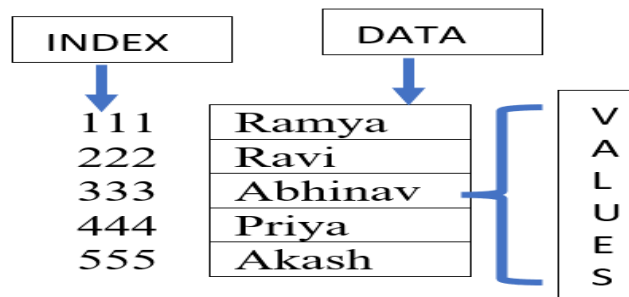
- Python libraries contain a collection of built-in modules
- NumPy, Pandas and Matplotlib are **three** well-established Python libraries for scientific and analytical use.
- PANDAS (**PANel DAta**) is a high-level data manipulation tool used for **Data Analysing**
- Pandas is an **Open Source** library built for Python Programming language.
- The main author of Pandas is **Wes McKinney**.

Data Structure in Pandas :

- A data structure is a collection of data values and operations that can be applied to that data.
- It enables efficient storage, retrieval and modification to the data
- Data structures in Pandas are:
 - 1) Series
 - 2) DataFrame
 - 3) Panel

Series:

- Series is a **data structure** of Pandas
- It is a **one dimensional** structure
- It contains **homogeneous** data
- Data values are associated with **labelled index**
- Index can be numeric, string or any other datatype
- Default index is **zero** if no index is given
- Series has two main components-
 - ✓ An array of actual data.
 - ✓ An associated array of indexes or data labels

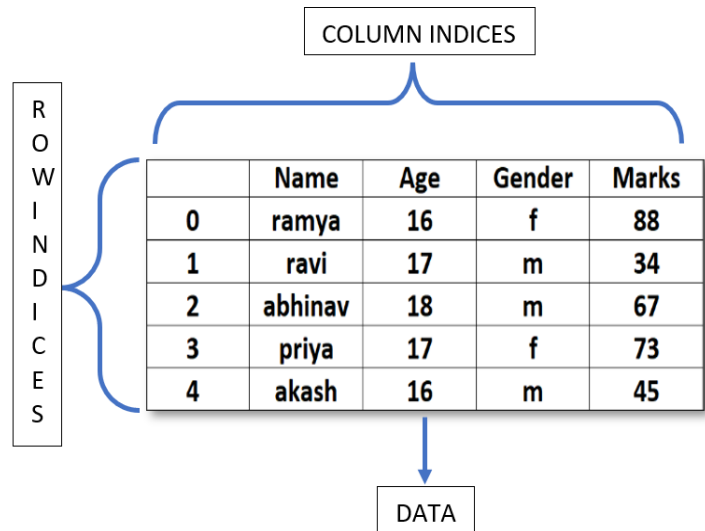


Key Points :

- Homogeneous data
- Size Immutable
- Values of Data Mutable

DataFrame :

- Pandas store **tabular data** using a DataFrame.
- DataFrame is a data structure of Pandas
- A DataFrame is a **two-dimensional** structure
- It contains heterogenous data
- It is like a table of MySQL
- It contains rows and columns, and therefore has both a **row and column index**.
- Row index is called **index** and column index is called **column name**
- Dimensions of dataframe are also called as Axis
[Row index (axis=0), Column index (axes=1)]
- Dataframe is size and value mutable



Key Points :

- Heterogeneous data
- Size Mutable
- Values of Data Mutable

What is a Series?

- A Pandas Series is like a column in a table.
- It is a one-dimensional array holding data of any type

Creation of Series :

There are a number of ways to create a DataFrame

(A) Creation of an empty Series:

An empty Series can be created as follows:

Coding:

```
import pandas as pd
s1=pd.Series()
print(s1)
```

Output:

```
Series([], dtype: float64)
```

(B) Creation of a Series from List: Series can be created from a List:[default indices range from 0 through N – 1. Here N is the number of data elements]

Coding:

```
import pandas as pd
s2=pd.Series(['p', 'y', 't', 'h', 'o', 'n'])
print(s2)
```

Output:

```
0      p
1      y
2      t
3      h
4      o
5      n
dtype: object
```

Index of the Series can be changed by User defined Labels

Coding: import pandas as pd s2=pd.Series(['p', 'y', 't', 'h', 'o', 'n'], index=[111,222,333,444,555,666]) print(s2)	Output: 111 p 222 y 333 t 444 h 555 o 666 n dtype: object
--	---

(C) Creation of a Series from Numpy Array: [one-dimensional (1D) NumPy array]

Coding: import pandas as pd a1=np.array([10,20,30,40]) s=pd.Series(a1) print(s)	Output: 0 10 1 20 2 30 3 40 dtype: int32
Data and index- numpy array used a1=np.array([10,20,30,40]) a2=np.array([11,22,33,44]) s=pd.Series(a1,a2) print(s)	11 10 22 20 33 30 44 40 dtype: int32

(D) Creation of a Series from Dictionary: Keys become Index and Values become Data

Coding: import pandas as pd d1={'I': 'one', 'II': 'two', 'III': 'three'} s=pd.Series(d1) print(s)	Output: I one II two III three dtype: object
--	---

(E) Creation of a Series from Scalar value(Single value for all items)

Coding: import pandas as pd s=pd.Series(5) print(s)	Output: 0 5 dtype: int64
[Depending on the number of index, scalar values are repeated] s=pd.Series(5,[11,22,33]) print(s)	11 5 22 5 33 5 dtype: int64

(F) Creation of a Series with Incomplete Value

<p>Coding: import pandas as pd import numpy as np s=pd.Series([10,20,30,np.NaN,50]) print(s) Note: numpy should be imported</p>	<p>Output: 0 10.0 1 20.0 2 30.0 3 NaN 4 50.0 dtype: float64</p>
---	---

(G) Creation of a Series using range() function

<p>Coding: import pandas as pd s=pd.Series(range(1,10,2)) print(s)</p>	<p>Output: 0 1 1 3 2 5 3 7 4 9 dtype: int64</p>
--	---

(H) Creation of a Series using for loop

<p>Coding: import pandas as pd s=pd.Series(y for y in "chennai") print(s)</p>	<p>Output: 0 c 1 h 2 e 3 n 4 n 5 a 6 i dtype: object</p>
---	--

Accessing Elements of a Series

There are two common ways for accessing the elements of a series:

- (i) Indexing
- (ii) Slicing.

(A) Indexing:

Indexes are of two types: positional index and labelled index.

- a) Positional index :
It takes an integer value that corresponds to its position in the series starting from 0
- b) Labelled index:
It takes any user-defined label as index

Positional index :



- Single element can be accessed using positional index (Seriesobject[index])
- More than one element of a series can be accessed using a list of positional integers

If s is the series given below

<pre>s=pd.Series(['p', 'y', 't', 'h', 'o', 'n'])</pre> <pre> 0 p 1 y 2 t 3 h 4 o 5 n dtype: object</pre>
1. s[0] gives p
2. s[2] gives t
3. s[[1,3]] gives
<pre> 1 y 3 h dtype: object</pre>

Labelled index :

- Single element can be accessed using labelled index (Seriesobject [labelled index])
- More than one element of a series can be accessed using a list of index labels

<p>If s is the series given below(Data is the city name, Index is the State)</p> <pre>city=['Mumbai','kolkata','Chennai','Bangalore','Hydrebad'] state=['Maharashtra','west Bengal','Tamilnadu', 'karnataka','Telangana'] s=pd.Series(city,state) print(s)</pre>		
	<div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">INDEX</div>	<div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">DATA</div>
		
	<pre>Maharashtra west Bengal Tamilnadu karnataka Telangana dtype: object</pre>	<pre>Mumbai kolkata Chennai Bangalore Hydrebad</pre>
1) s['Maharashtra'])	gives	Mumbai
2) s['Tamilnadu']	gives	Chennai
3) s[['west Bengal','Telangana']])	gives	<pre>west Bengal kolkata Telangana Hydrebad dtype: object</pre>
4) Even though labelled index is used, We can also access elements of the series using the positional index		
5) Both s[3], s['karnataka'] gives Bangalore, Bangalore		

(B) Slicing:

- It is used to extract a part of a series.
- Part of the series to be sliced can be defined by specifying the start and end parameters [start :end] with the series name. eg: s[2:5]
- When we use positional indices for slicing, the value at the end index position is excluded, i.e., In s[2:5], element at 5th index is excluded, (end-start) 5-2=3 elements at index 2,3 and 4 are extracted

- If labelled indexes are used for slicing, then value at the end index label is also included i.e s['west Bengal':'Telangana'] includes all elements from index westbengal till Telangana(included)

Note: Negative indexing also works

Slicing: If s is the given series

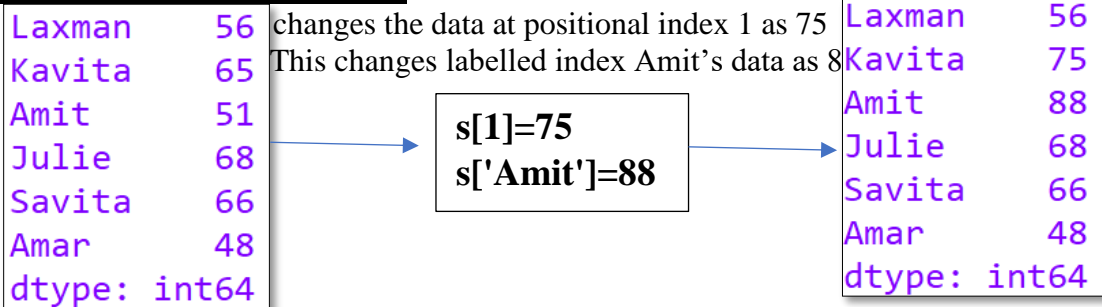
0	Laxman	56	-6
1	Kavita	65	-5
2	Amit	51	-4
3	Julie	68	-3
4	Savita	66	-2
5	Amar	48	-1
dtype: int64			

s[1:3]	Kavita 65 Amit 51 dtype: int64	Displays Elements at positional index 1 and 2
s[:2]	Laxman 56 Kavita 65 dtype: int64	Displays Elements at positional index 0 and 1
s[2:]	Amit 51 Julie 68 Savita 66 Amar 48 dtype: int64	Displays Elements from positional index 2 till last
s[::-1]	Amar 48 Savita 66 Julie 68 Amit 51 Kavita 65 Laxman 56 dtype: int64	Displays Elements in reverse
s[-2:]	Savita 66 Amar 48 dtype: int64	Displays Elements from positional index -2 (i.e -2 and -1)

<code>s[:-2]</code>	<pre>Laxman 56 Kavita 65 Amit 51 Julie 68 dtype: int64</pre>	Displays Elements from positional index 0 till -3 (-2 will not display)
<code>s[-4:-2]</code>	<pre>Amit 51 Julie 68 dtype: int64</pre>	Displays Elements at positional index -4 and -3

Modifying Series Data:

Modifying Single Element using index:



Modifying Multiple Elements using slicing:

`s[3:5]=77`
#This changes element from index 3 to 4 as 55

```
Laxman 56
Kavita 65
Amit 51
Julie 77
Savita 77
Amar 48
dtype: int64
```

`s[['Julie','Amar']]=90`
#This changes Julie's and Amar's data as 90

```
Laxman 56
Kavita 65
Amit 51
Julie 90
Savita 66
Amar 90
dtype: int64
```

```
s['Laxman':'Amit']=33
#This changes data from Laxman till Amit(including) as 33
```

```
Laxman    33
Kavita    33
Amit      33
Julie     68
Savita    66
Amar      48
dtype: int64
```

Attributes of Series :

We can access certain properties called attributes of a series by using that property with the series name.

If s1 and s2 are two series as given below

```
s1=pd.Series([10,20,30])
```

```
s2=pd.Series([11,22,np.NaN,44], index=[x for x in ['a','b','c','d']])
```

```
0    10
1    20
2    30
dtype: int64
```

```
a    11.0
b    22.0
c     NaN
d    44.0
dtype: float64
```

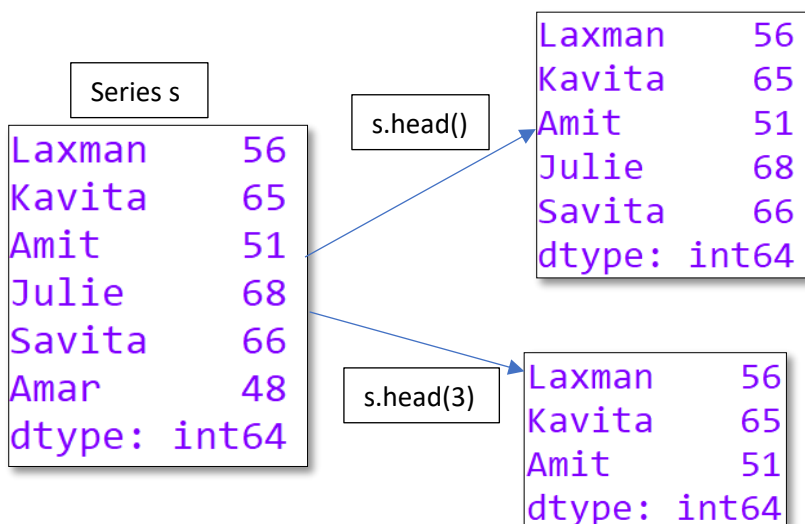
Attributes	Description	
Index	It returns the index of the object	
	s1.index gives RangeIndex(start=0, stop=3, step=1)	s2.index gives Index(['a', 'b', 'c', 'd'], dtype='object')
values	It returns the ndarray of the data	
	s1.values [10 20 30]	s2.values [11. 22. nan 44.]
nbytes	It returns number of bytes	
	s1.nbytes 24	s2.nbytes 32
dtype	It returns the data type of the data	
	s1.dtype int64	s2.dtype float64
shape	It returns the shape of the data in the form of tuple	
	s1.shape (3,)	s2.shape (4,)
	It returns the total number of elements in the data	

size	s1.size 3	s2.size 4
empty	It returns true in case of empty series	
	s1.empty False	s2.empty False
Hasnans	It returns true if the series contains NaN	
	s1.hasnans	s2.hasnans
ndim	It returns the number of dimension	
	s1.ndim 1	s2.ndim 1

Head() & Tail()

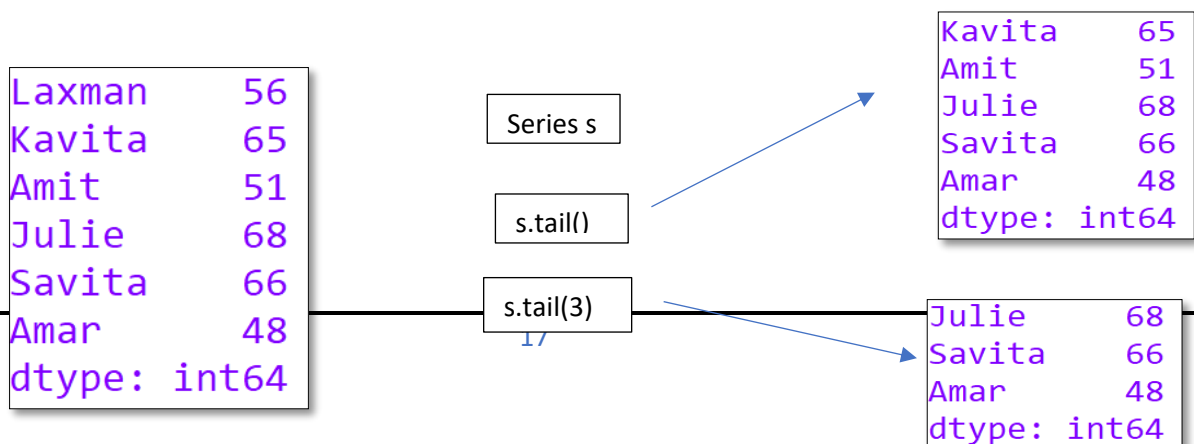
Head():

- head(<n>) function fetches first n rows from a pandas object
- To access first 3 rows you should write Series_name.head(3)
- If you do not provide any value for n, (Series_name.head())it will return first 5 rows



Tail():

- tail(<n>) function fetches last n rows from a pandas object
- To access last 3 rows you should write Series_name.tail(3)
- If you do not provide any value for n, (Series_name.tail())will return last 5 rows



Note: if number of rows existing less than the required rows ,available rows will get displayed

Mathematical Operations on a series

Mathematical processing can be performed on series using scalar values and functions. All the arithmetic operators such as +, -, *, /, etc. can be successfully performed on series.

Note:

Arithmetic operation is possible on objects of same index; otherwise, will result as NaN.

Coding:

```
import pandas as pd
s1 = pd.Series([10,20,30,40,50])
s2 = pd.Series([1,2,3,4])
s = s1 + s2
print("Addition of two Series:")
print(s)
print("Subtraction of two Series:")
s = s1 - s2
print(s)
print("Multiplication two Series:")
s = s1 * s2
print(s)
print("Division of Series1 by Series2:")
s = s1 / s2
print(s)
```

```
S1:
0    10
1    20
2    30
3    40
4    50
dtype: int64
```

```
S2:
0    1
1    2
2    3
3    4
dtype: int64
```

```
Addition of two Series:
0    11.0
1    22.0
2    33.0
3    44.0
4     NaN
dtype: float64
```

```
Subtraction of two Series:
0     9.0
1    18.0
2    27.0
3    36.0
4     NaN
dtype: float64
```

```
Multiplication two Series:
0    10.0
1    40.0
2    90.0
3   160.0
4     NaN
dtype: float64
```

```
Division of Series1 by Series2:
0    10.0
1    10.0
2    10.0
3    10.0
4     NaN
dtype: float64
```

Vector Operations on a series:

Series also supports vector operations. Any operation to be performed on a series gets performed on every single element of it

```
import pandas as pd
s1 = pd.Series([1,3,6,4])
print(s1)
```

```
print(s1+2) # 2 gets added with every element
print(s1*2) # every element gets multiplied by 2
print(s1>2) # It returns true if element >2, otherwise False
```

S1:	S1+2:	S1*2:	S1>2:
0 1	0 3	0 2	0 False
1 3	1 5	1 6	1 True
2 6	2 8	2 12	2 True
3 4	3 6	3 8	3 True
dtype: int64	dtype: int64	dtype: int64	dtype: bool

Retrieving values using conditions:

We can also give conditions to retrieve values from a series that satisfies the given condition

The following examples performing the filter operation and returns filtered result containing only those values that return True for the given Boolean expression.

```
print(s1[s1>2]) #This returns only those result for which s1>2 is True (False data will not be displayed)
print(s1[s1%2==0]) #This returns only those result for which s1%2==0 is True
```

S1:	S1>2:	S1[S1>2]:	s1[s1%2==0]
0 1	0 False	1 3	2 6
1 3	1 True	2 6	3 4
2 6	2 True	3 4	dtype: int64
3 4	3 True	dtype: int64	
dtype: int64	dtype: bool		

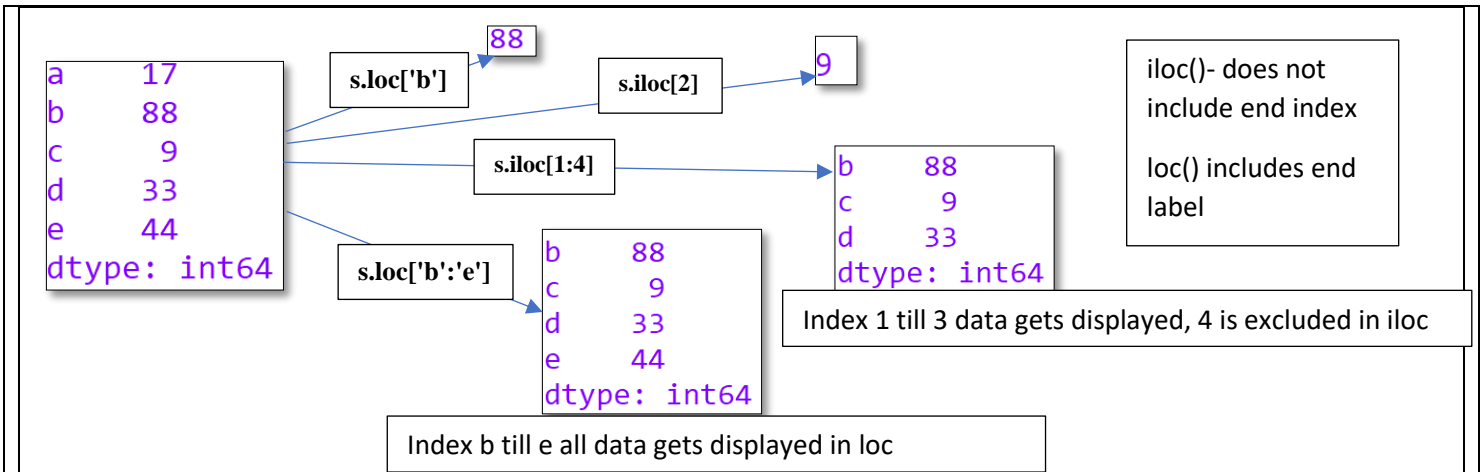
Deleting elements from a Series:

We can delete an element from a series using drop() method by passing the index of the element to be deleted as the argument to it.

Laxman 56	s.drop("Kavita")	Laxman 56
Kavita 65		Amit 51
Amit 51		Julie 68
Julie 68		Savita 66
Savita 66		Amar 48
Amar 48		dtype: int64
dtype: int64		

Accessing Data through iloc & loc:

- Indexing and accessing can also be done using iloc and loc.
- iloc :- iloc is used for indexing and selecting based on position (default position starts from 0), It refers to position-based indexing.
Syntax: iloc [<row no. range>, <column no. range>]
- loc :- loc is used for indexing and selecting based on name(user defined label) It refers to name-based indexing.
Syntax: loc [<list of row names>, <list of column names>]



Pandas Series Assignment: Find the output of the following: (1 to 15)

1.	<pre>import pandas as pd s = pd.Series() print (s)</pre>
2.	<pre>import pandas as pd import numpy as np data = np.array(['a','b','c','d']) s = pd.Series(data) print (s)</pre>
3.	<pre>import pandas as pd s = pd.Series([17,88,9,33,44],index = ['a','b','c','d','e']) print (s['a']) print (s[3]) print(s[:3]) print(s[-2:]) print (s[['d','e']])</pre>
4.	<pre>import pandas as pd import numpy as np data = np.array(['a','b','c','d']) s = pd.Series(data,index=[1,12,123,145]) print (s)</pre>
5.	<pre>import pandas as pd import numpy as np s = pd.Series(5, index=[0, 1, 2, 3]) print (s)</pre>
6.	<pre>import pandas as pd import numpy as np data = {'Mammal' : 'Tiger', 'Snake' : 'Python', 'Bird' : 'Peacock'} s = pd.Series(data) print (s)</pre>
7.	<pre>import pandas as pd k=[11,22,33,44,55] i=['a','b','c','d','e'] s=pd.Series(data=k,index=i)</pre>

	<pre>print(s) print(s.loc['a']) print(s.loc['a':'d']) print(s.iloc[1]) print(s.iloc[2:4])</pre>
8.	<pre>import pandas as pd k=[11,22,33,44,55,66,77,88,99] i=[1,2,3,4,5,6,7,8,9] s=pd.Series(data=k,index=i) print(s.head(1)) print(s.tail(3))</pre>
9.	<pre>import pandas as pd k=[11,22,33,44,55,66,77,88,99] i=[1,2,3,4,5,6,7,8,9] s=pd.Series(data=k,index=i) print(s/2)</pre>
10	<pre>import pandas as pd s1=pd.Series([10,20,30,40]) s2=pd.Series([1,2,3,4]) s3=pd.Series([10,20,30,40,50,60]) s4=pd.Series([10,20,30,40,5,6,7,8,9]) print(s1+s2) print(s1+s3) print(s3*s4)</pre>
11	<pre>import pandas as pd s=pd.Series([34,56,78]) print(s>40)</pre>
12	<pre>import pandas as pd k=[11,22,33,44,55] i=['a','b','c','d','e'] s=pd.Series(data=k,index=i) print(s) print("val=",s.loc['c']) print("val by iloc=",s.iloc[1:4])</pre>
13	<pre>import pandas as pd k=[11,22,33,44,55,66,77,88,99,100] s=pd.Series(k) print(s[0],s[0:4],s[:3],s[3:],s[3:8]) print(s[:-1],s[-10:-5],s[-8:])</pre>
14	<pre>import pandas as p k=[11,22,33,44,55,66,77,88,99,100] s=pd.Series(k) print(s[0:5],s[5:8],s[:2],s[5:],s[6:8]) print(s[-1:],s[-3:],s[-5:])</pre>
15	<p>Consider the following Series object “S1” and write the output of the following statement :</p> <pre>import pandas as pd L1=[2, 4, 2, 1, 3, 5, 8, 9] S1 = pd.Series(L1)</pre>

	<pre>print("1. ",S1.index) print("2. ",S1.values) print("3. ",S1.shape) print("4. ",S1.ndim) print("5. ",S1.size) print("6. ",S1.nbytes) print("9. ",S1[5]**2) print("10. ",S1.empty) print("11.\n", S1>60) print("12.\n", S1[: :-1])</pre>
16	<p>Write a program to create the following series and display only those values greater than 200 in the given Series “S1”</p> <pre>0 300 1 100 2 1200 3 1700</pre>
17	<p>Write a program to create the following series and modify the value 5000 to 7000 in the following Series “S1”</p> <pre>A 25000 C 8000 B 12000 D 5000</pre>
18	<p>Write a Pandas program to convert a dictionary to a Pandas series. Sample dictionary: d1 = {'a': 100, 'b': 200, 'c':300, 'd':400, 'e':800}</p>
19	<p>Define the Pandas/Python pandas?</p>
20	<p>Mention the different types of Data Structures in Pandas?</p>

Creation of DataFrame :

There are a number of ways to create a DataFrame

(A) Creation of an empty DataFrame:

An empty DataFrame can be created as follows:

<p>Coding:</p> <pre>import pandas as pd df1=pd.DataFrame() print(df1)</pre>	<p>Output:</p> <pre>Empty DataFrame Columns: [] Index: []</pre>
--	--

(B) Creation of DataFrame from List of Dictionaries:

We can create DataFrame from a list of Dictionaries, for example:

Coding:

```
import pandas as pd
d1={'Name':'Priya','Age':16,'Marks':70}
d2={'Name':'Harshini','Age':11,'Marks':99}
d3={'Name':'Kanishka','Age':15,'Marks':90}
df1=pd.DataFrame([d1,d2,d3])
print(df1)
```

Output:

Keys of dictionaries (Name, Age, Marks)
become column names

	Name	Age	Marks
0	Priya	16	70
1	Harshini	11	99
2	Kanishka	15	90

- The dictionary keys are taken as column labels
- The values corresponding to each key are taken as data
- No of dictionaries= No of rows, As No of dictionaries=3, No of rows=3
- No of columns= Total Number of unique keys of all the dictionaries of the list, as all dictionaries have same 3 keys, no of columns=3

Coding:

```
import pandas as pd
d1={'Name':'Priya','Age':16,'Marks':70,'Gender':'f'}
d2={'Name':'Harshini','Age':11,'Marks':99,'Grade':'A'}
d3={'Name':'Kanishka','Age':15,'Marks':90}
df1=pd.DataFrame([d1,d2,d3])
print(df1)
```

Output:

Keys of dictionaries (Name, Age, Marks, Gender, Grade)
become column names

	Name	Age	Marks	Gender	Grade
0	Priya	16	70	f	NaN
1	Harshini	11	99	NaN	A
2	Kanishka	15	90	NaN	NaN

- The dictionary keys are taken as column labels
- The values corresponding to each key are taken as data
- No of dictionaries= No of rows, As No of dictionaries=3, No of rows=3
- No of columns= Total Number of distinct keys of all the dictionaries of the list, as total keys is 5, no of columns=5
- NaN (Not a Number) is inserted if a corresponding value for a column is missing (As dictionary d1 has no Grade it has Grade as NaN, dictionary d2 has no Gender, hence it has Gender as NaN and d3 has no Gender and Grade, hence it has both values as NaN)

(C) Creation of DataFrame from Dictionary of Lists

DataFrames can also be created from a dictionary of lists.

Coding:

```
import pandas as pd
name=['ramya','ravi','abhinav','priya','akash']
age=[16,17,18,17,16]
gender=['f','m','m','f','m']
marks=[88,34,67,73,45]
d1={'name':name,'age':age,'gender':gender,'marks':marks}
df1=pd.DataFrame(d1)
print(df1)
```

Output:

Keys of dictionary (Name, Age, Gender, Marks) become column names

	name	age	gender	marks
0	ramya	16	f	88
1	ravi	17	m	34
2	abhinav	18	m	67
3	priya	17	f	73
4	akash	16	m	45

Dictionary keys become column labels by default in a Data Frame, and the lists become the rows

(D) Creation of DataFrame from Series**DataFrame created from One Series:****Coding:**

```
import pandas as pd
s1=pd.Series([100,200,300,400])
df1=pd.DataFrame(s1)
print(df1)
```

Output:

As no index passed default value of row index starts with 0, Only one column with default 0 index

	0
0	100
1	200
2	300
3	400

DataFrame from One Series:

No of rows = No of elements in Series=4 (As s1 has 4 elements)
No of columns = one (As single series used)

DataFrame created from Multiple Series:**Coding:**

```
import pandas as pd
s1=pd.Series([100,200,300,400])
s2=pd.Series([111,222,333,444])
df1=pd.DataFrame([s1,s2])
print(df1)
```

Output:

Default value of row indices and column indices starts with 0

	0	1	2	3
0	100	200	300	400
1	111	222	333	444

```
s1=pd.Series([100,200,300,400],index=['a','b','c','d'])
s2=pd.Series([111,222,333,444],index=['a','b','c','d'])
df1=pd.DataFrame([s1,s2])
print(df1)
```

Column index is index of Series

	a	b	c	d
0	100	200	300	400
1	111	222	333	444

```
s1=pd.Series([100,200,300,400],index=['a','b','c','d'])
s2=pd.Series([111,222,333,444],index=['a','b','c','e'])
```

Column index is union of all index of all Series

	Eng	Maths	Science
Priya	80	88	73
Ram	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

	a	b	c	d	e
0	100.0	200.0	300.0	400.0	NaN
1	111.0	222.0	333.0	NaN	444.0

```
df1=pd.DataFrame([s1,s2])
print(df1)
```

DataFrame from Multiple Series:

- The labels(index) in the series object become the column names
- Each series becomes a row
- No of columns =No of distinct labels in all the series
- If a particular series does not have a corresponding value for a label, NaN is inserted in the DataFrame column

(E) Creation of DataFrame from Dictionary of Series

DataFrame created from Dictionary of Series:

Coding:

```
import pandas as pd
name=pd.Series(['ramya','ravi','abhinav','priya','akash'])
age=pd.Series([16,17,18,17,16])
gender=pd.Series(['f','m','m','f','m'])
marks=pd.Series([88,34,67,73,45])
d1={'name':name,'age':age,'gender':gender,'marks':marks}
df1=pd.DataFrame(d1)
print(df1)
```

Output:

Keys becomes Column name
Values (Series) becomes column data

	name	age	gender	marks
0	ramya	16	f	88
1	ravi	17	m	34
2	abhinav	18	m	67
3	priya	17	f	73
4	akash	16	m	45

DataFrame created from Dictionary of Series(With different index):

```
import pandas as pd
name=pd.Series(['ramya','ravi','abhinav','priya','akash'],[111,222,333,444,555])
age=pd.Series([16,17,18,17,16],[111,555,666,222,333])
gender=pd.Series(['f','m','m','f','m'],[111,333,444,555,666])
marks=pd.Series([88,34,67,73,45],[222,333,444,555,666])
d1={'name':name,'age':age,'gender':gender,'marks':marks}
df1=pd.DataFrame(d1)
print(df1)
```

Output :

Keys becomes Column name
Values (Series) becomes column data
If no value for particular row index, NaN is inserted

	name	age	gender	marks
111	ramya	16.0	f	NaN
222	ravi	17.0	NaN	88.0
333	abhinav	16.0	m	34.0
444	priya	NaN	m	67.0
555	akash	17.0	f	73.0
666	NaN	18.0	m	45.0

DataFrame from Dictionary of Series

- Keys of dictionary become column name
- Values of dictionary(Series) become column data
- The labels(index) in the series object become the row index

- *No of rows =No of distinct labels in all the series*
If a particular series does not have a corresponding value for an index, NaN is inserted in the DataFrame column

Operations on rows and columns in DataFrames

We can perform some basic operations on rows and columns of a DataFrame like selection, deletion, addition, and renaming etc

(A) Adding a New Column to a DataFrame

- If the new column name does not exist, new column will be created
- if it already exists, the old values will get updated with new values
- if we try to add a column with lesser values, than the number of rows in the DataFrame, it results in a ValueError, with the error message:

ValueError:Length of values does not match length of index.

The following command will add new column city with list of values
If the given dataframe is

	name	age	gender	marks
0	ramya	16	f	88
1	ravi	17	m	34
2	abhinav	18	m	67
3	priya	17	f	73
4	akash	16	m	45

df1['city'] =
['chennai','mumbai','delhi'
,'mumbai','kolkata']



	name	age	gender	marks	city
0	ramya	16	f	88	chennai
1	ravi	17	m	34	mumbai
2	abhinav	18	m	67	delhi
3	priya	17	f	73	mumbai
4	akash	16	m	45	kolkata

The following command will add new column newcity with same value 'chennai' for all rows

	name	age	gender	marks
0	ramya	16	f	88
1	ravi	17	m	34
2	abhinav	18	m	67
3	priya	17	f	73
4	akash	16	m	45

df1['newcity']='chennai'



	name	age	gender	marks	newcity
0	ramya	16	f	88	chennai
1	ravi	17	m	34	chennai
2	abhinav	18	m	67	chennai
3	priya	17	f	73	chennai
4	akash	16	m	45	chennai

The following command will change the content of existing column city with new value as chennai for all rows

	name	age	gender	marks	city
0	ramya	16	f	88	chennai
1	ravi	17	m	34	mumbai
2	abhinav	18	m	67	delhi
3	priya	17	f	73	mumbai
4	akash	16	m	45	kolkata

`df1['city']='chennai'`

	name	age	gender	marks	city
0	ramya	16	f	88	chennai
1	ravi	17	m	34	chennai
2	abhinav	18	m	67	chennai
3	priya	17	f	73	chennai
4	akash	16	m	45	chennai

(B) Adding a New Row to a DataFrame

We can add a new row to a DataFrame using the **DataFrame.loc[]** method

The following command will add new row 'Swetha' with given list of values

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1.loc['Sita'] = [77,67,76]`

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92
Sita	77	67	76

The following command will add new row 'Gita' with value 80 for all columns

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1.loc['Gita'] =`

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92
Gita	80	80	80

The following command can set all values of a DataFrame to a particular value

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1[:]=0`

	Eng	Maths	Science
Priya	0	0	0
Ramya	0	0	0
Kavita	0	0	0
Kanishka	0	0	0
Harshini	0	0	0

(C) Deleting Rows or Columns from a DataFrame

- DataFrame.drop() method can be used to delete rows and columns from a DataFrame.
- To delete a row, axis=0 and for deleting a column axis=1 should be given default value of axis is 0

The following command removes the row 'Ramya' [default value of axis is 0]

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1=df1.drop('Ramya')`



	Eng	Maths	Science
Priya	80	88	73
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

The following command removes the row 'Priya' [axis is 0]

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1=df1.drop('Priya',axis=0)`



	Eng	Maths	Science
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

The following command removes the row 'Kavita'

`inplace = True` makes changes in the dataframe permanent

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1.drop('Kavita',inplace=True)`



	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kanishka	86	96	94
Harshini	90	95	92

The following command removes the Column 'Eng'

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1=df1.drop('Eng',axis=1)`



	Maths	Science
Priya	88	73
Ramya	98	81
Kavita	77	66
Kanishka	96	94
Harshini	95	92

The following command removes the Columns Eng ,Maths

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1=df1.drop(['Eng','Maths'],
axis=1)`

	Science
Priya	73
Ramya	81
Kavita	66
Kanishka	94
Harshini	92

(D) Renaming Row Labels of a DataFrame

- The labels of rows and columns can be changed using the DataFrame.rename() method.
- If no new label is passed corresponding to an existing label, the existing row label is left as it is

The following command renames the row label Ramya by Ram[By default axis =0 so row label changes]

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1=df1.rename({'Ramya':'Ram'})`

The following command renames the row label Kavita by Savita [index used]

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1=df1.rename
(index={'Kavita':'Savita'})`

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Savita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

The following command renames the row label Priya by Riya [axis=0 used by default axis is 0]

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1=df1.rename
({'Priya':'Riya'},axis=0)`

	Eng	Maths	Science
Riya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

The following command renames the Column label Eng by English [axis=1]

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1=df1.rename({'Eng':'English'},axis=1)`

	English	Maths	Science
Priya	88		
Ramya	98		
Kavita	77		
Kanishka	96		
Harshini	95		

Name: Maths, dtype: int64

The following command renames the Column labels Science by EVS and Maths by Mathematics [columns]

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1=df1.rename(columns={'Maths':'Mathematics','Science':'EVS'})`

	Eng	Mathematics	EVS
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

Accessing DataFrames Elements:

A) Indexing: Accessing Single Column

Select Columns by Name in Pandas DataFrame using []

The [] is used to select a column by mentioning the respective column name Df[‘Columnname’]

Note: Df.Columnname also can be used

In the given dataframe df1,

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1['Maths']`
`df1.Maths`

Indexing: Accessing Multiple Columns

The [] is used to select multiple columns passed as a list ,Df [[list of column names]]

In the given dataframe df1,

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

df1[['Eng','Maths']]



	Eng	Maths
Priya	80	88
Ramya	70	98
Kavita	75	77
Kanishka	86	96
Harshini	90	95

B) Slicing:

- We can use slicing to select a subset of rows and/or columns from a DataFrame, like Select all rows with particular columns, Select particular rows with all columns etc

C) Accessing the data frame through loc()[label indexing] and iloc()[positional indexing] method

- Pandas provide loc() and iloc() methods to access the subset from a data frame using row/column

Loc() method :

- The *loc* property is used to access a group of rows and columns by label(s) [label index]
Df.loc[StartRow : EndRow, StartColumn : EndColumn]
- when the row label is passed as an integer value, it is interpreted as a **label** of the index and not as an integer position along the index
- When labelled indices are used for slicing, value at the end index label is also included in the output.
Df1.loc[a:e,col1:col4] access 'a' to 'e' [including 'e'] and columns col1 to col4

iLoc() method :

- It is used to access a group of rows and columns based on **numeric index** value
Df.iloc[StartRowindex : EndRowindex, StartColumnindex : EndColumnindex]
- When positional indices are used for slicing, the value at end index position is excluded
Df1.iloc[1:5,2:6] access rows 1 to 4 [excluding 5] and columns 2 to 5[excluding 6]

Note -If we pass “:” in row or column part then pandas provide the entire rows or columns respectively

Using Label Indexing *loc()*

1) Single Row Access:

The following commands helps to access Single row [Details of Ramya] [Symbol “:” indicates all columns]

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1.loc['Ramya']`

Eng	70
Maths	98
Science	81
Name: Ramya, dtype: int64	

`df1.loc['Ramya',:]`

2) Multiple Row Access:

The following commands help to access Multiple rows (Details of Ramya and Kanishka)

[Records not necessary to be continuous] `df1.loc[['Ramya','Kanishka']]`

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

	Eng	Maths	Science
Ramya	70	98	81
Kanishka	86	96	94

3) Multiple Row Access:

The following commands help to access Multiple rows (Details from Ramya to Kanishka)

[Symbol ':' should be used]

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1.loc['Ramya':'Kanishka']`

	Eng	Maths	Science
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94

4) Multiple Row Access:

The following commands help to access Multiple rows [Display all rows from Ramya till last row]

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1.loc['Ramya:']`

	Eng	Maths	Science
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

5) Single Column Access:

The following commands helps to access Single Column [Details of Maths] [Symbol “:” indicates all rows]

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

df1.loc[:, 'Maths']



Priya	88
Ramya	98
Kavita	77
Kanishka	96
Harshini	95
Name: Maths, dtype: int64	

6) Multiple Column Access:

The following commands helps to access Multiple Columns (Details of English and Science) [Records not necessary to be continuous, column name should be given as a list]

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

df1.loc[:, ['Eng', 'Science']]



	Eng	Science
Priya	80	73
Ramya	70	81
Kavita	75	66
Kanishka	86	94
Harshini	90	92

7) Multiple Columns Access:

The following commands helps to access Multiple Columns (Details from Eng till Science) [Symbol “:” should be used]

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

df1.loc[:, 'Eng': 'Science']



	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

Using Positional Indexing (iloc):

1) Single Row Access:

The following commands helps to access Single row [Details of Ramya] [Symbol “:” indicates all columns]

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

df1.iloc[1]
df1.iloc[1,:]

Eng	70
Maths	98
Science	81
Name: Ramya, dtype: int64	

2) Multiple Row Access:

The following commands helps to access Multiple rows (Details from Ramya to Kanishka index 1 to 3) [Symbol ':' should be used]

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

df1.iloc[1:4]

	Eng	Maths	Science
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94

3) The following commands helps to access Multiple rows [Display all rows from Ramya(index 1) till last row]

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

df1.iloc[1:]

	Eng	Maths	Science
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

4) Single Column Access: The following commands helps to access Single Column [Details of Maths index-1] [Symbol ":" indicates all rows]

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

df1.iloc[:,1]

Priya	88
Ramya	98
Kavita	77
Kanishka	96
Harshini	95
Name: Maths, dtype: int64	

5) Multiple Columns Access:

The following commands helps to access Multiple Columns (Details of English and Science Index 0,2) [Records not necessary to be continuous, indices should be given as a list]

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1.iloc[:,[0,2]]`

	Eng	Science
Priya	80	73
Ramya	70	81
Kavita	75	66
Kanishka	86	94
Harshini	90	92

6) Multiple Columns Access:

The following commands helps to access Multiple Columns (Details from Eng till Science index 0 till last) [Symbol ':' should be used]

`df1.iloc[:,0:]`

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

bool

Boolean Indexing :

- Boolean means a binary variable that can represent either of the two states - True (indicated by 1) or False (indicated by 0).
- In Boolean indexing, we can select the subsets of data based on the actual values in the DataFrame rather than their row/column labels.
- Thus, we can use conditions on column names to filter data values.

