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Experiment – 3.2

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Branch:	**ME – CSE - AIML**	**Section/Group:**	**MAI – 1 (A)**
Semester:	**1st**	**Date of Performance:**	
Subject Name:	**Python Programming**	**Subject Code:**	**23 CSH 623**

1. Aim of the Experiment :

i. Write a python program to implement Numpy and its related functions like ones( ), zeros( ),arrange( ), reshape( ) etc.
ii. Write a python program to read a csv file using Pandas and implement various in built functions. Also use the data preprocessing functions.
iii. Write a python program to illustrate the use of matplotlib for visualizaing scatter plot, pie chart, and bar graph.

2. Objective of the Experiment :

i. To implement Numpy and its related functions like ones( ), zeros( ),arrange( ), reshape( ).
ii. To read a csv file using Pandas and implement various in built functions. Also use the data preprocessing functions.
iii. To illustrate the use of matplotlib for visualizaing scatter plot, pie chart, and bar graph.

3. Algorithm/ Steps for Experiment

Step 1: Create a python file to perform the python programs.
Step 2: Import Numpy library.
Step 3: Discover different in built functions of Numpy.
Step 4: Perform visualization using matplotlib.

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Code for Experiment (Implement Numpy and its related functions like ones( ), zeros( ),arrange( ), reshape( ).) **:**

#Importing Numpy

```
import numpy as np

arr = np.array([1, 2, 3, 4, 5])

print(arr)

print(type(arr))
```

 # numpy.zeros method

```
import numpy as np

b = np.zeros(2, dtype = int)

print("Matrix b : \n", b)

a = np.zeros([2, 2], dtype = int)

print("\nMatrix a : \n", a)

c = np.zeros([3, 3])

print("\nMatrix c : \n", c)
```

 # array with all ones

```
import numpy as np

c = np.ones([5, 3])

print("\nMatrix c : \n", c)

d = np.ones([5, 2], dtype = float)

print("\nMatrix d : \n", d)
```

reshaping numpy array

```python
import numpy as np

array = np.array([1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16])

print("Array : " + str(array))

n = array.size

# N-D array N dimension

N = 4

M = n//N

# converting it to 2-D from 1-D array

reshaped1 = array.reshape((N, M))

# printing reshaped array

print("First Reshaped Array : ")

print(reshaped1)

# creating another reshaped array

reshaped2 = np.reshape(array, (2, 8))

# printing reshaped array

print("Second Reshaped Array : ")

print(reshaped2)
```

Result/Output :

```
In [1]: runfile('C:/Users/ystan/OneDrive/Desk
ystan/OneDrive/Desktop/python')
[1 2 3 4 5]
<class 'numpy.ndarray'>
```

```
ystan/OneDrive/Desktop/python')
Matrix b :
 [0 0]

Matrix a :
 [[0 0]
 [0 0]]

Matrix c :
 [[0. 0. 0.]
 [0. 0. 0.]
 [0. 0. 0.]]
```

```
In [3]: runfile('C:/Users/ystan/OneD
ystan/OneDrive/Desktop/python')

Matrix c :
 [[1. 1. 1.]
 [1. 1. 1.]
 [1. 1. 1.]
 [1. 1. 1.]
 [1. 1. 1.]]

Matrix d :
 [[1. 1.]
 [1. 1.]
 [1. 1.]
 [1. 1.]
 [1. 1.]]
```

```
In [5]: runfile('C:/Users/ystan/OneDrive/Desktop/python/new.
ystan/OneDrive/Desktop/python')
Array : [ 1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16]
First Reshaped Array :
[[ 1  2  3  4]
 [ 5  6  7  8]
 [ 9 10 11 12]
 [13 14 15 16]]
Second Reshaped Array :
[[ 1  2  3  4  5  6  7  8]
 [ 9 10 11 12 13 14 15 16]]
```

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Code for Experiment :

Python program to read a csv file using Pandas and implement various in built functions. Also use the data preprocessing functions -

 # reading csv file

```
# Import pandas
import pandas as pd
df = pd.read_csv("C:/Users/ystan/OneDrive/Desktop/people.csv")
print(df.head())
```

#inbuilt function and data preprocessing

```
df = pd.read_csv('train.csv')
#dropping coloumn
cols = ['Name', 'Ticket', 'Cabin']
df = df.drop(cols, axis=1)

#dropping missing values
df = df.dropna()
#Take Care of Missing Data
df['Age'] = df['Age'].interpolate()
```

Result/Output :

```
   First Name Last Name     Sex                    Email Date of
birth  Job Title
0    Shelby    Terrell    Male        elijah57@example.net    1945-10-
26  Games developer
1    Phillip   Summers   Female       bethany14@example.com    1910-03-
24  Phytotherapist
2    Kristine   Travis    Male        bthompson@example.com    1992-07-
02  Homeopath
3    Yesenia   Martinez   Male     kaitlinkaiser@example.com    2017-08-
03  Market researcher
4     Lori      Todd      Male    buchananmanuel@example.net    1938-12-
```

```
>>> df.info()
<class 'pandas.core.frame.DataFrame'>
Int64Index: 891 entries, 0 to 890
Data columns (total 12 columns):
PassengerId 891 non-null int64
Survived 891 non-null int64
Pclass 891 non-null int64
Name 891 non-null object
Sex 891 non-null object
Age 714 non-null float64
SibSp 891 non-null int64
Parch 891 non-null int64
```

```
>>>df.info()
PassengerId 891 non-null int64
Survived 891 non-null int64
Pclass 891 non-null int64
Sex 891 non-null object
Age 714 non-null float64
SibSp 891 non-null int64
Parch 891 non-null int64
Fare 891 non-null float64
Embarked 889 non-null object
```

