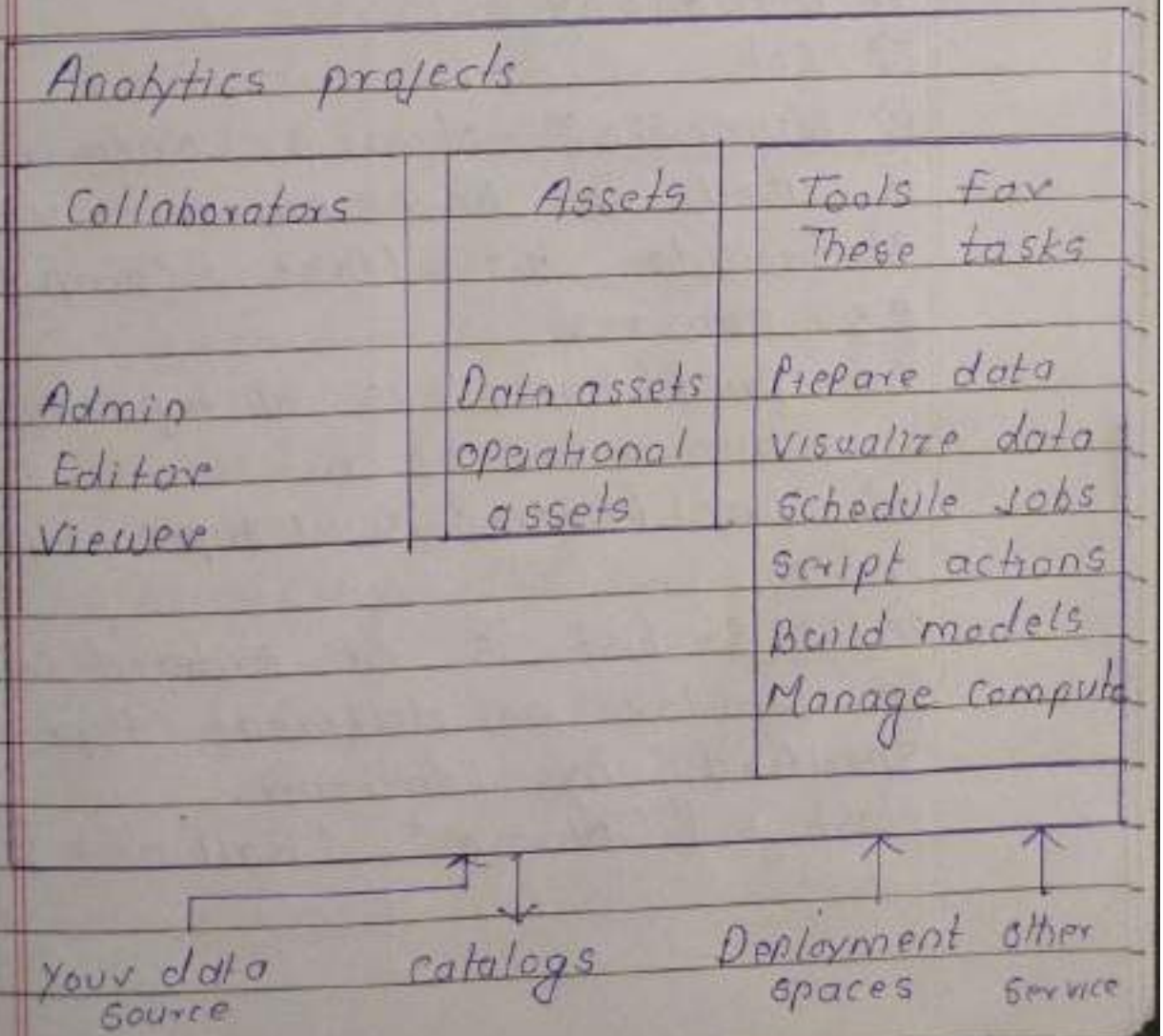
Assignment No - 2

Q.1 a) Explain how Watson Studio will provide the environment to solve business problems.

Ans:- 1) Watson Studio provides the environment and tools for you to collaboratively work on data to solve your business problems.
2) You can choose the tools you need to analyze and visualize data, to clean, cleanse and shape data.
3) The architecture of watson studio is created around and analytic project.



Q.1 b) What is data type? List out the types of data type with example.