The following commands displays True or False depending on whether the data value satisfies the given condition or not. (if Maths >= 95 it returns True otherwise it returns False)

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1.Maths >= 95`



The following commands displays the details of those students who secured ≥ 95 in Maths

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1[df1.Maths>=95]`



	Eng	Maths	Science
Ramya	70	98	81
Kanishka	86	96	94
Harshini	90	95	92

The following commands displays the English and Science marks of those students who secured ≥ 95 in Maths

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

`df1[df1.Maths>= 95] [['Eng','Science']]`



	Eng	Science
Ramya	70	81
Kanishka	86	94
Harshini	90	92

DATA FRAME ATTRIBUTES:

When we create an object of a DataFrame then all information related to it like size, datatype etc can be accessed by attributes.

`<DataFrame Object>.<attribute name>`

ATTRIBUTE	DESCRIPTION
Index	It shows index of dataframe <code>Index(['Priya', 'Ramya', 'Kavita', 'Kanishka', 'Harshini'], dtype='object')</code>
Columns	It shows column labels of dataframe <code>Index(['Eng', 'Maths', 'Science'], dtype='object')</code>
Axes	It returns both the axes i.e index and column <code>[Index(['Priya', 'Ramya', 'Kavita', 'Kanishka', 'Harshini'], dtype='object'), Index(['Eng', 'Maths', 'Science'], dtype='object')]</code>

Dtypes	It returns data type of data contained by dataframe Eng int64 Maths int64 Science int64 dtype: object																								
Size	It returns number of elements in an object 15																								
Shape	It returns tuple of dimension of dataframe (5, 3)																								
Values	It returns numpy form of dataframe [[80 88 73] [70 98 81] [75 77 66] [86 96 94] [90 95 92]]																								
Empty	It is an indicator to check whether dataframe is empty or not False																								
Ndim	It returns an int representing the number of axes/dimensions 2																								
T	It transpose index and columns <table border="1" style="margin-left: 20px;"> <thead> <tr> <th></th> <th>Priya</th> <th>Ramya</th> <th>Kavita</th> <th>Kanishka</th> <th>Harshini</th> </tr> </thead> <tbody> <tr> <th>Eng</th> <td>80</td> <td>70</td> <td>75</td> <td>86</td> <td>90</td> </tr> <tr> <th>Maths</th> <td>88</td> <td>98</td> <td>77</td> <td>96</td> <td>95</td> </tr> <tr> <th>Science</th> <td>73</td> <td>81</td> <td>66</td> <td>94</td> <td>92</td> </tr> </tbody> </table>		Priya	Ramya	Kavita	Kanishka	Harshini	Eng	80	70	75	86	90	Maths	88	98	77	96	95	Science	73	81	66	94	92
	Priya	Ramya	Kavita	Kanishka	Harshini																				
Eng	80	70	75	86	90																				
Maths	88	98	77	96	95																				
Science	73	81	66	94	92																				

Head() and Tail():

- DataFrame.head(n) to display the first n rows in the DataFrame
- If the parameter n is not specified by default, it gives the first 5 rows of the DataFrame.

The following command displays first 2 rows

<pre>Priya Eng Maths Science Priya 80 88 73 Ramya 70 98 81 Kavita 75 77 66 Kanishka 86 96 94 Harshini 90 95 92</pre>	df1.head(2) 	<pre> Eng Maths Science Priya 80 88 73 Ramya 70 98 81</pre>
--	------------------------	--

If df1.head() command is executed it displays first 5 rows, if number of rows is less than 5, it will display all rows

- DataFrame.tail(n) to display the last n rows in the DataFrame
- If the parameter n is not specified by default, it gives the last 5 rows of the DataFrame.

The following command displays last 2 rows

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

df1.tail(2)
→

	Eng	Maths	Science
Kanishka	86	96	94
Harshini	90	95	92

If df1.tail() command is executed it displays last 5 rows, if number of rows is less than 5, it will display all rows

Iterations in DataFrame:

Iterrows():

- DataFrame.iterrows() method is used to iterate over rows
- Each iteration produces an index and a row (a Pandas Series object)

df1:

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

CODING:

```
for i,j in df1.iterrows():
    print("Details of ",i,":\n",j)
```

In the coding df1.iterrows(), it helps to iterate data row wise, where in
i,j -> i represents row index
j represents row data as series

```
Details of Priya :
Eng      80
Maths    88
Science  73
Name: Priya, dtype: int64
Details of Ramya :
Eng      70
Maths    98
Science  81
Name: Ramya, dtype: int64
Details of Kavita :
Eng      75
Maths    77
Science  66
Name: Kavita, dtype: int64
Details of Kanishka :
Eng      86
Maths    96
Science  94
Name: Kanishka, dtype: int64
Details of Harshini :
Eng      90
Maths    95
Science  92
Name: Harshini, dtype: int64
```

Iteritems():

- DataFrame.iteritems() method is used to iterate over columns
- Each iteration produces a column name and a column (a Pandas Series object)

df1:

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

CODING: for i,j in df1.iteritems():
 print(i,j)

In the coding df1.iteritems(), it helps to iterate data column wise, where in
i,j -> i represents column name
 j represents column data as a series

```
Details of Eng :
Priya      80
Ramya      70
Kavita     75
Kanishka   86
Harshini   90
Name: Eng, dtype: int64
Details of Maths :
Priya      88
Ramya      98
Kavita     77
Kanishka   96
Harshini   95
Name: Maths, dtype: int64
Details of Science :
Priya      73
Ramya      81
Kavita     66
Kanishka   94
Harshini   92
Name: Science, dtype: int64
```

Itertuples():

- DataFrame.iter tuples() method return a named tuple for each row in the DataFrame
- The first element of the tuple will be the row's corresponding index value, while the remaining values are the row values

df1:

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

```
Pandas(Index='Priya', Eng=80, Maths=88, Science=73)
Pandas(Index='Ramya', Eng=70, Maths=98, Science=81)
Pandas(Index='Kavita', Eng=75, Maths=77, Science=66)
Pandas(Index='Kanishka', Eng=86, Maths=96, Science=94)
Pandas(Index='Harshini', Eng=90, Maths=95, Science=92)
```

CODING:
for i in df1.itertuples():
 print(i)

Binary Operations in a DataFrame

It is possible to perform add, subtract, multiply and division operations on DataFrame.

To Add :(+, add or radd)

df1:	sub1	sub2	sub3
A	90	91	88
B	80	86	60
C	70	73	50
D	60	64	62
E	50	55	77

df2:	sub1	sub2	sub3
A	88	20	62
B	77	30	52
C	66	40	42
D	55	50	72
E	44	60	68

```
df3=df1+df2
sub1 sub2 sub3
A 178 111 150
B 157 116 112
C 136 113 92
D 115 114 134
E 94 115 145
*****
df4=df1.add(df2)
sub1 sub2 sub3
A 178 111 150
B 157 116 112
C 136 113 92
D 115 114 134
E 94 115 145
*****
df5=df1.radd(df2)
sub1 sub2 sub3
A 178 111 150
B 157 116 112
C 136 113 92
D 115 114 134
E 94 115 145
*****
```

#Addition

```
df3=df1+df2 # This performs addition of two dataframe elementwise
print("df3=df1+df2","\n",df3)
print("*****")
```

```
df4=df1.add(df2) # add() also performs addition of two dataframe elementwise
print("df4=df1.add(df2)","","\n",df4)
print("*****")
```

```
df5=df1.radd(df2) # radd() also performs addition of two dataframe elementwise
# but in reverse order df5=df2+df1
print("df5=df1.radd(df2)","","\n",df5)
print("*****")
```

Similarly Subtraction, Multiplication, and Division can be performed

To Subtract : (- , sub or rsub)

To Multiply: (* , mul, or rmul)

To Divide : (/ , div or rdiv)

Note: Use of at, iat

iat:

- The **iat** property gets, or sets, the value of the specified position.
- Specify both row and column with a number representing the position.

	Eng	Maths	Science
Priya	80	88	73
Ramya	70	98	81
Kavita	75	77	66
Kanishka	86	96	94
Harshini	90	95	92

Syntax : *dataframe.iat[row, column]*

df1.iat[1,2] # it gives the data at row index 1 and column index 2 (so it displays 81)

df1.iat[2,1]=45 # it changes the data at row index 2 , column index 1 as 45

(It changes Kavita's Maths mark as 45)

at :

- The **at** property gets, or sets, the value of the specified position.
- Specify both row (index) and column (label) of the cell you want to return.

Syntax : *dataframe.at[index, label]*

print(df1.at['Harshini','Science']) # it displays the row label 'Harshini's Column 'Science' data (92 will be displayed)


```
df1.at['Ramya','Maths']=77
```

```
# it changes the row label 'Ramya's Column 'Maths' as 77
```

1. **Some Important points at glance**

Creating an Empty Dataframe:

```
#Create an empty dataframe  
df=pd.DataFrame()  
print (df)
```

Output:
Empty DataFrame
Columns: []

Index: []

2. **Creating an Empty Dataframe with columnnames:**

```
#Create an empty dataframe with columnnames  
df = pd.DataFrame(columns = ['Name', 'Articles', 'Improved'])  
print(df)
```

Output:
Empty DataFrame
Columns: [Name, Articles, Improved]

Index: []

3. **Creating an Empty Dataframe with columnnames and indices:**

```
#Create an empty DataFrame with a column name and indices  
df = pd.DataFrame(columns = ['Name', 'Articles', 'Improved'],  
                  index = ['a', 'b', 'c'])  
  
print(df)
```

Output:
Name Articles Improved
a NaN NaN NaN
b NaN NaN NaN

c NaN NaN NaN

4. **Creating Dataframes using Dictionary(Keys of dictionary- becomes column names)**

```
#Creating Dataframes using Dictionary  
details = {  
    'Name' : ['Ankit', 'Aishwarya', 'Shaurya', 'Shivangi'],  
    'Age' : [23, 21, 22, 21],  
    'University' : ['BHU', 'JNU', 'DU', 'BHU'],  
}  
df = pd.DataFrame(details)  
print(df)
```

Output:

	Name	Age	University
0	Ankit	23	BHU
1	Aishwarya	21	JNU
2	Shaurya	22	DU
3	Shivangi	21	BHU

5. **Creating a Dataframe object from dictionary with custom indexing**

```

details = {
    'Name' : ['Ankit', 'Aishwarya', 'Shaurya', 'Shivangi'],
    'Age' : [23, 21, 22, 21],
    'University' : ['BHU', 'JNU', 'DU', 'BHU'],
}
df = pd.DataFrame(details, index = ['a', 'b', 'c', 'd'])
print(df)

```

Output:

	Name	Age	University
a	Ankit	23	BHU
b	Aishwarya	21	JNU
c	Shaurya	22	DU
d	Shivangi	21	BHU

6. Create DataFrame from Dictionary with required columns only.
 # creating a Dataframe object with skipping one column i.e skipping age column

```

# creating a Dataframe object with skipping
# one column i.e skipping age column.

details = {
    'Name' : ['Ankit', 'Aishwarya', 'Shaurya', 'Shivangi'],
    'Age' : [23, 21, 22, 21],
    'University' : ['BHU', 'JNU', 'DU', 'BHU'],
}
df = pd.DataFrame(details, columns = ['Name', 'University'])
print(df)

```

Output:

	Name	University
0	Ankit	BHU
1	Aishwarya	JNU
2	Shaurya	DU
3	Shivangi	BHU

7. Find the output:

```

df = pd.DataFrame({'Region':['West', 'North', 'South'],
                  'Company':['Costco', 'Walmart', 'Home Depot'],
                  'Product':['Dinner Set', 'Grocery', 'Gardening tools'],
                  'Month':['September', 'July', 'February'],
                  'Sales':[2500, 3096, 8795]})

```

- print(df)
- print(df.index)
- print(df.columns)
- print(df.axes)
- print(df.dtypes)
- print(df.size)
- print(df.shape)
- print(df.values)
- print(df.empty)
- print(df.ndim)
- print(df.T)

a) df:

	Region	Company	Product	Month	Sales
0	West	Costco	Dinner Set	September	2500
1	North	Walmart	Grocery	July	3096
2	South	Home Depot	Gardening tools	February	8795

b) df.index : It gives the index of the dataframe

```
RangeIndex(start=0, stop=3, step=1)
```

c) df.columns : It shows column labels of dataframe

```
Index(['Region', 'Company', 'Product', 'Month', 'Sales'], dtype='object')
```

d) df.axes : It returns both the axes i.e index and column

```
RangeIndex(start=0, stop=3, step=1)
```

```
Index(['Region', 'Company', 'Product', 'Month', 'Sales'], dtype='object')
```

e) print(df.dtypes) : It returns data type of data contained by dataframe

```
Region      object
Company     object
Product     object
Month       object
Sales       int64
dtype: object
```

f) print(df.size) : It returns number of elements in an object

15

g) print(df.shape) : It returns tuple of dimension of dataframe

(3, 5)

h) print(df.values): It returns numpy form of dataframe

```
[['West' 'Costco' 'Dinner Set' 'September' 2500]
 ['North' 'Walmart' 'Grocery' 'July' 3096]
 ['South' 'Home Depot' 'Gardening tools' 'February' 8795]]
```

i) print(df.empty) : It is an indicator to check whether dataframe is empty or not

False

j) print(df.ndim) : It returns an int representing the number of axes/dimensions

2

k) print(df.T) : It transpose index and columns

	0	1	2
Region	West	North	South
Company	Costco	Walmart	Home Depot
Product	Dinner Set	Grocery	Gardening tools
Month	September	July	February
Sales	2500	3096	8795

8. In the given Dataframe give the command to access column 'Age'

	Name	Age	University
a	Ankit	23	BHU
b	Aishwarya	21	JNU
c	Shaurya	22	DU
d	Shivangi	21	BHU

Answer: (All the codings given below will display column 'Age')

```
print(df['Age'])
print(df.Age)
print(df.loc[:, 'Age'])
print(df.iloc[:, 1])
```

9. In the given Dataframe give the command to do the following:

	Name	TotalMarks	Grade	Promoted
0	John	82	A	True
1	Doe	38	E	False
2	Bill	63	B	True
3	Jim	22	E	False
4	Harry	55	C	True
5	Ben	40	D	True

a) Display columns TotalMarks and Grade

Answer: (All the codings given below will display columns TotalMarks and Grade)

```
print(df[['TotalMarks', 'Grade']])
print(df.iloc[:, [1, 2]])
print(df.iloc[:, 1:3])
print(df.loc[:, ['TotalMarks', 'Grade']])
print(df.loc[:, 'TotalMarks': 'Grade'])
```

b) Display columns TotalMarks and Promoted

Answer: (All the codings given below will display columns TotalMarks and Promoted)

```
print(df[['TotalMarks', 'Promoted']])
print(df.iloc[:, [1, 3]])
print(df.iloc[:, 1:4:2])
print(df.loc[:, ['TotalMarks', 'Promoted']])
print(df.loc[:, 'TotalMarks': 'Promoted': 2])
print(df.get(['TotalMarks', 'Promoted']))
```

c) Display all columns from TotalMarks

Answer: (All the codings given below will display Display all columns from TotalMarks)

```
print(df.iloc[:, 1:])
print(df.loc[:, 'TotalMarks:'])
```

d) Display columns Name ,Totalmarks and grade

Answer: (All the codings given below will display Display all columns Name ,Totalmarks and grade)

```
print(df[['Name', 'TotalMarks', 'Grade']])
print(df.iloc[:, [0, 1, 2]])
print(df.iloc[:, 0:3])
print(df.loc[:, 'Name': 'Grade'])
print(df.loc[:, :, 'Grade'])
print(df.get(['Name', 'TotalMarks', 'Grade']))
```

10. Adding a single column:

	A	B
0	1	5
1	2	6
2	3	7
3	4	8

a) Give the command to add a column named 'C' with all values as 11

Answer: (All the codings given below will add column 'C')

```
df['C']=11
df['C']=[11,11,11,11]
df.insert(2, "C", 11)
df.insert(2, "C", [11,11,11,11])
```

[The insert function takes 3 parameters which are the index, the name of the column, and the values. The column indices start from 0 so we set the index parameter as 2 to add the new column next to column B.]

```
df.loc[:, "C"]=11
df=df.assign(C=11)['Note: C is not enclosed in quotes and it is assigned to df]
```

b) Adding single column City with a list of values ['Delhi', 'Bangalore', 'Chennai', 'Patna']

Answer: (All the codings given below will add column 'City')

```
df['City']=['Delhi', 'Bangalore', 'Chennai', 'Patna']
df.insert(2,"City",['Delhi', 'Bangalore', 'Chennai', 'Patna'])
df = df.assign(City = ['Delhi', 'Bangalore', 'Chennai', 'Patna'])
df.loc[:, 'City']=['Delhi', 'Bangalore', 'Chennai', 'Patna']
df.at[:, 'City']=['Delhi', 'Bangalore', 'Chennai', 'Patna']
```

c)Adding a Single row

Answer: (All the codings given below will add row with values ['a','b'])

```
df.at[4]=['a','b']
df.at[4,:]=['a','b']
df.loc[4]=['a','b']
df.loc[4,:]=['a','b']
```

Worksheet - Basic Level Questions: (L1)

	Name	Age	University
a	Ankit	23	BHU
b	Aishwarya	21	JNU
c	Shaurya	22	DU
d	Shivangi	21	BHU

- 1) Create an Empty DataFrame
- 2) Create the above DataFrame
- 3) Find the output
 - a. df.shape
 - b. df.size
 - c. df.ndim
 - d. df.empty
 - e. df.columns
 - f. df.T
- 4) print(df.loc['d'])
- 5) print(df.loc['d','Name'])
- 6) print(df.loc['d',['Name','University']])
- 7) print(df.loc['d','Age':])
- 8) print(df.loc['d;','Age'])
- 9) print(df.loc['b':'d'])
- 10) print(df.loc[['b','d']])

- 11) Which of the following can be used to specify the data while creating a DataFrame?
 - i. Series ii. List of Dictionaries iii. Structured ndarray iv. All of these
- 12) Carefully observe the following code:

```
import pandas as pd
Year1={'Q1':5000,'Q2':8000,'Q3':12000,'Q4': 18000}
Year2={'A':13000,'B':14000,'C':12000}
totSales={1:Year1,2:Year2}
df=pd.DataFrame(totSales)
print(df)
```

Answer the following:
 - a. List the index of the DataFrame df
 - b. List the column names of DataFrame df.

Worksheet - Moderate Level Questions: (L2)

- 1) Write a Python code to create a DataFrame with appropriate column headings from the list given below: [[101,'Gurman',98],[102,'Rajveer',95],[103,'Samar',96],[104,'Yuvraj',88]]
- 2) Consider the given DataFrame 'Stock':

	Name	Price
0	Nancy Drew	150
1	Hardy boys	180
2	Diary of a wimpy kid	225
3	Harry Potter	500

Write suitable Python statements for the following:

- i. Add a column called Special_Price with the following data: [135,150,200,440].
 - ii. Add a new book named 'The Secret' having price 800. iii. Remove the column Special_Price.
- 3) Mark the correct choice as
- i. Both A and R are true and R is the correct explanation for A
 - ii. Both A and R are true and R is not the correct explanation for A
 - iii. A is True but R is False
 - iv. A is false but R is True
- Assertion (A):- DataFrame has both a row and column index.
Reasoning (R): - A DataFrame is a two-dimensional labelled data structure like a table of MySQL.
- 4) Mr. Som, a data analyst has designed the DataFrame df that contains data about Computer Olympiad with 'CO1', 'CO2', 'CO3', 'CO4', 'CO5' as indexes shown below. Answer the following questions:

	School	Tot_students	Topper	First_Runnerup
CO1	PPS	40	32	8
CO2	JPS	30	18	12
CO3	GPS	20	18	2
CO4	MPS	18	10	8
CO5	BPS	28	20	8

A. Predict the output of the following python statement:

- i. df.shape
- ii. df[2:4]

B. Write Python statement to display the data of Topper column of indexes CO2 to CO4.

Worksheet - Difficult questions(L3):

If df is as given below, find the output of 1 to 14 and write commands for 15 to 20

1. `print(df.loc['a':'d':2])`
2. `print(df.loc['b':'d','Name'])`
3. `print(df.loc[['b','d'],'Name'])`
4. `print(df.loc['a':'d':2,['Name','Age']])`
5. `print(df.loc['a':'d':2,'Name':'University'])`
6. `print(df.at['b','Name'])`
7. `df.at['b','Name']='Ravi'`
`print(df)`
8. `print(df.iat[2,1])`
9. `df.iat[2,1]=111`
`print(df)`
10. `print(df.iloc[2])`
11. `print(df.iloc[2:4])`
12. `print(df.iloc[2,2])`
13. `print(df.iloc[1:,1:])`
14. `df.iloc[2,2]='RU'`
15. Display the details of Students who are from BHU university
16. Display the details of Students whose age is more than 21
17. Display the names of Students who are from JNU University
18. Display name and age whose university is DU
19. Give all the possible ways of displaying column Age
20. Make all the values as 0

	Name	Age	University
a	Ankit	23	BHU
b	Aishwarya	21	JNU
c	Shaurya	22	DU
d	Shivangi	21	BHU

Additional Practice Questions on Series:

1. What do you mean by pandas in python?
2. Name three data structures available in pandas?
3. What do you mean by Series in python?
4. Write the code in python to create an empty series.
5. Name a method which is used to create series in python.
6. Write a Program in python to create a series of first five even numbers.
7. Write a Program in python to create series of vowels.
8. Write a Program in python to create series of given tuple:A=(11,22,33,44,55)
9. Write a Program in python to create the pandas series of all the characters in the name accepted from user.
10. Write a Program in python to create a series in python from the given dictionary.
D={"Jan":31,"Feb":28,"Mar":31 }
11. Write a Program in python to create a series from dictionary that stores classes (8,9,10,11,12) as keys and number of students as values.
12. Write the output of the following:
import pandas as pd
S1=pd.Series(15,index=[1,2,3])
print(s1)
13. Write the output of the following:


```
import pandas as pd  
S1=pd.Series(range(2,16,2),index=[a for a in "super"])  
print(s1)
```

14. Write the output of the following:

```
import pandas as pd  
S1=pd.Series(range(101,151,11),index=[a for a in "My name is Arpita Misra".split()])  
print(s1)
```

15. Write the output of the following:

```
import pandas as pd  
L1=[1,"A",23]  
S1=pd.Series(data=2*L1)  
print(S1)
```

16. Name any two attributes of series in python.

17. Which property of series return all the index value?

18. Which property of Series returns the number of elements in the Series.

19. Write the output of the following:

```
import numpy as num  
import pandas as pd  
arr=num.array([1,7,21])  
S1=pd.Series(arr)  
print(S1)
```

20. Write the output of the following:

```
import numpy as num  
import pandas as pd  
arr=num.array([1,7,21])  
S1=pd.Series(arr,index=(88,888))  
print(S1)
```

21. Write the output of the following:

```
import numpy as num  
import pandas as pd  
arr=num.array([21,57,131])  
S1=pd.Series(arr,index=(8,88,888))  
print(S1[888])
```

22. Write the output of the following :

```
import numpy as num  
import pandas as pd  
arr=num.array([21,57,141])  
S1=pd.Series(arr)  
print(S1[0])
```

23. Write the output of the following :

```
import pandas as pd  
L1=list("My name is Aarthi")  
S1=pd.Series(L1)
```

```
print(S1[0])
```

24. Write the output of the following :

```
import pandas as pd
L1=list("My name is Aarthi".split( ))
S1=pd.Series(L1)
print(S1[0])
```

25. Give an example of creating Series from numpy array.

26. Which property of series help to check whether a Series is empty or not? Explain with example

27. Fill in the blanks in the given code.

```
import pandas as pd
_____ = _____.Series([1,2,3,4,5])
print(S1)
```

28. Fill i the blanks in the given code,if the output is 71.

```
import pandas as pd
S1=pd.Series([10,20,30,40,71,50])
print(S1[_____])
```

29. Complete the code to get the required output.

```
import _____ as pd
_____ =pd.Series([21,28,41],
index=["Jan","Feb","Mar"])
print(S1["_____ "])
```

Output:

28

30. Explain any three methods of pandas Series.

Importing and Exporting data between CSV files and Dataframes

CSV files

- Comma separated values files
- Data in tabular format
- Can be imported and exported from programs

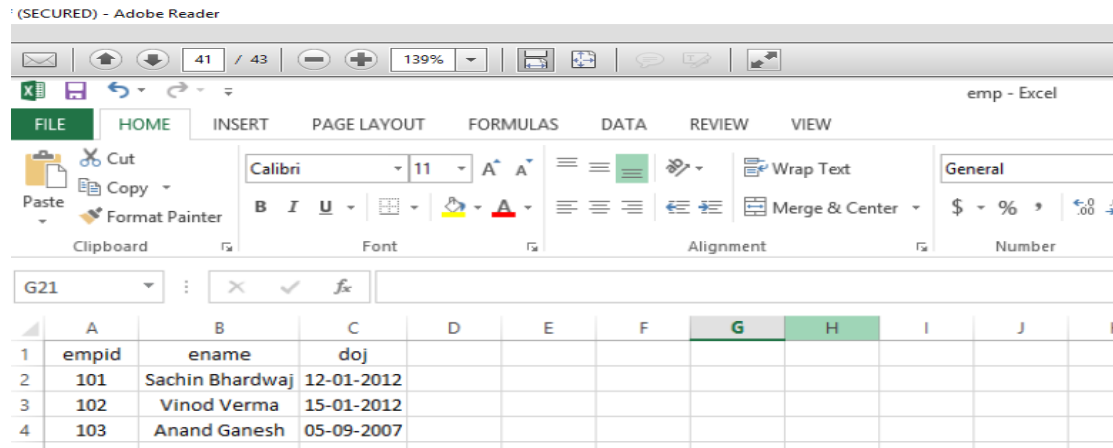
To create a CSV file

- Open Note pad and create a new file
- Enter the data separated by commas and each rows separated by new lines
- Save the file with extension .csv

Importing data to dataframe from csv file

Function used

pd.read_csv() is the function used to read a csv file



(SECURED) - Adobe Reader

emp - Excel

	A	B	C	D	E	F	G	H	I	J	K
1	empid	ename	doj								
2	101	Sachin Bhardwaj	12-01-2012								
3	102	Vinod Verma	15-01-2012								
4	103	Anand Ganesh	05-09-2007								

```
1 # importing pandas module
2 import pandas as pd
3 # making data frame
4 df = pd.read_csv("E:\emp.csv")
5 print(df)
6
```

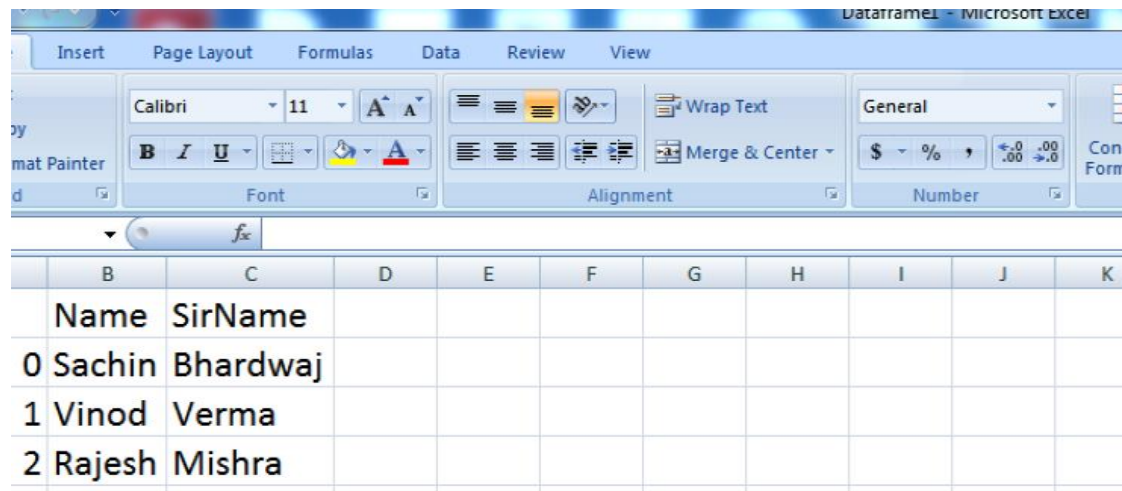
```
   empid  ename      doj
0    101  Sachin Bhardwaj  12-01-2012
1    102    Vinod Verma  15-01-2012
2    103    Anand Ganesh  05-09-2007
```

Exporting data from dataframe to csv file

Function used

Dataframe.to_csv()

```
1 import pandas as pd
2 l = [{'Name': 'Sachin', 'SirName': 'Bhardwaj'},
3      {'Name': 'Vinod', 'SirName': 'Verma'},
4      {'Name': 'Rajesh', 'SirName': 'Mishra'}]
5 df1=pd.DataFrame(l)
6 # saving the dataframe
7 df1.to_csv('E:\Dataframe1.csv')
```



	B	C	D	E	F	G	H	I	J	K
	Name	SirName								
0	Sachin	Bhardwaj								
1	Vinod	Verma								
2	Rajesh	Mishra								

Worksheet for CSV files

1	Full form of CSV is
2	The function used to import data from csv file to dataframe is
3	The function used to export data to csv file from dataframe is
4	Write a program to export data to csv from a dataframe containing employee details.
5	Write a program to import data from csv file containing student details to dataframe and display it.

Data Visualization

- Representing the data in the form of pictures or graph
- Represents patterns and trends in data which helps the decision makers
- Matplotlib is the python library used for this.
- Pyplot is a submodule
- Constructs 2D plots

Basics of plotting

There are various types of chart we can use to visualize the data elements like:

Line chart: it displays information as a series of data points called markers connected by straight line

Bar chart it were present category wise data in rectangular bars with length proportional to the values it can be horizontal and vertical.

Histogram:

Line chart or line graph

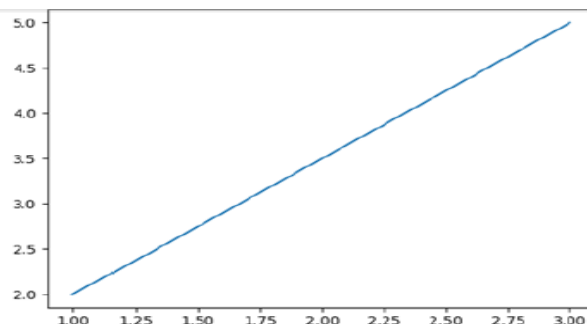
Line graph is a symbol graph that shows the result in form of lines to create a line graph we need X and Y co-ordinate.

Function used :

Plot()

Example:

```
#Simple line draw
import matplotlib.pyplot as plt
x=[1,2,3]
y=[2,3.5,5]
plt.plot(x,y)
plt.show()
```



❖ **Setting up the labels in X and Y axis**

Function used :

xlabel()

ylabel()

❖ **Setting up the title for the chart**

Function used :

title()

❖ **Display the graph**

Function used :

show()

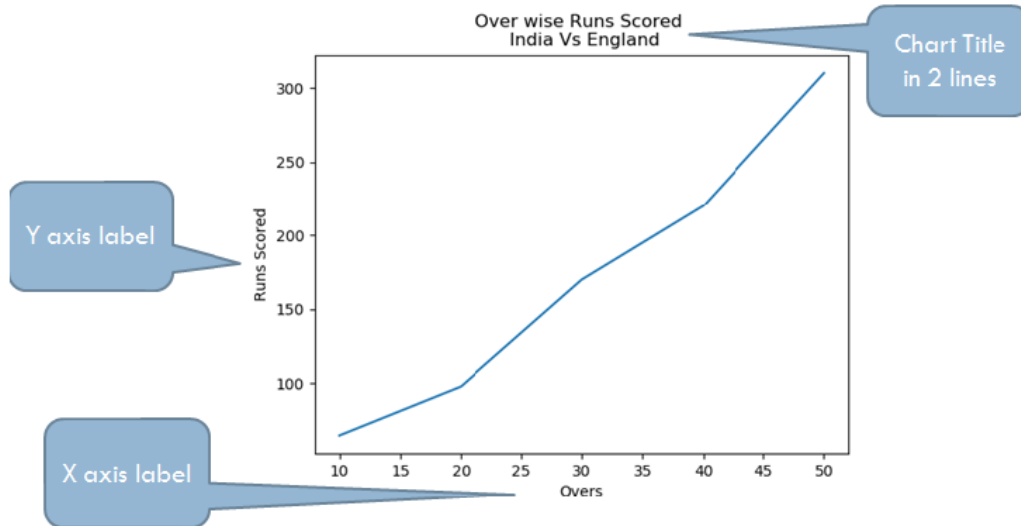
❖ **Save the graph as an image**

Function used :

Savefig(filename)

```
# Setting Label of X and Y axis and also title for chart
import matplotlib.pyplot as plt
x = [ 10, 20, 30, 40, 50]
y = [65, 98, 170, 220, 310]
plt.xlabel('Overs')
plt.ylabel('Runs Scored')
plt.title('Over wise Runs Scored \n India Vs England')
plt.plot(x,y)
plt.show()
```

Output:



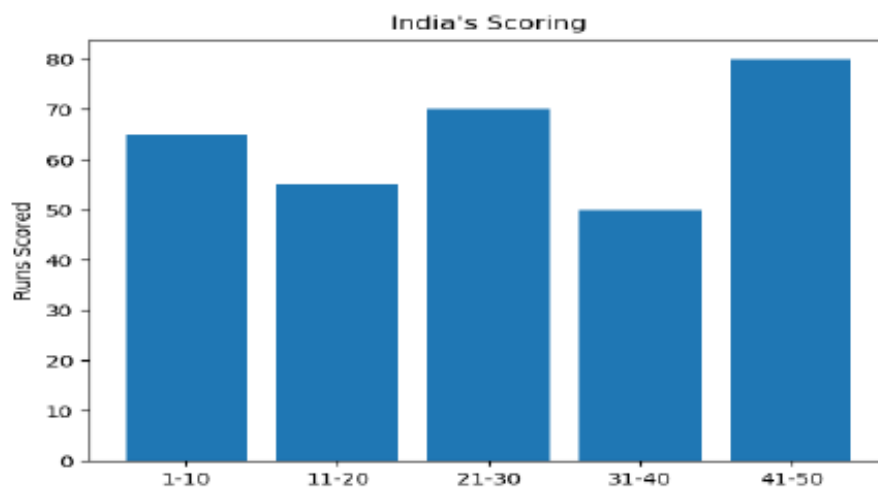
Bar Graph

A bar graph is used to represent data in the form of vertical or horizontal bars it is useful to compare the quantities

Function used :

bar()

```
# Bar chart example
import matplotlib.pyplot as plt
import numpy as np
OverRangel=['1-10', '11-20', '21-30', '31-40', '41-50']
RunsScored1=[65, 55, 70, 50, 80]
plt.bar(OverRangel,RunsScored1)
plt.xlabel('Over Interval')
plt.ylabel('Runs Scored')
plt.title('India\'s Scoring')
plt.show()
```



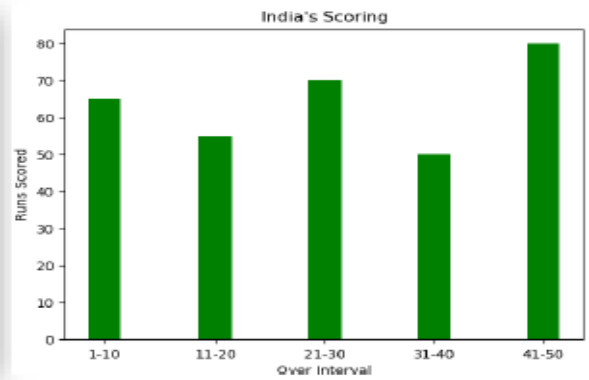
❖ Changing Width, color in bar chart

Parameters in the bar function

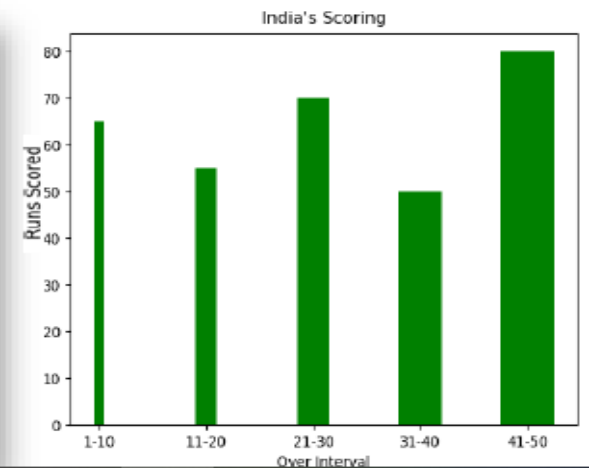
❖ Width

❖ color

```
# Bar chart example
import matplotlib.pyplot as pl
import numpy as np
OverRange1=['1-10','11-20','21-30','31-40','41-50']
RunsScored1=[65,55,70,50,80]
pl.bar(OverRange1,RunsScored1,width=0.3,color='g')
#default width=0.5
pl.xlabel('Over Interval')
pl.ylabel('Runs Scored')
pl.title('India\'s Scoring')
pl.show()
```



```
# Bar chart example
import matplotlib.pyplot as pl
import numpy as np
OverRange1=['1-10','11-20','21-30','31-40','41-50']
RunsScored1=[65,55,70,50,80]
pl.bar(OverRange1,RunsScored1,width=[0.1,0.2,0.3,0.4,0.5],color='g')
#default width=0.5
pl.xlabel('Over Interval')
pl.ylabel('Runs Scored')
pl.title('India\'s Scoring')
pl.show()
```



Example 2-

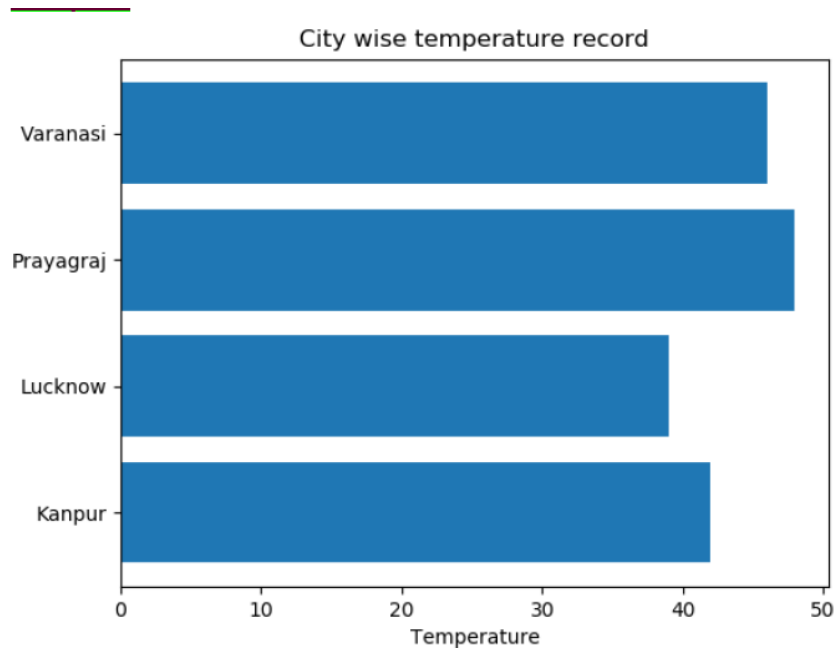
```
# Bar chart example
import matplotlib.pyplot as pl
import numpy as np
OverRange1=['1-10','11-20','21-30','31-40','41-50']
RunsScored1=[65,55,70,50,80]
pl.bar(OverRange1,RunsScored1,width=0.3,color=['r','g','b','c','m'])
#default width=0.5
pl.xlabel('Over Interval')
pl.ylabel('Runs Scored')
pl.title('India\'s Scoring')
pl.show()
```

Horizontal bar graph

Function used :

Barh() is used to draw horizontal bar graph.

```
import matplotlib.pyplot as plt
import numpy as np
Cities=['Kanpur', 'Lucknow', 'Prayagraj', 'Varanasi']
Temp=[42, 39, 48, 46]
plt.barh(Cities, Temp)
plt.xlabel('Temperature')
plt.ylabel('Cities')
plt.title('City wise temperature record')
plt.show()
```



❖ Adding legends in Graphs

Function used :

- Legend()

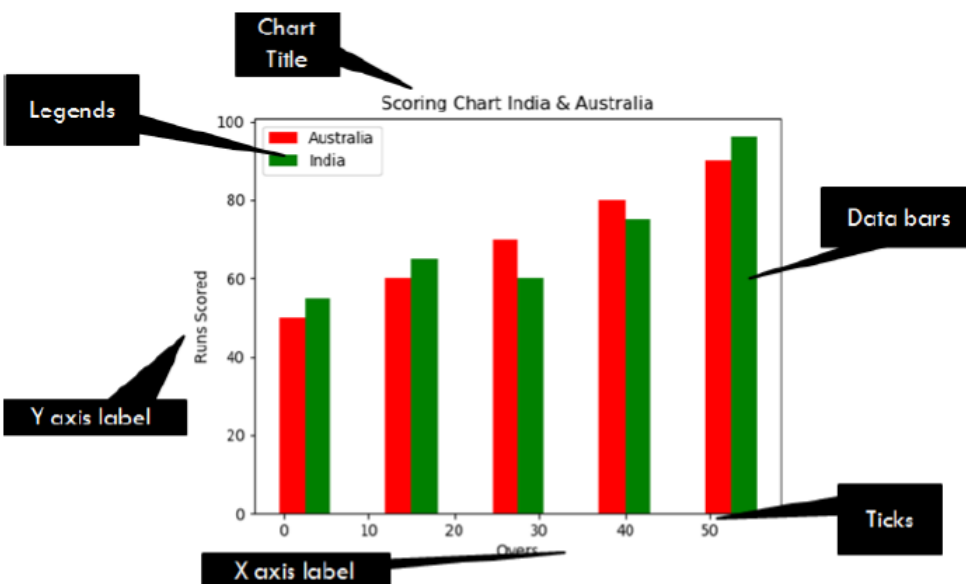
```

import matplotlib.pyplot as plt
import numpy as np
a=[50,60,70,80,90]
b=[55,65,60,75,96]
x = np.linspace(1,51,5)
plt.bar(x,a,width=3,color='r',label='Australia')
plt.bar(x+3,b,width=3,color='g',label='India')
plt.xlabel('Overs')
plt.ylabel('Runs Scored')
plt.title('Scoring Chart India & Australia')
plt.legend()
plt.show()

```

Legend label

To display legend

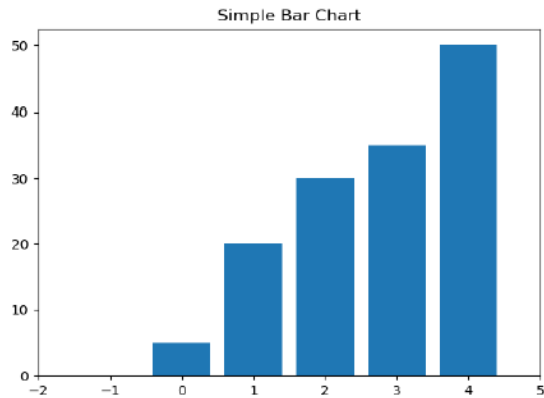


❖ Setting Limits to X-axis and Y axis

Functions used

- xlim()
- ylim()

```
import matplotlib.pyplot as plt
import numpy as np
x = np.arange(5)
y = [5.0,20.0, 30.0,35.0,50.0]
plt.xlim(-2.0,5.0)
plt.bar(x,y)
plt.title("Simple Bar Chart")
plt.show()
```



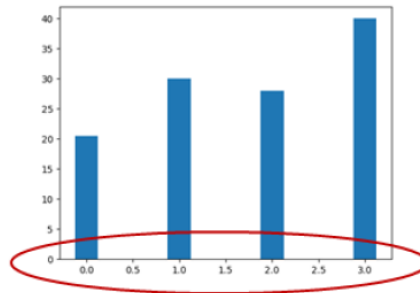
❖ Setting ticks for bar graph

Functions used

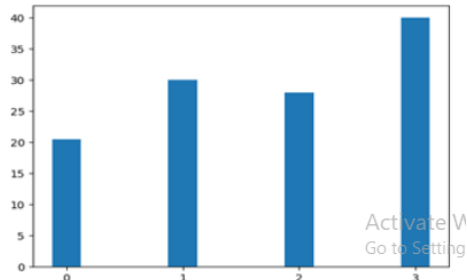
- `xticks()`
- `yticks()`

```
# Example ticks
import matplotlib.pyplot as plt
x = range(4)
y = [20.5,30,28,40]
plt.bar(x,y,width=0.25)
plt.show()
```

By default the ticks are appearing at data point 0.5 apart



```
# Example ticks
import matplotlib.pyplot as plt
x = range(4)
y = [20.5,30,28,40]
plt.xticks([0,1,2,3])
plt.bar(x,y,width=0.25)
plt.show()
```



Histogram

- Distribution of values.
- It shows how the values are grouped into different intervals or bins.