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Code for Experiment (**To illustrate the use of matplotlib for visualizaing scatter plot, pie chart, and bar graph.**)**:**

 # plotting the data linear graph

```python
import matplotlib.pyplot as plt

# initializing the data

x = [10, 20, 30, 40]

y = [20, 25, 35, 55]

plt.plot(x, y)

plt.show()
```

 # visualizaing scatter plot

```python
import matplotlib.pyplot as plt

x =[5, 7, 8, 7, 2, 17, 2, 9, 4, 11, 12, 9, 6]

y =[99, 86, 87, 88, 100, 86, 103, 87, 94, 78, 77, 85, 86]

plt.scatter(x, y, c ="blue")

# To show the plot

plt.show()
```

#Pie-chart

```python
# Import libraries

from matplotlib import pyplot as plt

import numpy as np

# Creating dataset

cars = ['AUDI', 'BMW', 'FORD',  'TESLA', 'JAGUAR', 'MERCEDES']
```

```python
data = [23, 17, 35, 29, 12, 41]

# Creating plot

fig = plt.figure(figsize =(10, 7))

plt.pie(data, labels = cars)

# show plot

plt.show()
```

#Bar graph

```python
import numpy as np

import matplotlib.pyplot as plt

# creating the dataset

data = {'C':20, 'C++':15, 'Java':30, 'Python':35}

courses = list(data.keys())

values = list(data.values())

fig = plt.figure(figsize = (10, 5))

# creating the bar plot

plt.bar(courses, values, color ='Blue', width = 0.4)

plt.xlabel("Courses offered")

plt.ylabel("No. of students enrolled")

plt.title("Students enrolled in different courses")

plt.show()
```
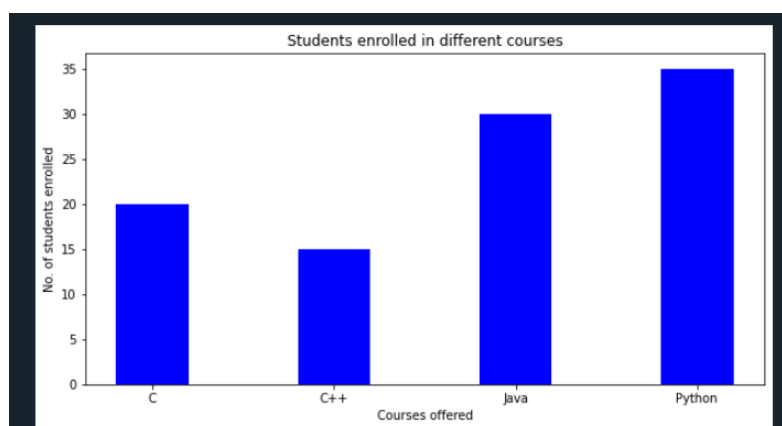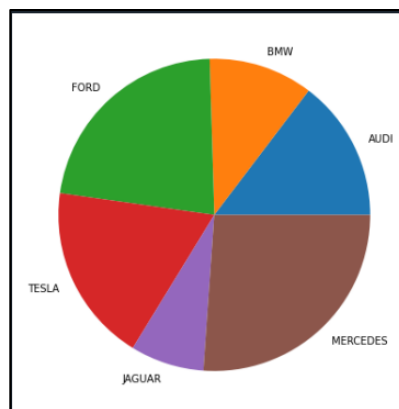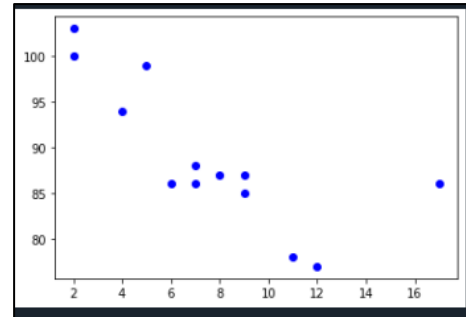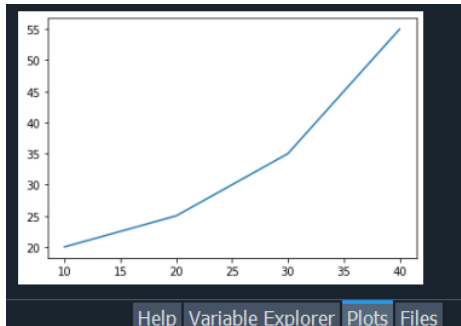
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Result/Output :

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Learning outcomes (What I have learnt):

1. I learnt read and write the contents into a file.

2. I learnt about matplotlib.

3. Learned about numpy and its libraries.

Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):

Sr. No.	Parameters	Maximum Marks	Marks Obtained
1.	**Student Performance (Conduct of experiment) Objectives/Outcomes.**	12	
2.	**Viva Voce**	10	
3.	**Submission of Work Sheet (Record)**	8	