Ans:- Data type is a collection or grouping of data values, usually specified by a set of possible values a set of allowed operations on these values.

List of data types :-

1) Numeric
2) Sequence type
3) String
4) Dictionary
5) Set

1) Numeric :- Numeric data type is used to hold numeric value. It include int, Float, Complex

ex num = 5
print(num, ' is of type ' type(num))
num = 2.0
print(num2, ' is of type ', type(num2))

2) List :- List is an ordered collection of similar or different types of specified by common.

List = ['Name', 'Roll no']

3) String :- Sequence of characters represented by either single or double quotes.

ex

```
name = 'python'
Print (name)
```

output :-

Python

4) Dictionary :- Python dictionary is an ordered collection of items

```
dict = { 'Name': 'Mayur', 'Roll no':
        '131' }
print (dict)
```

output :- {'Name': 'Mayur', 'Rollno': '131'}

5) Set :- Set is an unordered collection of unique items.

ex

```
student-id = { 12, 14, 16 }
   print ( student-id )
   print ( type (student-id )
```

output :-

{ 12, 14, 16 }

< class 'set' >

Q.2) What is dictionary? Explain the methods available in dictionary.

Ans:- Dictionary is mutable data structures that allows you to store key-value pairs. The dictionary can be created using the dict().

The Methods available in dictionary are:

1) key():- It use return list of all the available keys in the dictionary

ex:- dict = {'Name': 'Mayur', 'Roll no': '131'}
print(dict.keys())

Output:- dict_keys('Name', 'Roll no')

2) values():- It use returns list of dictionary value from the key value pairs.

ex: dict = {'Name': 'Mayur', 'Roll no': '131'}
print(dict.values())

Output:- dict_values('Mayur', '131')

3) Copy():- This method returns a shallow copy of dictionary

ex
dict = {'Name': 'Mayur', 'Roll no': '131'}

dict_new = dict.copy()
print(dict_new)
Output:- {'Name': 'Mayur', 'Roll no': '131'}

4) update:- The update() inserts new item to the dictionary

Example:-
dict = {'Name': 'Mayur', 'Roll no': '131'}
dict.update({'age': 22})
print(dict)

Output:-
{'Name': 'Mayur', 'Roll No': '131', 'Age': '22'}

Q. 2) b) Difference between numpy arrays and lists.

Ans:-

Numpy arrays	Lists
1) It is the core library of python which used for scientific computing	1) The core library of python provides List.
2) It can contain similar data-types	2) It contain different types of datatypes
3) It is Homogeneous	3) It is both Homo-geneous and heterogeneous
4) In this element wise operation is possible	4) In this not element wise operation is possible
5) It is faster as compared list	5) It is slow as compared arrays.
6) It also have some optimism function	6) It does not have some optimism function.
7) It store each item in sequential manner	7) It store item in random location of the memory.

Q.3 a) Explain the following term
i) Raw code ii) Waffle chart

Ans:- i) Raw code :-

The Raw code feature is exactly how it sounds: Its a full block of code that contains all of the forms HTML, CSS and JavaScript that can be embedded directly into your site.

1) In data visualization "raw code" typically refers to the direct programming code or scripts used to create visulizations from raw data.

2) This code can be written in ~~ii) white chart~~ :- various programming languages like python, R etc.

3) Raw code in data visulizations provides flexibility and control over the design and presentation of visualizations.

4) However, it may require good understanding of programming and data visualization concepts to effectively create and customize.

ii) Waffle chart :-

1) A waffle chart is a type of data visualization that is used to represent the distribution of a categorical variable.

2) It is similar to a 100% stacked bar chart but is displayed in a grid format that resembles a waffle or a checkere board.

3) Waffle chart are effectively for showing the composition of data in an easily under-standable and visually engaging way.

Q.3 b) How will you create the normalized weight

Ans:- By Mathematically :- Simply divide the survey weight of each unit used in the analysis by the (unweighted) average of the survey weights of all the analyzed units.

To create normalised weights you typically follow three steps :-

1. Determine the weights :- first you need a set of weights that you want to normalize

2. Calculate the sum :- find the sum of all the weight.

Sum = $W_1 + W_2 + W_3 + \cdots + W_n$

3) Normalise Each weight :-

Divide each individual weight by the sum calculated in step 2 The normalized weight (w-nom) for a weight w-i would be w-nom-i = w-i / sum.