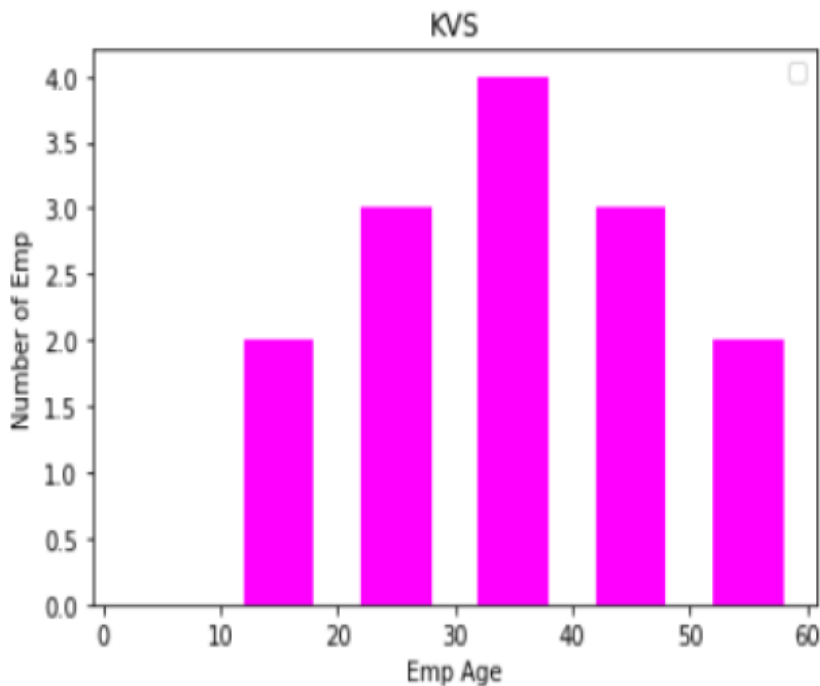
Functions used

`hist()`

```

import matplotlib.pyplot as plt
age=[22,32,35,45,55,14,26,19,56,44,48,33,38,28]
years=[0,10,20,30,40,50,60]
plt.hist(age, bins=years, color='magenta', histtype='bar', rwidth=.6)
plt.xlabel('Emp Age')
plt.ylabel('Number of Emp')
plt.title('KVS')
plt.legend()
plt.show()

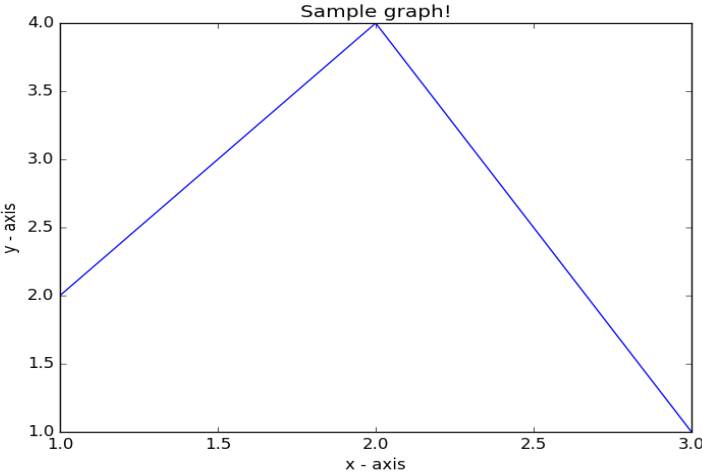
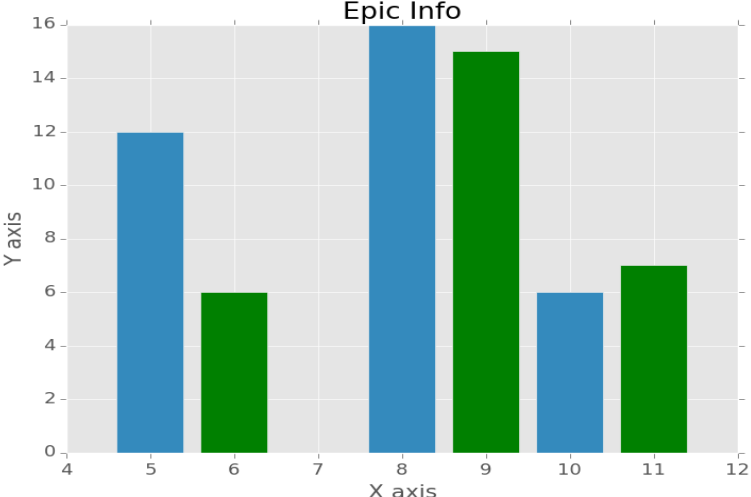
```



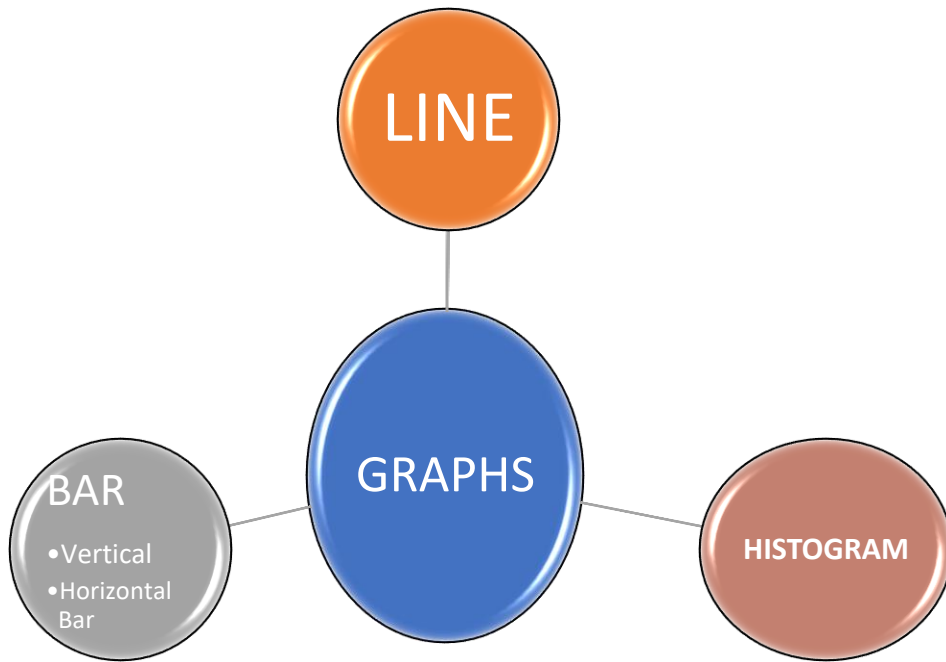
rwidth=0.6
 means that the
 bars width is
 60%. There will
 be a gap of 40%
 space before and
 after the bar.

Worksheet for Data Visualization

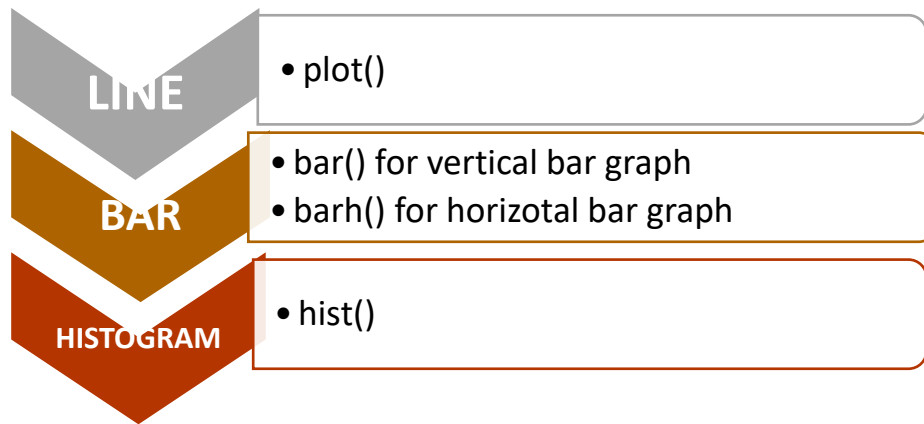
1is the function used to set the limits for X axis. a) xlimit() b) xLim() c)lim() d) xlim()
2 is the library used for data visualization in python
3	The plot which tells the trend between two graphed variable is
4	Which argument of bar() lets you set the thickness of bar?
5	Which argument must be set in the plotting function for legend() to display the legend? a) show b) label c) name d) seq
6 is a summarization tool for discrete or continuous data. a)
7method is used to create a histogram from a dataframe in pandas.
8	Explain the use of barh() function.
9	Which argument of bar() lets you set the thickness of bar?
10	What do you mean by legends?
11	What do you mean by marker style and markersize in plot() function.
12	What will be the output of the following code :

	<pre>import matplotlib.pyplot as plt plt.plot([1,2,3],[4,5,1]) plt.show()</pre>
13	What is data visualization? What is its significance?
14	<p>Write a Python program to draw a line as shown below using given axis values with suitable label in the x axis , y axis and a title.</p> 
15	<p>Write the Code for the bar chart given.</p> 
16	Given two arrays namely arr1 and arr2 each having 5 values. Write a program to create a Line chart so that each data points gets a different color, different size. Keep the marker style as Diamond.
17	Write the Python program to create a histogram on the list named height containing height of students. Use necessary functions to give the title, label, legend etc Height=[167,158,150,140,130,145,146,128,162,153,165,133,144,122,138]

Type of Graphs



Functions for creating graph



Functions for customizing graph

Adding Labels	Adding ticks	Setting limits	Display graph	Setting title
<ul style="list-style-type: none">• xlabel()• ylabel()	<ul style="list-style-type: none">• xticks()• yticks()	<ul style="list-style-type: none">• xlim()• ylim()	<ul style="list-style-type: none">• show()	<ul style="list-style-type: none">• title()

UNIT – II

DATABASE QUERY USING SQL

SQL Functions

1. A function is used to perform some particular task and it returns zero or more values as a result.
2. Functions can be applied on single or multiple records (rows) of a table. Depending on their application in one or multiple rows, SQL functions are categorized as Single row functions and Aggregate functions.

Single Row Functions

1. These are also known as Scalar functions.
2. Single row functions can be applied on a single value ,as well as a column.
3. When applied to a column of a table, they yield one value for each row, i.e., if they are applied on 10 rows, we get 10 values as output.

They are categorized into: Numeric functions, String functions, and Date functions.

Numeric Functions			
These functions take numeric values (numbers) as arguments.			
S.NO.	NAME OF FUNCTION WITH SYNTAX	DESCRIPTION	EXAMPLE
1.	POWER(X,Y) Or, POW(X,Y)	RETURNS X^Y (X Raised To The Power Y)	1. SELECT POWER(3,4) RESULT: 81 2. SELECT POWER(-2,4) RESULT: 16
2.	ROUND(X,D)	ROUNDS OFF X TO D DECIMAL PLACES. If the digit to be dropped is less than 5, the preceding digit is not changed. Otherwise, it is increased by 1. If the value of D is not specified then default value 0 is taken and the number gets converted to an integer.	(i) SELECT ROUND (-1.23); Result: -1 (ii) SELECT ROUND (-1.58); Result: -2 (iii) SELECT ROUND (1.58); Result: 2 (iv)SELECT ROUND (3.798, 1);

		If the value of D is negative then rounding off on the left-hand side of decimal.	Result: 3.8 (v) SELECT ROUND (1.298, 0); Result: 1 (vi) SELECT ROUND (23.298, -1); Result: 20
3.	MOD (X, Y)	CALCULATES AND RETURNS THE REMAINDER WHEN X IS DIVIDED BY Y	SELECT MOD (21, 2); Result: 1.
STRING FUNCTIONS			
1.	LENGTH(S)	RETURNS NUMBER OF CHARACTERS IN THE STRING. *All the spaces, commas or any other symbol present in the string are to be added.	SELECT LENGTH('INFORMATICS') Result:11
2.	LCASE(S) Or, LOWER(S)	Returns the argument in lowercase (small letters).	SELECT LOWER('INFORMATICS') Result: informatics SELECT LCASE('INFORMATICS') Result: informatics
3.	UCASE(S)	Returns the argument in uppercase (capital letters).	SELECT UCASE('informatics') Result : INFORMATICS SELECT UPPER('informatics') Result : INFORMATICS
4	MID(S,M,N) Or, SUBSTR(S,M,N) Or, SUBSTRING(S, M,N)	Returns <N> characters starting from the M character of the string <S>. If the third argument <N> is missing, then starting from the Mth position, the rest of the string is returned. If <M> is negative, the beginning	SELECT MID ('Python program'3,5) RESULT: thon select mid ('Python Programming', -4,4); RESULT: ming

		of the substring is the M th character from the end of the string Original String is unchanged.	
5	LEFT(S,N)	Extracts and returns N characters from the left side of the string S.	SELECT LEFT('PYTHON',3) RESULT: PYT
6.	RIGHT(S,N)	Extracts and returns N characters from the right side of the string S.	SELECT RIGHT('PYTHON',3) RESULT: HON
7.	TRIM(S)	TRIM() function in MySQL is used to remove the unwanted leading and trailing characters in a string. Syntax : TRIM([{BOTH LEADING TRAILING} [remstr] FROM] str)	SELECT TRIM(" DELHI "); RESULT: DELHI
8.	LTRIM(S)	Removes leading spaces from the string S	SELECT LTRIM(" DELHI"); RESULT: DELHI
9.	RTRIM(N)	Removes trailing spaces from the string S	SELECT RTRIM("DELHI "); RESULT: DELHI
10	INSTR (S1, S2)	Tells the position of first occurrence of S2 within S1.	SELECT INSTR ('PYTHON','ON'); RESULT: 5
DATE FUNCTIONS			
Date Time functions manipulate the display format of dates and time.			
1.	NOW ()	It returns the current system date and time	SELECT NOW() RESULT: 2022-10-02 17:58:15
2.	DATE(DT)	It returns the date part from the given date/ time expression.	SELECT DATE(NOW()) RESULT: 2022-10-02

3.	DAY(D)	It returns the day part from the date.	SELECT DAY ('2022-10-02') RESULT: 2
4.	MONTH(D)	It returns the month in numeric form from the date.	SELECT MONTH ('2022-10-02') RESULT: 10
5.	YEAR(D)	It returns the year from the date.	SELECT YEAR ('2022-10-02') RESULT: 2022
6.	DAYNAME(D)	It returns the name of the day from the specified date.	SELECT DAYNAME ('2022-10-02') RESULT: SUNDAY
7.	MONTHNAME(D)	It returns the month name from the specified date.	SELECT MONTHNAME ('2022-10-02') RESULT: OCTOBER

Note: All the dates should be enclosed in quotes.

More about Trim():

TRIM() function in MySQL is used to clean up data. It is also used to remove the unwanted leading and trailing characters in a string.

Syntax :

TRIM([{BOTH | LEADING | TRAILING} [remstr] FROM] str)

Parameter : This method can accept three-parameter as mentioned above and described below :

- **BOTH | LEADING | TRAILING :** LEADING, TRAILING, or BOTH option to explicitly instruct the TRIM() function to remove leading, trailing, or both leading and trailing unwanted characters from a string .By default, the TRIM() function uses the BOTH option.
- **remstr :** It is a string which we want to remove. If not given, spaces will be removed.
- **str :** It identifies the string from which we want to remove remstr.

Returns : It returns a string that has unwanted characters removed.

Examples:

1. SELECT TRIM(LEADING FROM " www.python.org") ;
Result: www.python.org

2. `SELECT TRIM(TRAILING '.COM' FROM 'WWW.GOOGLE.COM')`
RESULT: WWW.GOOGLE
3. `SELECT TRIM(both 'mysql' from 'mysql_Python_mysql');`
RESULT: _Python_
4. `SELECT TRIM(LEADING 'mysql' from 'mysql_Python_mysql');`
RESULT: _Python_mysql

WORKSHEET (SOLVED)

Write Output of the following MySQL statements:

i. `SELECT POW(4,3), POW(3,4);`

<code>POW(4,3)</code>	<code>POW(3,4)</code>
64	81

ii. `SELECT ROUND(543.5694,2), ROUND(543.5694), ROUND(543.5694,-1);`

<code>ROUND(543.5694,2)</code>	<code>ROUND(543.5694)</code>	<code>ROUND(543.5694,-1)</code>
543.57	544	540

iii. `SELECT LENGTH("Prof. M. L. Sharma");`

<code>LENGTH("Prof. M. L. Sharma")</code>
18

iv. `SELECT YEAR(NOW()), MONTH(NOW()), DAY(NOW());`

<code>YEAR(NOW())</code>	<code>MONTH(NOW())</code>	<code>DAY(NOW())</code>
2022	10	2

v. `SELECT DAYOFYEAR(NOW()), DAYOFMONTH(NOW()),DAYNAME(NOW());`

<code>DAYYEAR(NOW())</code>	<code>DAYOFMONTH(NOW())</code>	<code>DAYNAME(NOW())</code>
275	2	SUNDAY

vi. `SELECT LEFT("Unicode",3), RIGHT("Unicode",4);`

<code>LEFT("Unicode",3)</code>	<code>RIGHT("Unicode",4)</code>
Uni	code

vii. `SELECT INSTR("UNICODE","CO"), INSTR("UNICODE","CD");`

<code>INSTR("UNICODE","CO")</code>	<code>INSTR("UNICODE","CD")</code>
4	0

viii. `SELECT MID("Informatics",3,4), SUBSTR("Practices",3);`

<code>MID("Informatics",3,4)</code>	<code>SUBSTR("Practices",3)</code>
form	actices

WORKSHEET (UNSOLVED)

1. SELECT ROUND(3456.885, -2);
2. SELECT SUBSTR("Innovation",3,4) ;
3. SELECT RIGHT("Innovation",5) ;
4. SELECT INSTR("COVID-19","V") ;
5. SELECT MOD(5,2)
6. SELECT ROUND(21.341, 2);
7. SELECT MOD(10, 3);
8. SELECT MID("YOUNG INDIA",5);
9. SELECT INSTR("MACHINE INTELLIGENCE","IN");
10. SELECT LENGTH("GOOD LUCK");
11. SELECT POWER(3, 3);
12. SELECT UPPER("examination");
13. SELECT ROUND (7658.345,2);
14. SELECT MOD (ROUND (13.9, 0), 3);
15. SELECT SUBSTR ("FIT INDIA MOVEMENT", 5);
16. SELECT INSTR ("ARTIFICIAL INTELLIGENCE", "IA");
17. SELECT TRIM (" ALL THE BEST ");
18. SELECT POWER(5,2);
19. SELECT UPPER (MID ("start up india", 10));
20. The SQL string function that returns the index of the first occurrence of substring is_____
21. Write the names of SQL functions to perform the following operations :
 - a. Display name of the Month from your date of birth.
 - b. Convert email-id to lowercase.
 - c. Count the number of characters in your name.

Consider a database LOANS with the following table:

Table: Loan_Accounts

AccNo	Cust_Name	Loan_Amount	Installments	Int_Rate	Start_Date
1	R.K. Gupta	300000	36	12.00	2009-07-19
2	S.P. Sharma	500000	48	10.00	2008-03-22
3	K.P. Jain	300000	36		2007-03-03
4	M.P. Yadav	800000	60	10.00	2008-12-06
5	S.P. Sinha	200000	36	12.50	2010-01-03
6	P. Sharma	700000	60	12.50	
7	K.S. Dhall	500000	48		2008-03-05

Give the output of the following SQL Queries:

1. SELECT Cust_Name, LENGTH(Cust_Name), LCASE(Cust_Name), UCASE(Cust_Name) FROM Loan_Accounts WHERE Int_Rate < 11.00;

Cust_Name,	LENGTH(Cust_Name)	LCASE(Cust_Name),	UCASE(Cust_Name)
S.P. Sharma	11	s.p. sharma	S.P. SHARMA
M.P. Yadav	10	m.p. yadav	M.P. YADAV

2. SELECT LEFT(Cust_Name, 3), Right(Cust_Name, 3), SUBSTR(Cust_Name, 1, 3) FROM Loan_Accounts WHERE Int_Rate > 10.00;

LEFT(Cust_Name, 3)	Right(Cust_Name, 3)	SUBSTR(Cust_Name, 1, 3)
R.K	Pta	R.K
S.P	Nha	S.P
P.	Rma	P.

3. SELECT RIGHT(Cust_Name, 3), SUBSTR(Cust_Name, 5) FROM Loan_Accounts;

RIGHT(Cust_Name, 3)	SUBSTR(Cust_Name, 5)
Pta	Gupta
Rma	Sharma
Ain	Jain
Dav	Yadav
Nha	Sinha
Rma	Harma
All	Dhall

4. SELECT DAYNAME(Start_Date) FROM Loan_Accounts;

DAYNAME(Start_Date)
Sunday
Saturday
Saturday
Saturday

Sunday
Wednesday

5. SELECT ROUND(Int_Rate*110/100, 2) FROM Loan_Accounts WHERE Int_Rate > 10;

ROUND(Int_Rate*110/100, 2)
13.2
13.75
13.75

Aggregate Functions

1. An aggregate function performs a calculation on one or more values and returns a single value.
2. We often use aggregate functions with the GROUP By and HAVING clauses of the SELECT statement.
3. Except for count (*), aggregate functions totally ignore NULL values and considers all values in the present in a column.

Some aggregate functions are as follows:

(i) MAX(): This function returns the maximum value in selected columns. MAX() function ignores NULL values and considers all values in the calculation.

Syntax:

SELECT MAX(Column_Name) FROM Table_Name;

(ii) MIN(): This function returns the minimum value in selected columns. MIN() function ignores NULL values.

Syntax:

SELECT MIN(Column_Name) FROM Table_Name;

(iii) AVG(): This function calculates the average of specified column(s). It ignores NULL values.

Syntax:

SELECT AVG(Column_Name) FROM Table_Name;

(iv) SUM(): This function calculates the sum of all values in the specified columns. It accepts only the expression that evaluates to numeric values. It ignores NULL values.

Syntax:

SELECT SUM(Column_Name) FROM Table_Name;

(v) COUNT(<column>): This function returns the number of cells having values in the given column.

If used with keyword distinct, it counts one value once.

If used with *, returns the cardinality of the table.

Syntax:

Select count([distinct]<column>/*) form <tablename>

WORKSHEET (SOLVED)

1. Discuss the purpose of count (*) function with the help of a suitable example.

Ans: The count (*) function returns the number of rows where at least one element is present. In other words, it returns the cardinality of the table.

2. Give any two differences between MOD() and AVG() functions in SQL.

Ams: a. MOD() returns the remainder when first parameter is divided by second, whereas AVG() returns average of values stored in a specific column.

b. MOD() takes two parameters, whereas AVG() takes only one parameters.

c. MOD() is a single row function, whereas AVG() is an aggregate function.

3. Give any two differences between the POWER() and SUM() SQL functions.

Ans: a. POWER () returns the value of a number raised to the power of another number, while SUM() returns the sum of the values stored in a specific column.

b. POWER () is a single row function while SUM() is a group/aggregate function.

c. POWER () accepts two parameters while SUM() accepts one parameter.

4. Consider table **Hotel**

Hotel_Id	H_Name	Location	Room_type	Price	Star
H001	The Palace	Delhi	Deluxe	4500	5
H002	The Resort	Mumbai	Deluxe	8000	7
H003	Adobe Resort	Dubai	Villa	2750	7
H004	Victoria Hill	London	Duplex	10000	3
H005	The Bee	London	Villa	30000	7

Write the output of the following SQL statements

i. SELECT COUNT(*) FROM HOTEL;

ANS: 5

ii. SELECT COUNT(DISTINCT STAR) FROM HOTEL;

ANS: 3

iii. SELECT AVG (PRICE) FROM HOTEL;

ANS: 11050

iv. SELECT SUM (PRICE) FROM HOTEL;

ANS: 55250

v. SELECT MIN(STAR) FROM HOTEL;

ANS: 3

vi. SELECT MAX(PRICE) FROM HOTEL;

ANS: 30000

5. Consider a table ITEM with the following data :

S.No.	Itemname	Type	Stockdate	Price	Discount
1	Eating Paradise	Dining Table	2002-02-19	11500.58	25
2	Royal Tiger	Sofa	2002-02022	31000.67	30
3	Decent	Office Table	2002-01-01	25000.623	30
4	Pink Feather	Baby Cot	2001-01-20	7000.3	20
5	White Lotus	Double Bed	2002-02-23	NULL	25

Write SQL queries using SQL functions to perform the following operations:

(i) Display the first 3 characters of the Itemname.

Ans SELECT LEFT(Itemname,3) FROM ITEM ;

OR

SELECT MID(Itemname,1,3) FROM ITEM ;

OR

SELECT SUBSTR(Itemname,1,3) FROM ITEM ;

OR

SELECT SUBSTRING(Itemname,1,3) FROM ITEM ;

(ii) Display the month name from the Stockdate.

Ans SELECT MONTHNAME(Stockdate) FROM ITEM ;

(iii) Display the total price of the whole stock.

Ans SELECT SUM(Price) FROM ITEM ;

(iv) Display the average Price of all the stocks.

Ans SELECT AVG(Price) FROM ITEM ;

(v) Display all the Price round off up to 2 decimal places.

Ans SELECT ROUND(Price,2) FROM ITEM ;

WORKSHEET (UNSOLVED)

1. An aggregate function performs a calculation on _____ and returns a single value.
 - (A) single value
 - (B) multiple values
 - (C) no value
 - (D) None of the above
2. Which of the following is not a built in aggregate function in SQL?
 - A) avg
 - B) max
 - C) total
 - D) count
3. Aggregate functions are functions that take a _____ as input and return a single value.
 - A. Collection of values
 - B. Single value
 - C. Aggregate value
 - D. Both A & B
4. Select _____ from instructor where dept name= 'Comp. Sci.';
Which of the following should be used to find the mean of the salary ?
 - A. Mean(salary)
 - B. Avg(salary)
 - C. Sum(salary)
 - D. Count(salary)
5. All aggregate functions except _____ ignore null values in their input collection.
 - A. Count(attribute)
 - B. Count(*)
 - C. Avg
 - D. Sum

6. Find the output (i and ii) for the following SQL commands :

Table: F_INDIA

F_ID	Product	Price	Qty
F01	Sun Cream	678	10
F02	Beauty Cream	5400	15
F03	Face Glow Foundation	1704	20
F04	Gel Wax	520	10
F05	Hair Shampoo	800	25
F06	Beauty Cream 1200	32	

(i) SELECT COUNT (Distinct product) FROM F_INDIA;

(ii) SELECT Product, Price FROM F_INDIA WHERE Product LIKE '%m';

7. For the given table School,

Table : School

Admno	Name	Class	House	Percentage	Gender
20150001	Abhishek Kumar	10	Green	86	Male
20140212	Mohit Bhardwaj	11	Red	75	Male
20090234	Ramandeep Kaur	10	Yellow	84	Female
20130216	Mukesh Sharma	9	Red	91	Male
20190227	Rahil Arora	10	Blue	70	Male
20120200	Swapnil Bhatt	11	Red	64	Female

Write SQL queries for the following :

(a) Display the total number of students in each House where number of students are more than 2.

(b) Display the average Percentage of girls and boys.

(c) Display the minimum Percentage secured by the students of Class 10.

8. Ms. Anubha is working in a school and stores the details of all students in a Table: SCHOOL

Table : SCHOOL

Admid	Sname	Grade	House	Per	Gender	Dob
20150001	Aditya Das	10	Green	86	Male	2006-02-20
20140212	Harsh Sharma	11	Red	50	Male	2004-10-05
20090234	Swapnil Pant	10	Yellow	84	Female	2005-11-21
20130216	Soumen Rao	9	Red	90	Male	2006-04-10
20190227	Rahil Arora	10	Blue	70	Male	2005-05-14
20120200	Akasha Singh	11	Red		Female	2004-12-16

(a) Write the SQL statements from the given table to :

(i) Remove TRAILING SPACES from column Sname.

- (ii) Display the names of students who were born on Tuesday.
- (iii) Display the Grades of students born in 2006.
- (iv) Display the average grade of all the students born in 2005.

(b) Predict the output of the following SQL queries from the above Table: SCHOOL

- (i) `SELECT AVG(Per) FROM SCHOOL WHERE House="Red";`
- (ii) `SELECT Sname, Per FROM SCHOOL WHERE MONTH(Dob)=11;`

(c) Predict the output produced by the following SQL queries. Are they same? Why (not)?

- (i) `SELECT Count (Per) FROM SCHOOL;`
- (ii) `SELECT Count (*) FROM SCHOOL;`

9 Write the names of SQL functions to perform the following operations:

- (a) Display the name of the month from the given date value.
- (b) Display the day of month from the given date value.
- (c) Count the number of characters in a given string.
- (d) Remove spaces from beginning and end of a string.
- (e) To find if a string is present in another string.
- (f) To find today's date.
- (g) To find length of a string.

SORTING USING ORDER BY CLAUSE

- The SQL ORDER BY clause is used to sort data in ascending or descending order based on one or more columns.
- It sorts record in ascending order by default.
- To sort data in descending order DESC keyword is used.

Syntax

```
SELECT <column-names> FROM <table-name> [WHERE <condition>]
ORDER BY <column-name> [ASC, DESC]
```

Example:

Consider the following table emp.

EID	ENAME	SALARY	DEPT
1000	ARJUN	38000.00	ACCOUNTS
1001	ARTI	34000.00	IT
1002	KIRAN	45000.00	SALES
1003	HEMANTH	23000.00	IT
1004	KARTHIKA	40000.00	SALES
1006	ANAND	45000.00	ACCOUNTS

The following query selects details of all the employees in ascending order of their salaries.

```
mysql> SELECT * FROM EMPLOYEE ORDER BY SALARY;
```

EID	ENAME	SALARY	DEPT
1003	HEMANTH	23000.00	IT
1001	ARTI	34000.00	IT
1000	ARJUN	38000.00	ACCOUNTS
1004	KARTHIKA	40000.00	SALES
1002	KIRAN	45000.00	SALES
1006	ANAND	45000.00	ACCOUNTS

Sorting data on Multiple columns:

Syntax:

```
SELECT <column-names> FROM <table-name>
```

```
[WHERE <condition>]
```

```
ORDER BY <column-name> [ASC, DESC] , <column-name> [ASC, DESC];
```

Example:

The following query retrieves data from EMP table in the descending order of salary and ascending order of names.

```
mysql> SELECT * FROM EMP ORDER BY SALARY DESC, ENAME;
```

EID	ENAME	SALARY	DEPT
1006	ANAND	45000.00	ACCOUNTS
1002	KIRAN	45000.00	SALES
1004	KARTHIKA	40000.00	SALES
1000	ARJUN	38000.00	ACCOUNTS
1001	ARTI	34000.00	IT
1003	HEMANTH	23000.00	IT

GROUP BY in SQL

- At times we need to fetch a group of rows on the basis of common values in a column. This can be done using a GROUP BY clause.
- It groups the rows together that contain the same values in a specified column. We can use the aggregate functions (COUNT, MAX, MIN, AVG and SUM) to work on the grouped values.
- HAVING Clause in SQL is used to specify conditions on the rows with GROUP BY clause.

GROUP BY syntax:

```
SELECT <column_list> FROM < table name > WHERE <condition>
GROUP BY <columns>
[HAVING] <condition>;
```

Example:

- 1) Display total salary paid to employees working in each department.

```
mysql> SELECT DEPT,SUM(SALARY) FROM EMP GROUP BY DEPT;
```

dept	sum(salary)
ACCOUNTS	83000.00
IT	57000.00
SALES	85000.00

- 2) Display the number of employees and total salary paid to employees working in each department.

```
SELECT dept "Department Code", COUNT(*) "No of Employees", SUM(salary) "Total Salary" FROM emp GROUP BY dept;
```

```
+-----+-----+-----+
| Department Code | No of Employees | Total Salary |
+-----+-----+-----+
| ACCOUNTS       | 2               | 83000.00    |
| IT              | 2               | 57000.00    |
| SALES          | 2               | 85000.00    |
+-----+-----+-----+
3 rows in set (0.00 sec)
```

SQL GROUP BY with HAVING clause

The following query displays the department id, number of employees of those departments with average salary more than 40000:

```
mysql>SELECT DEPT, COUNT(*) "NO. OF EMPLOYEE" FROM EMP GROUP BY DEPT HAVING AVG(SALARY) > 40000;
```

```
+-----+-----+
| dept      | No. of Employee |
+-----+-----+
| ACCOUNTS  | 2               |
| SALES     | 2               |
+-----+-----+
2 rows in set (0.12 sec)
```

WORKSHEET (SOLVED)

L1

- 1) We can use the aggregate functions in select list of the _____ clause of a select statement. But they cannot be used in a _____ clause.
 - a) WHERE, HAVING
 - b) GROUP BY, HAVING
 - c) HAVING, WHERE
 - d) GROUP BY, WHERE
- 2) Amisha wants to group the result set based on some column's value. Also, she wants that the grouped result should appear in a sorted order. In which order will she write the two clauses (for sorting and for grouping). Give example to support your answer.
- 3) Write a query that counts the number of doctors registering patients for each day. (If a doctor has more than one patient on a given day, he or she should be counted only once.)
- 4) Consider the following Table Hospital and write the output for the following commands:

ID	Name	Department	DOJ	Gender	Salary
1	Amit Kumar	Orthopaedics	1993-02-12	M	35000

2	Anita hans	Paediatrics	1998-10-16	F	30000
3	Sunita Maini	Gynaecology	1991-08-23	F	40000
4	Joe Thomas	Surgery	1994-10-20	M	55000
5	Gurpreet Kaur	Paediatrics	1999-11-24	F	52000
6	Anandhini Burman	Oncology	1994-03-16	F	31000
7	Ram Mukherjee	Oncology	2000-06-27	M	54500

- Display the names and salaries of doctors in descending order of salaries.
- Display names of each department along with total salary being given to doctors of that department.
- Display names of each department along with average salary if the count of doctors in that department is more than 1.

ANSWERS

1) Option b. GROUP BY, HAVING

2) When we use GROUP BY clause (for grouping of data) and ORDER BY clause (for sorting data) together, the ORDER BY clause always follows other clauses. That is, the GROUP BY clause will come before ORDER BY clause.

For example,

```
SELECT EMP_ID, SUM(SALARY) AS 'ANNUAL SALARY'
FROM EMPLOYEE
GROUP BY DEPTID ORDER BY EMP_ID DESC;
```

3) SELECT ord_date, COUNT (DISTINCT doctor_code)
FROM Patients GROUP BY ord_date;

4) a) SELECT DOCName, Salary FROM DOCTOR ORDER BY
Salary DESC;

b) SELECT Department, SUM(Salary) FROM DOCTOR
GROUP BY Department;

c) SELECT Department, AVG(Salary) FROM DOCTOR

GROUP BY Department HAVING count(*)>1;

L2

1) Shanya Khanna is using a table EMPLOYEE. It has the following columns:

Admno, Name, Agg, Stream

[column Agg contains Aggregate marks]

She wants to display highest Agg obtained in each Stream.

She wrote the following statement:

```
SELECT Stream, MAX(Agg) FROM EMPLOYEE;
```

But she did not get the desired result. Rewrite the above query with necessary changes to help her get the desired output.

2) Select correct SQL query from below to find the temperature in increasing order of all cities.

(a) SELECT city FROM weather ORDER BY temperature;

(b) SELECT city, temperature FROM weather;

(c) SELECT city, temperature FROM weather ORDER BY temperature;

(d) SELECT city, temperature FROM weather ORDER BY city;

3) Assertion & Reasoning

Mark the correct choice as

a. Both A and R are true and R is the correct explanation for A

b. Both A and R are true and R is not the correct explanation for A

c. A is True but R is False

d. A is false but R is True

Assertion(A) : The ORDER BY clause sorts the result set in descending order by default.

Reason(R): To sort a result set in ascending order, we can use ASC keyword with ORDER BY clause.

ANSWERS

1) SELECT Stream, MAX(Agg)

FROM EMPLOYEE

GROUP BY Stream;

2) Option c.

SELECT city, temperature FROM weather ORDER BY temperature;

3) Option d. A is false but R is True

L3

1) What is the meaning of **GROUP BY** clause in MySql ?

- a) Group data by column values
 - b) Group data by row values.
 - c) Group data by row and column values.
 - d) None of these
- 2) To specify a condition with GROUP BY clause, _____ clause is used.
- a) USE b) WHERE c) HAVING d) LIKE
- 3) By default, ORDER BY clause lists the results in _____ order.
- a) Descending b) Any c) Same d) Ascending
- 4) Find odd one out?
- a) GROUP BY b) DESC c) ASC d) ORDER BY

True / False Questions

- 1) The rows of the result relation produced by a SELECT statement can be sorted, but only by one column.
- 2) The HAVING clause acts like a WHERE clause, but it identifies groups that meet a criterion, rather than rows.
- 3) The SQL keyword GROUP BY instructs the DBMS to group together those rows that have the same value in a column.

Short Answer Questions

- 1) What is the difference between a WHERE clause and a HAVING clause of SQL statement ?
- 2) What is the difference between order by and group by clause when used along with the SELECT statement?

ANSWERS

- 1) Option a. Group data by column values
- 2) Option c. Having
- 3) Option d. Ascending
- 4) Option a. Group By

True / False Questions

- 1) False
- 2) True
- 3) True

Short Answer Questions

1) The difference between WHERE and HAVING clause is that WHERE conditions are applicable on individual rows whereas HAVING conditions are applicable on groups as formed by GROUP BY clause.

