Assignment No. 2

Q.1 Explain data manipulation with pandas & write a program of pandas with the help of pandas series and dataframe.

→ ① Pandas is a powerful library for data manipulation and analysis in python.

② It provides a flexible and easy to use data structure called a dataframe, which is similar to a table in a database.

③ Pandas allows you to load data from a wide range of sources, including csv files, excel file, SQL databases and more.

④ Some common data manipulation task that can be performed using pandas are:

a) loading data.

b) cleaning data

c) Transforming data

d) Filtering data

e) merging data.

program:

import pandas as pd

\# load data from csv file.

data = pd.read_csv('data.csv')

\# drop rows with missing values.

data = data.dropna()

```python
# group data by category
grouped_data = data.groupby('category').sum()


# filter data by price
filtered_data = data.loc[data['price'] >100]


# merge data with another Dataframe
other_data = pd.read_csv('other_data.csv')
merged_data = pd.merge(data, other_data, on='id')
```

Ques.2 Explain visualization with matplotlib and seaborn with a example of matplotlib and seaborn.

→ ① Matplotlib :—→

   matplotlib is a low level library of python which is used for data visualization. It is easy to use and emulates MATLAB like graphs and visualization. This library is built on the top of Numpy array and consist of several plot like lines, bar chart, histogram and etc.

   pyplot is a matplotlib module that provides a MATLAB like interface.

```python
import matplotlib.pyplot as plt
#initializing the data
a = [10, 20, 30, 40]
```
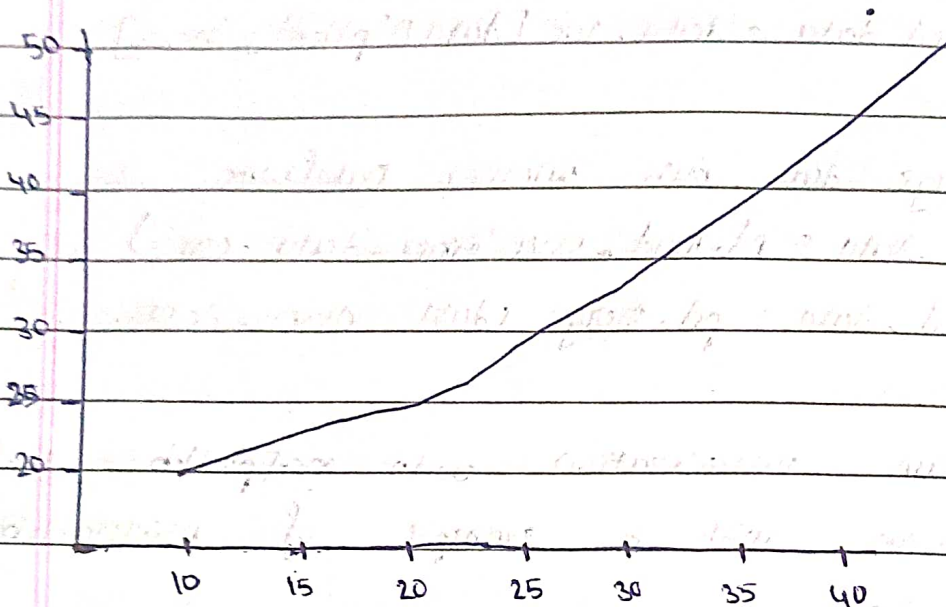
```python
y = [ 20, 25, 35, 55 ]
# plotting the data
plt.plot (x,y)
plt.show ()
```


