COLLEGEOFENGINEERINGTRIVANDRUM

Department of Computer Applications

20MCA241
DATASCIENCELAB

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Output:

Output 1:

```
Array 1: [1 2 3]
Array 2: [1 3 2]
Greater: [False False True]
Greater Equal: [ True False True]
Equal: [ True False False]
Less Equal: [ True True False]
Less: [False True False]
```

Output 2:

```
Even numbers from 30 to 70: [30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62
64 66 68]
```

EXERCISE 1: Introduction to Numpy

Sep 18, 2023

1. Write a NumPy program to create an element-wise comparison (greater, greater_equal, less and less_equal) of two given arrays.

2. Write a NumPy program to create an array of all the even integers from 30 to 70.

3. Write a NumPy program to create a 3x3 identity matrix.

4. Write a NumPy program to create a vector with values from 0 to 20 and change the sign of the numbers in the range from 9 to 15.

5. Write a NumPy program to create a 5x5 zero matrix with elements on the main diagonal equal to 1, 2, 3, 4, 5.

6. Write a NumPy program to compute sum of all elements, sum of each column and sum of each row of a given array.

7. Write a NumPy program to save a given array to a text file and load it.

8. Write a NumPy program to check whether two arrays are equal (element wise) or not.

9. Write a NumPy program to create a 4x4 array with random values, now create a new array from the said array swapping first and last rows.

10. Write a NumPy program to multiply two given arrays of same size element-by-element

Program 1:

```
import numpy as np array_1 = np.array([1, 2, 3]) array_2 =
np.array([1, 3, 2]) print('Array 1:', array_1) print('Array
2:', array_2) print('Greater:', np.greater(array_1,
array_2)) print('Greater Equal:', np.greater_equal(array_1,
array_2)) print('Equal:', np.equal(array_1, array_2))
print('Less Equal:', np.less_equal(array_1, array_2))
print('Less:', np.less(array_1, array_2))
```

Program 2:

```
array_3 = np.arange(30, 70, 2) print('Even
numbers from 30 to 70:', array_3)
```

Output 3:

```
3x3 identity matrix: [[1 0 0]
 [0 1 0]
```

```
 [0 0 1]]
```

Output 4:

```
Original vector:
[ 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20]
After changing the sign of the numbers in the range from 9 to 15:
[ 0 1 2 3 4 5 6 7 8 -9 -10 -11 -12 -13 -14 -15 16 17
  18 19 20]
```

Output 5:

```
5x5 Zero matrix with diagonal 1,2 3, 4, 5: [[1 0 0 0 0]
 [0 2 0 0 0]
 [0 0 3 0 0]
 [0 0 0 4 0]
 [0 0 0 0 5]]
```

Program 3:

```
array_4 = np.identity(3, int)
print('3x3 identity matrix:', array_4)
```

Program 4:

```
array_5 = np.arange(21) print("Original vector:") print(array_5)
print("After changing the sign of the numbers in the range from 9 to
15:") array_5[(array_5 >= 9) & (array_5 <= 15)] *= -1 print(array_5)
```

Program 5:

```
array_6 = np.diag(np.arange(1, 6)) print('5x5 Zero matrix
with diagonal 1,2 3, 4, 5:', array_6)
```

Output 6:

```
Array: [[1 0 0 0 0]
 [0 2 0 0 0]
 [0 0 3 0 0]
 [0 0 0 4 0]
 [0 0 0 0 5]]
Sum: 15
Sum Row: [1 2 3 4 5]
Sum Col: [1 2 3 4 5]
```

Output 7:

```
Saving array to array.txt
Reading from array.txt:
[[1 0 0 0 0]
 [0 2 0 0 0]
 [0 0 3 0 0]
 [0 0 0 4 0]
 [0 0 0 0 5]]
```