2) The ORDER BY clause is used to show the output of the select query in a sorted manner as per the field name given in the ORDER BY clause. The result can be arranged in the ascending or descending order of the mentioned field.

The GROUP BY clause is used to group rows in a given field and then perform the mentioned actions such as apply an aggregate functions. e.g., max(), min() etc on the entire group as per the specific condition (through HAVING clause.)

UNIT – III

INTRODUCTION TO COMPUTER NETWORKS

A collection of computers or devices interconnected with each other for sharing information and resources is called a computer network

Types of network: LAN, MAN, WAN

Based on the geographical area covered and data transfer rate, computer networks are broadly categorised as:

- LAN (Local Area Network)
- MAN (Metropolitan Area Network)
- WAN (Wide Area Network)

LAN	MAN	WAN
Local Area Network	Metropolitan Area Network	Wide Area Network
area covered by a LAN : a single room/a floor/ an office /laboratory/a school/ college, university campus(usually extended up to 1 km)	an extended form of LAN which covers a larger geographical area like a city or a town (30-40km)	connects computers and others LANs and MANs, spread across different geographical locations of a country or in different countries or continents
The connectivity is done by means of wires, Ethernet cables, fibre optics, or Wi- Fi.	Cable TV network or cable based broadband internet services are examples of MAN	Different branches of an office in different locations,Internet are all examples of WAN

LAN is comparatively secure, data transfer rate will be high(10Mbps-1000Mbps)

Network Devices

Devices that are used to connect computers and other electronic devices to a network are called **network devices**

Hub:

A hub is a device that is used for connecting multiple computers to a form a network.

When it receives any message, it will broadcast the same to every device connected to it.

Switch

A Switch is device that is used for connecting multiple computers to a form a network.

When it receives any message, it will forward the same to only the correct destination node. Therefore, it is also called as **intelligent hub.**



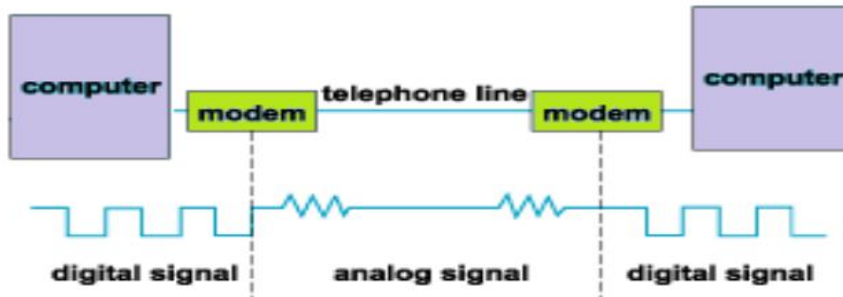
Modem : ‘MOdulator DEMolulator’.

Modem is a device used for conversion between analog signals and digital Signals. Computer store data in digital format but while transmitting data is in analog form.

Modulation is the process of converting digital signals to analog signals

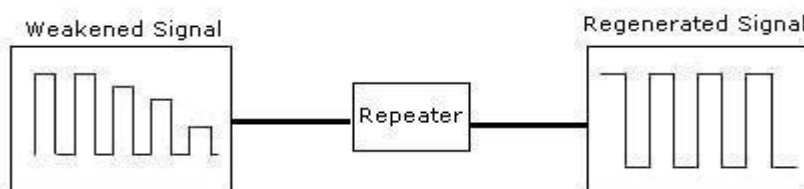
Demodulation is the process of converting analog signals to digital signals

Modem performs both modulation and demodulation as shown in the diagram below



Repeater

Signals lose their strength when they travel long distance. Repeater is a device used to increase the power of a signal and retransmits it, allowing it to travel further.



Router

It is a networking device that interconnects different networks. The simplest function of a router is to receive packets from one network and pass them to second connected network.

A router can be wired or wireless. A wireless router can provide Wi-Fi access to smartphones and other devices.

Gateway

It is a device that is used for the communication among the networks which have a different set of protocols.(for connecting dissimilar networks). It acts as a protocol converter.

Network Topologies

The arrangement of computers and other peripherals in a network is called its topology. Common network topologies are mesh, bus, star and tree.

Star Topology

In star topology, each communicating device is connected to a central node, which is a networking device like a hub or a switch, as shown in Figure.

Advantages:

- very effective, efficient and fast as each device is directly connected with the central device
- disturbance in one device will not affect the rest of the network
- fault detection is easier

Disadvantages:

- Any failure in the central networking device may lead to the failure of complete network



Bus Topology

In bus topology each device connects to a central backbone known as bus.

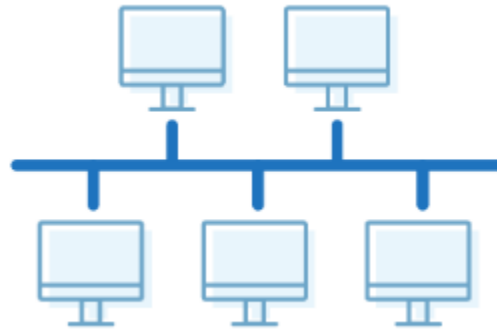
Data sent from a node are passed on to the bus and can be received by any of the nodes connected to the bus

Advantages:

- Single backbone cable makes it cheaper and easy to maintain
- Easy to add new nodes

Disadvantages:

- less secure and less reliable.
- Fault detection is difficult



Mesh Topology

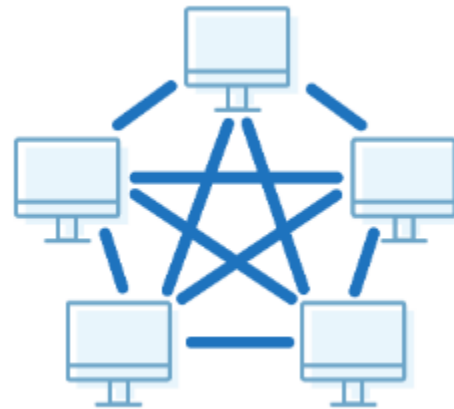
Each device is connected with every other device in the network in as shown in Figure

Advantages:

- can handle large amounts of traffic simultaneously
- are more reliable, even if a node gets down, it does not cause any break in the transmission of data between other nodes
- Secured

Disadvantages:

- More cables are required
- Complex network



Tree Topology

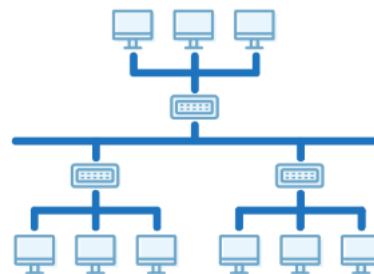
Tree topology combines the characteristics of bus topology and star topology. There are multiple branches and each branch can have one or more basic topologies like star, ring and bus

Advantages:

- Expansion of Network is possible and
- If one segment is damaged, other segments affected.

Disadvantages:

- maintenance becomes difficult



easy.
are not

Introduction to Internet

The Internet is the global network of computing devices including desktop, laptop, servers, tablets, mobile phones etc.

The World Wide Web (WWW) is an ocean of information, stored in the form of many interlinked web pages and web resources.

URL

URL is Uniform Resource Locator and provides the location and mechanism (protocol) to access the resource located on the web. Examples of URL are: <https://www.mhrd.gov.in>, <http://www.ncert.nic.in>

URL is also called a web address.

HTML

HTML — HyperText Markup Language is a language which is used to design standardised Web Pages It uses tags to define the way page content should be displayed by the web browser.

HTTP

HTTP is a protocol (set of rules) used when transmitting files (data) over the world wide web

Applications of Internet- email, Chat, VoIP

e-mail (electronic mail)

- It is one of the ways of sending and receiving message(s) using the Internet.
- can be sent anytime to any number of recipients anywhere at any time
- can be either or an attached file (text, image audio, video, etc.)
- Some of the popular email service providers are Google (Gmail), Yahoo (yahoo mail), Microsoft (outlook)

Chat

- Chatting or Instant Messaging (IM) over the Internet means communicating to people at different geographic locations in real time
- It is possible to send text, image, document, audio, video through instant messengers
- Applications such as WhatsApp, Skype, Yahoo Messenger, Google Talk, Facebook Messenger, Google Hangout, etc., are examples of instant messengers

VoIP

Voice over Internet Protocol or VoIP, allows us to have voice call over the Internet. It is also known as Internet Telephony .

Website

- A website (usually referred to as a site in short) is a collection of web pages related through hyperlinks, and saved on a web server.

- A website's purpose is to make the information available to people at large

Webpage

- A web page (also referred to as a page) is a document on the WWW that is viewed in a web browser.
- Basic structure of a web page is created using HTML (HyperText Markup Language) and CSS (Cascaded Style Sheet).
- A web page is usually a part of a website and may contain information in different forms, such as text , images , audio , video and other interactive contents

Static and Dynamic Web Pages

Static Web Pages	Dynamic Web Pages
content always remains same, i.e., does not change for person to person.	content of the web page can be different for different users.
generally written in HTML, JavaScript and/or CSS and have the extension .htm or .html.	can be created using various languages such as JavaScript, PHP, ASP.NET, Python, Java, Ruby, etc
Less time to load	more complex and thus takes more time to load

Web Server

A web server is used to store and deliver the contents of a website to clients that request it.

Web Hosting

Web hosting is a service that allows us to put a website or a web page onto the Internet, and make it a part of the World Wide Web

Web Browser

A browser is a software application that helps us to view the web page(s). Some of the commonly used web browsers are Google Chrome, Internet Explorer, Mozilla Firefox, Opera, etc. A web browser essentially displays the HTML documents which may include text, images, audio, video and hyperlinks that help to navigate from one web page to another

Add-ons and plug-ins

Add-ons and plug-ins are the tools that help to extend and modify the functionality of the browser.

A **plug-in** is a complete program or may be a third-party software installed on a computer.

It can be used by browser as well as other applications. Example: Flash,Java

An **add-on**(extension) is not a complete program. It is used to add only a particular functionality to the browser. Adding the functionality of a sound and graphics card is an example of an add-on

Cookies

Cookies are small pieces of data stored in text files that are saved on your computer when websites are loaded in a browser.

It helps in customising the information that will be displayed, for example the choice of language for browsing, allowing the user to auto login, remembering the shopping preference, displaying advertisements of one's interest, etc.

Cookies are usually harmless. Cookies can be disabled by changing the Privacy and Security settings of our browser.

Worksheet for L1 Achievers

1. What's a web browser ?

- a) A kind of spider
- b) A computer that store www files
- c) A person who likes to look at websites
- d) A software program that allows you to access sites on the world wide web

Ans. d

2. A _____ is a document commonly written and is accessible through the internet or other network using a browser?

- a) Accounts
- b) Data
- c) Web page
- d) Search engine

Ans. c

3. Which of the following is used to read HTML code and to render Webpage?

- a) Web Server
- b) Web Browser
- c) Web Matrix
- d) Weboni

Ans. b

4. A free open source software version of Netscape was the developed called.

- a) Opera Mini
- b) IE
- c) Google Chrome
- d) Mozilla

Ans. d

5. Which of the following is considered as latest browser?

- a) Mosaic
- b) Google Chrome
- c) IE
- d) Mozilla Firefox

Ans. b

6. The first widely used web browser was _____.

- a) Mozilla
- b) World Wide Web
- c) NCSA Mosaic
- d) heman

Ans. c

7. Name the first popular web browser is

- a) IBM browser
- b) Google chrome
- c) Mozilla Firefox
- d) MOSAIC

Ans. d

8 .Simple plain HTML is used to create following type of website

- a) Completely Dynamic Website
- b) None of these
- c) Completely Flash Website
- d) Completely Static Website

Ans. d

9. What is the name of the browser developed and released by Google?

- a) Chrome
- b) GooglyGoogle
- c) Heetson
- d) Titanium

Ans. a

10. Which of the following are alternative names for mobile browsers?

- a) microbrowser
- b) wireless internet browser
- c) minibrowser
- d) All of these

Ans. d

11. The open source software version of netscape is _____

- a) Chrome
- b) Mozilla
- c) internet Explorer
- d) Erwise

Ans. b

12. Which of the following is an Indian Web Browser ?

- a) Google Chrome
- b) Safari
- c) Epic
- d) IE

Ans. c

13. Which of the following is a Web Browser ?

- a) MS-OFFICE
- b) Notepad
- c) Firefox
- d) Word 2007

Ans. c

14. Which of the following browser has high speed browsing capacity ?

- a) Chrome
- b) Opera
- c) UC browser
- d) Lynx

Ans. b

15. A free open source software version of Netscape was the developed called

- a) Opera Mini
- b) IE
- c) Google Chrome
- d) Mozilla

Ans. d

16 Static Websites are generally designed using

- a) Eclipse
- b) Netbeans
- c) Visual C++ Studio
- d) Dreamviewer

Ans. d

17. Student A used combination of PHP,MySQL and HTML for his project. What is the type of website developed by Student A ?

- a) Static
- b) Flash
- a) Dynamic
- b) None of these

Ans b

Worksheet for L2 Achievers

1. What's a web browser ?

- a) A kind of spider
- b) A computer that store www files
- c) A person who likes to look at websites
- d) A software program that allows you to access sites on the world wide web

Ans. d

2. A _____ is a document commonly written and is accessible through the internet or other network using a browser?

- a) Accounts
- b) Data
- c) Web page
- d) Search engine

Ans. c

3. Which of the following is used to read HTML code and to render Webpage?

- a) Web Server
- b) Web Browser
- c) Web Matrix
- d) Weboni

Ans. b

4. A free open source software version of Netscape was the developed called.

- a) Opera Mini
- b) IE
- c) Google Chrome
- d) Mozilla

Ans. d

5 Internal name for the old Netscape browser was _____.

- a) Mozilla
- b) Google Chrome
- c) Opera Mini
- d) IE

Ans. a

6. Which of the following is considered as latest browser?

- a) Mosaic
- b) Google Chrome
- c) IE
- d) Mozilla Firefox

Ans. b

7. The first widely used web browser was _____.

- a) Mozilla
- b) WorldWideWeb
- c) NCSA Mosaic
- d) heman

Ans. c

8. Name the first popular web browser is

- a) IBM browser
- b) Google chorme
- c) Mozilla Firefox
- d) MOSAIC

Ans. d

9.Simple plain HTML is used to create following type of website

- a) Completely Dynamic Website
- b) None of these
- c) Completely Flash Website
- d) Completely Static Website

Ans. d

10. Which of these rendering engine is used by Chrome web browser?

- a) Gecko
- b) Blink
- c) Quantum
- d) Heetsoni

Ans. b

11. Which of the following is the oldest web browser still in general use?

- a) Lynx
- b) Safari
- c) Internet Explorer
- d) Navigator

Ans. a

12. Which of the following browsers were/are available for the Macintosh?

- a) Opera
- b) Safari
- c) Netscape
- d) All of these

Ans. d

13. What is the name of the browser developed and released by Google?

- a) Chrome
- b) GooglyGoogle
- c) Heetson
- d) Titanium

Ans. a

14. Which of the following are alternative names for mobile browsers?

- a) micro browser
- b) wireless internet browser
- c) mini browser
- d) All of these

Ans. d

15. Some web browsers are intended for specific audiences. What is the target group of the ZAC Browser?

- a) disgruntled postal workers
- b) autistic children
- c) hardcore gamers
- d) librarians

Ans. b

16. The open source software version of netscape is _____

- a) Chrome
- b) Mozilla
- c) internet Explorer
- d) Erwise

Ans. b

17. Which of the following is an Indian Web Browser ?

- a) Google Chrome
- b) Safari
- c) Epic
- d) IE

Ans. c

18. Which of the following is a Web Browser ?

- a) MS-OFFICE
- b) Notepad
- c) Firefox
- d) Word 2007

Ans. c

19. Which of the following browser has high speed browsing capacity ?

- a) Chrome
- b) Opera
- c) UC browser
- d) Lynx

Ans. b

20. A free open source software version of Netscape was the developed called

- a) Opera Mini
- b) IE
- c) Google Chrome
- d) Mozilla

Ans. d

21. Internal name for the old Netscape browser was _____.

- a) Mozilla
- b) Google Chrome
- c) Opera Mini
- d) IE

Ans. a

22. Which of these tech company owns Firefox web browser?

- a) Lenovo
- b) IBM
- c) Apple
- d) Mozilla

Ans. d

23. Which of the following browsers were/are available for the Macintosh?

- a) Opera
- b) Safari
- c) Netscape
- d) All of these

Ans. d

24. What is the name of the browser developed and released by Google?

- a) Chrome
- b) Googly Google
- c) Heetson
- d) Titanium

Ans. a

25 Static Websites are generally designed using

- a) Eclipse
- b) Netbeans
- c) Visual C++ Studio
- d) Dreamviewer

Ans. d

Worksheet for L3 Achievers

1. What's a web browser ?

- a) A kind of spider
- b) A computer that store www files
- c) A person who likes to look at websites
- d) A software program that allows you to access sites on the world wide web

Ans. d

2. A _____ is a document commonly written and is accessible through the internet or other network using a browser?

- a) Accounts
- b) Data
- c) Web page
- d) Search engine

Ans. c

3. Which of the following is used to read HTML code and to render Webpage?

- a) Web Server
- b) Web Browser

c) Web Matrix

d) Weboni

Ans. b

4. First Web Browser was created in _____.

a) 1991

b) 1992

c) 1993

d) 1990

Ans. d

5. First web browser was created by _____.

a) Tim Berners lee

b) Mozilla Foundation

c) Marc Andreessen

d) Jacobs

Ans. a

6. A free open source software version of Netscape was the developed called.

a) Opera Mini

b) IE

c) Google Chrome

d) Mozilla

Ans. d

7 Internal name for the old Netscape browser was _____.

a) Mozilla

b) Google Chrome

c) Opera Mini

d) IE

Ans. a

8. Which of the following is considered as latest browser?

a) Mosaic

b) Google Chrome

c) IE

d) Mozilla Firefox

Ans. b

9. The first widely used web browser was _____.

a) Mozilla

b) WorldWideWeb

c) NCSA Mosaic

d) heman

Ans. C

10. Name the first popular web browser is

a) IBM browser

b) Google chorme

c) Mozilla Firefox

d) MOSAIC

Ans. d

11. Simple plain HTML is used to create following type of website

a) Completely Dynamic Website

b) None of these

c) Completely Flash Website

d) Completely Static Website

Ans. d

12. Which of the following was the first web browser to handle all HTML 3 features?

- a) Cello
- b) Erwise
- c) UdiWWW
- d) Mosaic

Ans. c

13. Which of these rendering engine is used by Chrome web browser?

- a) Gecko
- b) Blink
- c) Quantum
- d) Heetsoni

Ans. b

14. Which of the following is the oldest web browser still in general use?

- a) Lynx
- b) Safari
- c) Internet Explorer
- d) Navigator

Ans. a

15. When was Chrome web browser launched ?

- a) 2002
- b) 2003
- c) 2004
- d) 2008

Ans. d

16. Which of these tech company owns Firefox web browser?

- a) Lenovo
- b) IBM
- c) Apple
- d) Mozilla

Ans. d

17. Which of the following browsers were/are available for the Macintosh?

- a) Opera
- b) Safari
- c) Netscape
- d) All of these

Ans. d

18. What is the name of the browser developed and released by Google?

- a) Chrome
- b) GooglyGoogle
- c) Heetson
- d) Titanium

Ans. a

19. Which of the following are alternative names for mobile browsers?

- a) microbrowser
- b) wireless internet browser
- c) minibrowser

d) All of these

Ans. d

20. Apple, Inc. joined the “browser wars” by developing its own browser. What is the name of this browser?

- a) Opera
- b) NetSurf
- c) Internet Explorer
- d) Safari

Ans. d

21. Some web browsers are intended for specific audiences. What is the target group of the ZAC Browser?

- a) disgruntled postal workers
- b) autistic children
- c) hardcore gamers
- d) librarians

Ans. b

22. Nexus is first graphical web browser.

- a) True
- b) False

Ans. b

23. The open source software version of netscape is _____

- a) Chrome
- b) Mozilla
- c) internet Explorer
- d) Erwise

Ans. b

24. Which of the following is an Indian Web Browser ?

- a) Google Chrome
- b) Safari
- c) Epic
- d) IE

Ans. c

25. Which of the following is a Web Browser ?

- a) MS-OFFICE
- b) Notepad
- c) Firefox
- d) Word 2007

Ans. c

27. Which of the following browser has high speed browsing capacity ?

- a) Chrome
- b) Opera
- c) UC browser
- d) Lynx

Ans. b

28. A free open source software version of Netscape was the developed called

- a) Opera Mini
- b) IE
- c) Google Chrome
- d) Mozilla

Ans. d

29. Internal name for the old Netscape browser was _____.

- a) Mozilla
- b) Google Chrome
- c) Opera Mini
- d) IE

Ans. a

30. Which of these tech company owns Firefox web browser?

- a) Lenovo
- b) IBM
- c) Apple
- d) Mozilla

Ans. d

31. Which of the following browsers were/are available for the Macintosh?

- a) Opera
- b) Safari
- c) Netscape
- d) All of these

Ans. d

32. What is the name of the browser developed and released by Google?

- a) Chrome
- b) GooglyGoogle
- c) Heetson
- d) Titanium

Ans. a

33. Which of the following are alternative names for mobile browsers?

- a) microbrowser
- b) wireless internet browser
- c) minibrowser
- d) All of these

Ans. d

34. Apple, Inc. joined the “browser wars” by developing its own browser. What is the name of this browser?

- a) Opera
- b) NetSurf
- c) Internet Explorer
- d) Safari

Ans. d

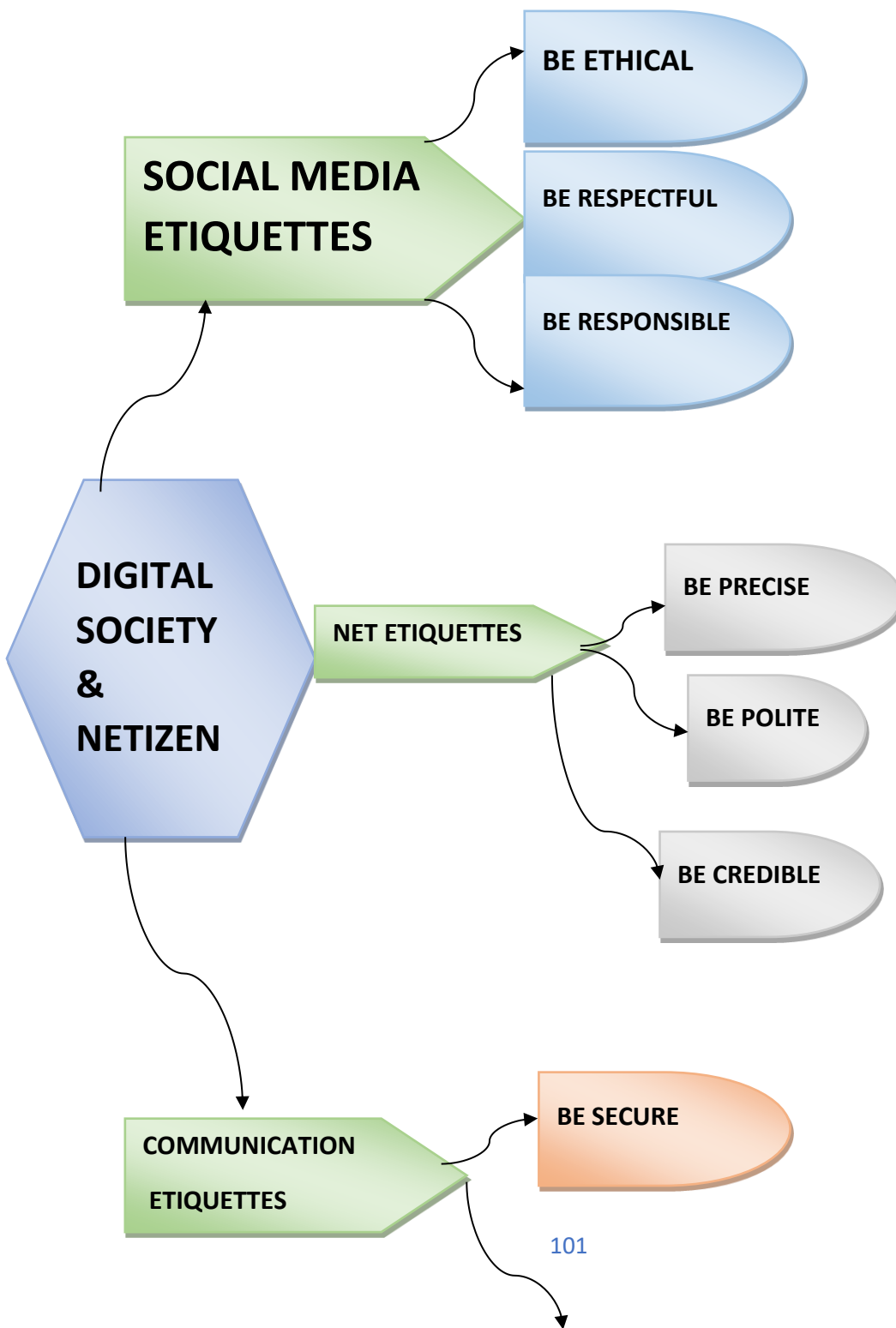
35. Some web browsers are intended for specific audiences. What is the target group of the ZAC Browser?

- a) disgruntled postal workers
- b) autistic children
- c) hardcore gamers
- d) librarians

Ans. b

UNIT-IV
SOCIETAL IMPACTS

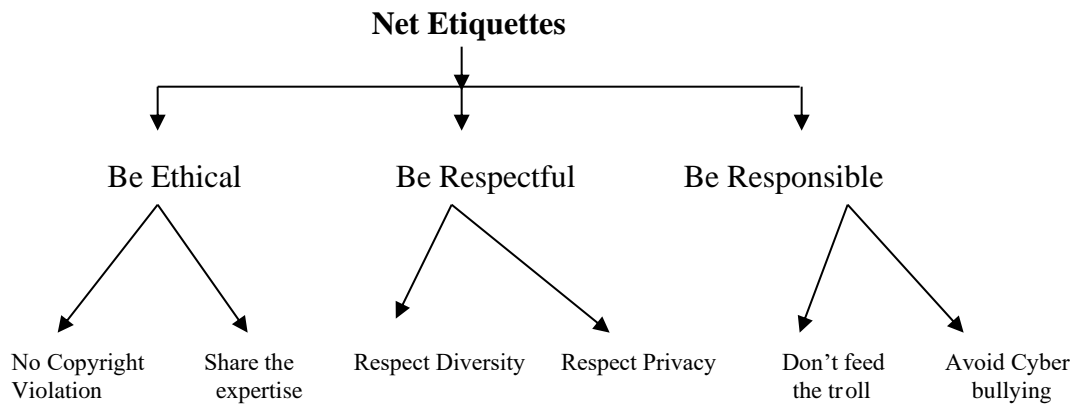
MIND MAP



DIGITAL FOOTPRINT

The digital footprint is created knowingly or unknowingly while using the internet. Wherever data is asked to fill up for the interaction you are leaving your digital footprint. Whatever data we are providing through the internet on websites or apps, it may be used for any purposes including showing relevant ads to your devices, or it can be misused or exploited for any other purposes.

Digital Society & Netizen:



Be ethical: Follow the following rules to be ethical on the internet.

- **No copyright violation:** While uploading media like audio, video, or images and creating content we should not use any material created by others without their consent. We should always try to make our own content.
- **Share the expertise:** You can share your knowledge to help people on the internet. There are many platforms like a blog, you tube, podcast and affiliate marketing etc. You should follow the simple stuff before sharing your knowledge on the internet. The information should be true.

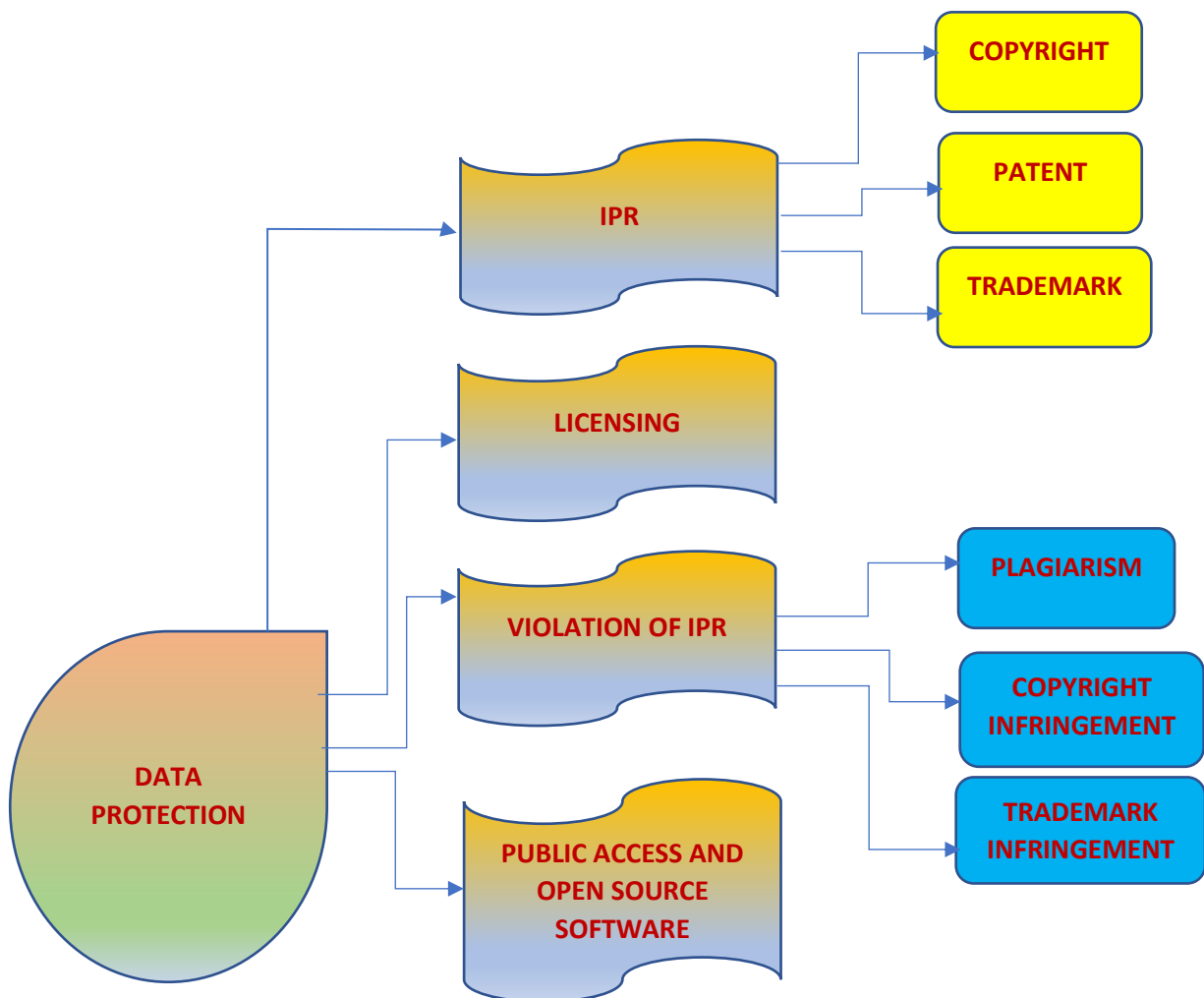
Be respectful: We should be respectful on the internet with following aspects:

- **Respect Privacy:** We should not share anything on the internet related to others without their consent. This is called respect for privacy.
- **Respect Diversity:** There is a different kind of people having different kind of mindset and opinion, knowledge, experience, culture and other aspects. So we have to respect their diversity in the groups or community or forum.

Be responsible: While using internet, we should be responsible whatever we are doing.

- **Avoid cyber bullying:** Cyber bullying refers to the activities done internet with an intention to hurt someone or insult someone, degrading or intimidating online behaviour such as spreading or sharing rumours without any knowledge or fact check on the ground, sharing threats online, posting someone’s personal information, sexual harassment or comments publicly ridicule. These type of activities have very serious impacts on the victims. Always remeber, your activities can be tracked through your digital footprints.

MIND MAP



DATA PROTECTION

Security and control on data stored digitally to avoid any inconvenience, harm, loss or embarrassment.

Each country has its own data protection law to ensure right protection of data from any changes or breach.

Intellectual Property Rights:

If a person owns a house it is considered as his own property. Similarly, if a person is posting something with his unique ideas and concepts is called a person's intellectual property. Intellectual Property refers to inventions, literary and artistic expressions, designs and symbols, names and logos.

The Intellectual Property Right gives ownership to the creator of the Intellectual Property holder. By this, they can get recognition and financial benefits from their property. These intellectual properties are legally protected by copyrights, patents, trademarks, etc.

Copyrights:

Copyrights refers to the legal rights to use a material like writing, articles, photographs, audios, videos, software or any other literacy or artistic work. Copyrights are automatically granted to the creators or the owners.

Patent:

The patents are given for the inventions. Here the creator needs to apply for the invention. When the patent is granted the owner gets rights to prevent others from using, selling or distributing the protected invention. Patent gives full control to the patentee to decide how others can use the invention. A patent protects an invention for 20 years, after that public can use it freely.

Trademark:

Trademark is applicable for the visual symbol, word, name, design, slogan, label etc. for the product. It provides uniqueness for the other brands and commercial enterprise. It also gives recognition to the company. The trademark product denoted by ® or ™ symbols. There is no expiry time for the trademark.

Licensing:

A license refers to a contract or permission or agreement given to any party by a creator to use their product or service or creation. A license can be purchased by paying money. License is the term that gives special rights to the user to use the copyrighted material.

Similarly, a software license is an agreement that provides legal rights to the authorised use of digital material. All the software, digital documents or games you are downloading from the

internet provides the license agreement to use the material. If anyone is not following will be considered a criminal offence.

Violation of IPR:

Knowingly or unknowingly, people are violating IPR while doing work. So the violation of IPR done in following ways:

- ✓ Plagiarism
- ✓ Copyright Infringement
- ✓ Trademark Infringement

Plagiarism:

Plagiarism refers to copy or share the intellectual property of someone on the internet without giving any credit or any mention of the creator. Sometimes if you derived an idea or product which is already available, then also it is considered plagiarism. Sometimes it is also considered fraud. Whenever you are using any online material for your personal use or for any purpose, always cite the author and source to avoid plagiarism.

Copyright Infringement:

When you use the work of others without taking their written permission or don't paid for that using that is considered as copyright infringement. If you download an image from google and use in your work even after giving the credit or reference you are violating copyright. So before downloading any content check it for copyright violation.

Trademark Infringement:

The unauthorized use of trademark product is known as trademark infringement. The trademark owner can take a legal action for trademark infringement.

Public access and open source:

For the encouragement towards the innovation and new creations, the way of accessing the material and resources should be available. So there are some public access and open-source licenses are made for them. Open source allows using the material without any special permission.

Some software is there which are available for free of cost and allows redistribution. User can use them, copy them and redistribute them. They are available with modifiable source code. Free and Open Source Software (FOSS) is a large community of users and developers who are contributing towards open source software. These tools are Linux, Ubuntu, open office, Firefox are examples of open source software.

Creative common:

- ✓ Creative common is non-profit organization provides public CC license free of charge.
- ✓ CC license is governed by Copyright law.
- ✓ CC is used for all kind of creative works like websites, music, film, literature etc.
- ✓ Six different Creative Commons licenses:
 - ❖ CC BY,
 - ❖ CC BY-SA,
 - ❖ CC BY-NC,
 - ❖ CC BY-ND,
 - ❖ CC BY-NC-SA,
 - ❖ CC BY-NC-ND

Among these, CC BY is the most open license.

Cyber crime:

The cybercrime covers phishing, credit card frauds, illegal downloading, cyber bullying, creation and distribution of viruses, spam etc. These type of activities increasing day by day through hacking, ransomware like attacks, denial-of-service attack, phishing, email fraud, banking fraud and identity theft.

Hacking:

Hacking refers to entering into someone's account without the user's consent or stealing login information from someone's account and unauthorized access to data. When people share them on the internet through different websites like emails, online shopping etc. some expert people trying to break the system security and gain unauthorized access.

If this hacking is done for positive intent then it is known as **Ethical Hacking** or **White Hat Hacking**. The hacker is known as Ethical Hacker or White Hat Hacker. They help to protect the system from hacking and improves the security of the system.

A **Black Hat Hacker** or **Unethical Hacker** tries to gain unauthorized access and steal the sensitive information with the aim to damage or break down the system. Their main focus is security cracking and stealing the sensitive information.

Phishing:

Phishing is a type of attack on a computer device where the attacker tries to find the sensitive information of users in a fraud manner through electronic communication by intending to be from a related trusted organization in an automated manner.

Ransomware:

Ransomware is a form of malicious software that prevents computer users from accessing their data by encrypting it. Cybercriminals use it to extort money from individuals or organizations whose data they have hacked, and they hold the data hostage until the ransom is paid.

If the cybercriminals do not pay the ransom within the specified time frame, the data may leak to the public or be permanently damaged. One of the most serious issues that businesses face is ransomware.

Steps to stop Ransomware:

- **Avoid Unverified Links:**
- **Frequently Update Your Operating System and Software:**
- **Make a System Backup:**
- **Restrict Access To Your Data:**
- **Disable vulnerable plug-ins:**
- **Create Strong Passwords:**

Indian Information Technology Act (IT Act)

The Indian IT Act provides guidelines and rules to the user on the processing, storage and transmission of sensitive information. The states of our country have their own cyber cells in the police station to report cybercrime. The IT act provides legal provisions and implications against cybercrime. If the cybercrime is proved then the accused may get the penalties also.

E-Waste Hazards and Management:

E-Waste in India:

As India is the fifth largest E-waste producing country in the world, aspirants should know that E-waste is a term used for those electronic products which are near to the end of their useful life. Some examples of E-waste are:

- Computers
- Televisions
- VCRs
- Stereos
- Copiers, and
- Fax machines

Impacts of E-Waste on the humans.

Electronic devices are made up of metals and elements like lead, beryllium, cadmium, plastics, etc. Out of these materials most of them are difficult to recycle. These materials are very toxic and unsafe for human beings because they may cause disease like cancer.

E-Waste management:

The efficient disposal of e-waste is E-Waste management. It is not possible to dispose it completely but at certain level it can be reduced through Reduce, Recycle and Reuse.

- **Reduce:** Reduce the purchase of electronic devices by using some alternates or as per the need only. They can only be discarded only after their useful life ends. Good maintenance of these devices increases its life.
- **Reuse:** The devices can be modified and reused for other purposes. The discarded devices can be supplied or sold to someone who can use them. The process of re-selling old electronic goods at lower prices is called refurbishing.
- **Recycle:** Recycling refers to the process of conversion of electronic devices into something else which can be used again and again. The e-waste which cannot be



recycled can be repaired re-used. Many NGOs provide doorstep services to collect e-waste.

Recycle Reduce



According to the Environmental Protection Act, 1986 - “Polluter pays Principle” means that anyone causing the pollution will pay for the damage caused. Any kind of violation will be punished according to this act. The Central Pollution Control Board(CPCB) has issued guidelines for the proper handling and disposal of e-waste. The guideline says that the manufacturer of the product will be responsible for the disposal of the product when it becomes e-waste.

The Department of Information Technology (DIT) issued a comprehensive technical guide on “Environmental Management for Information Technology Industry in India.

WORKSHEET

L1

- 1) Jack is a good programmer and wants to contribute to the features of one of the softwares, that he uses. What kind of software he can contribute to?
 - a) Proprietary software
 - b) Free software
 - c) Open source software
 - d) Shareware
- 2) Digital footprints are stored _____
 - a) Temporarily (for few days)
 - b) Permanently
 - c) for 7 days only
 - d) for 3 days
- 3) What is hazardous pollutant released from mobile phone ?
 - a) Lithium
 - b) Barium
 - c) Lead
 - d) Copper
- 4) Nitish received an email warning him of closure of his bank accounts if he did not update his banking information as soon as possible. He clicked the link in the email and entered his banking information. Next he got to know that he was duped.
 - i) This is an example of _____ .
 - ii) Someone steals Nitish’s personal information to commit theft or fraud, it is called _____
 - iii) Nitish’s Online personal account, personal website are the examples of _____
- 5) Which of the following come under cybercrime?
 1. Theft of a brand new sealed laptop.
 2. Access to a bank account for an unauthorized money transaction.
 3. Modification in a company’s data with unauthorized access.
 4. Photocopying a printed report.

Assertion & Reasoning

Mark the correct choice as

- a. Both A and R are true and R is the correct explanation for A
- b. Both A and R are true and R is not the correct explanation for A
- c. A is True but R is False
- d. A is false but R is True

6) Assertion (A) : Plagiarism is stealing someone else’s intellectual work and representing it as your own work.

Reason (R) : Using someone else’s work and giving credit to the author or creator.

7) Assertion (A) : Intellectual Property Rights are the rights of the owner of information to decide how much information is to be exchanged.

Reason (R) : The owner has the right to protect his/her intellectual property

Short Answer Questions

8) Ms. Sunitha has many electronic gadgets which are not usable due to outdated hardware and software. Help her to find any three best ways to dispose the used electronic gadgets.

9) Sumit got good marks in all the subjects. His father gifted him a laptop. He would like to make Sumit aware of health hazards associated with inappropriate use of laptop. Help his father to list the points which he should discuss with Sumit.

10) Give Difference between Licensing and Copyright

ANSWERS

1) Option c. Open source software

2) Option b. Permanently

3) Option a. Lithium

4) i) Phishing ii) Identity theft iii) Digital Property

5) Ans. (2) and (3)

6) Option c. A is true but R is false.