Q.4 a) Explain pie chart specialised visualization Tools using Matplotlib.

Ans :- A Pie chart is a circular statistical plot that can display only one series of data.

Creating pie chart :-

Matplotlib API has pie() function in its pyplot module which create pie chart representing the data in an array.

Syntax :- Matplotlib.pyplot.pie(data, explode = None, labels = None, colors = None, autopct = None, shadow = False)

Parameters :-

data :- It represents the array of data values to be plotted.

labels :- It is a list of sequence of strings which sets the label of each wedge

Color :- attribute is used to provide color to the wedges.

autopct :- It is a string used to label the wedge with their

numerical value

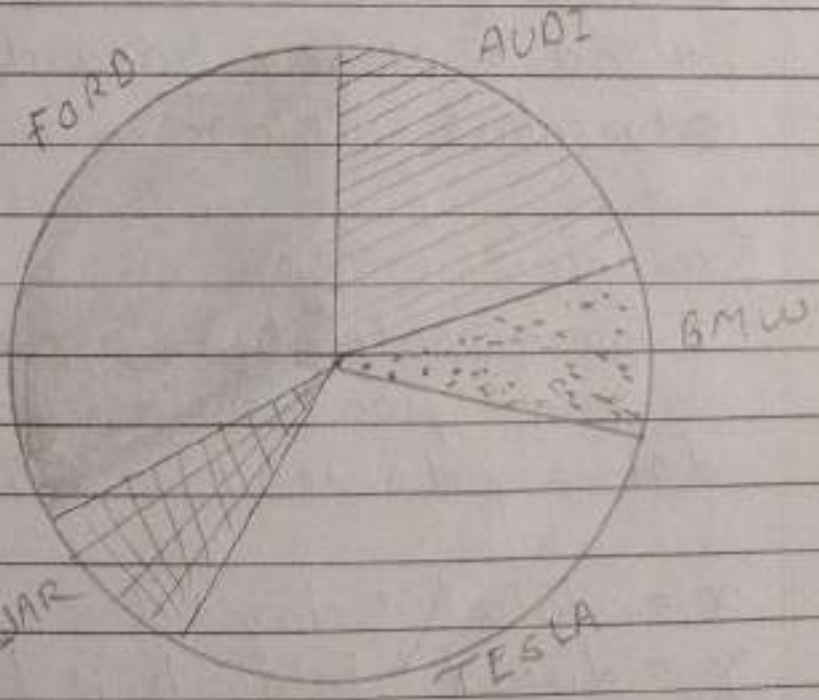
Shadow :- is used to create shadow of wedge

Example :-

```
from matplotlib import pyplot as plt
import numpy as np
cars = [ 'AUDI', 'BMW', 'FORD',
         'TESLA', 'JAGUAR' ]

data = [ 23, 17, 35, 29, 12 ]
fig = plt.figure( figsize = (10, 7))
plt.pie( data, labels = cars )
plt.show()
```

Output :-



Q.4 b) Explain Bubble plots Specilised Visudlization Tools using matPlotlib.

Ans:- A bubble plot is a scatter plot where the circle size is mapped to the value of a third numeric variable.

The bubble plots are used to observe relationship between variables. The bubble() method in matplotlib library is used to draw a bubble plot.