Output 8:

```
Array 1: [1 2 3]
Array 2: [1 3 2]
Arrays are not equal
```

Output 9:

```
Random array: [[0.30024    0.16806804 0.9019789 0.41344361]
 [0.77899607 0.86131724 0.71662955 0.00561989]
 [0.77845095 0.81002041 0.50775929 0.7935476 ]
 [0.75333544 0.13389178 0.10450286 0.76691089]]
Swapped Array: [[0.75333544 0.13389178 0.10450286 0.76691089]
 [0.77899607 0.86131724 0.71662955 0.00561989]
 [0.77845095 0.81002041 0.50775929 0.7935476 ]
[0.30024     0.16806804 0.9019789 0.41344361]]
```

Output 10:

```
a: [1 2 3 4 5] b: [
6 7 8 9 10]
axb: [ 6 14 24 36 50]
```

Program 6:

```
print('Array:', array_6) print('Sum:',
np.sum(array_6)) print('Sum Row:',
np.sum(array_6, axis=0)) print('Sum Col:',
np.sum(array_6, axis=1))
```

Program 7:

```
print('Saving array to array.txt')
np.savetxt('array.txt', array_6) print('Reading
from array.txt:')
print(np.loadtxt('array.txt').astype(np.int64))
```

Program 8:

```
print('Array 1:', array_1)
print('Array 2:', array_2) if
np.array_equal(array_1, array_2):
    print('Arrays are equal')
else: print('Arrays are not
    equal')
```

Program 9:

```
array_7 = np.random.rand(4, 4)
print('Random array:', array_7)
array_7[[0 ,3]] = array_7[[3, 0]]
print('Swapped Array:', array_7)
```

Program 10:

```
a = np.arange(1, 6)
b = np.arange(6, 11)
print('a:', a)
print('b:', b)
print('axb:', a*b)
```

Result: Program is executed and output is verified.

Output:

Output 1:

```
Enter matrix 1:
```

```
Enter matrix 2:
First Matrix:
[[1 2]
 [3 4]] Second
Matrix:
[[1 2] [3
4]] Dot
Product:
[[ 7 10]
 [15 22]]
```

EXERCISE 2: Matrix operations (using vectorization) and transformations Sep 18, 2023

Write Python program to create two matrices (read values from user) and find the following

1. Dot Product
2. Transpose
3. Trace
4. Rank
5. Determinant
6. Inverse
7. Eigenvalues and eigenvectors

Program 1:

```
r1 = int(input('Enter number of rows of first matrix'))
c1 = int(input('Enter number of cols of first matrix'))
print('Enter matrix 1:') m1 = [] for i in range(r1):
    m1.append([int(input(f'Enter element {i+1} {j+1}:')) for j in range(c1)])
r2 = int(input('Enter number of rows of first matrix')) c2 = int(input('Enter
number of cols of first matrix')) print('Enter matrix 2:') m2 = [] for i in
range(r2):
    m2.append([int(input(f'Enter element {i+1} {j+1}:')) for j in range(c2)])

m1 = np.array(m1)
m2 = np.array(m2)

print('First Matrix:')
print(m1) print('Second
Matrix:') print(m2)
print('Dot Product:')
```

Output 2:

```
Transpose:
First Matrix:
[[1 3]
 [2 4]] Second
Matrix:
[[1 3]
 [2 4]]
```

Output 3:

```
Trace:
First Matrix:
```

```
5 Second
Matrix:
5
```

Output 4:

```
Rank:
First Matrix:
2 Second
Matrix:
2
```

Output 5:

```
Determinant:
First Matrix: -
2.0000000000000004 Second
Matrix:
-2.0000000000000004
```

Program 2:

```
print('Transpose:')
print('First  Matrix:')
print(m1.transpose())
print('Second Matrix:')
print(m2.transpose())
```

Program 3:

```
print('Trace:')
print('First  Matrix:')
print(m1.trace())
print('Second Matrix:')
print(m2.trace())
```

Program 4:

```
print('Rank:')
print('First  Matrix:')
print(matrix_rank(m1))
print('Second Matrix:')
print(matrix_rank(m2))
```

Program 5:

```
print('Determinant:')
print('First  Matrix:')
print(det(m1))
print('Second Matrix:')
print(det(m2))
```