7) Option a. Both A and R are true and R is the correct explanation for A

8) i) Give your electronic waste to a certified e-waste cyler.

ii) Donating your outdated technology.

iii) Give back to your electronic companies at drop off points.

9) Hazards associated with excessive use of laptop are:

i) Headache and eyes strain.

ii) Excessive use of laptop may distract him from studies.

iii) He will not be able to use his time properly.

10) Copyright is a type of intellectual property protection and licensing is a kind of risk control measure that can be applied to control copyright and less exposure, so the licensor (copyright owner) can grant permission that usually takes the form of a licensing agreement to use its copyrighted material. This agreement specifies the exact material to be used, purpose of the work and the duration of the license.

L2

1) In FOSS, source code is hidden from

a) All users b) Purchaser c) Only the vendor d) In FOSS source code is not hidden.

2) Mr. Raghavendra found that after posting some images in social media ,some people were writing negative messages. This is an instance of

(a) Phishing b) Trolling c) Hacking d) Spamming

3) Sneha found that her picture posted in a social networking site has been merged with an unknown person and published. What should she do?

a) Ignore the instance
b) Report it to the cyber crime cell
c) Try to delete the posts
d) Enjoy the instance.

4) A person complains that his/her debit/credit card is safe with him still somebody has done shopping /ATM transaction on this card.

a) Identity theft. b) Bank Fraud c) Cyber theft d) Cyber Crime

Assertion & Reasoning

Mark the correct choice as

a. Both A and R are true and R is the correct explanation for A
b. Both A and R are true and R is not the correct explanation for A
c. A is True but R is False
d. A is false but R is True

5) Assertion (A) : Cyber crime involves the use of computer and network in attacking computers and networks as well.

Reason(R) : Cyber bullying is an act of cyber law.

6) Assertion (A) : Scams committed over the Internet are called Online scams.

Reason (R) : It is a fraudulent business practice that extracts money from an unsuspecting, ignorant person called a Scam.

ANSWERS

1) Option d. In FOSS source code is not hidden.

2) Option b. Trolling

3) Option b. Report it to the cyber crime cell.

4) Option a. Identity theft

5) Option c. c. A is True but R is False

6) Option a. Both A and R are true and R is the correct explanation of A

L3

1) Any information created by us that exists in digital form is called

a) Digital footprint b) Cyber print c) Internet print d) Web finger print

2) A fraudulent process that extracts money from an ignorant person is called

a) Spamming b) Phishing c) Scam d) None of these

3) The term Intellectual property rights cover

a) Trademark b) Copyright c) Patents d) All of these

4) Using someone's Twitter handle to post something will be termed as

- a) Fraud b) Identity theft c) Online stealing d) Phishing
- 5) Which of the following are not ways of data protection?
- a) Using password b) Using User IDs
- c) Using encryption techniques. d) None of these
- 6) A mail or message sent to a large number of people indiscriminately without their consent is called _____.
- a) Spam b) Cookies c) Adware d) Malware
- 7) FOSS stands for _____
- a) For open source software
- b) Free and open set software
- c) Free and open source software
- d) None of the above

Short Answer Questions

- 8) List some health hazards related to excessive use of technology.
- 9) What is Intellectual Property (IP)? Give some examples.

ANSWERS

- 1) Option a. Digital footprint
- 2) Option c. Scam
- 3) Option d. All of these
- 4) Option b. Identity theft
- 5) Option b. Using User IDs
- 6) Option a. Spam
- 7) Option c. Free and open source software
- 8) 1. Neck strain
2. Vision Problem
3. Sense of isolation
4. Sleeping disorder
5. Stress
6. Loss of attention
7. Problem in social relationships of individuals.
8. Computer anxiety
9. Internet addiction etc.
- 9) It is a property which is scientific, innovatory invention created by a person or group of persons using their own intellect for ultimate use in commerce and which is already not available in the public domain.
- Following are examples of intellectual property :-
- These are an invention relating to a product or any process, a new design, a literary or artistic work and a trademark (a word, a symbol and /or a logo etc.)

BLUEPRINT

CLASS: XII

SUB: INFORMATICS PRACTICES (065)

S. No	Unit Name	Section A (1 mark)	Section B (2 marks)	Section C (3marks)	Section D (5 marks)	Section E (4 marks)	Total Marks
1	Data Handling Using Pandas	4*	3	2	-	1***	20
2	Data Visualization	-	-	-	1**	-	5
3	Database Query using SQL	6	2	2**	1**	1***	25
4	Introduction to Computer Networks	3*	1**	-	1	-	10
5	Societal Impacts	5	1**	1**	-	-	10
Section wise Total		18	14	15	15	8	70

* (One Assertion and Reasoning type question)

** (One Choice question)

*** (Internal choice for the last part only)

SAMPLE QUESTION PAPER - I
CLASS XII
INFORMATICS PRACTICES (065)

TIME: 3 HOURS

M.M.70

General Instructions:

1. This question paper contains five sections, Section A to E.
2. All questions are compulsory.
3. Section A have 18 questions carrying 01 mark each.
4. Section B has 07 Very Short Answer type questions carrying 02 marks each.
5. Section C has 05 Short Answer type questions carrying 03 marks each.
6. Section D has 03 Long Answer type questions carrying 05 marks each.
7. Section E has 02 questions carrying 04 marks each. One internal choice is given in Q35 against part c only.
8. All programming questions are to be answered using Python Language only.

PART A		
1.	25 computers in a school are connected to form a network. It is an example of: i. LAN ii. WAN iii. MAN iv. Internet	1
2.	Which of the following is not a type of cyber-crime? i. Phishing ii. Downloading attachment from email iii. Forgery iv. Cyber bullying	1
3.	_____ is the process of conversion of electronic devices into something that can be used again and again in some or the other manner i. Re-Using ii. Replaying iii. Recycling iv. None of the above	1
4.	Which of the following is not an aggregate function? i. Count() ii. Min() iii. Round() iv. Avg()	1

5.	<p>If column “Fees” contains the data set (5000,8000,7500,5000,8000), what will be the output after the execution of the given query?</p> <p>SELECT COUNT(DISTINCT Fees) FROM student ;</p> <p>i. 5 ii. 3 iii. 2 iv. 4</p>	1
6.	<p>‘F’ in FOSS stands for:</p> <p>i. Free ii. Friendly iii. Follow iv. None of the above</p>	1
7.	<p>Which SQL statement do we use to find out the number of distinct names present in the table Student?</p> <p>i. SELECT DISTINCT NAMES FROM ORDERS; ii. SELECT TOTAL (DISTINCT NAMES) FROM ORDERS; iii. SELECT COUNT(DISTINCT NAMES) FROM ORDERS; iv. SELECT SUM (DISTINCT NAMES) FROM ORDERS;</p>	1
8.	<p>Which one of the following aggregate function cannot be applied on columns with varchar datatype?</p> <p>i. SUM() ii. MIN() iii. COUNT() iv. MAX()</p>	1
9.	<p>Which one of the following functions is used to find the smallest value from the given data in MySQL?</p> <p>i. MINIMUM() ii. MIN() iii. SMALLEST() iv. SMALL()</p>	1
10.	<p>To display first 7 rows of a series object ‘S’, you may write:</p> <p>i. S.Head(7) ii. S.Tail(7) iii. S.head(7) iv. S.head()</p>	1
11.	<p>Which of the following statement will import pandas library?</p> <p>i. Import pandas as pd ii. import Pandas iii. import pandas as pd iv. both (ii) and (iii)</p>	1

12.	Which of the following cannot be used to specify the data while creating a DataFrame? i. Series ii. List of Dictionaries iii. Structured ndarray iv. All of these	1
13.	Which amongst the following is not an example of a browser? i. Opera ii. Internet Explorer iii. Avast iv. Edge	1
14.	In SQL, which function is used to display current date and time? i. Now() ii. Curdate () and Curtime() iii. Curdatetime () iv. Curdate ()	1
15.	_____ offers users the right to freely distribute and modify the original work, but only under the condition that the derivative works be licensed with the same rights. i. Copyright ii. Copyleft iii. GPL iv. FOSS	1
16.	_____ gets created through your data trail that you unintentionally leave online. i. Passive digital footprint ii. Inactive digital footprint iii. Digital footprint iv. Active digital footprint	1
Q17 and 18 are ASSERTION AND REASONING based questions. Mark the correct choice as i. Both A and R are true and R is the correct explanation for A ii. Both A and R are true and R is not the correct explanation for A iii. A is True but R is False iv. A is false but R is True		
17.	Assertion (A): - Internet cookies create some security and privacy concerns. Reasoning (R): - To make browsing the Internet faster & easier, its required to store certain information on the server's computer.	1
18.	Assertion (A): - ndim attribute in a series object will return 10 Reasoning (R): - Series is a one-dimensional data structure.	1

PART B																																								
19.	<p>Explain the terms Web page and Home Page.</p> <p style="text-align: center;">OR</p> <p>Mention any four networking goals.</p>	2																																						
20.	<p>A table called CCA contains the following columns – Event_ID, Event_Name, Winners, Points. Write a query in mySQL to display the total points secured by each house .</p> <p>Sample CCA Table:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Event_ID</th> <th>Event_Name</th> <th>Winners</th> <th>Points</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Group Song</td> <td>Blue</td> <td style="text-align: center;">50</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Display Board</td> <td>Green</td> <td style="text-align: center;">50</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Solo Dance</td> <td>Yellow</td> <td style="text-align: center;">20</td> </tr> <tr> <td style="text-align: center;">4</td> <td>English Recitaion</td> <td>Red</td> <td style="text-align: center;">20</td> </tr> <tr> <td style="text-align: center;">5</td> <td>Group Dance</td> <td>Blue</td> <td style="text-align: center;">50</td> </tr> <tr> <td style="text-align: center;">6</td> <td>Poster making</td> <td>Green</td> <td style="text-align: center;">50</td> </tr> </tbody> </table> <p>Expected Output:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>House</th> <th>Total Points</th> </tr> </thead> <tbody> <tr> <td>Blue</td> <td style="text-align: center;">100</td> </tr> <tr> <td>Green</td> <td style="text-align: center;">100</td> </tr> <tr> <td>Yellow</td> <td style="text-align: center;">20</td> </tr> <tr> <td>Red</td> <td style="text-align: center;">20</td> </tr> </tbody> </table>	Event_ID	Event_Name	Winners	Points	1	Group Song	Blue	50	2	Display Board	Green	50	3	Solo Dance	Yellow	20	4	English Recitaion	Red	20	5	Group Dance	Blue	50	6	Poster making	Green	50	House	Total Points	Blue	100	Green	100	Yellow	20	Red	20	2
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21.	<p>What is the purpose of Group By clause in SQL? Explain with the help of suitable example.</p>	2																																						
22.	<p>Consider following code and predict the output:</p> <pre>import pandas as pd S1 = pd.Series([31, 28, 31, 30, 31], index = ["Jan", "Feb", "Mar", "Apr", "May"]) print(S1[1 : 3] * 2)</pre>	2																																						

23.	List any four benefits of e-waste management. <p style="text-align: center;">OR</p> Explain any two cyber crimes.	2
24.	Write a program in Python to create a series of first five even number.	2
25.	Carefully observe the following code: <hr/> <pre> import pandas as pd Y1={"Q1":5000,"Q2":8000,"Q3":3500} Y2={"Q1":7000,"Q2":2000,"Q3":7500} Sales={1:Y1,2:Y2} Df=pd.DataFrame(Sales) print(Df) </pre> What will be the output of the above code?	2

SECTION C																																
26.	<p>Write outputs for SQL queries (i) to (iii) which are based on the given table PURCHASE:</p> <p style="text-align: center;">TABLE: PURCHASE</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>CNO</th> <th>CNAME</th> <th>CITY</th> <th>QUANTITY</th> <th>DOP</th> </tr> </thead> <tbody> <tr> <td>C01</td> <td>GURPREET</td> <td>NEW DELHI</td> <td>150</td> <td>2022-06-11</td> </tr> <tr> <td>C02</td> <td>MALIKA</td> <td>HYDERABAD</td> <td>10</td> <td>2022-02-10</td> </tr> <tr> <td>C03</td> <td>NADAR</td> <td>DALHOUSIE</td> <td>100</td> <td>2021-12-10</td> </tr> <tr> <td>C04</td> <td>SAHIB</td> <td>CHANDIGARH</td> <td>50</td> <td>2021-10-10</td> </tr> <tr> <td>C05</td> <td>MEHAK</td> <td>CHANDIGARH</td> <td>15</td> <td>2021-10-20</td> </tr> </tbody> </table> <p>i. SELECT SUBSTR(CNAME,-4,4) FROM PURCHASE WHERE QUANTITY<50;</p> <p>ii. SELECT CNAME FROM PURCHASE WHERE MONTH(DOP)=10;</p> <p>iii. SELECT MOD (QUANTITY, 3) FROM PURCHASE WHERE CITY= 'CHANDIGARH' AND QUANTITY>15;</p>	CNO	CNAME	CITY	QUANTITY	DOP	C01	GURPREET	NEW DELHI	150	2022-06-11	C02	MALIKA	HYDERABAD	10	2022-02-10	C03	NADAR	DALHOUSIE	100	2021-12-10	C04	SAHIB	CHANDIGARH	50	2021-10-10	C05	MEHAK	CHANDIGARH	15	2021-10-20	3
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27.	<p>Write a Python code to create a DataFrame with column headings as (stu_id, name, class) and data labels as (1,4,5,6) from the list given below:</p> <p>L1=[[101,'Guru',10],[102,'Raj',9],[103,'Sam' ,12],[104,'Yuvraj',12]]</p>	3																														
28.	<p>Consider the given DataFrame 'Stock':</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>Name</th> <th>Price</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Nancy Drew</td> <td>1390</td> </tr> <tr> <td>1</td> <td>Hardy boys</td> <td>1260</td> </tr> <tr> <td>2</td> <td>Diary of a wimpy kid</td> <td>2250</td> </tr> <tr> <td>3</td> <td>Harry Potter</td> <td>1500</td> </tr> </tbody> </table> <p>Write suitable Python statements for the following:</p> <p>i. Add a column called Discount with the following data: [5,30,17,10].</p> <p>ii. Add a new book named 'The Secret' having price 800 and discount 20.</p> <p>iii. Remove the row where index is 2 and 3.</p>		Name	Price	0	Nancy Drew	1390	1	Hardy boys	1260	2	Diary of a wimpy kid	2250	3	Harry Potter	1500	3															
	Name	Price																														
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29.	<p>Avantika has recently shifted to a new flat in a city and makes many friends in her locality. From the day she arrived to the new flat, she started to keep on getting messages from an unknown person, she neglected it. Later on she realised that her phone and all details in it got indirectly accessed and was under control of someone she was shocked.</p> <p>i. What do you think was happening to avantika, what is the term called for that?</p> <p>ii. What immediate action or measures should she take to handle it?</p> <p>iii. What was avantika's fault, from now on what she should be careful of to ensure that it doesn't happen again?</p>	3																														

	OR																																																																			
	What do you mean by cyber crime? in what ways it's happening and how can we avoid it?																																																																			
30.	<p>Based on table STUDENT given here, write suitable SQL queries for the following:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Roll No</th> <th>Name</th> <th>Class</th> <th>Gender</th> <th>City</th> <th>Marks</th> </tr> </thead> <tbody> <tr><td>1</td><td>Abhishek</td><td>XI</td><td>M</td><td>Agra</td><td>430</td></tr> <tr><td>2</td><td>Prateek</td><td>XII</td><td>M</td><td>Mumbai</td><td>440</td></tr> <tr><td>3</td><td>Sneha</td><td>XI</td><td>F</td><td>Agra</td><td>470</td></tr> <tr><td>4</td><td>Nancy</td><td>XII</td><td>F</td><td>Mumbai</td><td>492</td></tr> <tr><td>5</td><td>Himnashu</td><td>XII</td><td>M</td><td>Delhi</td><td>360</td></tr> <tr><td>6</td><td>Anchal</td><td>XI</td><td>F</td><td>Dubai</td><td>256</td></tr> <tr><td>7</td><td>Mehar</td><td>X</td><td>F</td><td>Moscow</td><td>324</td></tr> <tr><td>8</td><td>Nishant</td><td>X</td><td>M</td><td>Moscow</td><td>429</td></tr> <tr><td>9</td><td>Ishitha</td><td>XI</td><td>F</td><td>Banglore</td><td>427</td></tr> <tr><td>10</td><td>Rohan</td><td>X</td><td>M</td><td>Hyderabad</td><td>399</td></tr> </tbody> </table> <p>i. Display city wise average marks where average mark is above 400. ii. Display class wise highest marks. iii. Display total number of student from each city.</p> <p style="text-align: center;">OR</p> <p>Discuss the significance of Having clause in detail with the help of suitable example.</p>	Roll No	Name	Class	Gender	City	Marks	1	Abhishek	XI	M	Agra	430	2	Prateek	XII	M	Mumbai	440	3	Sneha	XI	F	Agra	470	4	Nancy	XII	F	Mumbai	492	5	Himnashu	XII	M	Delhi	360	6	Anchal	XI	F	Dubai	256	7	Mehar	X	F	Moscow	324	8	Nishant	X	M	Moscow	429	9	Ishitha	XI	F	Banglore	427	10	Rohan	X	M	Hyderabad	399	3
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	SECTION D																																																																			
31.	<p>Write suitable SQL query for the following:</p> <ol style="list-style-type: none"> Display 7 characters extracted from left from the string 'INDIA SHINING'. Display the position of occurrence of string 'rat' in the string 'Quadratically'. Round off the value 123.785 to two decimal place. Display the remainder of 400 divided by 12. Remove all the expected leading and trailing spaces from a column userid of the table 'USERS'. <p style="text-align: center;">OR</p> <p>Explain the following SQL functions using suitable examples.</p> <ol style="list-style-type: none"> INSTR() TRIM() NOW() DAY() POWER() 	5																																																																		
32.	<p>Prime Computer services Ltd. is an international educational organization. It is planning to set up its India campus at Mumbai with its head office in Delhi. The Mumbai office campus has four main buildings-ADMIN, ACCOUNTS, EXAMINATION and RESULT.</p>	5																																																																		

You as a network expert have to suggest the best network related solutions for their problems raised in (i) to (v), keeping in mind the distances between the buildings and other given parameters.

Shortest distances between various buildings:

ADMIN TO ACCOUNTS	55 m
ADMIN TO EXAMINATION	90 m
ADMIN TO RESULT	80m
ACCOUNTS TO EXAMINATION	55m
ACCOUNTS TO RESULT	50m
EXAMINATION TO RESULT	45 m
DELHI Head Office to MUMBAI campus	2150m

Number of computers installed at various buildings are as follows:

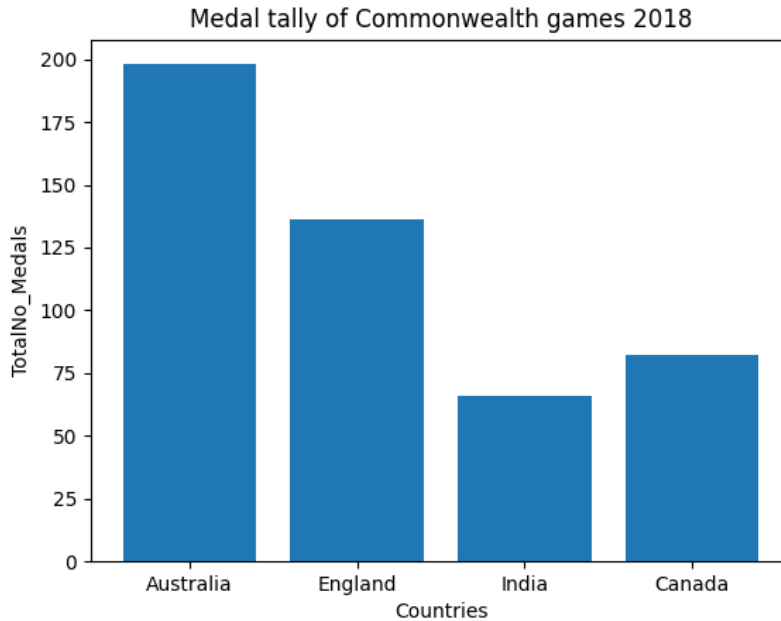
ADMIN	110
ACCOUNTS	75
EXAMINATION	40
RESULT	12
DELHI HEAD OFFICE	20

- (i) Suggest the most appropriate location of the server inside the MUMBAI campus (out of the four buildings) to get the best connectivity for maximum number of computers. Justify your answer.
- (ii) Suggest and draw cable layout to efficiently connect various buildings within the MUMBAI campus for a wired connectivity.
- (iii) Which networking device will you suggest to be procured by the company to interconnect all the computers of various buildings of MUMBAI campus?
- (iv) Company is planning to get its website designed which will allow students to see their results after registering themselves on its server. Out of the static or dynamic, which type of website will you suggest?
- (v) Which of the following will you suggest to set up the online face to face communication between the people in the ADMIN office of Mumbai campus and Delhi head office?
 - a) Cable TV
 - b) Email
 - c) Video conferencing
 - d) Text chat

33.

Write Python code to plot a bar chart for India's medal tally as shown below:

5



Also give suitable python statement to save this chart.

OR

Write a python program to plot a line chart based on the given data to depict the students performance in the monthly test.

Months=["AUG", "SEP", "OCT", "NOV"]
Avg_mark=[60,72,88,94]

SECTION E

34.

Shreya, a database administrator has designed a database for a clothing shop. Help her by writing answers of the following questions based on the given table:

TABLE: CLOTH

CCODE	CNAME	SIZE	COLOR	PRICE	DOP
C001	JEANS	XL	BLUE	990	2022-01-21
C002	T SHIRT	M	RED	599	2021-12-12
C003	SHIRT	M	GREY	399	2021-11-10
C004	SAREE	FREE	RED	1299	2019-11-12
C005	KURTI	L	WHITE	399	2021-12-07
C006	SHIRT	M	WHITE	699	2022-03-07
C007	KURTI	M	RED	799	2022-05-09

- i. Write a query to display cloth names in lower case.
- ii. Write a query to display the total price of the cloths.
- iii. Write a query to count total number of red colored cloths purchased of medium size.

1+1+2

	OR (Option for part iii only)	
	Write a query to count year wise total number of cloths purchased.	
35.	<p>Mr. Som, a data analyst has designed the DataFrame df that contains data about Computer Olympiad with 'CO1', 'CO2', 'CO3', 'CO4', 'CO5' as indexes shown below. Answer the following questions:</p> <p>A. Predict the output of the following python statement:</p> <ol style="list-style-type: none"> i. <code>df.axes</code> ii. <code>df.iat[2,3]</code> <p>B. Write Python statement to display the data of School and Topper column of indexes CO1 to CO4.</p> <p style="text-align: center;">OR (Option for part iii only)</p> <p>Write Python statement to compute and display the difference of data of Tot_students column and Topper column of the above given DataFrame.</p>	1+1+2

SAMPLE QUESTION PAPER-I

MARKING SCHEME

CLASS XII

INFORMATICS PRACTICES (065)

TIME: 3 HOURS

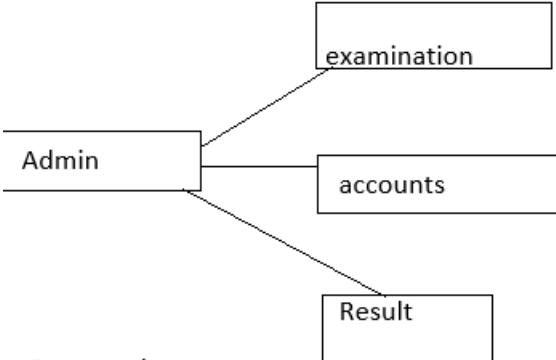
M.M.70

1.	iii. LAN 1 mark for correct answer	1
2.	ii. Downloading attachment from email 1 mark for correct answer	1
3.	iii. Recycling 1 mark for correct answer	1
4.	iii. Round() 1 mark for correct answer	1
5.	ii. 3 1 mark for correct answer	1
6.	i.Free 1 mark for correct answer	1
7.	ii. SELECT COUNT (DISTINCT NAMES) FROM ORDERS; 1 mark for correct answer	1
8.	i. SUM() 1 mark for correct answer	1
9.	ii. MIN () 1 mark for correct answer	1
10.	iii. S.head(7) 1 mark for correct answer	1
11.	iii. import pandas as pd 1 mark for correct answer	1
12.	iv. All of these	1

	1 mark for correct answer	
13.	iii. Avast 1 mark for correct answer	1
14.	iv. Now() 1 mark for correct answer	1
15.	i. Copyright 1 mark for correct answer	1
16.	iii. Passive Digital footprint 1 mark for correct answer	1
17.	iii. A is True but R is False	1
18.	iv. A is False but R is True	1
19.	<p>Web Page: A Web Page is a part of a website and is commonly written in HTML. It can be accessed through a web browser.</p> <p>Home Page: It is the first web page you see when you visit a website.</p> <p>1 mark for correct explanation of each term</p> <p style="text-align: center;">Or</p> <p>Four networking goals are:</p> <ul style="list-style-type: none"> i. Resource sharing ii. Reliability iii. Cost effective iv. Fast data sharing <p>½ mark for each goal</p>	2
20.	<p>Corrected Query:</p> <p>SELECT WINNERS AS HOUSE, SUM(POINTS) AS TOTAL POINTS FROM STUDENT GROUP BY WINNERS;</p> <p>1 Mark for error identification 1 Mark for writing correct query</p>	2

21.	<p>GROUP BY clause:</p> <p>The GROUP BY statement groups rows that have the same values into summary rows, like "find the number of customers in each country".</p> <p>The following SQL statement lists the number of customers in each country:</p> <pre>SELECT COUNT(CustomerID), Country FROM Customers GROUP BY Country;</pre> <p>1 mark for correct purpose 1 mark for correct example</p>	2			
22.	<pre>Feb 56 Mar 62 dtype: int64</pre> <p>1 mark for each correct python statement</p>	2			
23.	<p>The e-waste management-</p> <ul style="list-style-type: none"> i. Saves the environment and natural resources ii. Allows for recovery of precious metals iii. Protects public health and water quality iv. Saves landfill space <p>½ mark for each benefit</p> <p style="text-align: center;">Or</p> <p>List and define any two cyber crime(Hacking,Phising,Cyber Bullying/Cyber Stalking or any other)</p> <p>1 mark for each each cyber crime.</p>	2			
24.	<pre>import pandas as pd s1=pd.Series([2,4,6,8,10]) print(s1)</pre> <p>½ mark for import statement 1 mark for correct logic ½ mark for correct code</p>	2			
25.	<p style="text-align: center;">1 2</p> <p>Q1 5000 7000</p> <p>Q2 8000 2000</p> <p>Q3 3500 7500</p> <p>1 mark for each correct column</p>	2			
26.	<p>i.</p> <table border="1" style="margin-left: 20px;"> <tr><td>CName</td></tr> <tr><td>LIKA</td></tr> <tr><td>EHAK</td></tr> </table>	CName	LIKA	EHAK	3
CName					
LIKA					
EHAK					

	ii. <table border="1"> <tr><td>Cname</td></tr> <tr><td>SAHIB</td></tr> <tr><td>MEHAK</td></tr> </table> iii. <table border="1"> <tr><td>Mod(Quantity,3)</td></tr> <tr><td>2</td></tr> </table>	Cname	SAHIB	MEHAK	Mod(Quantity,3)	2	
Cname							
SAHIB							
MEHAK							
Mod(Quantity,3)							
2							
	1 mark for each correct output						
27.	<pre>import pandas as pd L1=[[101,'Guru',10],[102,'Raj',9],[103,'Sam' ,12],[104,'Yuvraj',12]] df=pd.DataFrame(L1,columns=['stu_id','Name', 'class'])</pre> 1 mark for each correct python statement	3					
28.	i. Stock['Discount']=[5,30,17,10] ii. Stock.loc['5']=["The Secret",800,20] iii. Stock=Stock.drop([2,3],axis=0) 1 mark for each correct statement	3					
29.	i. She has become a victim of cyber bullying and cyber stalking. ii. She must immediately bring it into the notice of her parents and school authorities. And she must report this cyber crime to local police with the help of her parents. iii. She should make sure not to share passwords, to logout from her account after use (any valid points) 1 mark for each correct answer	3					

30.	<p>i. select city,avg(marks) from student group by city having avg(marks)>400; ii. select class,max(marks) from student group by class; iii. select city,count(gender) from student group by city;</p> <p>1 mark for each correct query</p> <p style="text-align: center;">OR</p> <p>Having Clause is used to filter groups after applying Group By clause</p> <p>1 mark for correct significance 2 marks for correct example(sample table, query and output to be included in example)</p>	3
31.	<p>i. select LEFT('INDIA SHINING',7); ii. select INSTR('QUADRATICALLY','RAT'); iii. select round(123.785,2); iv. select mod(400,12); v. select trim(userid) from users;</p> <p>1 mark for each correct query</p>	5
	<p style="text-align: center;">OR</p> <p>½ mark for each correct explanation ½ mark for each correct example</p>	
32.	<p>i. Server should be installed in Admin department as it has maximum number of computers.</p> <p>ii.</p> <div style="text-align: center;">  <pre> graph TD Admin[Admin] --- examination[examination] Admin --- accounts[accounts] Admin --- Result[Result] </pre> <p>Star topology</p> </div> <p>iii. Hub/Switch iv. Dynamic v. Video conferencing</p>	5

33.	<pre>import matplotlib.pyplot as plt Category=["Australia","England","India","Canada"] Medal=[200,125,65,75] plt.bar(Category,Medal) plt.ylabel('Total Number of Medals') plt.xlabel('Countries') plt.title('Medal tally of commonwealth Games 2018') plt.show()</pre> <p>½ mark for each correct statement</p> <p>Python statement to save the chart:</p> <pre>plt.savefig("aa.jpg")</pre> <p>1 mark for the correct statement</p> <p style="text-align: center;">OR</p> <pre>Import matplotlib.pyplot as plt Months=["Aug","Sep","Oct","Nov"] Avg_mark=[60,72,88,94] plt.plot(Months,Avg_Mark) plt.show()</pre> <p>1 mark for each correct statement</p>	5
34	<p>i. SELECT LOWER(CNAME) FROM CLOTH;</p> <p>ii. SELECT SUM(PRICE) FROM CLOTH;</p> <p style="text-align: center;">1 mark for each correct query</p> <p>iii. SELECT COUNT(*) FROM CLOTH WHERE COLOR="RED"AND SIZE= "M";</p> <p style="text-align: center;">OR</p> <p> SELECT YEAR(DOP),COUNT(*) FROM CLOTH GROUP BY YEAR(DOP);</p> <p>2 marks for correct query</p>	1+1+2
35	<p>Output:</p> <p>i. [Index(['C01', 'C02', 'C03', 'C04', 'C05'], dtype='object'), Index(['School', 'Tot_students', 'Topper', 'First_Runnerup'] dtype='object')]</p> <p>ii. 2</p> <p style="text-align: center;">1 mark for each correct output</p> <p>B. Python statement:</p> <pre>print(df[["School", "Topper"]].loc[["C01": "C03"],:])</pre> <p style="text-align: right;">OR</p> <pre>print(df.Tot_students-df.Topper)</pre> <p>2 marks for correct Python statement</p>	

SAMPLE QUESTION PAPER - II
CLASS XII
INFORMATICS PRACTICES (065)

TIME: 3 HOURS

M.M.70

General Instructions:

1. This question paper contains five sections, Section A to E.
2. All questions are compulsory.
3. Section A have 18 questions carrying 01 mark each.
4. Section B has 07 Very Short Answer type questions carrying 02 marks each.
5. Section C has 05 Short Answer type questions carrying 03 marks each.
6. Section D has 03 Long Answer type questions carrying 05 marks each.
7. Section E has 02 questions carrying 04 marks each. One internal choice is given in Q35 against part c only.
8. All programming questions are to be answered using Python Language only.

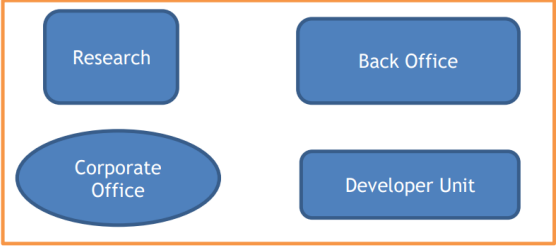
PART A		
1	Bluetooth is an example of: i. LAN ii. WAN iii. MAN iv. PAN	1
2	A person complains that somebody has created a fake profile of Facebook and defaming his/her character with abusive comments and pictures. i. Cyber bullying ii. Cyber stalking iii. Cyber theft iv. Cyber Crime	1
3	The process of re-selling old electronic goods at lower prices is called ____ i. Refurbishing ii. Recycle iii. Reuse iv. Reduce	1
4	Which function accepts a character string as an input and provides character string or numeric values as an output? i. Text ii. Date iii. Time iv. Math	1
5	If column “ Marks ” contains the data set (50,48,50,40, NULL), what will be the output	1

	<p>after the execution of the given query?</p> <p>SELECT AVG (Marks) FROM student;</p> <ul style="list-style-type: none"> i. 37.6 ii. 47 iii. 46 iv. 45 	
6	<p>Linux, MySQL and Mozilla Firefox software come under_____ category.</p> <ul style="list-style-type: none"> i. Proprietary ii. FOSS iii. Freeware iv. Shareware 	1
7	<p>The count(*) function returns :</p> <ul style="list-style-type: none"> i. Count of rows of a table ii. Count of Non Null values of a column iii. Count of Non Null rows iv. Count of Null values of a column 	
8	<p>Which of the following is not a Date function?</p> <ul style="list-style-type: none"> i. Month() ii. Year() iii. Now() iv. Pow() 	1
9	<p>Which one of the following functions is used to find the smallest value from the given data in MySQL?</p> <ul style="list-style-type: none"> i. MIN() ii. MINIMUM() iii. SMALL() iv. LEAST() 	1
10	<p>Function to delete rows of a Data Frame:</p> <ul style="list-style-type: none"> i. delete ii. drop iii. pop iv. del 	1
11	<p>Which python library is not used for data science?</p> <ul style="list-style-type: none"> i. Pandas ii. Numpy iii. Matplotlib iv. Tkinter 	1
12	<p>Which of the following import statement is not correct?</p> <ul style="list-style-type: none"> i. import pandas as class12 ii. import pandas as 1pd iii. import pandas as pd1 iv. import pandas as pd 	1
13	<p>A website is a collection of</p> <ul style="list-style-type: none"> i. web server ii. web page iii. web browser 	1

	iv. WWW	
14	In SQL, which function is used to display current date ? i. Date () ii. Time () iii. Curdate () iv. Now ()	1
15	GPL is primarily designed for providing public license to a _____ i. software ii. websites iii. literature iv. music	1
16	The digital data trail we leave online intentionally is called _____ i. Active digital footprints ii. Passive digital footprints iii. Current digital footprints iv. None of the above	1
Q17 and 18 are ASSERTION AND REASONING based questions. Mark the correct choice as i. Both A and R are true and R is the correct explanation for A ii. Both A and R are true and R is not the correct explanation for A iii. A is True but R is False iv. A is false but R is True		
17	Assertion (A) : Static webpage contains contents that do not chane. Reason (R) : They may only change if the actual HTML file is manually edited. Ans. Option i is correct.	1
18	Assertion (A) : A Series is a one-dimensional array containing a sequence of values of any data type (int, float, list, string, etc). Reason (R) : Pandas Series can be imagined as a column in a spreadsheet. Ans. Option i is correct.	1
PART B		
19	Differentiate between Web browser and Web server. Write any two popular web browsers. OR Write two advantages and two disadvantage of Star topology.	2
20	Gopi Krishna is using a table Employee. It has thefollowing columns : Code, Name, Salary, Dept_code He wants to display maximum salary department wise. He wrote the following command : SELECT Dept_code, Max(Salary) FROM Employee; But he did not get the desired result. Rewrite the above query with necessary changes to help him get the desired output.	2
21	What is the difference between order by and group by clause when used along with SELECT statement? Explain with an example.	2

22	<p>Consider a given Series, Subject :</p> <table border="1"> <thead> <tr> <th>Index</th> <th>Marks</th> </tr> </thead> <tbody> <tr> <td>English</td> <td>75</td> </tr> <tr> <td>Hindi</td> <td>78</td> </tr> <tr> <td>Maths</td> <td>82</td> </tr> <tr> <td>Science</td> <td>88</td> </tr> </tbody> </table> <p>Write a program in Python Pandas to create this series.</p>	Index	Marks	English	75	Hindi	78	Maths	82	Science	88	2																									
Index	Marks																																				
English	75																																				
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23	<p>What is the importance of Cyber Law?</p> <p style="text-align: center;">OR</p> <p>What is hacking ? Explain any two types of hackers.</p>																																				
24	<p>What is the output for following Python code:</p> <pre>import pandas as pd data = {"Marks1": 90, "Marks2": 95, "Marks3": 97} ser = pd.Series(data) print(ser)</pre>	2																																			
25	<pre>import pandas as pd data={"Year":[2010,2010,2012,2010,2012],"Month":["Jan","Mar","Jan", "Dec", "Dec"] ,"Passengers":[25,50,35,55,65]} df=pd.DataFrame(data) print(df)</pre> <p>Do the following:</p> <ol style="list-style-type: none"> Write statement to print the details of "January" month along with the number of passengers. Change the index of the Data Frame as ['Spice Jet', 'Jet', 'Emirates', 'Air India', 'Indigo'] 	2																																			
SECTION C																																					
26	<p>Write outputs for the SQL Queries (i) to (iii) which are based on the given table MOVIE.</p> <table border="1"> <thead> <tr> <th>NO</th> <th>TITLE</th> <th>TYPE</th> <th>RATING</th> <th>SEATSLEFT</th> <th>PRICE</th> <th>RDATE</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>SANJU</td> <td>BIOPIC</td> <td>A</td> <td>4</td> <td>250</td> <td>2022-02-08</td> </tr> <tr> <td>2</td> <td>RAID</td> <td>ACTION</td> <td>B</td> <td>2</td> <td>175</td> <td>2022-01-15</td> </tr> <tr> <td>3</td> <td>RACE3</td> <td>ACTION</td> <td>C</td> <td>7</td> <td>245</td> <td>2022-02-03</td> </tr> <tr> <td>4</td> <td>HAAMI</td> <td>COMEDY</td> <td>A</td> <td>3</td> <td>130</td> <td>2022-01-22</td> </tr> </tbody> </table> <ol style="list-style-type: none"> SELECT RIGHT(TITLE,3) FROM MOVIE WHERE PRICE>100; SELECT MOD(SEATS_LEFT,3) FROM MOVIE; SELECT TITLE FROM MOVIE WHERE DAY(RDATE)>15; 	NO	TITLE	TYPE	RATING	SEATSLEFT	PRICE	RDATE	1	SANJU	BIOPIC	A	4	250	2022-02-08	2	RAID	ACTION	B	2	175	2022-01-15	3	RACE3	ACTION	C	7	245	2022-02-03	4	HAAMI	COMEDY	A	3	130	2022-01-22	3
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4	HAAMI	COMEDY	A	3	130	2022-01-22																															
27	<p>Write a Python code to create a Data Frame with the following data and export that to a CSV file Sample.csv</p> <table border="1"> <thead> <tr> <th>Rollno</th> <th>Name</th> <th>Marks1</th> <th>Marks2</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Swapnil Sharma</td> <td>30</td> <td>50</td> </tr> </tbody> </table>	Rollno	Name	Marks1	Marks2	1	Swapnil Sharma	30	50	3																											
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	2	Raj Batra	75	45																																																		
	3	Bhoomi Singh	82	95																																																		
	4	Jay Gupta	90	95																																																		
28	<p>Consider the given Data Frame ‘Vaccine’ :</p> <table border="1"> <thead> <tr> <th></th> <th>TokenNo</th> <th>Vaccine</th> <th>Price</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>T567</td> <td>Covaxin</td> <td>780</td> </tr> <tr> <td>1</td> <td>T667</td> <td>Covishield</td> <td>900</td> </tr> <tr> <td>2</td> <td>T990</td> <td>Sputnik V</td> <td>1200</td> </tr> </tbody> </table> <p>Write suitable Python statements for the following:</p> <ol style="list-style-type: none"> Add a column labelled Discount with data [25,55,70]. Add a new row with data ['T1000','Covaxin',780] Modify Price after giving discount (ie.,Discount should be subtracted from Price) 					TokenNo	Vaccine	Price	0	T567	Covaxin	780	1	T667	Covishield	900	2	T990	Sputnik V	1200	3																																	
	TokenNo	Vaccine	Price																																																			
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2	T990	Sputnik V	1200																																																			
29	<p>Mr. Manoj who is a business man by profession faced following situations. Identify the type of crime for each situation/incident happened to him?</p> <ol style="list-style-type: none"> He was constantly receiving abusive emails Derogatory messages were posted on him online His laptop was controlled by somebody in an unauthorised way <p style="text-align: center;">OR</p> <p>What do you understand by Net Etiquettes? Explain any two such etiquettes.</p>				3																																																	
30	<p>Based on table Employee given here, write suitable SQL queries for the following:</p> <table border="1"> <thead> <tr> <th>Ecode</th> <th>Name</th> <th>Dept</th> <th>DOB</th> <th>Gender</th> <th>Designation</th> <th>Salary</th> </tr> </thead> <tbody> <tr> <td>101</td> <td>Sunita</td> <td>Sales</td> <td>06-06-1995</td> <td>F</td> <td>Manager</td> <td>25000</td> </tr> <tr> <td>102</td> <td>Neeru</td> <td>Office</td> <td>05-07-1993</td> <td>F</td> <td>Clerk</td> <td>12000</td> </tr> <tr> <td>103</td> <td>Raju</td> <td>Purchase</td> <td>05-06-1994</td> <td>M</td> <td>Manager</td> <td>26000</td> </tr> <tr> <td>104</td> <td>Neha</td> <td>Sales</td> <td>08-08-1995</td> <td>F</td> <td>Accountant</td> <td>18000</td> </tr> <tr> <td>105</td> <td>Nishant</td> <td>Office</td> <td>08-10-1995</td> <td>M</td> <td>Clerk</td> <td>10000</td> </tr> <tr> <td>106</td> <td>Vinod</td> <td>Purchase</td> <td>12-12-1994</td> <td>M</td> <td>Clerk</td> <td>10000</td> </tr> </tbody> </table> <ol style="list-style-type: none"> Display gender wise average salary. Display designation wise maximum salary. Display total number of employees in each Dept. <p style="text-align: center;">OR</p> <p>Explain health concerns related to overuse of technology.</p>				Ecode	Name	Dept	DOB	Gender	Designation	Salary	101	Sunita	Sales	06-06-1995	F	Manager	25000	102	Neeru	Office	05-07-1993	F	Clerk	12000	103	Raju	Purchase	05-06-1994	M	Manager	26000	104	Neha	Sales	08-08-1995	F	Accountant	18000	105	Nishant	Office	08-10-1995	M	Clerk	10000	106	Vinod	Purchase	12-12-1994	M	Clerk	10000	3
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SECTION D																																																						
31	<p>Write the SQL queries to perform the following operations:</p> <ol style="list-style-type: none"> To round off the value 123.2356 to two decimal places. To remove spaces from the beginning of a string, “ Python”. To display the name of the month eg, January or February from your date of birth. To display the starting position of word “Information” from “Information 				5																																																	

	<p>Technology”</p> <p>v. To compute the power of two numbers 3 and 4.</p> <p style="text-align: center;">OR</p> <p>Explain the following SQL functions using suitable examples.</p> <p>i. SUBSTR() ii. LEFT() iii. MOD() iv. MONTH() v. INSTR()</p>	
32	<p>A company in Cyntel Enterprises has 4 departments of buildings as shown in the diagram :</p>  <p>Center to center distances between various Buildings:</p> <p>Research to Back Office - 50m Back Office to Developer Unit - 60m Developer Unit to Corporate Office - 25m Corporate Office to Research - 170m Research to Developer Unit - 125m Back Office to w4 - 90m</p> <p>Number of computers in each of the department:</p> <p>Back Office - 150 Developer Unit - 15 Research -15 Corporate Office – 25</p> <p>Computers in each department are networked but departments are not networked The company has now decided to connect the departments also.</p> <p>i. Suggest a most suitable cable layout for the above connections. ii. Suggest the most appropriate topology of the connection between the departments. iii. The company wants internet accessibility in all the departments. Suggest a suitable technology. iv. Suggest the placement of the following devices with justification if the company wants minimized network traffic</p> <p>a) Repeater b) Hub /switch</p>	5

v. The company is planning to link its head office situated in New Delhi with the offices in hilly areas. Suggest a way to connect it economically.