Syntax:-

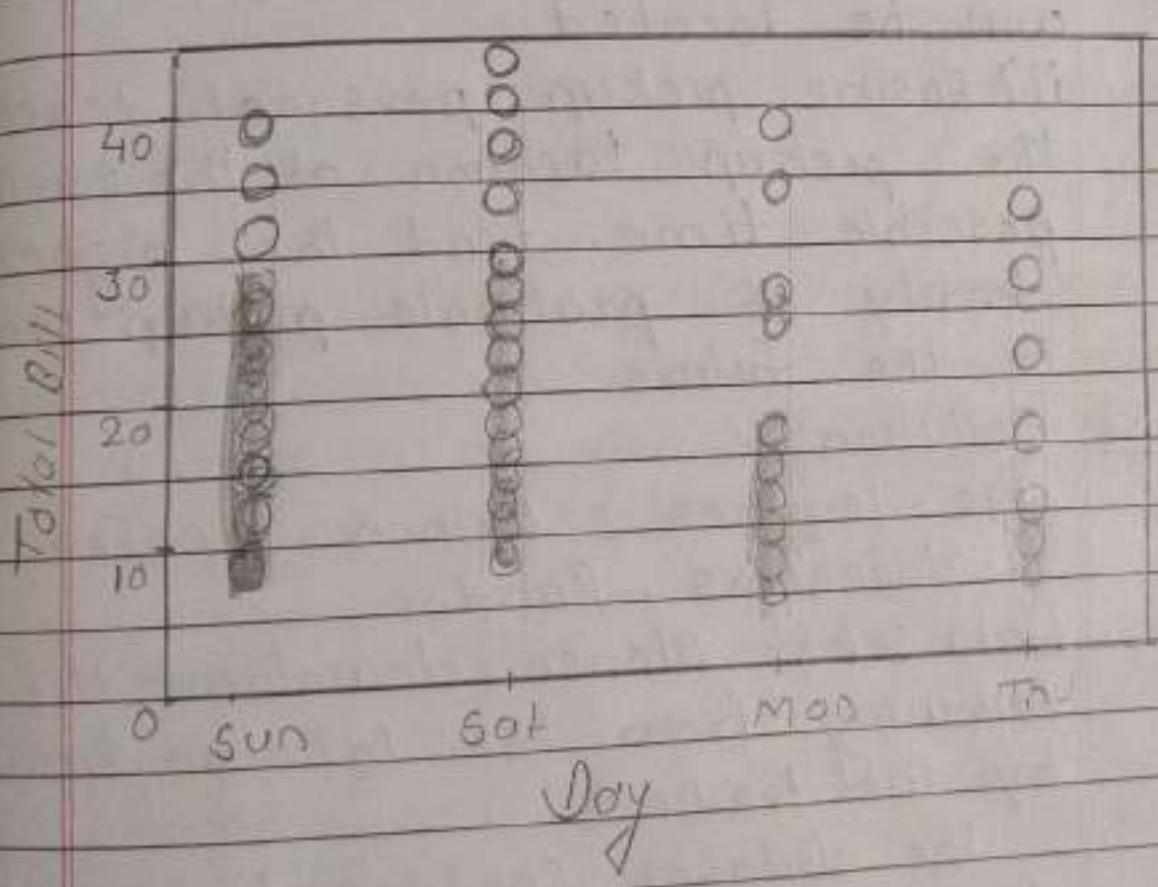
matplotlib.pyplot.bubble(x-axis-data, y-axis-data, S = None, C = None, marker = None, cmap = None, Vmin = None, Vmax = None, alpha = None, linewidths = None, edgecolors = None

Example:-

```
import matplotlib.pyplot as plt
import pandas as pd
data = pd.read_csv('tips.csv')
x = data['day']
y = data['total_bill']
```

plt.bubble(x, y)
plt.title("Tips Dataset")
plt.ylabel("Total Bill")
plt.xlabel("Day")
plt.show()

Output:-



Q.5 a) An e-commerce company 'wants to get into logistics "DeliverU", It wants to know the pattern for maximum pickup calls from different areas of the city throughout the day. This will result in:

i) Build optimum number of stations where its pickup delivery personal will be located

ii) Ensure pickup personal reaches the pickup location at the earliest possible time. Find the highest density of probable pickup locations in the future.

Ans: Solution :-

Pre-requires : Python, Jupyter Notebooks, Pandas

Data set :- Please download the following from the location specified by the trainer.

The dataset contains two separate data files - train-del.csv and test-del.csv the difference is that train-del.csv contains additional column which is trip-duration which we will not be needed for our present analysis.

a) Import libraries - Pandas and folium. Drop the trip_duration column and combine the 2 different files as one dataframe.

```
import pandas as pd
import folium

df_train = pd.read_csv('train-del.csv').drop(column = ['trip_duration', 'dropoff_datetime'])
df_train.head()
```

Throughout the city, pickups are more probable from central area. So better to set lot of pickup stops at these locations.

Therefore, by using maps we can highlight trends and uncover patterns and derive insights from the data.

Q.5 b) Explain spatial visualization and Analysis in python with folium.