* Seaborn :→

Seaborn is an amazing visualization library for statistical graphics, plotting in Python. It is built on the top of matplotlib library and also closely integrated into a data structured from pandas.

```python
import numpy as np
import seaborn as sns

sns.set (style = "white" )
```
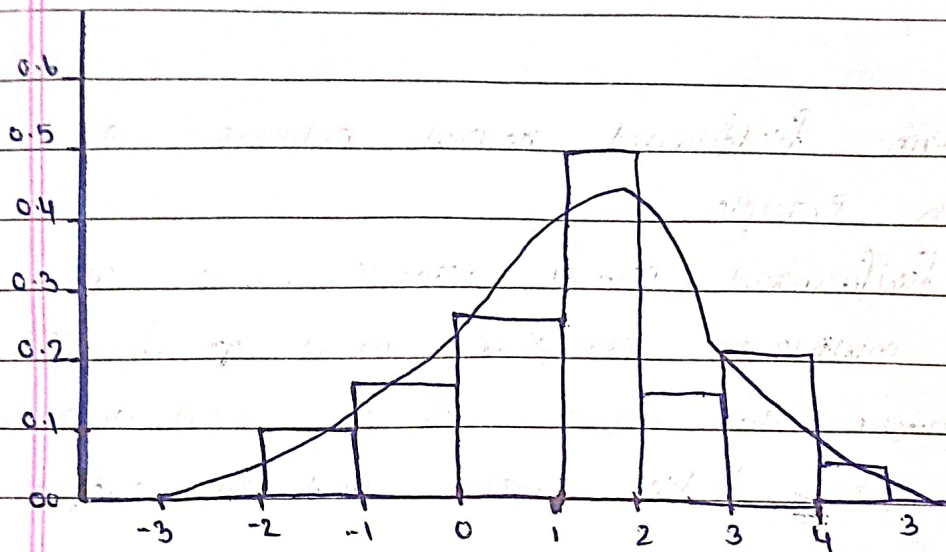
```python
rs = np.random.Randomstart (16)
d = rs. normal (size = 50)


sns. distplot (d, kde = True, color = 'g')
```


Q.3 WAP to plot histogram using matplotlib

→
```python
import numpy as np
import matplotlib.pyplot as plt


# generate a random dataset
data = np.random.normal (size=1000)


# plot.hist (data) ie. histogram.
plt.hist (data, bins = 30)


# add labels and titles.
plt.xlabel ('value')
```

plt.ylabel ('frequency')
plt.title ('Histogram of Random data')

display the plot
plt.show().

Ques.4 Explain feedforward neural network in detail
with example.
→ ① A feedforward neural network, also known as
a multilayer perceptron, is a type of AI
network that consist of an input layer, one
or more hidden layers and an output
layer.

② Information flows in forward direction, from the
i/p layer through hidden layer to the o/p
layer, without any feedback loop.

③ Each layer in a feedforward neural
network consist of a set of neurons or
nodes that are connected to the neurons in
the adjacent layers.

④ The activation function is used in the
o/p layer depends on the type of task
being performed.

⑤ They are widely used for supervised learning
task, such as classification and regression
and can be trained on a variety of data

types, such as text images.

⑥ They can also be used as a building block for more complex neural network architectures, such as CNN.

Q.5. Explain neural networks in detail also write the pros and cons for the same.

→ ① Neural network is a type of machine learning model that is inspired by the structure and function of the human brain.

② It consists of multiple layers of interconnected nodes.

③ The basic building block of neural network is an artificial neuron, which receives i/p from other neurons or from the outside world.

④ The i/p to a neurons is weighted, meaning that some i/p are given more importance than other, and the weights are learned through a process called backpropagations.

⑤ A neural network typically consist of three types of layer: input layer, hidden layer and output layer.

⑥ The i/p layer receives the raw data such as image or text and then passes to the hidden layer.

⑧ The hidden layer perform computation on the i/p and pass the result to the o/p layer, which

produces the final output such as a numerical value.

pros:
① It has ability to learn the complex pattern from large dataset.
② It has high levels of accuracy on a wide tasks
③ versatility.
④ Neural network are often very robust to noisy and incomplete data, still make accurate predictions.

cons:
① Neural networks require large amounts of data to be trained effectively.
② Vulnerability to adversarial attacks.
③ lack of interpretability.
④ Prone to overfitting
⑤ It requires significant computation resources.