33 Write code to draw the following bar graph representing the number of students in each class.

OR

Consider a Dataframe 'emp_df'.

Name	Age	Salary
Shalini	25	32000
Gaurav	31	35000
Bhavya	29	37000
Divansh	28	27000

Write a Python code to display a line graph with names on x-axis and age on y-axis. Give appropriate names for axis and title for the graph.

SECTION E

34 In a database there is a table 'LOAN' as shown below:

LOAN

Loan_number	Branch_name	Amount	LOANTYPE
L-170	Downtown	300000	HomeLoan
L-230	RedWood	400000	CarLoan
L-260	Perryridge	170000	EducationalLoan
L-215	RedWood	270000	HomeLoan

	<table border="1"> <tr> <td>L-300</td> <td>DownTown</td> <td>120000</td> <td>CarLoan</td> </tr> </table>	L-300	DownTown	120000	CarLoan																						
L-300	DownTown	120000	CarLoan																								
	<p>i. Write a query to display Branch name in Upper Case.</p> <p>ii. Write a query to display Loan Table data in the descending order of Amount.</p> <p>iii. Write a query to display count of Loan issued by Downtown and Perryridge branch.</p> <p style="text-align: center;">OR(Option for part iii only)</p> <p>Write a query to display total amount of HomeLoan and CarLoan.</p>																										
35	<p>Given here is a Data frame of Sales data of four months stored with name sales_df.</p> <table style="margin-left: 40px;"> <thead> <tr> <th></th> <th>April</th> <th>May</th> <th>June</th> <th>July</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>75</td> <td>90</td> <td>54</td> <td>67</td> </tr> <tr> <td>2</td> <td>78</td> <td>65</td> <td>87</td> <td>84</td> </tr> <tr> <td>3</td> <td>84</td> <td>79</td> <td>92</td> <td>79</td> </tr> <tr> <td>4</td> <td>65</td> <td>78</td> <td>94</td> <td>90</td> </tr> </tbody> </table> <p>A. Predict the output of the following python statements:</p> <p style="margin-left: 40px;">i. <code>sales_df.loc[1:2,'April':'May']</code></p> <p style="margin-left: 40px;">ii. <code>sales_df.columns</code></p> <p>B. iii. Write a Python statement to display the Sales data of July month of indexes 1 to 3.</p> <p style="text-align: center;">OR(Option for part iii only)</p> <p>Write a Python statement to compute and display the Sales difference between the months June and July.</p>		April	May	June	July	1	75	90	54	67	2	78	65	87	84	3	84	79	92	79	4	65	78	94	90	4
	April	May	June	July																							
1	75	90	54	67																							
2	78	65	87	84																							
3	84	79	92	79																							
4	65	78	94	90																							

SAMPLE QUESTION PAPER - II

MARKING SCHEME

TIME: 3 HOURS

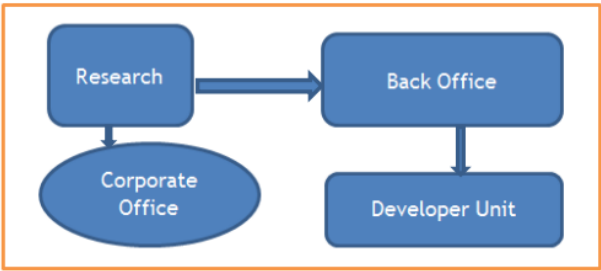
M.M.70

PART A		
1	iv. PAN	1
2	ii. Cyber Stalking	1
3	i Refurbishing	1
4	i Text	1
5	ii 47	1
6	ii FOSS	1
7	i. Count of rows of a table	
8	iv Pow()	1
9	i MIN()	1
10	ii. drop	1
11	iv. Tkinter	1
12	ii. import pandas as lpd	1
13	ii. webpage	1
14	iii. Curdate()	1
15	i. software	1
16	i. Active digital footprints	1
<p>Q17 and 18 are ASSERTION AND REASONING based questions. Mark the correct choice as</p> <p>i.Both A and R are true and R is the correct explanation for A</p> <p>ii.Both A and R are true and R is not the correct explanation for A</p> <p>iii. A is True but R is False</p> <p>iv.A is false but R is True</p>		
17	Option i is correct.	1
18	Option i is correct.	1
PART B		
19	<p>A web browser is a special software that enables the users to read/view web page and jump from one web page to another. It displays a webpage and interprets its HTML code. Eg. Microsoft Edge, Mozilla Firefox</p> <p>A web server is a computer that runs websites. It is a computer program that distributes web pages as they are requested. The basic objective of the web server is to store, process and deliver web pages to the users.</p> <p style="text-align: center;">OR</p> <p>Advantages:</p>	2

	<ul style="list-style-type: none"> i. We can easily increase computers in a network without any disturbance. ii. We can easily diagnose errors due to central device. <p>Disadvantages:</p> <ul style="list-style-type: none"> i. When central device(hub/switch) failed, entire network is collapsed. ii. More cable is required than bus topology 	
20	<pre>SELECT Deptcode, Max(Salary) FROM Employee GROUP BY Deptcode;</pre>	2
21	<p>The ORDER By clause is used to show the contents of a table / relation in a sorted manner with respect to the column mentioned after the order by clause. The contents of the column can be arranged in ascending or descending order.</p> <p>The GROUP By clause is used to group groups the rows together that contain the same values in a specified column.</p> <p>Write one example also.</p>	2
22	<pre>import pandas as pd Subject=pd.Series([75,78,82,88], index=['English', 'Hindi', 'Maths', 'Science']) print(Subject)</pre>	2
23	<p>Cyber law as it is the part of the legal systems that deals with the cyberspace, Internet and with the legal issues. It covers a broad area, like freedom of expressions, access to and utilization of the Internet, and online security or online privacy.</p> <p>It is important as it is concerned to almost all aspects of activities and transactions that take place either on the internet or other communication devices. Whether we are aware of it or not, but each action and each reaction in Cyberspace has some legal and Cyber legal views</p> <p style="text-align: center;">OR</p> <p>Hacking is the process of gaining unauthorized access into a computing device, or group of computer systems. This is done through cracking of passwords and codes which gives access to the systems.</p> <p>Black hat hackers or crackers are individuals with extraordinary computing skills, resorting to malicious /destructive activities. Black hat hackers use their knowledge and skill for their own personal gains probably by hurting others.</p> <p>White hat hackers are those individuals who use their hacking skills for defensive purposes. This means that the white hat hackers use their knowledge and skill for the good of others and for the common good.</p>	
24	<pre>Marks1 90 Marks2 95 Marks3 97 dtype: int16</pre>	2
25	<ul style="list-style-type: none"> i. <code>df[['Month', 'Passengers']][df['Month']=='Jan']</code> ii. <code>df.index=['Spice Jet', 'Jet', 'Emirates', 'Air India', 'Indigo']</code> 	2
SECTION C		
26		3

	<p>Ans:i</p> <pre> +-----+ RIGHT(TITLE,3) +-----+ NJU AID CE3 AMI +-----+ 4 rows in set (0.04 sec) </pre> <p>ii.</p> <pre> +-----+ MOD(SEATSLEFT,3) +-----+ +-----+ 4 rows in set (0.02 sec) </pre> <p>iii.</p> <pre> +-----+ TITLE +-----+ HAAMI +-----+ 1 row in set (0.02 sec) </pre>	
27	<pre> import pandas as pd d={'Rollno':[1,2,3,4],'Name':['Swapnil Sharma','Raj Batra','Bhoomi Singh','Jay Gupta'],'Marks1':[30,75,82,90],'Marks2':[50,45,95,95]} df=pd.DataFrame(d) df.to_csv('Sample.csv') </pre>	3
28	<p>i. Vaccine['Discount']=[25,55,70] ii. Vaccine.loc[3]=['T1000','Covaxin',780] iii. Vaccine['Price']=Vaccine['Price']-Vaccine['Discount']</p>	3
29	<p>i. Cyber Bullying ii. Cyber Trolls iii. Hacking</p> <p style="text-align: center;">OR</p> <p>Do</p> <ul style="list-style-type: none"> Keep Messages and Posts Brief 	3

	<ul style="list-style-type: none"> • Protect Personal Information • Obey Copyright Laws • Respect other people's privacy • Verify facts before reposting • Check messages and respond promptly • Show good sportsmanship when playing online games <p>Don't</p> <ul style="list-style-type: none"> • posting inflammatory /offensive comments shout • respond to Internet Trollers • Post private or embarrassing images/comments 	
30	<p>i. SELECT GENDER,AVG(SALARY) FROM EMPLOYEE GROUP BY GENDER;</p> <p>ii. SELECT DESIGNATION,MAX(SALARY) FROM EMPLOYEE GROUP BY DESIGNATION;</p> <p>iii. SELECT DEPT,COUNT(*) FROM EMPLOYEE GROUP BY DEPT;</p> <p style="text-align: center;">OR</p> <p>Physical Problems:</p> <ol style="list-style-type: none"> 1. Repetitive Strain Injury: The pain exists even when resting and as a result it becomes very difficult to accomplish even easy and ordinary tasks. 2. Computer Vision Syndrome: Experts believe that people blink their eyes more frequently while using computers than they do otherwise and that this can cause various eye and vision-related problems. 3. Radiation: Computer screens produce radiations of various types. These radiations can cause headaches and inattentiveness. 4. Sleeping disorders and decrease in productivity 5. Loss of attention and stress <p>Psychological Disorders:</p> <ul style="list-style-type: none"> • Fear of technology • Computer anxiety • Internet addiction 	3
	SECTION D	
31	<p>i) SELECT ROUND (123.2356,2);</p> <p>ii) SELECT LTRIM (“ Python“)</p> <p>iii) SELECT MONTHNAME(DOB)</p> <p>iv) SELECT INSTR (“Information Technology”, ”Information”)</p>	5

	<p>v)SELECT POW (3,4);</p> <p style="text-align: center;">OR</p> <p>SUBSTR() Returns the substring (part) of a string. Eg. SELECT SUBSTR('Python Programming',3,4); Output: thon</p> <p>LEFT() :Returns the extracted characters from left (beginning) side . Eg. SELECT LEFT('Informatics Practices',3); Output Inf</p> <p>MOD() : Returns remainder of one expression by dividing by another expression. Eg. SELECT MOD(11,3); Output 2</p> <p>INSTR() : Returns the index of the first occurrence of substring. Eg. SELECT INSTR('Welcome Home', 'om'); Output 5</p> <p>MONTH() : Returns the month from the date passed as argument. Eg. SELECT MONTH('2008-03-23'); Output 03</p>	
32	<p>i. Most suitable layout according to distance is:</p>  <p>ii. Star Topology iii. Broadband. iv. a. Not required. Repeaters may be skipped as per above layout (because distance is less than 100 m) b. In every wing v. Radio Waves</p>	5
33	<pre>import matplotlib.pyplot as plt Classes = ['VII','VIII','IX','X']</pre>	5

	<pre> Students = [40,45,35,44] plt.barh(Classes,Students) plt.title('Class wise Strength') plt.xlabel('Classes') plt.ylabel('Strength') plt.show() OR import matplotlib.pyplot as plt x = emp_df['Name'] y = emp_df['Age'] plt.plot(x,y) plt.xlabel("Name") plt.ylabel("Age") plt.title("Name vs Age") plt.show() </pre>	
SECTION E		
34	<p>i. SELECT UPPER(Branch_name) FROM LOAN;</p> <p>ii. SELECT * FROM LOAN ORDER BY AMOUNT DESC;</p> <p>iii. SELECT BRANCH_NAME,COUNT(*) FROM LOAN GROUP BY BRANCH_NAME HAVING BRANCH_NAME IN('DOWNTOWN','PERRYRIDGE');</p> <p style="text-align: center;">OR</p> <p>SELECT LOANTYPE,SUM(AMOUNT) FROM LOAN GROUP BY LOANTYPE HAVING LOANTYPE IN('HOMELoAN','CARLoAN');</p>	4
35	<p>A. i.</p> <pre> April May 1 78 65 2 84 79 </pre> <p>ii.Index(['April', 'May', 'June', 'July'], dtype='object')</p> <p>B. sales_df.loc[1:3,'July']</p> <p style="text-align: center;">OR</p> <pre> >>> diff=sales_df['June']-sales_df['July'] >>> print(diff) </pre>	4

SAMPLE QUESTION PAPER - III
CLASS XII
INFORMATICS PRACTICES (065)

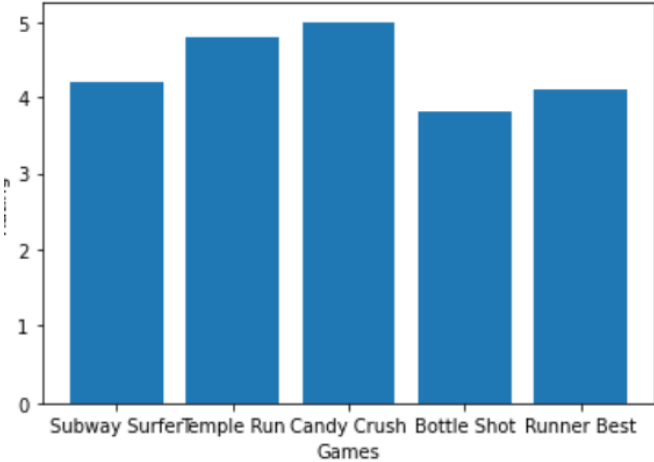
PART A		
1	<p>Akhilesh is transferring songs from his mobile to his friend's mobile via Bluetooth connection. Name the network used by Akhilesh</p> <p style="margin-left: 40px;">i. LAN ii. WAN iii. MAN iv. PAN</p>	1
2	<p>The school offers Wi-Fi to the students of Class XII. For communication, the network security-staff of the school is having a registered URL "schoolwifi.edu". One day, emails were received by all the students regarding expiry of their passwords. Instructions were also given renew their password within 24 hours by clicking on particular URL provided. Specify which type of cybercrime is it.</p> <p style="margin-left: 40px;">a) Spamming b) Phishing c) Identity Theft d) Hacking</p>	1
3	<p>Which amongst the following is not an example of browser?</p> <p style="margin-left: 40px;">a. Chrome b. Firefox c. Avast d. Edge</p>	1
4	<p>Write the output of the following SQL command.</p> <pre>select round(49.88);</pre> <p style="margin-left: 40px;">a. 49.88 b. 49.8 c. 49.0 d. 50</p>	1
5	<p>A table "Animals" in a database has 3 columns and 10 records. What is the degree and cardinality of this table</p> <p style="margin-left: 40px;">a)degree -10 cardinality ..3 b) degree -3 cardinality 10 c)degree -5 cardinality ..3 d)degree -3 cardinality 5</p>	1
6	<p>State whether True or False:</p> <p style="margin-left: 40px;">i. A copyright is automatically granted to authors or creators of content.</p> <p style="margin-left: 40px;">ii. In FOSS source code is usually hidden from the users. _____</p>	1

7	Out of the given query is SELECT SUBSTRING('practically',5);	1
8	Identify an aggregate fn a)orderby() b) count(*) c) groupby() d) upper()	1
9	To filter the groups returned by GROUP BY clause, we use a clause	1
10	Given a Pandas series called Sequences, the command which will display the first 4 rows is a. print(Sequences.head(4)) b. print(Sequences.Head(4)) c. print(Sequences.heads(4)) d. print(Sequences.Heads(4))	1
11	Which of the following statement/s will give the exact number of values in each column of the dataframe? i. print(df.count()) ii. print(df.count(0)) iii. print(df.count) iv. print(df.count(axis='index')) Choose the correct option: a. both (i) and (ii) b. only (ii) c. (i), (ii) and (iii) d. (i), (ii) and (iv)	1
12	Which of the following statement/s will give the exact number of values in each column of the dataframe? i. print(df.count()) ii. print(df.count(0)) iii. print(df.count) iv. print(df.count(axis='index')) Choose the correct option: a. both (i) and (ii) b. only (ii) c. (i), (ii) and (iii) d. (i), (ii) and (iv)	1
13	The address of location of the document on the World Wide Web is called its.....	1
14	Suppose a table BOOK contain columns (BNO, BNAME, AUTHOR, PUBLISHER), Raj is assigned a task to see the list of publishers, when he executed the query as: SELECT PUBLISHER FROM BOOK; He noticed that the same publisher name is repeated in query output. What could be possible solution to get publisher name uniquely? a)use unique keyword	1

	b) Use No duplicate keyword c) Use DISTINCT keyword d) Use No repeat	
15	Legal term to describe the rights of a creator of original creative or artistic work is: i. Copyright ii. Copyleft iii. GPL iv. FOSS	1
16	A digital document hosted on a website is _____	1
	Q17 and 18 are ASSERTION AND REASONING based questions. Mark the correct choice as i. Both A and R are true and R is the correct explanation for A ii. Both A and R are true and R is not the correct explanation for A iii. A is True but R is False iv. A is false but R is True	
17	Assertion (A): - Switch is intelligent Hub Reasoning (R): - It keeps a record of the MAC addresses of the devices attached to it	1
18	Assertion (A): - Series is a one-dimensional array like structure with homogeneous data Reasoning (R): - It is Size mutable and Data Mutable	1
	PART B	
19	Differentiate static and dynamic web page. OR Explain any two networking devices	2
20	Anjali writes the following commands with respect to a table employee having fields, empno, name, department, commission. Command1: Select count (*) from employee; Command2: Select count(commission) from employee; She gets the output as 4 for the first command but gets an output 3 for the second command. Explain the output with justification	2
21	Explain the use of GROUP BY in SQL.	2
22	Consider a given Series , Subject: INDEX MARKS ENGLISH 75 HINDI 78 MATHS 82 SCIENCE 86 Write a program in Python Pandas to create this series.	2

23	Expand the following terms related to Computer Networks: a. PPP b. HTTPS OR a)VoIP b)www	2																																				
24	Consider the series h1 0 12 1 23 2 34 3 27 (a) Write code to change the index as a1,a2,a3,a4. (b)Write the name of module imported to create series.	2																																				
25	Write python code to create the given dataframe using dictionary and display. code pname price 0 x01 Talcum powder 200 1 x02 Face wash 50 2 x03 Bath soap 40 3 x04 Shampoo 200 4 x05 Tooth paste 300	2																																				
SECTION C																																						
26	Write outputs for SQL queries (i) to (iii) which are based on the given table Table : Salesman <table border="1" style="margin-left: auto; margin-right: auto;"><thead><tr><th>Scode</th><th>Sname</th><th>Address</th><th>Dojoin</th><th>Sales</th><th>Area</th></tr></thead><tbody><tr><td>100</td><td>Amit</td><td>Delhi</td><td>2017/09/29</td><td>5000.90</td><td>East</td></tr><tr><td>101</td><td>Sushant</td><td>Gurgaon</td><td>2018/01/01</td><td>7000.75</td><td>East</td></tr><tr><td>102</td><td>Priya</td><td>Noida</td><td>2018/04/25</td><td>3450.45</td><td>West</td></tr><tr><td>103</td><td>Mohit</td><td>Delhi</td><td>2018/11/03</td><td>6000.50</td><td>North</td></tr><tr><td>104</td><td>Priyanshi</td><td>Delhi</td><td>2019/12/15</td><td>8000.62</td><td>North</td></tr></tbody></table> i) Select Sname from Salesman Where Address NOT IN(“Delhi”) ii) Select sname, round(sales,1) from salesman; iii) Select Right(Sname,3), Round(Sales) from Salesman Where Sname Like “P%”;	Scode	Sname	Address	Dojoin	Sales	Area	100	Amit	Delhi	2017/09/29	5000.90	East	101	Sushant	Gurgaon	2018/01/01	7000.75	East	102	Priya	Noida	2018/04/25	3450.45	West	103	Mohit	Delhi	2018/11/03	6000.50	North	104	Priyanshi	Delhi	2019/12/15	8000.62	North	3
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27	Write a Python code to create a DataFrame with appropriate column headings from the list given below: [[200,'Delhi',98],[300,'Mumbai',95],[300,'Kolkota' ,96],[400,'Chennai' ,88]]	3																																				
28	Consider the following DataFrame, classframe <table border="1" style="margin-left: auto; margin-right: auto;"><thead><tr><th></th><th>Rollno</th><th>Name</th><th>Class</th><th>Section</th><th>CGPA</th><th>Stream</th></tr></thead><tbody><tr><td>St1</td><td>1</td><td>Aman</td><td>IX</td><td>E</td><td>8.7</td><td>Science</td></tr><tr><td>St2</td><td>2</td><td>Preeti</td><td>X</td><td>F</td><td>8.9</td><td>Arts</td></tr><tr><td>St3</td><td>3</td><td>Kartikey</td><td>IX</td><td>D</td><td>9.2</td><td>Science</td></tr><tr><td>St4</td><td>4</td><td>Lakshay</td><td>X</td><td>A</td><td>9.4</td><td>Commerce</td></tr></tbody></table> Write commands to : i. Add a new column ‘Activity’ to the Dataframe ii. Add a new row with values (5 , Mridula ,X, F , 9.8, Science)		Rollno	Name	Class	Section	CGPA	Stream	St1	1	Aman	IX	E	8.7	Science	St2	2	Preeti	X	F	8.9	Arts	St3	3	Kartikey	IX	D	9.2	Science	St4	4	Lakshay	X	A	9.4	Commerce	3	
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St4	4	Lakshay	X	A	9.4	Commerce																																

	iii. Remove a column Section																																				
29	<p>Nadar has recently shifted to a new city and school. She does not know many people in her new city and school. But all of a sudden, someone is posting negative, demeaning comments on her social networking profile etc. She is also getting repeated mails from unknown people. Every time she goes online, she finds someone chasing her online. i. What is this happening to Nadar? ii. What immediate action should she take to handle it? iii. Is there any law in India to handle such issues? Discuss briefly.</p> <p>OR</p> <p>What do you understand by Cyber bullying? Why is it a punishable offence?</p>	3																																			
30	<p>A relation Vehicles is given below :</p> <table border="1"> <thead> <tr> <th>V_no</th> <th>Type</th> <th>Company</th> <th>Price</th> <th>Qty</th> </tr> </thead> <tbody> <tr> <td>AW125</td> <td>Wagon</td> <td>Maruti</td> <td>250000</td> <td>25</td> </tr> <tr> <td>J0083</td> <td>Jeep</td> <td>Mahindra</td> <td>4000000</td> <td>15</td> </tr> <tr> <td>S9090</td> <td>SUV</td> <td>Mitsubishi</td> <td>2500000</td> <td>18</td> </tr> <tr> <td>M0892</td> <td>Mini van</td> <td>Datsun</td> <td>1500000</td> <td>26</td> </tr> <tr> <td>W9760</td> <td>SUV</td> <td>Maruti</td> <td>2500000</td> <td>18</td> </tr> <tr> <td>R2409</td> <td>Mini van</td> <td>Mahindra</td> <td>350000</td> <td>15</td> </tr> </tbody> </table> <p>Write SQLcommands to:</p> <p>a. Display the average price of each type of vehicle having quantity more than 20.</p> <p>b. Count the type of vehicles manufactured by each company.</p> <p>c. Display the total price of all the types of vehicles</p> <p>OR</p> <p>Discuss the use of HAVING clause in detail with the help of suitable example.</p>	V_no	Type	Company	Price	Qty	AW125	Wagon	Maruti	250000	25	J0083	Jeep	Mahindra	4000000	15	S9090	SUV	Mitsubishi	2500000	18	M0892	Mini van	Datsun	1500000	26	W9760	SUV	Maruti	2500000	18	R2409	Mini van	Mahindra	350000	15	3
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R2409	Mini van	Mahindra	350000	15																																	
SECTION D																																					
31	<p>Write suitable SQL query for the following:</p> <p>i. Display first 5 characters extracted from the string 'Informatics Practices'.</p> <p>ii. Display the position of occurrence of string 'COME' in the string 'WELCOME WORLD'.</p> <p>iii. Round off the value 23.78 to one decimal place.</p> <p>iv. Display the current time and date.</p> <p>v. Remove all the expected leading and trailing spaces from a column userid of the table 'USERS'.</p> <p>OR</p> <p>Explain the following SQL functions using suitable examples.</p> <p>i. MONTH()</p> <p>ii. RTRIM()</p> <p>iii. INSTR()</p> <p>iv. DAYNAME()</p> <p>v. MOD()</p>	5																																			

32	<p>Cognisant technologies has set up their new center at Cochin for its office and web based activities. They have 4 blocks of buildings named Block A, Block B, Block C and Block D.</p> <table border="0"> <thead> <tr> <th>Name of Block</th> <th>No. of Computers</th> </tr> </thead> <tbody> <tr> <td>Block A</td> <td>25</td> </tr> <tr> <td>Block B</td> <td>50</td> </tr> <tr> <td>Block C</td> <td>125</td> </tr> <tr> <td>Block D</td> <td></td> </tr> </tbody> </table> <p>Distance between the Blocks</p> <table border="0"> <tbody> <tr> <td>Block A to Block B</td> <td>50m</td> </tr> <tr> <td>Block B to Block C</td> <td>150m</td> </tr> <tr> <td>Block C to Block D</td> <td>25m</td> </tr> <tr> <td>Block A to Block D</td> <td>170m</td> </tr> <tr> <td>Block B to Block D</td> <td>125m</td> </tr> <tr> <td>Block A to Block C</td> <td>90m</td> </tr> </tbody> </table> <p>Suggest the most suitable place (i.e. block) to house the server of this organization with a suitable reason.</p> <p>Suggest a cable layout of connections between the blocks.</p> <p>The organization is planning to link its front office situated in the city in a hilly region where cable connection is not feasible. Suggest an economic way to connect it with reasonably high speed.</p> <p>Describe where the following devices are required? (a) Hub/Switch (b) Repeater</p> <p>The organization is planning to link its Block E situated in the same city. Which type of network out of LAN, WAN, MAN can be considered? Justify.</p>	Name of Block	No. of Computers	Block A	25	Block B	50	Block C	125	Block D		Block A to Block B	50m	Block B to Block C	150m	Block C to Block D	25m	Block A to Block D	170m	Block B to Block D	125m	Block A to Block C	90m	10
Name of Block	No. of Computers																							
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33	<p>Mr. Sharma is working in a game development industry and he was comparing the given chart on the basis of the rating of the various games available on the play store. Write Python code to plot a bar chart.</p>  <table border="1"> <caption>Game Ratings</caption> <thead> <tr> <th>Game</th> <th>Rating</th> </tr> </thead> <tbody> <tr> <td>Subway Surfer</td> <td>4.2</td> </tr> <tr> <td>Temple Run</td> <td>4.8</td> </tr> <tr> <td>Candy Crush</td> <td>5.0</td> </tr> <tr> <td>Bottle Shot</td> <td>3.8</td> </tr> <tr> <td>Runner Best</td> <td>4.1</td> </tr> </tbody> </table> <p>Also give suitable python statement to save this chart.</p> <p>OR</p> <p>Write a python program to plot a line chart based on the given data to depict the marks of 5 students in English. Roll=[1,2,3,4]</p>	Game	Rating	Subway Surfer	4.2	Temple Run	4.8	Candy Crush	5.0	Bottle Shot	3.8	Runner Best	4.1	5										
Game	Rating																							
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	Marks=[40,42,38,44]																																				
	SECTION E																																				
34	<p>A Departmental store ‘Iconic’ is planning to automate its system so that they can store all the records on computer. They contacted a Software Company to make the software for the same. The company suggested that there is need of a front end and back-end software. The major challenge was to keep the record of all the items available in the store. To overcome the problem, the software company has shown the glimpses of the database and table required to resolve their problem: Table Name: Garment Attributes of the table: Gcode – Numeric, Gname – Character 25, Size - Character 5, Colour – Character 10, Price – Numeric Consider the following records in ‘Garment’ table and answer the given questions</p> <p style="text-align: center;">Table: GARMENT</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>GCODE</th> <th>GNAME</th> <th>SIZE</th> <th>COLOUR</th> <th>PRICE</th> </tr> </thead> <tbody> <tr> <td>111</td> <td>Tshirt</td> <td>XL</td> <td>Red</td> <td>1400.00</td> </tr> <tr> <td>112</td> <td>Jeans</td> <td>L</td> <td>Blue</td> <td>1600.00</td> </tr> <tr> <td>113</td> <td>Skirt</td> <td>M</td> <td>Black</td> <td>1100.00</td> </tr> <tr> <td>114</td> <td>Jacket</td> <td>XL</td> <td>Blue</td> <td>4000.00</td> </tr> <tr> <td>115</td> <td>Trousers</td> <td>L</td> <td>Brown</td> <td>1500.00</td> </tr> <tr> <td>116</td> <td>LadiesTop</td> <td>L</td> <td>Pink</td> <td>1200.00</td> </tr> </tbody> </table> <p>i) Write a query to delete the record with GCode as 116 ii) Write a query to change the colour of GARMENT with code as 116 to “Orange” iii) Write a query to display the table in the order of the price. OR (Option for part iii only) Write a query to find the count of the garments in each size.</p>	GCODE	GNAME	SIZE	COLOUR	PRICE	111	Tshirt	XL	Red	1400.00	112	Jeans	L	Blue	1600.00	113	Skirt	M	Black	1100.00	114	Jacket	XL	Blue	4000.00	115	Trousers	L	Brown	1500.00	116	LadiesTop	L	Pink	1200.00	1+1+2
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35	<p>Answer the following based on the series given below.</p> <pre>import pandas as pd list1=[1,2,3,4,5,6,7,8] list2=['swimming','tt','skating','kho kho', 'bb', 'chess', 'football',"cricket"] school=pd.Series(list1,index=list2) school.name=("little")</pre> <p>A. Predict the output i) print (school.tail(3)) ii) print (school[2:4]) B. Write the python statement to display the first 3 values OR Write python statement to display the Series.</p>																																				

SAMPLE QUESTION PAPER - III
MARKING SCHEME

PART A		
1	Ans: PAN	1
2	Ans: b) Phishing	1
3	Ans: c. Avast	1
4	Ans: d. 50	1
5	Ans:) degree -3 cardinality 10	1
6	Ans: i) True ii) False	1
7	Ans: tically	1
8	Ans: count(*)	1
9	Ans: HAVING	1
10	Ans: print(Sequences.head(4))	1
11	Ans: c	1
12	Ans: c	1
13	Ans: URL	1
14	Ans: Use DISTINCT keyword	1
15	Ans: Copyright	1
16	Ans: webpage	1

17	Ans: i	1
18	Ans:iii	1
	PART B	
19	<p>Ans: The static web pages display the same content each time when someone visits it.It takes less time to load over internet. In the dynamic Web pages, the page content changes according to the user.Dynamic web pages take more time while loading.</p> <p>OR</p> <p>Ans:</p> <p>Repeater</p> <ul style="list-style-type: none"> ▪ Data are carried in the form of signals over the cable ▪ Signals lose their strength beyond 100 m limit and become weak. ▪ The weakened signal appearing on the cable is regenerated and put back on the cable by a repeater <p>Hub</p> <ul style="list-style-type: none"> ▪ An Ethernet hub is a network device used to connect different devices through wires. ▪ Data arriving on any of the lines are sent out on all the other 	2
20	Ans: Count(*) counts null values while count() counts not null values only	2
21	Ans: The SQL GROUP BY clause is used to arrange identical data into groups.	2
22	Ans: import pandas as pd a = pd.Series(marks:[75,78,82,86],index=['ENGLISH', 'HINDI', 'MATHS', 'SCIENCE']) print(a)	2
23	<p>Ans:</p> <p>PPP-Point to Point Protocol b. HTTPS-Hypertext Transfer Protocol</p> <p>OR</p> <p>a)VoIP- Voice over Internet protocol b)www- World wide web</p>	2
24	<p>Ans:</p> <p>a) h1.rename(index=['a1', 'a2', 'a3', 'a4']) b) pandas</p>	2
25	<p>Ans:</p> <pre>import pandas as pd details = { 'Code' : ['x01', 'x02', 'x03', 'x04', 'x05'], 'pname' : ['Talcum powder', 'Face wash', 'Bath Soap', 'Shampoo', 'Tooth paste',</pre>	2

	<pre>'price' : [200, 50,40,200,300]} df = pd.DataFrame(details) print(df)</pre>																						
	SECTION C																						
26	<p>Ans: i)</p> <table border="1"> <tr><td>Sname</td></tr> <tr><td>Sushant</td></tr> <tr><td>Priya</td></tr> </table> <p>ii)</p> <table border="1"> <thead> <tr><th>Sname</th><th>round(sales,1)</th></tr> </thead> <tbody> <tr><td>Amit</td><td>5000.9</td></tr> <tr><td>Sushant</td><td>7000.7</td></tr> <tr><td>Priya</td><td>3450.5</td></tr> <tr><td>Mohit</td><td>6000.5</td></tr> <tr><td>Priyanshi</td><td>8000.6</td></tr> </tbody> </table> <p>iii)</p> <table border="1"> <thead> <tr><th>Right(Sname,3)</th><th>Round(Sales)</th></tr> </thead> <tbody> <tr><td>iya</td><td>3450</td></tr> <tr><td>shi</td><td>8001</td></tr> </tbody> </table>	Sname	Sushant	Priya	Sname	round(sales,1)	Amit	5000.9	Sushant	7000.7	Priya	3450.5	Mohit	6000.5	Priyanshi	8000.6	Right(Sname,3)	Round(Sales)	iya	3450	shi	8001	3
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Right(Sname,3)	Round(Sales)																						
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27	<p>Ans: import pandas as pd details = { 'Id' : [200,300,300,400], 'City' : ['Delhi','Mumbai','Kolkota','Chennai'], 'Populationinlakhs' : [98,95,96,88]}</p> <pre>df = pd.DataFrame(details) print(df)</pre>	3																					
28	<p>i. Add a new column 'Activity' to the Dataframe Ans: classframe['Activity']=['dancing','singing','sports','dancing']</p> <p>iv. Add a new row with values (5 , Mridula ,X, F , 9.8, Science) Ans: classframe.loc[len(classframe.index)] = [5 , 'Mridula' , 'X' , 'F' , 9.8, 'Science']</p> <p>v. Remove a column Section Ans: del classframe['Section']</p>	3																					
29	<p>Ans: i. Namita has become a victim of cyber bullying and cyber stalking.</p>	3																					

	<p>ii. She must immediately bring it to the notice of her parents and school authorities. And she must report this cybercrime to local police with the help of her parents.</p> <p>iii. Yes, IT Act, 2000</p> <p>iv.</p> <p>OR</p> <p>What do you understand by Cyber bullying? Why is it a punishable offence?</p> <p>Ans: Any insulting, degrading or intimidating online behaviour like repeated posting of rumors, giving threats online, posting the victim’s personal information, sexual harassment or comments aimed to publicly ridicule a victim is termed as cyber bullying. It implies repeatedly targeting someone with intentions to hurt or embarrass. We need to realize that bullying online can have very serious implications on the other person (victim).</p>	
30	<p>Ans:</p> <p>a. <code>SELECT AVG(Price) FROM Vehicles WHERE Quantity >20 GROUP BY Type;</code></p> <p>b. <code>SELECT COUNT(Type) FROM Vehicles GROUP BY Type;</code></p> <p>c. <code>SELECT SUM(Price) FROM Vehicles;</code></p> <p>OR</p> <p>Ans:</p> <p>HAVING Clause in SQL is used to specify conditions on the rows with GROUP BY clause.</p> <p>Eg:</p> <p><code>SELECT CustID, COUNT(*) FROM SALE GROUP BY CustID HAVING Count(*)>1</code></p> <ul style="list-style-type: none"> • Display customer id and number of cars purchased if the customer purchased more than one car from the sale table. 	3
SECTION D		
31	<p>Write suitable SQL query for the following:</p> <p>i. Display first 5 characters extracted from the string ‘Informatics Practices’.</p> <p>Ans: <code>Select LEFT(‘Informatics Practices’,5);</code></p> <p>ii. Display the position of occurrence of string ‘COME’ in the string ‘WELCOME WORLD’.</p> <p>Ans: <code>SELECT INSTR(‘WELCOME WORLD’,’COME’);</code></p> <p>iii. Round off the value 23.78 to one decimal place.</p> <p>Ans: <code>SELECT ROUND(2378,1);</code></p> <p>ii. Display the current time and date.</p> <p>Ans: <code>select NOW();</code></p> <p>iii. Remove all the expected leading and trailing spaces from a column userid of the table ‘USERS’.</p> <p>Ans: <code>SELECT TRIM(USERID) FROM USERS;</code></p> <p>OR</p> <p>Explain the following SQL functions using suitable examples.</p> <p>i. MONTH()-</p> <p>Ans: : Returns the month from the date passed as argument.</p> <p>Example: <code>SELECT MONTH(‘2020-03-21’); Result:3</code></p>	5

ii. RTRIM()
 Ans:
 Removes trailing spaces. Example: SELECT RTRIM(' INFOR MATICS '); Result: ' INFOR MATICS'

iii. INSTR()
 Ans:
 Returns the index of the first occurrence of substring. Example: (i) SELECT INSTR('Informatics',' mat'); Result: 6 (since 'm' of 'mat' is at 6th place)

iv. DAYNAME() :
 Ans:
 Returns the name of the weekday. Example: SELECT DAYNAME('2010-07-21'); Result: WEDNESDAY

v. MOD()
 Ans:
 Divides x by y and gives the remainder. (i)SELECT MOD(12,5); Result: 2

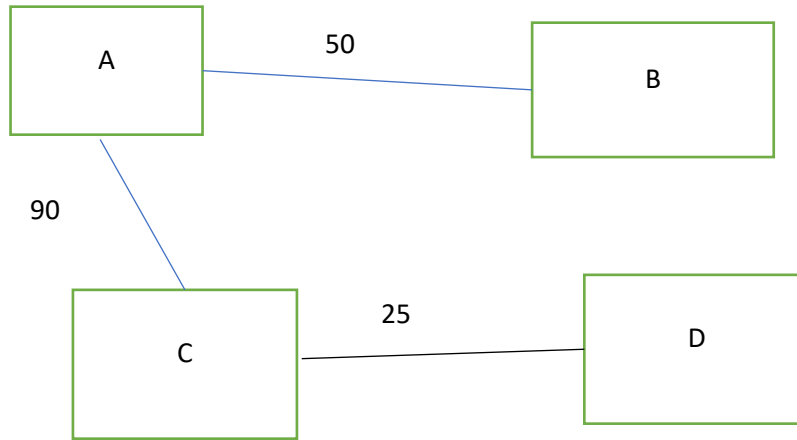
32 Cognisant technologies has set up their new center at Cochin for its office and web based activities. They have 4 blocks of buildings named Block A, Block B, Block C and Block D.