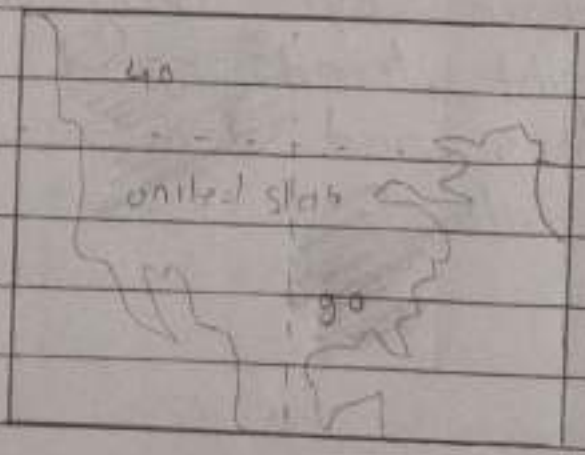
Ans :- Visualizing spatial data with folium maps are defined as a folium maps object and we can add other folium objects on top of the folium.

Syntax :- folium.map(locations, tiles = "openstreetmap" zoom - start = 4)

Code :-

```
import folium
import Pandas as p
m = folium.Map(location = [40, -95]
               , zoom-start = 4)
m.save(imy map.html)
```

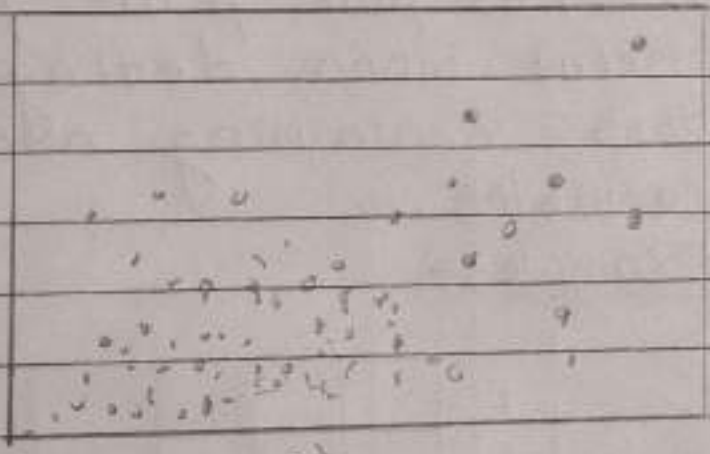
output :-



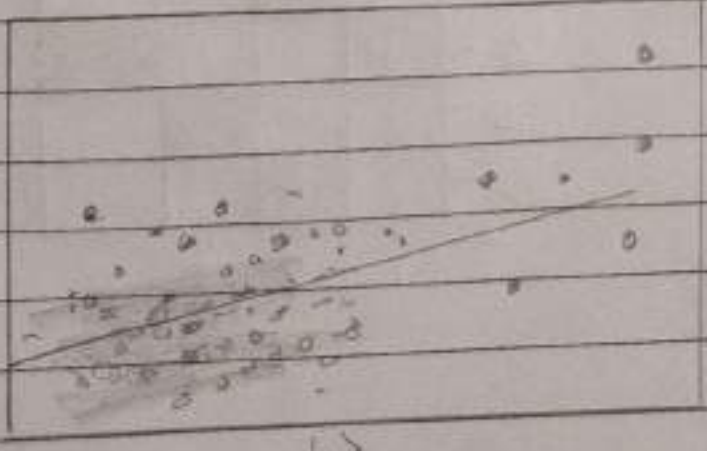
Q.6 a) Explain the following terms
i) regression plots ii) matrix plots.

Ans:- i) Regression plots :-

Regression plots as the ~~son~~ name suggests creates a regression line between 2 parameters and helps to visualize their linear relationships. Below are example of scatter plot and the same plot with a linear regression line added. The regression line is an attempt to find the best fit through the points in the scatter plot



a)



b)