Name of Block	No. of Computers	
Block A	25	
Block B	50	
Block C	125	
Block D		10
Distance between the Blocks		
Block A to Block B	50m	
Block B to Block C	150m	
Block C to Block D	25m	
Block A to Block D	170m	
Block B to Block D	125m	
Block A to Block C	90m	

Suggest the most suitable place (i.e. block) to house the server of this organization with a suitable reason.

Ans: Block C-maximum number of computers

Suggest a cable layout of connections between the blocks.



The organization is planning to link its front office situated in the city in a hilly region where cable connection is not feasible. Suggest an economic way to connect it with reasonably high speed.

Ans: Microwave

Describe where the following devices are required?

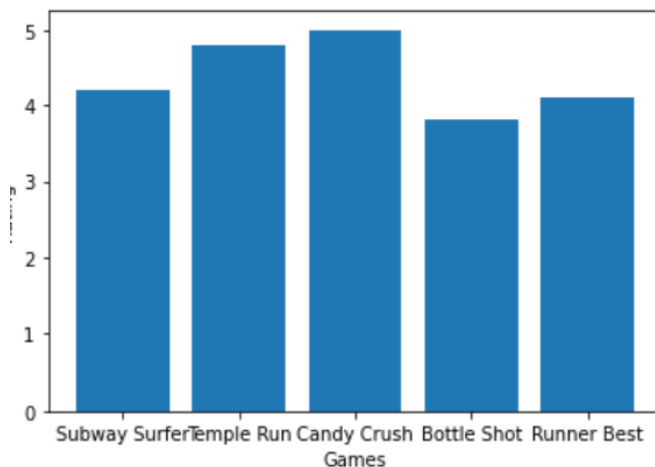
(a) Hub/Switch – In all blocks (b) Repeater- No need since the distances between blocks are below 100 m

The organization is planning to link its Block E situated in the same city. Which type of network out of LAN, WAN, MAN can be considered? Justify.

Ans: Metropolitan Area Network (MAN): covers a larger geographical area like a city or a town.

- Can be extended up to 30-40 kms

- 33 Mr. Sharma is working in a game development industry and he was comparing the given chart on the basis of the rating of the various games available on the play store. Write Python code to plot a bar chart. 5



Also give suitable python statement to save this chart.

Ans:

```
plt.bar(['Subway', 'Surfer', 'TempleRun', 'CandyCrush', 'BottleShot', 'RunnerBest', [1,2,3,4,5])
```

```
plt.xlabel('Games' )
plt.ylabel('Rating')
plt.show()
plt.savefig()
```

OR

Write a python program to plot a line chart based on the given data to depict the marks of 5 students in English.

```
Roll=[1,2,3,4]
Marks=[40,42,38,44]
```

Ans:

```
import matplotlib as plt
Roll=[1,2,3,4]
Marks=[40,42,38,44]
plt.plot(Roll,Marks)
plt.title('English Marks')
plt.xlabel('Rollnumbers' )
plt.ylabel('Marks')
plt.show()
plt.savefig()
```

SECTION E

- 34 A Departmental store 'Iconic' is planning to automate its system so that they can store all the records on computer. They contacted a Software Company to make the software for the same. The company suggested that there is need of a front end and back-end software. The major challenge was to keep the record of all the items available in the store. To overcome the problem, the software company has shown the glimpses of the database and table required to resolve their problem:
Table Name: Garment
Attributes of the table: Gcode – Numeric, Gname – Character 25, Size - Character 5, Colour – Character 10, Price – Numeric
Consider the following records in 'Garment' table and answer the given questions

Table: GARMENT

GCODE	GNAME	SIZE	COLOUR	PRICE
111	Tshirt	XL	Red	1400.00
112	Jeans	L	Blue	1600.00
113	Skirt	M	Black	1100.00
114	Jacket	XL	Blue	4000.00
115	Trousers	L	Brown	1500.00
116	LadiesTop	L	Pink	1200.00

- i) Write a query to delete the record with GCode as 116

Ans:

```
DELETE * FROM GARMENT WHERE GCODE=116;
```

- ii) Write a query to change the colour of GARMENT with code as 116 to "Orange"

	<p>Ans: UPDATE GARMENT SET COLOUR='ORANGE' WHERE CODE=116;</p> <p>iii) Write a query to display the table in the order of the price. Ans: SELECT * FROM GRAMENT ORDER BY PRICE; OR (Option for part iii only) Write a query to find the count of the garments in each size. Ans: SELECT GNAME, COUNT(GNAME) FROM GARMENTS GROUP BY SIZE;</p>	
35	<p>Answer the following based on the series given below.</p> <pre>import pandas as pd list1=[1,2,3,4,5,6,7,8] list2=['swimming','tt','skating','kho kho', 'bb', 'chess', 'football',"cricket"] school=pd.Series(list1,index=list2) school.name=("little")</pre> <p>A. Predict the output</p> <p>i) print (school.tail(3))</p> <p>Ans: chess 6 football 7 cricket 8</p> <p>ii) print (school[2:4])</p> <p>Ans: skating 3 kho kho 4</p> <p>B. Write the python statement to display the first 3 values Ans: print (school.head(3))</p> <p>OR Write python statement to display the Series.</p> <p>Ans: print(school)</p>	

**SAMPLE QUESTION PAPER - IV
CLASS XII
INFORMATICS PRACTICES (065)**

TIME: 3 HOURS

M.M.70

General Instructions:

1. This question paper contains five sections, Section A to E.
2. All questions are compulsory.
3. Section A have 18 questions carrying 01 mark each.
4. Section B has 07 Very Short Answer type questions carrying 02 marks each.
5. Section C has 05 Short Answer type questions carrying 03 marks each.
6. Section D has 03 Long Answer type questions carrying 05 marks each.
7. Section E has 02 questions carrying 04 marks each. One internal choice is given in Q35 against part c only.
8. All programming questions are to be answered using Python Language only.

SECTION A

1)	Uploading photo from mobile phone to Desktop computer is an example of _____ a) LAN b) PAN c) MAN d) WAN	1
2)	Using Someone else's twitter handle to post something is termed as a) Fraud b) Identity theft c) Online stealing d) Violation	1
3)	Following are the impact of e-waste on the environment. Choose the odd one out. a) Soil Pollution b) Water Pollution c) Air Pollution d) Sound Pollution	1
4)	The practice of taking confidential information from you through an original looking site and URL is known as _____ a) Plagiarism b) Phishing c) Hacking d) Cookies	1
5)	If column "Salary" contains the data set (20000,30000,NULL,10000), what will be the output after the execution of the given query? select avg(salary) from empl; a) 15000 b) 20000 c) 10000	1

	d) 60000	
6)	OSS stands for _____ a) Open system Service b) Open Source Software c) Open system Software d) Open Synchronized Software	1
7)	SQL command that removes trailing spaces from a given string is _____ a) rtrim() b) ltrim() c) right() d) left()	1
8)	The avg() function in MySQL is an example of a) Math Function b) Text Function c) Date Function d) Aggregate Function	1
9)	Write the SQL command that will display the time and date at which the command got executed. a) Select sysdate(); b) Select now(); c) Select curdate(); d) Both (i) and (ii)	1
10)	Pandas series is: a) 2 dimensional b) 1 dimensional c) 3 dimensional d) Multi dimensional	1
11)	The command to install Pandas is: a) install pip pandas b) install pandas c) pip pandas d) pip install pandas	1
12)	In Pandas the function used to delete a column in a DataFrame is a) remove b) delete c) drop d) cancel	1
13)	For web pages where the information is changed frequently, for example, stock prices, weather information which out of the following options would you advise? a) Static web page b) Dynamic web page c) Animated web page d) Home page	1
14)	Write the output of the following SQL command. select round (49.88); a) 49.88 b) 49.8	1

	c) 49.0 d) 50	
15)	Which of the following is not a violation of IPR? a) Plagiarism b) Copyright Infringement c) Patent d) Trademark Infringement	1
16)	A patent protects an invention for _____ years, after which it can be freely used. a) 10 b) 20 c) 30 d) 40	1
Q17 and 18 are ASSERTION AND REASONING based questions. Mark the correct choice as i. Both A and R are true and R is the correct explanation for A ii. Both A and R are true and R is not the correct explanation for A iii. A is True but R is False iv. A is false but R is True		
17)	Assertion(A):Digital Footprints are also termed as Digital Tattoos Reason(R): A digital tattoo can also refer to the record of someone’s actions and communications online and its permanence like a physical tattoo	1
18)	Assertion(A): List of dictionaries can be passed to form a DataFrame Reason(R): Keys of dictionaries are taken as row names by default	1
SECTION B		
19)	Explain the differences between Static web page and Dynamic web page (or) Differentiate between LAN and WAN	2
20)	To display the sum of salary paid to KARATE coaches of each gender, Ravi has written the following command but unable to get the desired result, help him to identify the error and write the correct query by suggesting the possible reason Select sex, sum(pay) from club group by sex where sports= “KARATE”;	2
21)	What is the difference between a WHERE clause and a HAVING clause in SQL SELECT statement?	2
22)	Write a program to create a series object using a dictionary that stores the number of employees in each department of XYZ company. Note: Assume there are five departments namely SALES, ACCOUNTS, COMPUTER, PURCHASE,PRODUCTION with 120,10,5,50,200 respectively	2
23)	What is e-waste? What is the procedure to dispose e-waste? (or) Sita has recently shifted to a new house. She does not know many people in her new street. But all of a sudden, someone starts posting negative, demeaning comments on her social networking profile, college site’s forum, etc. She is also getting repeated mails from unknown people. Every time she goes online, she finds someone chasing her online. (i) What is happening to Sita? (ii) What action should she take to stop them?	2
24)	Find the output of the following: import pandas as pd s=pd.Series(index=[111,222,333,444,555],data=[11,22,33,44,55])	2

	print(s[s%2==0])																																									
25)	<p>Carefully observe the following code</p> <pre>import pandas as pd import numpy as np data = {'Ramya': {'Age': 35,'Desg':'PGT', 'Address': 'Portblair','dob':'12-12-1987'}, 'Priya': {'Age': 28,'Desg':'TGT', 'Address': 'Chennai','Salary':65000}, 'Suresh': {'Age': 25, 'Desg':'PRT','Address': 'Madurai'}}</pre> <p>df= pd.DataFrame(data) print(df)</p> <p>Answer the following:</p> <ol style="list-style-type: none"> Give the command to list all row labels of df, and give the output of the same Give the commands to find the dimension and shape of dataframe df 	2																																								
SECTION C																																										
26)	<p>Write outputs for SQL queries (i) to (iii) which are based on the given table AGENT:</p> <p>TABLE AGENT</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="border: none;">AGENT_CODE</th> <th style="border: none;">AGENT_NAME</th> <th style="border: none;">WORKING_AREA</th> <th style="border: none;">COMMISSION</th> <th style="border: none;">PHONE_NO</th> </tr> </thead> <tbody> <tr><td style="border: none;">A001</td><td style="border: none;">Subbarao</td><td style="border: none;">Bangalore</td><td style="border: none;">1100</td><td style="border: none;">077-12346674</td></tr> <tr><td style="border: none;">A002</td><td style="border: none;">Mukesh</td><td style="border: none;">Mumbai</td><td style="border: none;">1000</td><td style="border: none;">029-12358964</td></tr> <tr><td style="border: none;">A003</td><td style="border: none;">Alex</td><td style="border: none;">London</td><td style="border: none;">2000</td><td style="border: none;">075-12458969</td></tr> <tr><td style="border: none;">A005</td><td style="border: none;">Anderson</td><td style="border: none;">Brisban</td><td style="border: none;">1100</td><td style="border: none;">045-21447739</td></tr> <tr><td style="border: none;">A006</td><td style="border: none;">McDen</td><td style="border: none;">London</td><td style="border: none;">1600</td><td style="border: none;">078-22255588</td></tr> <tr><td style="border: none;">A011</td><td style="border: none;">Ravi Kumar</td><td style="border: none;">Bangalore</td><td style="border: none;">1500</td><td style="border: none;">077-45625874</td></tr> <tr><td style="border: none;">A012</td><td style="border: none;">Lucida</td><td style="border: none;">San Jose</td><td style="border: none;">1200</td><td style="border: none;">044-52981425</td></tr> </tbody> </table> <ol style="list-style-type: none"> SELECT AGENT_NAME, WORKING_AREA FROM AGENT WHERE LENGTH(WORKING_AREA)>6; SELECT SUBSTR(AGENT_NAME,2,3) FROM AGENT WHERE COMMISSION>1200; SELECT INSTR(AGENT_NAME,'A') ,MOD(COMMISSION,200) FROM AGENT WHERE WORKING_AREA LIKE '%A%'; 	AGENT_CODE	AGENT_NAME	WORKING_AREA	COMMISSION	PHONE_NO	A001	Subbarao	Bangalore	1100	077-12346674	A002	Mukesh	Mumbai	1000	029-12358964	A003	Alex	London	2000	075-12458969	A005	Anderson	Brisban	1100	045-21447739	A006	McDen	London	1600	078-22255588	A011	Ravi Kumar	Bangalore	1500	077-45625874	A012	Lucida	San Jose	1200	044-52981425	3
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27)	<p>Write a Python code to create a DataFrame 'df' with column headings as ['Sports_Id', 'Name', 'Student', 'Team'] and row labels as ['s1','s2','s3','s4'] using the list given below: [[1,'Hockey',15,'B'], [2,'Cricket',20,'D'], [3,'Chess',4,'C'], [4,'Carrom',4,'A']]</p>	3																																								
28)	<p>Consider the dataframe 'Person':</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="border: none;">Id</th> <th style="border: none;">Name</th> <th style="border: none;">Salary</th> </tr> </thead> <tbody> <tr><td style="border: none;">0</td><td style="border: none;">101 Ravikumar</td><td style="border: none;">25000</td></tr> <tr><td style="border: none;">1</td><td style="border: none;">102 Amala</td><td style="border: none;">30000</td></tr> <tr><td style="border: none;">2</td><td style="border: none;">103 Sweety</td><td style="border: none;">15000</td></tr> </tbody> </table> <p>Write suitable Python statements for the following:</p> <ol style="list-style-type: none"> Add a column called Comm as 10% of Salary Add a new person 'Ramesh' with id as '104' and salary as 40000 Remove the row with index as 1 	Id	Name	Salary	0	101 Ravikumar	25000	1	102 Amala	30000	2	103 Sweety	15000	3																												
Id	Name	Salary																																								
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2	103 Sweety	15000																																								
29)	<p>What do you mean by Identity theft? Explain with the help of an example. (or) What is Phishing? Write any two precautions that you would take to avoid being victim of phishing.</p>	3																																								

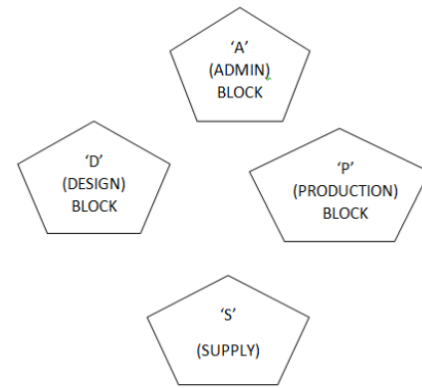
30)	<p>A relation Product is given below :</p> <table border="1"> <thead> <tr> <th>P_ID</th> <th>PNAME</th> <th>Manufacturer</th> <th>Price</th> <th>Qty</th> </tr> </thead> <tbody> <tr> <td>TP01</td> <td>TalcumPowder</td> <td>LAK</td> <td>40</td> <td>25</td> </tr> <tr> <td>FW05</td> <td>FaceWash</td> <td>ABC</td> <td>45</td> <td>15</td> </tr> <tr> <td>BD01</td> <td>BathSoap</td> <td>ABC</td> <td>55</td> <td>18</td> </tr> <tr> <td>SH06</td> <td>Shampoo</td> <td>XYZ</td> <td>70</td> <td>26</td> </tr> <tr> <td>FW12</td> <td>FaceWash</td> <td>XYZ</td> <td>60</td> <td>18</td> </tr> <tr> <td>FC10</td> <td>TalcumPowder</td> <td>ABC</td> <td>120</td> <td>15</td> </tr> </tbody> </table> <p>Write SQL Commands to:</p> <ol style="list-style-type: none"> Display the average Price of each type of Product Display the total quantity manufactured by each manufacturer if total quantity more than 100 Display the product name, totalprice (totalprice=price x qty) of all products arranged in descending order of totalprice <p style="text-align: center;">OR</p> <p>Discuss the significance of Aggregate functions in Mysql in detail and explain with example</p>	P_ID	PNAME	Manufacturer	Price	Qty	TP01	TalcumPowder	LAK	40	25	FW05	FaceWash	ABC	45	15	BD01	BathSoap	ABC	55	18	SH06	Shampoo	XYZ	70	26	FW12	FaceWash	XYZ	60	18	FC10	TalcumPowder	ABC	120	15	3
P_ID	PNAME	Manufacturer	Price	Qty																																	
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FW12	FaceWash	XYZ	60	18																																	
FC10	TalcumPowder	ABC	120	15																																	
SECTION D																																					
31)	<p>Write suitable SQL query for the following:</p> <ol style="list-style-type: none"> Display the position of "CHENNAI" in the string "KVSROCHENNAI" Extract 5 characters from position 9 from the string " CENTRAL BOARD OF SECONDAY EDUCATION "after removing leading and trailing spaces from the string Display the sqrt of the length of the number "1234.999" rounded off to zero decimal places Display the remainder of your day of birth divided by month of your birth Display the name of the day of hiredate column of table emp <p style="text-align: center;">(or)</p> <p>Explain the following SQL functions using suitable examples.</p> <ol style="list-style-type: none"> LTRIM () NOW () ROUND () MOD () INSTR () 	5																																			
32)	<p>"Anutulya Creations"-A start-up fashion house has set up its main centre at Kanpur, Uttar Pradesh for its dress designing, production and dress supplying activities. It has 4 blocks of buildings. Distance between the various blocks is as follows:</p>	5																																			

Distance between the various blocks is as follows:

A to D	50 m
A to P	60 m
A to S	110m
D to S	60m
P to S	50m
P to D	150m

Numbers of computers in each block

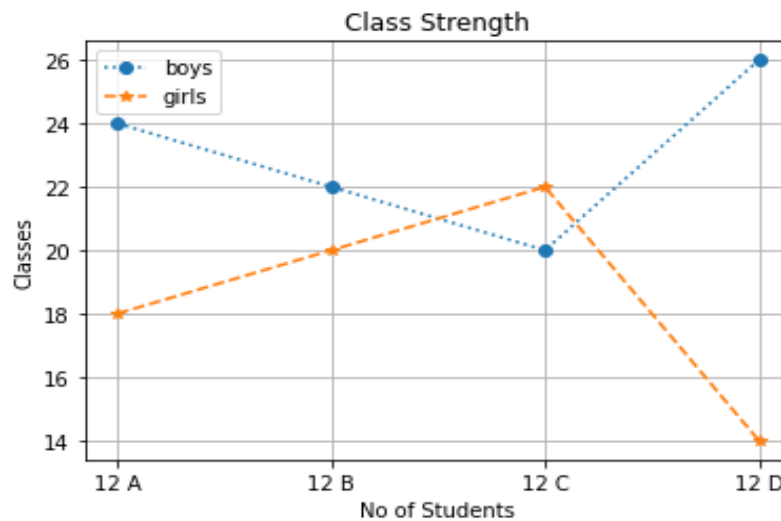
Block A -	20
Block D -	80
Block P -	15
Block S -	8



Based on the above specifications, answer the following questions:

- Out of LAN, WAN and MAN, what type of network will be formed if we interconnect different computers of the campus? Justify.
- Suggest the topology which should be used to efficiently connect various blocks of buildings within Kanpur centre for fast communication. Also draw the cable layout for the same.
- Suggest the placement of the following device with justification i. Repeater ii. Hub/Switch
- Now a day, video-conferencing software is being used frequently by the company to discuss the product details with the clients. Name any one video conferencing software. Also mention the protocol which is used internally in video conferencing software
- Suggest a device/software and its placement that would provide data security for the entire network

33) Write Python code to plot a line chart for Students Class Strength as shown below:



Also give suitable python statement to save this chart

(or)

Mr. Sharma is working in a game development industry and he has to compare the games on the basis of the rating of the various games available on the play store using Bar Chart. Help him to write the python program for the bar chart to get the desired output

```
Games=["Subway Surfer","Temple Run","Candy Crush","Bottle Shot","RunnerBest"]
Rating=[4.2,4.8,5.0,3.8,4.1]
```

SECTION E

34) Consider the table SHOP as given below:

1+1+2

Code	Item	Company	Qty	City	Price
102	Biscuit	Britannia	100	Delhi	15.00
103	Jam	Kissan	110	Kolkata	90.00
101	Coffee	Nestle	200	Kolkata	55.00
106	Sauce	Kissan	56	Mumbai	65.00
107	Cake	Britannia	72	Delhi	25.00
104	Maggi	Nestle	150	Mumbai	10.00
105	Chocolate	Cadbury	170	Delhi	35.00

Write SQL Commands for the following :

- Display all the company names in capital letters and itemname in lower case
- Display the highest price of each company
- Count number of items where number of characters in the item name is less than 5
(or)

Count number of items city wise

- 35) Zeenat has created the following data frame dataframe1 to keep track of data Rollno, Name, Marks1 and Marks2 for various students of her class where row indexes are taken as the default values

1+1+2

Rollno	Name	Marks1	Marks2
1	Swapnil Sharma	30	50
2	Raj Batra	75	45
3	Bhoomi Singh	82	95
4	Jay Gupta	90	95

- Find the output of the following python statement
 - Dataframe1.size
 - Dataframe1[1:2]
- Write python statement to display Marks1, Marks2 of Rollno 2 and 4
Or

Add one more column totalmarks as total of marks1 and mark2 columns of dataframe1

**SAMPLE QUESTION PAPER – IV
MARKING SCHEME
CLASS XII
INFORMATICS PRACTICES (065)**

TIME: 3 HOURS

M.M.70

General Instructions:

1. This question paper contains five sections, Section A to E.
2. All questions are compulsory.
3. Section A have 18 questions carrying 01 mark each.
4. Section B has 07 Very Short Answer type questions carrying 02 marks each.
5. Section C has 05 Short Answer type questions carrying 03 marks each.
6. Section D has 03 Long Answer type questions carrying 05 marks each.
7. Section E has 02 questions carrying 04 marks each. One internal choice is given in Q35 against part c only.
8. All programming questions are to be answered using Python Language only.

SECTION A

1)	<p>Uploading photo from mobile phone to Desktop computer is an example of _____</p> <p>a) LAN b) PAN c) MAN d) WAN</p> <p>Answer:b)PAN</p>	1
2)	<p>Using Someone else's twitter handle to post something is termed as</p> <p>a) Fraud b) Identity theft c) Online stealing d) Violation</p> <p>Answer: b)Identity theft</p>	1
3)	<p>Following are the impact of e-waste on the environment. Choose the odd one out.</p> <p>a) Soil Pollution b) Water Pollution c) Air Pollution d) Sound Pollution</p> <p>Answer: d. Sound Pollution</p>	1
4)	<p>The practice of taking confidential information from you through an original looking site and URL is known as _____</p> <p>a) Plagiarism b) Phishing c) Hacking d) Cookies</p> <p>Answer: b) Phishing</p>	1

5)	<p>If column "Salary" contains the data set (20000,30000,NULL,10000), what will be the output after the execution of the given query?</p> <pre>select avg(salary) from empl;</pre> <ul style="list-style-type: none"> a) 15000 b) 20000 c) 10000 d) 60000 <p>Ans: b)20000</p>	1
6)	<p>OSS stands for _____</p> <ul style="list-style-type: none"> a) Open system Service b) Open Source Software c) Open system Software d) Open Synchronized Software <p>Answer: b) Open Source Software</p>	1
7)	<p>SQL command that removes trailing spaces from a given string is _____</p> <ul style="list-style-type: none"> a) rtrim() b) ltrim() c) right() d) left() <p>Answer: a) rtrim()</p>	1
8)	<p>The avg() function in MySQL is an example of</p> <ul style="list-style-type: none"> a) Math Function b) Text Function c) Date Function d) Aggregate Function <p>Answer: d) Aggregate Function</p>	1
9)	<p>Write the SQL command that will display the time and date at which the command got executed.</p> <ul style="list-style-type: none"> a) Select sysdate(); b) Select now(); c) Select curdate(); d) Both (i) and (ii) <p>Answer: a)Select sysdate();</p>	1
10)	<p>Pandas series is:</p> <ul style="list-style-type: none"> a) 2 dimensional b) 1 dimensional c) 3 dimensional d) Multi dimensional <p>Answer: b)1 dimensional</p>	1
11)	<p>The command to install Pandas is:</p> <ul style="list-style-type: none"> a) install pip pandas b) install pandas c) pip pandas d) pip install pandas <p>Answer: d) pip install pandas</p>	1
12)	<p>In Pandas the function used to delete a column in a DataFrame is</p> <ul style="list-style-type: none"> a) remove b) delete 	1

	<p>c) drop d) cancel</p> <p>Answer: c)drop</p>	
13)	<p>For web pages where the information is changed frequently, for example, stock prices, weather information which out of the following options would you advise?</p> <p>a) Static web page b) Dynamic web page c) Animated web page d)Home page</p> <p>Answer: b) Dynamic web page</p>	1
14)	<p>Write the output of the following SQL command.</p> <p>select round (49.88);</p> <p>a) 49.88 b) 49.8 c) 49.0 d) 50</p> <p>Answer: 50</p>	1
15)	<p>Which of the following is not a violation of IPR?</p> <p>a) Plagiarism b) Copyright Infringement c) Patent d) Trademark Infringement</p> <p>Answer. C.Patent</p>	1
16)	<p>A patent protects an invention for _____ years, after which it can be freely used.</p> <p>a) 10 b) 20 c) 30 d) 40</p> <p>Answer. b. 20</p>	1
<p>Q17 and 18 are ASSERTION AND REASONING based questions. Mark the correct choice as</p> <p>i. Both A and R are true and R is the correct explanation for A ii. Both A and R are true and R is not the correct explanation for A iii. A is True but R is False iv. A is false but R is True</p>		
17)	<p>Assertion(A):Digital Footprints are also termed as Digital Tattoos Reason(R): A digital tattoo can also refer to the record of someone's actions and communications online and its permanence like a physical tattoo</p> <p>Answer: (i)</p>	1
18)	<p>Assertion(A): List of dictionaries can be passed to form a DataFrame Reason(R): Keys of dictionaries are taken as row names by default</p> <p>Answer: (iii)</p>	1
<p>SECTION B</p>		
19)	<p>Explain the differences between Static web page and Dynamic web page</p> <p><i>Static web page:</i></p>	2

a) A web page which displays same kind of information whenever a user visits it, is known as a static web page.

b) A static web page generally has .htm or .html as extension

Dynamic web page:

a) An interactive web page is a dynamic webpage.

b) A dynamic web page uses scripting languages to display changing content on the web page.

c) Such a page generally has php, .asp, " or .jsp as extension.

BASIS FOR COMPARISON	STATIC WEB PAGES	DYNAMIC WEB PAGES
Basic	Static web pages will remain same for the time until and unless someone changes it manually.	Dynamic web pages are behavioral and have the capacity to produce distinctive content for different visitors.
Complexity	Simple to design.	Complicated to construct.
Application and web languages used to create web pages	HTML, JavaScript, CSS, etc.	CGI, AJAX, ASP, ASP.NET, etc.
Information change	Occurs rarely	Frequently
Page loading time	Less comparatively	More
Use of Database	Doesn't use databases	A database is used.

(or)

Differentiate between LAN and WAN

LAN	WAN
<i>It spread over a small area</i>	<i>It spreads over a large area</i>
<i>Diameter of not more than few km</i>	<i>Span entire countries</i>
<i>Less cost to setup</i>	<i>Higher cost to setup</i>
<i>Operate at data transfer rate of several MBPS (1 to 10 MBPS)</i>	<i>Data rate less than 1 MBPS</i>
<i>Complete ownership by a single organization</i>	<i>Owned by multiple organizations</i>
<i>Very low error rates</i>	<i>Comparatively higher error rates</i>

20) To display the sum of salary paid to KARATE coaches of each gender, Ravi has written the following command but unable to get the desired result, help him to identify the error and write the correct query by suggesting the possible reason

Select sex, sum(pay) from club group by sex where sports= "KARATE";

Answer:

The problem with the given SQL query is that WHERE clause should not be used with Group By clause. To correct the error, where clause should be used before group by. Corrected Query: Select sex, sum(pay) from club where sports= "KARATE" group by sex;

2

21)	<p>What is the difference between a WHERE clause and a HAVING clause in SQL SELECT statement?</p> <p>Answer:</p> <table border="1"> <thead> <tr> <th>SR. NO.</th> <th>WHERE Clause</th> <th>HAVING Clause</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>WHERE Clause is used to filter the records from the table based on the specified condition.</td> <td>HAVING Clause is used to filter records from the groups based on the specified condition.</td> </tr> <tr> <td>2.</td> <td>WHERE Clause can be used without GROUP BY Clause</td> <td>HAVING Clause cannot be used without GROUP BY Clause</td> </tr> <tr> <td>3.</td> <td>WHERE Clause implements in row operations</td> <td>HAVING Clause implements in column operation</td> </tr> <tr> <td>4.</td> <td>WHERE Clause is used with single row function like UPPER, LOWER etc.</td> <td>HAVING Clause is used with multiple row function like SUM, COUNT etc.</td> </tr> <tr> <td>5.</td> <td>WHERE Clause can be used with SELECT, UPDATE, DELETE statement.</td> <td>HAVING Clause can only be used with SELECT statement.</td> </tr> <tr> <td>6.</td> <td>WHERE Clause is used before GROUP BY Clause</td> <td>HAVING Clause is used after GROUP BY Clause</td> </tr> </tbody> </table>	SR. NO.	WHERE Clause	HAVING Clause	1.	WHERE Clause is used to filter the records from the table based on the specified condition.	HAVING Clause is used to filter records from the groups based on the specified condition.	2.	WHERE Clause can be used without GROUP BY Clause	HAVING Clause cannot be used without GROUP BY Clause	3.	WHERE Clause implements in row operations	HAVING Clause implements in column operation	4.	WHERE Clause is used with single row function like UPPER, LOWER etc.	HAVING Clause is used with multiple row function like SUM, COUNT etc.	5.	WHERE Clause can be used with SELECT, UPDATE, DELETE statement.	HAVING Clause can only be used with SELECT statement.	6.	WHERE Clause is used before GROUP BY Clause	HAVING Clause is used after GROUP BY Clause	2
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22)	<p>Write a program to create a series object using a dictionary that stores the number of employees in each department of XYZ company.</p> <p>Note: Assume there are five departments namely SALES, ACCOUNTS, COMPUTER, PURCHASE, PRODUCTION with 120,10,5,50,200 respectively</p> <p>Answer:</p> <pre>import pandas as pd s=pd.Series({'SALES':120, 'ACCOUNTS':10, 'COMPUTER':5, 'PURCHASE':50, 'PRODUCTION':200}) print(s)</pre>	2																					
23)	<p>What is e-waste? What is the procedure to dispose e-waste?</p> <p>(or)</p> <p>Sita has recently shifted to a new house. She does not know many people in her new street. But all of a sudden, someone starts posting negative, demeaning comments on her social networking profile, college site's forum, etc. She is also getting repeated mails from unknown people. Every time she goes online, she finds someone chasing her online.</p> <p>(i) What is happening to Sita?</p> <p>(ii) What action should she take to stop them?</p> <p>Answer:</p>	2																					

	<p>Electronic waste or e-waste describes discarded electrical or electronic devices. Used electronics which are destined for refurbishment, reuse, resale, salvage, recycling through material recovery, or disposal are also considered e-waste.</p> <p>E-waste Disposal Process</p> <ol style="list-style-type: none"> 1. Dismantling: Removal of parts containing dangerous substances(CFCs, switches, PCB); removal of easily accessible parts containing valuable substances(cable containing copper, steel, iron, precious metals containing parts). 2. Segregation of ferrous metal, non-ferrous metal and plastic: This separation is normally done in a shredder process. 3. Refurbishment and reuse: Refurbishment and reuse of e-waste has potential for those used in electrical and electronic equipments which can be easily refurbished to put to its original use. 4. Recycling/recovery of valuable materials: Ferrous metals in electrical arc furnaces, non-ferrous metals in smelting plants, precious metals in separating works. 5. Treatment/disposal of dangerous materials and waste: Chlorofluora-carbons(CFCs) are treated thermally, Printed Circuit Board(PCB) disposed of in underground storages, Mercury(Hg) is recycled or disposed off underground. <p>(or)</p> <p>(i) Sita has become a victim of cyber bullying and cyber stalking. (ii) She must immediately bring it to the notice of her parents and college authorities and report this cyber crime to local police with the help of her parents.</p>	
24)	<p>Find the output of the following:</p> <pre>import pandas as pd s=pd.Series(index=[111,222,333,444,555],data=[11,22,33,44,55]) print(s[s%2==0])</pre> <p>Answer: 222 22 444 44 dtype: int64</p>	2
25)	<p>Carefully observe the following code</p> <pre>import pandas as pd import numpy as np data = {'Ramya': {'Age': 35,'Desg':'PGT', 'Address': 'Portblair','dob':'12-12-1987'}, 'Priya': {'Age': 28,'Desg':'TGT', 'Address': 'Chennai','Salary':65000}, 'Suresh': {'Age': 25, 'Desg':'PRT','Address': 'Madurai'}}</pre> <p>df= pd.DataFrame(data) print(df)</p> <p>Answer the following:</p> <ol style="list-style-type: none"> a) Give the command to list all row labels of df, and give the output of the same b) Give the commands to find the dimension and shape of dataframe df <p>Answer:</p> <ol style="list-style-type: none"> a) print(df.index) [or >>>df.index] Index(['Age', 'Desg', 'Address', 'dob', 'Salary'], dtype='object') b) print(df.ndim, df.shape) [or >>>df.ndim >>>df.shape] 	2

SECTION C

26) Write outputs for SQL queries (i) to (iii) which are based on the given table AGENT: 3

TABLE AGENT

AGENT_CODE	AGENT_NAME	WORKING_AREA	COMMISSION	PHONE_NO
A001	Subbarao	Bangalore	1100	077-12346674
A002	Mukesh	Mumbai	1000	029-12358964
A003	Alex	London	2000	075-12458969
A005	Anderson	Brisban	1100	045-21447739
A006	McDen	London	1600	078-22255588
A011	Ravi Kumar	Bangalore	1500	077-45625874
A012	Lucida	San Jose	1200	044-52981425

- a) SELECT AGENT_NAME, WORKING_AREA FROM AGENT WHERE LENGTH(WORKING_AREA)>6;
- b) SELECT SUBSTR(AGENT_NAME,2,3) FROM AGENT WHERE COMMISSION>1200;
- c) SELECT INSTR(AGENT_NAME,'A') ,MOD(COMMISSION,200) FROM AGENT WHERE WORKING_AREA LIKE '%A%';

Answer:

a)	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 30%;">AGENT_NAME</th> <th style="width: 70%;">WORKING_AREA</th> </tr> </thead> <tbody> <tr> <td>Subbarao</td> <td>Bangalore</td> </tr> <tr> <td>Anderson</td> <td>Brisban</td> </tr> <tr> <td>Ravi Kumar</td> <td>Bangalore</td> </tr> <tr> <td>Lucida</td> <td>San Jose</td> </tr> </tbody> </table>	AGENT_NAME	WORKING_AREA	Subbarao	Bangalore	Anderson	Brisban	Ravi Kumar	Bangalore	Lucida	San Jose		
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c)	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 50%;">INSTR(AGENT_NAME, 'A')</th> <th style="width: 50%;">MOD(COMMISSION, 200)</th> </tr> </thead> <tbody> <tr> <td>5</td> <td>100</td> </tr> <tr> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>100</td> </tr> <tr> <td>2</td> <td>100</td> </tr> <tr> <td>6</td> <td>0</td> </tr> </tbody> </table>	INSTR(AGENT_NAME, 'A')	MOD(COMMISSION, 200)	5	100	0	0	1	100	2	100	6	0
INSTR(AGENT_NAME, 'A')	MOD(COMMISSION, 200)												
5	100												
0	0												
1	100												
2	100												
6	0												

27) Write a Python code to create a DataFrame 'df' with column headings as ['Sports_Id', 'Name', 'Student', 'Team'] and row labels as ['s1','s2','s3','s4'] using the list given below: 3

[[1,'Hockey',15,'B'], [2,'Cricket',20,'D'], [3,'Chess',4,'C'], [4,'Carrom',4,'A']]

Answer:

d=[[1,'Hockey',15,'B'],[2,'Cricket',20,'D'], [3,'Chess',4,'C'],[4,'Carrom',4,'A']]

df1=pd.DataFrame(d,columns=['Sports_Id','Name','Student','Team'],index=['s1','s2','s3','s4'])

	print(df1)																					
28)	<p>Consider the dataframe 'Person':</p> <pre> Id Name Salary 0 101 Ravikumar 25000 1 102 Amala 30000 2 103 Sweety 15000 </pre> <p>Write suitable Python statements for the following:</p> <ol style="list-style-type: none"> Add a column called Comm as 10% of Salary Add a new person 'Ramesh' with id as '104' and salary as 40000 Remove the row with index as 1 <p>Answer:</p> <ol style="list-style-type: none"> df1.loc[3]=['104','Ramesh',40000] df1['Comm']=df1['Salary']*10/100 df1=df1.drop(1) or df1=df1.drop(1,axis=0) 	3																				
29)	<p>What do you mean by Identity theft? Explain with the help of an example. (or)</p> <p>What is Phishing? Write any two precautions that you would take to avoid being victim of phishing.</p> <p>Answer:</p> <p>Identity theft is the crime of obtaining the personal or financial information of another person for the sole purpose of assuming that person's name or identity to make transactions or use it to post inappropriate remarks , comments etc.</p> <p>Example: Alex likes to do his homework late at night. He uses the Internet a lot and also sends useful data through email to many of his friends. One Day he forgot to sign out from his email account. In the morning, his twin brother, Flex started using the computer. He used Flex's email account to send inappropriate messages to his contacts Or any other relevant example</p> <p>(or)</p> <p>Phishing is a type of social engineering attack often used to steal user data, including login credentials and credit card numbers.</p> <p>Example: URGENT REQUEST (Email Impersonation) These are targeted and simple forms of phishing emails designed to get victims to purchase gift cards, or to give up personal email or phone numbers. The "email compromise" gets its name because the attacker mimics the email of a known sender. Or any other relevant example</p>	3																				
30)	<p>A relation Product is given below :</p> <table border="1"> <thead> <tr> <th>P_ID</th> <th>PNAME</th> <th>Manufacturer</th> <th>Price</th> <th>Qty</th> </tr> </thead> <tbody> <tr> <td>TP01</td> <td>TalcumPowder</td> <td>LAK</td> <td>40</td> <td>25</td> </tr> <tr> <td>FW05</td> <td>FaceWash</td> <td>ABC</td> <td>45</td> <td>15</td> </tr> <tr> <td>BD01</td> <td>BathSoap</td> <td>ABC</td> <td>55</td> <td>18</td> </tr> </tbody> </table>	P_ID	PNAME	Manufacturer	Price	Qty	TP01	TalcumPowder	LAK	40	25	FW05	FaceWash	ABC	45	15	BD01	BathSoap	ABC	55	18	3
P_ID	PNAME	Manufacturer	Price	Qty																		
TP01	TalcumPowder	LAK	40	25																		
FW05	FaceWash	ABC	45	15																		
BD01	BathSoap	ABC	55	18																		

SH06	Shampoo	XYZ	70	26
FW12	FaceWash	XYZ	60	18
FC10	TalcumPowder	ABC	120	15

Write SQL Commands to:

- Display the average Price of each type of Product
- Display the total quantity manufactured by each manufacturer if total quantity more than 100
- Display the product name, totalprice (totalprice=price x qty) of all products arranged in descending order of totalprice

Answer:

- Select avg(Price) from Product group by Pname;
- Select sum(qty) from product group by manufacturer having sum(qty)>100;
- Select Pname, price*qty totalprice from Product order by totalprice;

OR

Discuss the significance of Aggregate functions in Mysql in detail and explain with example

Answer:

Aggregate Functions: Aggregate functions are functions that take a collection of values as input and return a single value.

SQL offers five types of aggregate functions:-

- Avg() :- To findout the average
- Min() :- Minimum value
- Max() :-Maximum value
- Sum() :-To calculate the total
- Count() :- For counting

NOTE: - The input to sum () and avg () must be a collection of numbers, but the other functions can operate on non numeric data types e.g.string

SECTION D

- 31) Write suitable SQL query for the following:
- Display the position of "CHENNAI" in the string "KVSROCHENNAI"
 - Extract 5 characters from position 9 from the string " CENTRAL BOARD OF SECONDAY EDUCATION "after removing leading and trailing spaces from the string
 - Display the sqrt of the length of the number "1234.999" rounded off to zero decimal places
 - Display the remainder of your day of birth divided by month of your birth
 - Display the name of the day of hiredate column of table emp
- (or)
- Explain the following SQL functions using suitable examples.
- LTRIM ()
 - NOW ()
 - ROUND ()

5

- d) MOD ()
- e) INSTR ()

Answer:

- a) SELECT INSTR('KVSROCHENNAI','CHENNAI');
- b) SELECT MID(TRIM(" CENTRAL BOARD OF SECONDAY EDUCATION"),9,5);
- c) SELECT SQRT(LENGTH(ROUND(1234.999)));
- d) SELECT MOD(DAY(DOB),MONTH(DOB)); [DOB-DATE OF BIRTH]
- e) SELECT DAYNAME(HIREDATE) FROM EMP;

(or)

- a) LTRIM():

The LTRIM() function removes leading spaces from a string.

Syntax: LTRIM(*string*) [String: Required. The string to remove leading spaces from]

- b) NOW():

The NOW() function returns the current date and time.

Note: The date and time is returned as "YYYY-MM-DD HH-MM-SS" (string) or as YYYYMMDDHHMMSS.uuuuuu (numeric).

Syntax: NOW()

- c) ROUND():

The ROUND() function rounds a number to a specified number of decimal places.

Syntax: ROUND(*number, decimals*)

- d) MOD():

The MOD() function returns the remainder of a number divided by another number.

Syntax: MOD(*x, y*)

- e) INSTR():

The INSTR() function returns the position of the first occurrence of a string in another string. This function performs a case-insensitive search.

Syntax: INSTR(*string1, string2*)

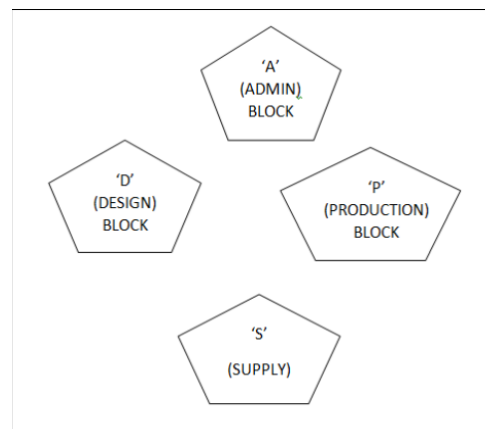
32) "Anutulya Creations"-A start-up fashion house has set up its main centre at Kanpur, Uttar Pradesh for its dress designing, production and dress supplying activities. It has 4 blocks of buildings. Distance between the various blocks is as follows:

Distance between the various blocks is as follows:

A to D	50 m
A to P	60 m
A to S	110m
D to S	60m
P to S	50m
P to D	150m

Numbers of computers in each block

Block A -	20
Block D -	80
Block P -	15
Block S -	8



Based on the above specifications, answer the following questions:

5

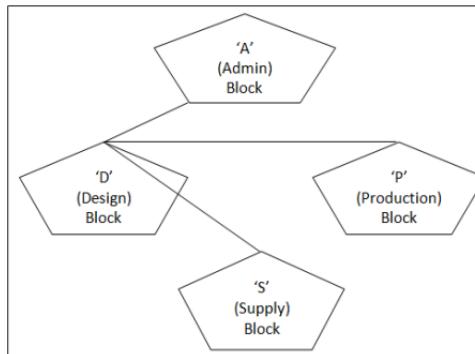
- (a) Out of LAN, WAN and MAN, what type of network will be formed if we interconnect different computers of the campus? Justify.
- (b) Suggest the topology which should be used to efficiently connect various blocks of buildings within Kanpur centre for fast communication. Also draw the cable layout for the same.
- (c) Suggest the placement of the following device with justification i. Repeater ii. Hub/Switch
- (d) Now a day, video-conferencing software is being used frequently by the company to discuss the product details with the clients. Name any one video conferencing software. Also mention the protocol which is used internally in video conferencing software
- (e) Suggest a device/software and its placement that would provide data security for the entire network

Answer:

(a) LAN As computers are placed with-in the same campus within a small range.

½ Mark for correct answer ½ Mark for correct justification

(b) Star topology ½ Mark for correct answer



½ Mark for correct cable layout

(c) i. Repeater should be placed in between Block 'D' (Design) and Block 'P' as distance is more. In order to amplify the signals repeater is used

ii. Hub/Switch should be placed in each building to connect various computers together.

½ Mark for each correct answer

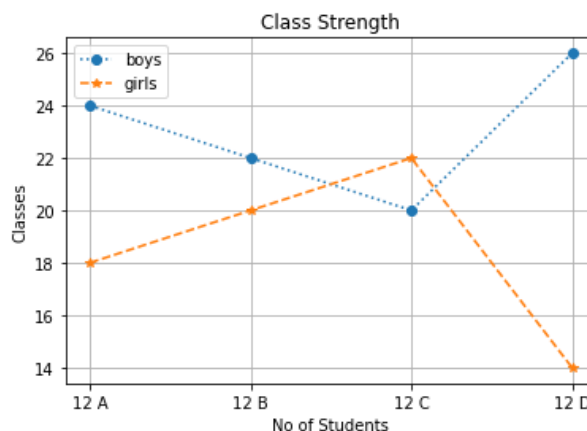
(d) Video Conferencing software: Teams, Zoom, Skype etc.

(Any one) Protocol of Video Conferencing software: VOIP ½ Mark for each correct answer

(e) Firewall placed at D Block along with the server

33) Write Python code to plot a line chart for Students Class Strength as shown below:

5



Also give suitable python statement to save this chart

(or)

Mr. Sharma is working in a game development industry and he has to compare the games on the basis of the rating of the various games available on the play store using Bar Chart. Help him to write the python program for the bar chart to get the desired output

```
Games=["Subway Surfer","Temple Run","Candy Crush","Bottle Shot","RunnerBest"]  
Rating=[4.2,4.8,5.0,3.8,4.1]
```

Answer:

```
import matplotlib.pyplot as plt  
classes=["12 A","12 B","12 C","12 D"]  
boys=[24,22,20,26]  
girls=[18,20,22,14]  
plt.plot(classes,boys,marker="o",label="boys",linestyle=":")  
plt.plot(classes,girls,marker="*",label="girls",linestyle="--")  
plt.xlabel("No of Students")  
plt.ylabel("Classes")  
plt.title("Class Strength")  
plt.legend()  
plt.grid()  
plt.show()
```

(or)

```
import matplotlib.pyplot as plt  
Games=["Subway Surfer","Temple Run","Candy Crush","Bottle Shot","RunnerBest"]  
Rating=[4.2,4.8,5.0,3.8,4.1]  
plt.bar(Games,Rating)  
plt.xlabel("Games")  
plt.ylabel("Rating")  
plt.title("Games - Rating")  
plt.show()
```

SECTION E

34) Consider the table SHOP as given below:

Code	Item	Company	Qty	City	Price
102	Biscuit	Britannia	100	Delhi	15.00
103	Jam	Kissan	110	Kolkata	90.00
101	Coffee	Nestle	200	Kolkata	55.00
106	Sauce	Kissan	56	Mumbai	65.00
107	Cake	Britannia	72	Delhi	25.00
104	Maggi	Nestle	150	Mumbai	10.00
105	Chocolate	Cadbury	170	Delhi	35.00

Write SQL Commands for the following :

- Display all the company names in capital letters and itemname in lower case
- Display the highest price of each company
- Count number of items where number of characters in the item name is less than 5

(or)

Count number of items city wise

1+1+2

Answer:

- a) select ucase(company),lcase(item) from shop;
 - b) select company,max(price) from shop group by company;
 - c) select count(*) from shop where length(item)<5;
- (or)
- select count(*) from shop group by city;

35) Zeenat has created the following data frame dataframe1 to keep track of data Rollno, Name, Marks1 and Marks2 for various students of her class where row indexes are taken as the default values

Rollno	Name	Marks1	Marks2
1	Swapnil Sharma	30	50
2	Raj Batra	75	45
3	Bhoomi Singh	82	95
4	Jay Gupta	90	95

- 1) Find the output of the following python statement
 - a) Dataframe1.size
 - b) Dataframe1[1:2]
 - 2) Write python statement to display Marks1,Marks2 of Rollno 2 and 4
- Or

Add one more column totalmarks as total of marks1 and mark2 columns of dataframe1

Answer:

- a) 16
 - b)

```
rollno  Name  Marks1  Marks2
1  2    Raj Batra  75    45
```
 - c)

```
print(dataframe1.loc[[1,3], 'Marks1': 'Marks2'])
[ or print(dataframe1.loc[[1,3], ['Marks1', 'Marks2']]) ]
```
- (or)
- ```
dataframe1['totalmarks']=dataframe1['Marks1']+dataframe1['Marks2']
```

1+1+2

**SAMPLE QUESTION PAPER - V**  
**CLASS XII**  
**INFORMATICS PRACTICES (065)**

**TIME: 3 HOURS**

**M.M.70**

**General Instructions:**

1. This question paper contains five sections, Section A to E.
2. All questions are compulsory.
3. Section A have 18 questions carrying 01 mark each.
4. Section B has 07 Very Short Answer type questions carrying 02 marks each.
5. Section C has 05 Short Answer type questions carrying 03 marks each.
6. Section D has 03 Long Answer type questions carrying 05 marks each.
7. Section E has 02 questions carrying 04 marks each.
8. All programming questions are to be answered using Python Language only.

| <b>SECTION A</b> |                                                                                                                                                                                                                                   |   |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 1                | Which of the following is not a type of cyber-crime?<br>a. Data theft<br>b. Damage to data and systems<br>c. Forgery<br>d. Stealing Mouse                                                                                         | 1 |
| 2                | If column “Fees” contains the data set (5000,8000,7500,5000,8000), what will be the output after the execution of the given query?<br>SELECT COUNT (DISTINCT Fees) FROM student;<br>a. 3<br>b. 5<br>c. 4<br>d. 2                  | 1 |
| 3                | Electronic products that are unwanted, not working, and nearing or at the end of their “useful life.”, known as<br>a. Computer Waste<br>b. E- Waste<br>c. Biological Waste<br>d. Chemical waste.                                  | 1 |
| 4                | Which amongst the following is not an example of browser ?<br>a. Chrome    b. Firefox    c. Avast    d. Edge                                                                                                                      | 1 |
| 5                | What is the correct syntax to return both the first row and the second row in a Pandas DataFrame df?<br>a. df.loc[[0,1]]<br>b. df.[[0,1]]<br>c. df.loc[[0-1]]<br>d. df.[[0-1]]                                                    | 1 |
| 6                | Abdul deleted all his chats from all his social media accounts, and he thinks that all his traces are deleted completely. Is he right in thinking so?<br>a. Yes    b. No    c. May be    d. Not sure                              | 1 |
| 7                | Which SQL statement do we use to find out the cardinality of the table Student?<br>a. SELECT * FROM Student;<br>b. SELECT COUNT (*) FROM Student;<br>c. SELECT COUNT (Marks) FROM Student;<br>d. SELECT SUM (Marks) FROM Student; | 1 |

|    |                                                                                                                                                                                                                                                                                                                                                                         |   |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 8  | Which one of the following is not a Single row function?<br>a. ROUND ()<br>b. MOD ()<br>c. COUNT ()<br>d. MID ()                                                                                                                                                                                                                                                        | 1 |
| 9  | Which one of the following functions is used to find the smallest value from the given data in MySQL?<br>a. MIN ()<br>b. MINIMUM ()<br>c. SMALLEST ()<br>d. Any of the above.                                                                                                                                                                                           | 1 |
| 10 | To display first five rows of a series object 'S', you may write:<br>a. S.head()<br>b. S.Tail()<br>c. S.Head()<br>d. S.tail()                                                                                                                                                                                                                                           | 1 |
| 11 | _____ is the function to save the graph.<br>a. Savefig()                      b. Savefigure()                      c. Savegraph()                      d. Savechart()                                                                                                                                                                                                   | 1 |
| 12 | The command to install the pandas is:<br>a. install pip pandas                      b. install pandas<br>c. pip pandas                      d. pip install pandas                                                                                                                                                                                                       | 1 |
| 13 | Which of the following is not a violation of IPR?<br>a. Plagiarism                      b. Copyright Infringement<br>c. Patent                      d. Trademark Infringement                                                                                                                                                                                           | 1 |
| 14 | In SQL, which function is used to display name of month from date?<br>a. Date ()                      b. Month_Name ()                      c. NameofMonth ()                      d.Monthname()                                                                                                                                                                        | 1 |
| 15 | A symbol, word, phrase, sound, color and design that is used to identify a product or an organization is _____<br>a. Trademark                      b. Patent                      c. Copyright                      d. Plagiarism                                                                                                                                      | 1 |
| 16 | FLOSS stands for _____<br>a) Free Legal Open-Source Systems<br>b) Free Libre Open-Source Software<br>c) Free License for Open-Source Software<br>d) Final License for Open Systems Software                                                                                                                                                                             | 1 |
|    | <b>Q17 and 18 are ASSERTION AND REASONING based questions. Mark the correct choice as</b><br>a. Both A and R are true and R is the correct explanation for A<br>b. Both A and R are true and R is not the correct explanation for A<br>c. A is True but R is False<br>d. A is false but R is True                                                                       |   |
| 17 | <b>Assertion (A):</b> Digital footprint is the trail of data we leave behind when we visit any website (or use any online application or portal) to fill-in data or perform any transaction.<br><b>Reason (R):</b> While online, all of us need to be aware of how to conduct ourselves, how best to relate with others and what ethics, morals and values to maintain. | 1 |
| 18 | <b>Assertion (A):</b> DataFrame.count() function will display the sum of the values from the data frame<br><b>Reason (R):</b> axis=0, argument is to be used to find sum column-wise                                                                                                                                                                                    | 1 |

| <b>SECTION B</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |        |         |        |          |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------|---------|--------|----------|--------------|--------|-----|-------|---------------|----|----|-----|-------------|-----|----|--------|---|---|-----|------|-----|---|----------|----|---|-----|---------|-----|---|---------|---|---|-----|----------|---|
| 19               | <p>What do you mean by Free and Open-Source Software? What is difference between Free Software and Open-Source Software?</p> <p style="text-align: center;">Or</p> <p>What is identity theft? How can we prevent identity thefts?</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2        |        |         |        |          |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| 20               | <p>Rahul writes the following commands with respect to a table employee having fields, empno, name, department, commission.</p> <p>Command1 : Select count(*) from employee;</p> <p>Command2: Select count(commission) from employee;</p> <p>He gets the output as 4 for the first command but gets an output 3 for the second command. Explain the output with justification</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2        |        |         |        |          |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| 21               | <p>What is the purpose of Group By clause in SQL? Explain with the help of suitable example.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2        |        |         |        |          |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| 22               | <p>Consider a given Series , M1:</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th></th> <th>Marks</th> </tr> </thead> <tbody> <tr> <td>Term1</td> <td>45</td> </tr> <tr> <td>Term2</td> <td>65</td> </tr> <tr> <td>Term3</td> <td>24</td> </tr> <tr> <td>Term4</td> <td>89</td> </tr> </tbody> </table> <p>Write a program in Python Pandas to create the series</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          | Marks  | Term1   | 45     | Term2    | 65           | Term3  | 24  | Term4 | 89            | 2  |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
|                  | Marks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |        |         |        |          |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| Term1            | 45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |        |         |        |          |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| Term2            | 65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |        |         |        |          |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| Term3            | 24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |        |         |        |          |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| Term4            | 89                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |        |         |        |          |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| 23               | <p>According to a survey, one of the major Asian countries generates approximately about 2 million tonnes of electronic waste per year. Only 1.5 % of the total e-waste gets recycled. Suggest two methods to manage e-waste.</p> <p style="text-align: center;">Or</p> <p>Write any 4 safety measures to reduce the risk of cyber crime.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2        |        |         |        |          |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| 24               | <p>Consider two objects X and Y. X is a list whereas Y is a Series. Both have values 20, 40,90, 110. What will be the output of the following two statements considering that the above objects have been created already</p> <p>a. print (x*2)</p> <p>b. print(y*2)</p> <p>Justify your answer.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2        |        |         |        |          |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| 25               | <p>Consider the following DataFrame, classframe</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th></th> <th>Rollno</th> <th>Name</th> <th>Class</th> <th>Section</th> <th>CGPA</th> <th>Stream</th> </tr> </thead> <tbody> <tr> <td>St1</td> <td>1</td> <td>Aman</td> <td>IX</td> <td>E</td> <td>8.7</td> <td>Science</td> </tr> <tr> <td>St2</td> <td>2</td> <td>Preeti</td> <td>X</td> <td>F</td> <td>8.9</td> <td>Arts</td> </tr> <tr> <td>St3</td> <td>3</td> <td>Kartikey</td> <td>IX</td> <td>D</td> <td>9.2</td> <td>Science</td> </tr> <tr> <td>St4</td> <td>4</td> <td>Lakshay</td> <td>X</td> <td>A</td> <td>9.4</td> <td>Commerce</td> </tr> </tbody> </table> <p>Write commands to :</p> <p>i. Add a new column 'Activity' to the Dataframe</p> <p>ii. Add a new row with values ( 5 , Mridula ,X, F , 9.8, Science)</p> |          | Rollno | Name    | Class  | Section  | CGPA         | Stream | St1 | 1     | Aman          | IX | E  | 8.7 | Science     | St2 | 2  | Preeti | X | F | 8.9 | Arts | St3 | 3 | Kartikey | IX | D | 9.2 | Science | St4 | 4 | Lakshay | X | A | 9.4 | Commerce | 2 |
|                  | Rollno                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Name     | Class  | Section | CGPA   | Stream   |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| St1              | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Aman     | IX     | E       | 8.7    | Science  |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| St2              | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Preeti   | X      | F       | 8.9    | Arts     |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| St3              | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Kartikey | IX     | D       | 9.2    | Science  |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| St4              | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Lakshay  | X      | A       | 9.4    | Commerce |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| <b>SECTION C</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |        |         |        |          |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| 26               | <p>Write a program in Python Pandas to create the following DataFrame batsman from a Dictionary:</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>B_NO</th> <th>Name</th> <th>Score1</th> <th>Score2</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Sunil Pillai</td> <td>90</td> <td>80</td> </tr> <tr> <td>2</td> <td>Gaurav Sharma</td> <td>65</td> <td>45</td> </tr> <tr> <td>3</td> <td>Piyush Goel</td> <td>70</td> <td>90</td> </tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                                                      | B_NO     | Name   | Score1  | Score2 | 1        | Sunil Pillai | 90     | 80  | 2     | Gaurav Sharma | 65 | 45 | 3   | Piyush Goel | 70  | 90 | 3      |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| B_NO             | Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Score1   | Score2 |         |        |          |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| 1                | Sunil Pillai                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 90       | 80     |         |        |          |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| 2                | Gaurav Sharma                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 65       | 45     |         |        |          |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |
| 3                | Piyush Goel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 70       | 90     |         |        |          |              |        |     |       |               |    |    |     |             |     |    |        |   |   |     |      |     |   |          |    |   |     |         |     |   |         |   |   |     |          |   |

|                                                                                                  |                                                                                                                                                              |                |              |              |            |               |
|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|--------------|------------|---------------|
|                                                                                                  | 4                                                                                                                                                            | Kartik Thakur  | 80           | 76           |            |               |
| Also display total score by each batsman.                                                        |                                                                                                                                                              |                |              |              |            |               |
| 27                                                                                               | Ms. Anubha is working in a school and stores the details of all students in a Table: SCHOOL                                                                  |                |              |              |            | 3             |
| <b>Table: SCHOOL</b>                                                                             |                                                                                                                                                              |                |              |              |            |               |
|                                                                                                  | <b>Admid</b>                                                                                                                                                 | <b>Sname</b>   | <b>Grade</b> | <b>House</b> | <b>Per</b> | <b>Gender</b> |
|                                                                                                  | 20150001                                                                                                                                                     | Aditya Das     | 10           | Green        | 86         | Male          |
|                                                                                                  | 20140212                                                                                                                                                     | Harsh Sharma   | 11           | Red          | 50         | Male          |
|                                                                                                  | 20090234                                                                                                                                                     | Swapnil Pant   | 10           | Yellow       | 84         | Female        |
|                                                                                                  | 20130216                                                                                                                                                     | Soumen Rao     | 9            | Red          | 90         | Male          |
|                                                                                                  | 20190227                                                                                                                                                     | Rahil Arora    | 10           | Blue         | 70         | Male          |
|                                                                                                  | 20120200                                                                                                                                                     | Akasha Singh   | 11           | Red          |            | Female        |
| Write the SQL statements from the given table to :                                               |                                                                                                                                                              |                |              |              |            |               |
| (i) Remove TRAILING SPACES from column Sname.                                                    |                                                                                                                                                              |                |              |              |            |               |
| (ii) Display the names of students who were born on Tuesday.                                     |                                                                                                                                                              |                |              |              |            |               |
| (iii) Display the Grades of students born in 2006.                                               |                                                                                                                                                              |                |              |              |            |               |
| 28                                                                                               | Consider the following DataFrame “population”                                                                                                                |                |              |              |            | 3             |
|                                                                                                  |                                                                                                                                                              | Country        | population   | percent      |            |               |
|                                                                                                  | IT                                                                                                                                                           | Italy          | 61           | 0.83         |            |               |
|                                                                                                  | ES                                                                                                                                                           | Spain          | 46           | 0.63         |            |               |
|                                                                                                  | GR                                                                                                                                                           | Greece         | 11           | 0.15         |            |               |
|                                                                                                  | FR                                                                                                                                                           | France         | 65           | 0.88         |            |               |
|                                                                                                  | PO                                                                                                                                                           | Portugal       | 10           | 0.14         |            |               |
| Perform the following operations on the DataFrame:                                               |                                                                                                                                                              |                |              |              |            |               |
| (i) Display the columns country and population.                                                  |                                                                                                                                                              |                |              |              |            |               |
| (ii) Display all the rows where population is more than 40.                                      |                                                                                                                                                              |                |              |              |            |               |
| (iii) Delete the last 2 rows.                                                                    |                                                                                                                                                              |                |              |              |            |               |
| 29                                                                                               | What do you mean by Identity theft? Explain with the help of an example.<br>OR<br>What do you understand by Net Etiquettes? Explain any two such etiquettes. |                |              |              |            | 3             |
| 30                                                                                               | For the given table School,<br>Table : School                                                                                                                |                |              |              |            | 3             |
|                                                                                                  | Admno                                                                                                                                                        | Name           | Class        | House        | Percentage | Gender        |
|                                                                                                  | 20150001                                                                                                                                                     | Abhishek Kumar | 10           | Green        | 86         | Male          |
|                                                                                                  | 20140212                                                                                                                                                     | Mohit Bhardwaj | 11           | Red          | 75         | Male          |
|                                                                                                  | 20090234                                                                                                                                                     | Ramandeep Kaur | 10           | Yellow       | 84         | Female        |
|                                                                                                  | 20130216                                                                                                                                                     | Mukesh Sharma  | 9            | Red          | 91         | Male          |
|                                                                                                  | 20190227                                                                                                                                                     | Rahil Arora    | 10           | Blue         | 70         | Male          |
|                                                                                                  | 20120200                                                                                                                                                     | Swapnil Bhatt  | 11           | Red          | 64         | Female        |
| Write SQL queries for the following :                                                            |                                                                                                                                                              |                |              |              |            |               |
| (a) Display the total number of students in each House where number of students are more than 2. |                                                                                                                                                              |                |              |              |            |               |
| (b) Display the average Percentage of girls and boys.                                            |                                                                                                                                                              |                |              |              |            |               |
| (c) Display the minimum Percentage secured by the students of Class 10.                          |                                                                                                                                                              |                |              |              |            |               |
| <b>SECTION D</b>                                                                                 |                                                                                                                                                              |                |              |              |            |               |
| 31                                                                                               | Explain the following SQL functions using suitable examples.<br>a. TRIM()<br>b. MID()                                                                        |                |              |              |            | 5             |

- c. LEFT()
- d. ROUND()
- e. POW()

OR

Consider a table “MYPET” with the following data :

Table : MYPET

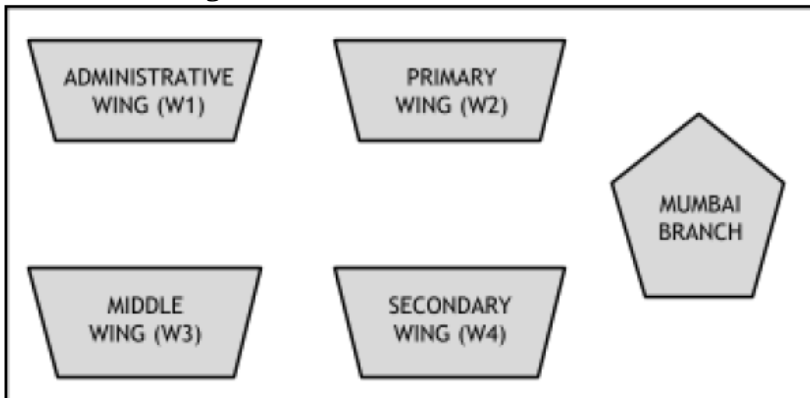
| Pet_id | Pet_Name | Breed              | LifeSpan | Price | Discount |
|--------|----------|--------------------|----------|-------|----------|
| 101    | Rocky    | Labrador Retriever | 12       | 16000 | 5        |
| 202    | Duke     | German Shepherd    | 13       | 22000 | 10       |
| 303    | Oliver   | Bulldog            | 10       | 18000 | 7        |
| 404    | Cooper   | Yorkshire Terrier  | 16       | 20000 | 12       |
| 505    | Oscar    | Shih Tzu           | NULL     | 25000 | 8        |

Write SQL queries for the following:

- (i) Display the Breed of all the pets in uppercase.
- (ii) Display the total price of all the pets.
- (iii) Display the average life span of all the pets.
- (iv) Find the position of “at” in “Innovation”
- (v) Round 456 to 500

32 ABC International School, Delhi has different wings Administrative Wing (W1), Primary Wing (W2), Middle Wing (W3) and Secondary Wing (W4) as shown in the diagram :

5



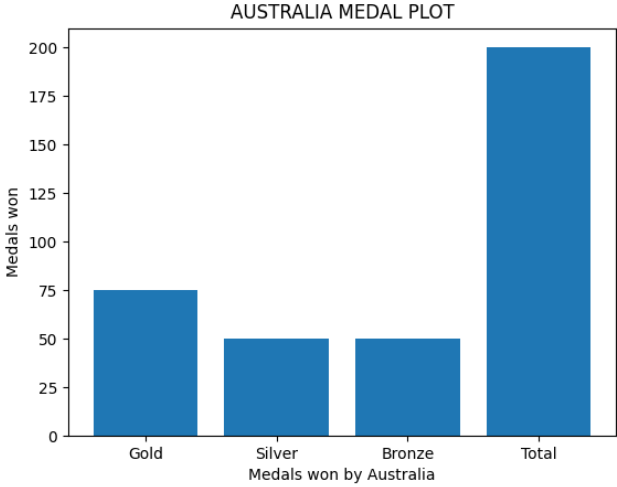
The school also has a branch in Mumbai. The school management wants to connect all the wings as well as all the computers of each wing (W1, W2, W3, W4).

Distance between the wings are as follows :

- W3 to W1 85 m
- W1 to W2 40 m
- W2 to W4 25 m
- W4 to W3 120 m
- W3 to W2 150 m
- W1 to W4 170 m

Number of computers in each of the wing:

- W1 125
- W2 40
- W3 42
- W4 60

|            | <p>Based on the above specifications, answer the following questions :</p> <ol style="list-style-type: none"> <li>Suggest the topology and draw the most suitable cable layout for connecting all the wings of Delhi branch.</li> <li>Suggest the kind of network required (out of LAN, MAN, WAN) for connecting             <ol style="list-style-type: none"> <li>Administrative Wing (W1) with Middle Wing (W3)</li> <li>Administrative Wing (W1) with the Mumbai branch</li> </ol> </li> <li>Suggest the placement of the following devices with justification:             <ol style="list-style-type: none"> <li>Repeater</li> <li>Switch/Hub</li> </ol> </li> <li>Due to pandemic school had to adopt Online classes. Suggest the protocol that is used for sending the voice signals over internet. Also, give an example of an application of WWW that helped the teachers to send messages instantly to the students.</li> <li>School is planning to get its website designed which will allow students to see their results after registering themselves on its server. Out of the static or dynamic, which type of website will you suggest?</li> </ol> |            |                  |      |    |        |    |        |    |       |     |   |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------------|------|----|--------|----|--------|----|-------|-----|---|
| 33         | <p>Write code to draw the following bar graph representing the total number of medals won by Australia.</p>  <table border="1" data-bbox="207 787 820 1270"> <caption>AUSTRALIA MEDAL PLOT</caption> <thead> <tr> <th>Medal Type</th> <th>Number of Medals</th> </tr> </thead> <tbody> <tr> <td>Gold</td> <td>75</td> </tr> <tr> <td>Silver</td> <td>50</td> </tr> <tr> <td>Bronze</td> <td>50</td> </tr> <tr> <td>Total</td> <td>200</td> </tr> </tbody> </table> <p>Also give suitable python statement to save this chart.<br/> OR<br/> Write a python program to plot a line chart based on the given data to depict the changing weekly average temperature in Delhi for four weeks.<br/> Week=[1,2,3,4]<br/> Avg_week_temp=[40,42,38,44]</p>                                                                                                                                                                                                                                                                                                                                | Medal Type | Number of Medals | Gold | 75 | Silver | 50 | Bronze | 50 | Total | 200 | 5 |
| Medal Type | Number of Medals                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |                  |      |    |        |    |        |    |       |     |   |
| Gold       | 75                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |                  |      |    |        |    |        |    |       |     |   |
| Silver     | 50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |                  |      |    |        |    |        |    |       |     |   |
| Bronze     | 50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |                  |      |    |        |    |        |    |       |     |   |
| Total      | 200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |            |                  |      |    |        |    |        |    |       |     |   |

**SECTION E**

34 Consider the table STUDENT given below

1+1+2

| RollNo | Name    | Class | DOB      | Gender | City   | Marks |
|--------|---------|-------|----------|--------|--------|-------|
| 1      | Anand   | XI    | 6/6/97   | M      | Agra   | 430   |
| 2      | Chetan  | XII   | 7/5/94   | M      | Mumbai | 460   |
| 3      | Geet    | XI    | 6/5/97   | F      | Agra   | 470   |
| 4      | Preeti  | XII   | 8/8/95   | F      | Mumbai | 492   |
| 5      | Saniyal | XII   | 8/10/95  | M      | Delhi  | 360   |
| 6      | Maakhiy | XI    | 12/12/94 | F      | Dubai  | 256   |
| 7      | Neha    | X     | 8/12/95  | F      | Moscow | 324   |

- State the command that will give the output as :  

```
name

Anand
Chetan
Geet
Preeti
```
- What will be the output of the following command?  
 Select \* from student where gender = "F" order by marks;
- Prachi has given the following command to obtain the highest marks  
 Select max(marks) from student where group by class;  
 but she is not getting the desired result. Help her by identifying the error and writing the correct command.

**Or (only for part c)**

Give the command to display average marks of all classes in descending order.

35 Consider the following DataFrame df1

1+1+2

|         | POPULATION | HOSPITALS | SCHOOLS |
|---------|------------|-----------|---------|
| DELHI   | 10927986   | 189       | 7916    |
| MUMBAI  | 12691836   | 208       | 8508    |
| KOLKATA | 4631392    | 149       | 7226    |
| CHENNAI | 4328063    | 157       | 7617    |

- Write command that will give the following output:  

```
DELHI 10927986
MUMBAI 12691836
KOLKATA 4631392
CHENNAI 4328063
```
- Display all details of DELHI
- Predict the output of the following python statement:
  - df1.shape
  - df1[1:3]

**OR (for part c only)**

Write Python statement to display the data of school column of indexes MUMBAI to CHENNAI.



SAMPLE QUESTION PAPER - V  
CLASS XII  
INFORMATICS PRACTICES (065)  
MARKING SCHEME

| <b>SECTION A</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 1                | d. Stealing Mouse                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1 |
| 2                | a. 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1 |
| 3                | b. E- Waste                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1 |
| 4                | c. Avast                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1 |
| 5                | a. df.loc[[0,1]]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1 |
| 6                | b. No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1 |
| 7                | b. SELECT COUNT (*) FROM Student;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1 |
| 8                | c. COUNT ()                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1 |
| 9                | a MIN ()                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1 |
| 10               | a. S.head()                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1 |
| 11               | a. Savefig()                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1 |
| 12               | d. pip install pandas                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1 |
| 13               | c. Patent                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1 |
| 14               | d. Monthname()                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1 |
| 15               | a. Trademark                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1 |
| 16               | FLOSS stands for _____<br>b) Free Libre Open-Source Software                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1 |
|                  | <b>Q17 and 18 are ASSERTION AND REASONING</b> based questions. Mark the correct choice as<br>a. Both A and R are true and R is the correct explanation for A<br>b. Both A and R are true and R is not the correct explanation for A<br>c. A is True but R is False<br>d. A is false but R is True                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |
| 17               | b. Both A and R are true and R is not the correct explanation for A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1 |
| 18               | d. A is false but R is True                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1 |
| <b>SECTION B</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |
| 19               | Free and open-source software (FOSS) is a term used to refer to groups of software consisting of both free software and open-source software where anyone is freely licensed to use, copy, study, and change the software in any way, and the source code is openly shared so that people are encouraged to voluntarily improve the design of the software.<br>“Free Software” is a matter of liberty not price. It provides four freedom to Run, Study how the program works, Redistributes copies, Releases improvement to the Public.<br>Open-Source Software:- In this type of software, the source code is freely available.<br>Or<br>Identity theft is when someone gains access to your personal information and uses it without your permission.<br>1. Don't Give out Personal Information to anyone .<br>2. Secure Your Personal Records | 2 |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |   |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|    | 3. Protect Your Personal Information Online (Or any other points)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |
| 20 | There may be any NULL value in the commission column. The count() function discards NULL values in a column but count(*) includes all the rows where at least one column has value, or in other word cardinality of the table                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2 |
| 21 | Purpose of Group By clause in SQL: The GROUP BY Clause is utilized in SQL with the SELECT statement to organize similar data into groups. It combines the multiple records in single or more columns using some functions. (1)<br>Suitable example. (1)                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2 |
| 22 | import pandas as pd<br>M1=pd.Series(data=[45,65,24,89],index=["Term1","Term2","Term3","Term4"],name="Marks")                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2 |
| 23 | Any two methods to manage e-waste (1 mark each)<br>Or<br>any 4 safety measures to reduce the risk of cyber crime. (½ mark each)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2 |
| 24 | Consider two objects X and Y. X is a list whereas Y is a Series. Both have values 20, 40, 90, 110. What will be the output of the following two statements considering that the above objects have been created already<br>a. [20, 40, 90, 110, 20, 40, 90, 110])<br>b. 0 40<br>1 80<br>2 180<br>3 220<br>In lists, '*' means replication whereas in series, it is scalar multiplication                                                                                                                                                                                                                                                                                                                           | 2 |
| 25 | i. classframe['Activity'] = ['Swimming', 'Dancing', 'Cricket', 'Singing']<br>ii. classframe.loc['St5'] = [1, 'Mridula', 'X', 'F', 9.8, 'Science']                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2 |
|    | <b>SECTION C</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |
| 26 | import pandas as pd<br>d1={'B_NO':[1,2,3,4], 'Name':['Sunil Pillai','Gaurav Sharma','Piyush Goel','Kartik Thakur'],'Score1':[90,65,70,80],'Score2':[80,45,95,76]}<br>batsman=pd.DataFrame(d1)<br>batsman["Total"]=batsman.Score1+batsman.Score2<br>print(batsman[["Name", "Total"]])                                                                                                                                                                                                                                                                                                                                                                                                                               | 3 |
| 27 | (i) SELECT RTRIM(Sname) FROM SCHOOL<br>(ii) SELECT Sname FROM SCHOOL WHERE DAYNAME(DOB)= "TUESDAY"<br>(iii) SELECT GRADES FROM SCHOOL WHERE YEAR(DOB) = 2006.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3 |
| 28 | (i) df[["Country","population"]]<br>(ii) print(df[df["population " ]>40])<br>(iii) df.drop(df.tail(n).index, inplace = True)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 3 |
| 29 | Identity theft is the crime of obtaining the personal or financial information of another person for the sole purpose of assuming that person's name or identity to make transactions or use it to post inappropriate remarks, comments etc. Example: Alex likes to do his homework late at night. He uses the Internet a lot and also sends useful data through email to many of his friends. One Day he forgot to sign out from his email account. In the morning, his twin brother, Flex started using the computer. He used Flex's email account to send inappropriate messages to his contacts.<br><br>OR<br>Net Etiquettes refers to the proper manners and behaviour we need to exhibit while being online. | 3 |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |   |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|    | <p>These include: 1. No copyright violation: we should not use copyrighted materials without the permission of the creator or owner. We should give proper credit to owners/creators of open-source content when using them.</p> <p>2. Avoid cyber bullying: Avoid any insulting, degrading or intimidating online behaviour like repeated posting of rumours, giving threats online, posting the victim's personal information, or comments aimed to publicly ridicule a victim.</p> <p>(Or any other )</p>                                                                                                                                                                                                                                                                                                                                                                           |   |
| 30 | <p>(a) SELECT HOUSE, COUNT(*) FROM SCHOOL GROUP BY HOUSE HAVING COUNT(*)&gt;2.</p> <p>(b) SELECT GENDER, AVG(PERCENTAGE) FROM SCHOOL GROUP BY GENDER;</p> <p>(c) SELECT MIN(PERCENTAGE) FROM SCHOOL WHERE CLASS =10.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 3 |
|    | <b>SECTION D</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |
| 31 | <p>Explanation of the SQL functions using suitable examples. (½ mark for explanation and ½ mark for example)</p> <p>a. TRIM()<br/> b. MID()<br/> c. LEFT()<br/> d. ROUND()<br/> e. POW()</p> <p style="text-align: center;">OR</p> <p>Write SQL queries for the following:</p> <p>(i) SELECT UPPER(Breed) FROM MYPET<br/> (ii) SELECT SUM(PRICE) FROM MYPET.<br/> (iii) SELECT AVG(LifeSpan) FROM MYPET.<br/> (iv) SELECT INSTR("Innovation","at");<br/> (v) SELECT ROUND (456,-2);</p>                                                                                                                                                                                                                                                                                                                                                                                                | 5 |
| 32 | <p>i. BUS OR STAR Anyone can be used.</p> <p>ii. Suggest the kind of network required (out of LAN, MAN, WAN) for connecting</p> <p>(a) Administrative Wing (W1) with Middle Wing (W3): LAN<br/> (b) Administrative Wing (W1) with the Mumbai branch: WAN</p> <p>iii. Suggest the placement of the following devices with justification:</p> <p>(a) <b>Repeater:</b> Repeater to be placed based on layout drawn in part(i), between two physically connected buildings wherever the distance between the two buildings is more.<br/> (b) <b>Switch/Hub:</b> in all buildings</p> <p>iv. Protocol name : VoIP OR Voice Over Internet Protocol<br/> WhatsApp, Slack, Skype, Yahoo Messenger, Google Talk, Facebook Messenger, Google Hangout, Instant Messenger<br/> Any of the above or any other correct example of an application of WWW for instant messaging.</p> <p>v. dynamic</p> | 5 |
| 33 | <pre>import matplotlib.pyplot as plt X=['Gold','Silver','Bronze','Total'] Y=[75,50,50,200] plt.bar(X,Y) plt.xlabel('Medals won by Australia') plt.ylabel('Medals won') plt.title('AUSTRALIA MEDAL PLOT')</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 5 |

```
plt.show()
To save the chart
plt.savefig()

OR

import matplotlib.pyplot as plt
Week=[1,2,3,4]
Avg_week_temp=[40,42,38,44]
plt.plot(Week,Avg_week_temp)
plt.xlabel('WEEK')
plt.ylabel('AVERAGE WEEKLY TEMPERATURE')
plt.show()
```

**SECTION E**

34 Consider the table STUDENT given below 1+1+2

| RollNo | Name    | Class | DOB      | Gender | City   | Marks |
|--------|---------|-------|----------|--------|--------|-------|
| 1      | Anand   | XI    | 6/6/97   | M      | Agra   | 430   |
| 2      | Chetan  | XII   | 7/5/94   | M      | Mumbai | 460   |
| 3      | Geet    | XI    | 6/5/97   | F      | Agra   | 470   |
| 4      | Preeti  | XII   | 8/8/95   | F      | Mumbai | 492   |
| 5      | Saniyal | XII   | 8/10/95  | M      | Delhi  | 360   |
| 6      | Maakhiy | XI    | 12/12/94 | F      | Dubai  | 256   |
| 7      | Neha    | X     | 8/12/95  | F      | Moscow | 324   |

a. SELECT Name from STUDENT WHERE Marks>400;

b.

| RollNo | Name    | Class | DOB      | Gender | City   | Marks |
|--------|---------|-------|----------|--------|--------|-------|
| 6      | Maakhiy | XI    | 12/12/94 | F      | Dubai  | 256   |
| 7      | Neha    | X     | 8/12/95  | F      | Moscow | 324   |
| 4      | Preeti  | XII   | 8/8/95   | F      | Agra   | 492   |

c. Conditions are applied using 'HAVING' when we use GROUP BY.

Select max(marks) from student group by class;

**Or (only for part c)**

SELECT CLASS, AVG (MARKS) FROM STUDENT  
GROUPBY CLASS ORDERBY AVG(MARKS) DESC;

35 a. df1["POPULATION"] or df1.POPULATION 1+1+2

b. df1.loc["DELHI"] Or df1.iloc[0]

c.

i. (4, 3)

|         |            |           |         |
|---------|------------|-----------|---------|
| ii.     | POPULATION | HOSPITALS | SCHOOLS |
| MUMBAI  | 12691836   | 208       | 8508    |
| KOLKATA | 4631392    | 149       | 7226    |

**OR (for part c only)**

print (df1[1:4])