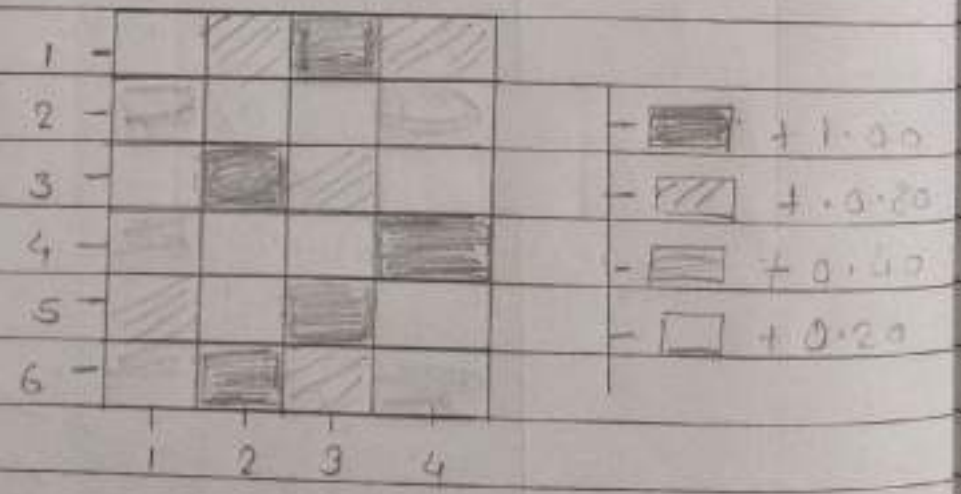
ii) Matrix plot :

Ans. 1) Matrix plots, also known as heatmap matrices, are a type of data visualization technique used to display the relationship between multiple variables in a dataset.

2) These are particularly useful for exploring correlations or patterns in multivariate data.

3) Matrix plots are particularly useful when dealing with data-sets containing numerous variables.

Example:-



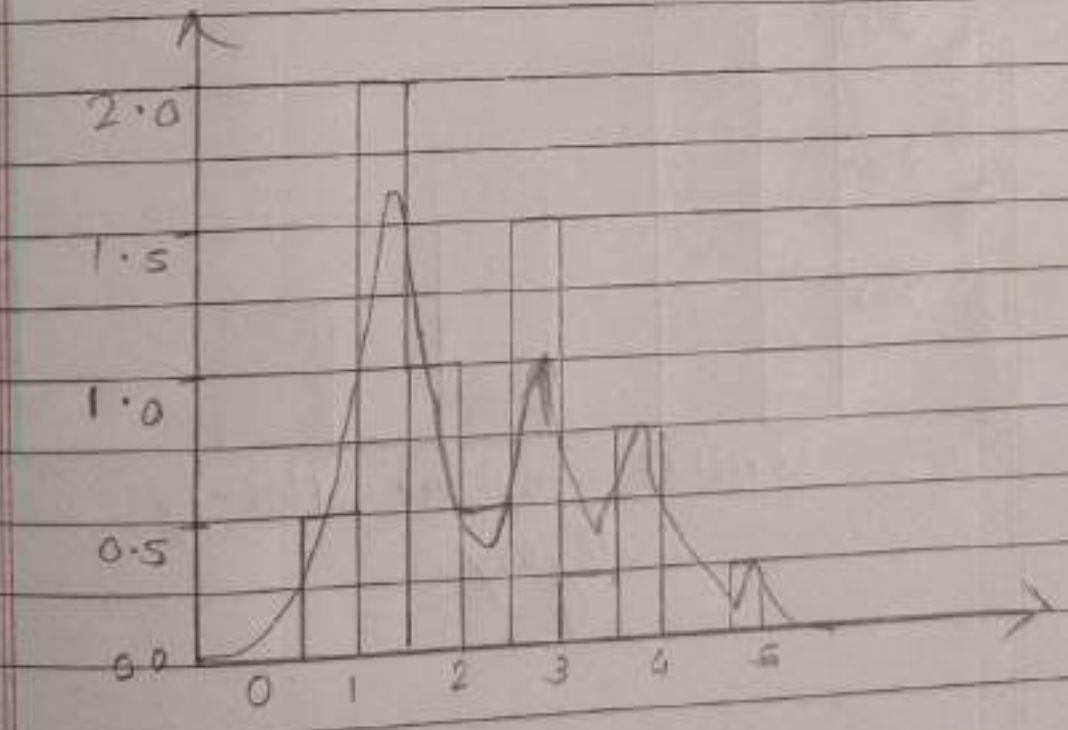
Q.6 b) Explain the following terms
i) Distribution plots ii) Categorical plots.

Ans:- i) Distribution plots :-

1) Distribution plots visually asses that distribution of sample data by comparing the empirical distribution of the data with the theoretical values expected from a specified distribution

2) The use of distribution plots is essential for exploratory data analysis

example



ii) Categorical plot :-

There are two types of categorical plots i) box plot and ii) violin plots. These kinds of plot allow us to choose a numerical variable, like age and plot the distribution of age for each category in a selected categorical variable

Ex :-

Chart of Number of Students