Output 6:

```
Determinant:
First Matrix: -
2.0000000000000004 Second
Matrix: -
2.0000000000000004
```

Output 7:

```
Inverse:
First Matrix:
[[-2. 1. ]
 [ 1.5 -0.5]]
Second Matrix:
[[-2. 1. ]
 [ 1.5 -0.5]]
```

Output 8:

```
Eigen Values, Eigen Vectors:
First Matrix:
[-0.37228132 5.37228132] [[-0.82456484 -0.41597356]
 [ 0.56576746 -0.90937671]]
Second Matrix:
[-0.37228132 5.37228132] [[-0.82456484 -0.41597356]
 [ 0.56576746 -0.90937671]]
```

Program 6:

```
print('Determinant:')
print('First Matrix:')
print(det(m1))
print('Second Matrix:')
print(det(m2))
```

Program 7:

```
print('Inverse:')
print('First  Matrix:')
print(inv(m1))
print('Second Matrix:')
print(inv(m2))
```

Program 8:

```
print('Eigen Values, Eigen Vectors:')
print('First Matrix:') eigenvalues,
eigenvectors = eig(m1)
print(eigenvalues, eigenvectors)
print('Second Matrix:') eigenvalues,
eigenvectors = eig(m2)
print(eigenvalues, eigenvectors)
```

Result: Program is executed and output is verified.

EXERCISE 3: Programs using Matplotlib

October 9, 2023

1. Draw a line in a diagram from position (1, 3) to (2, 10) then to (6, 12) and finally to position (18, 20). (Mark each point with a beautiful green colour and set line colour to red and line style dotted)

2. Draw a plot for the following data:

Temperature in degree Celsius	Sales
12	100
14	200
16	250
18	400
20	300
22	450
24	500

3. Write a Python program to draw a line using given axis values taken from a text file, with suitable label in the x axis, y axis and a title.

4. Write a Python program to plot two or more lines on the same plot with suitable legends of each line.

5. Write a Python program to create multiple plots.

6. Consider the following data.
Programming
Languages: Java Python PHP JavaScript C# C++
Popularity: 22.2 17.6 8.8 8 77 6.7

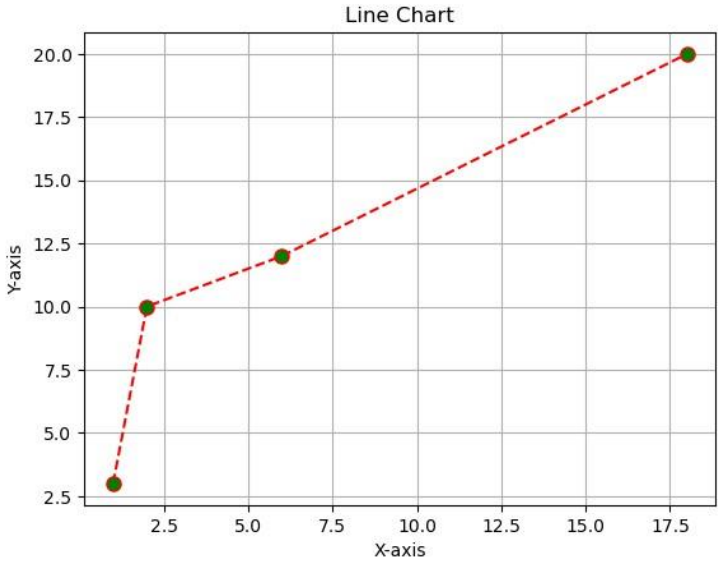
(i) Write a Python program to display a bar chart of the popularity of programming Languages. (ii) Write a Python programming to display a horizontal bar chart of the popularity of programming Languages(Give Red colour to the bar chart).
(iii) Write a Python program to display a bar chart of the popularity of programming Languages. Use a different color for each bar.

7. Write a Python program to create a bar plot of scores by group and gender. Use multiple X values on the same chart for men and women.

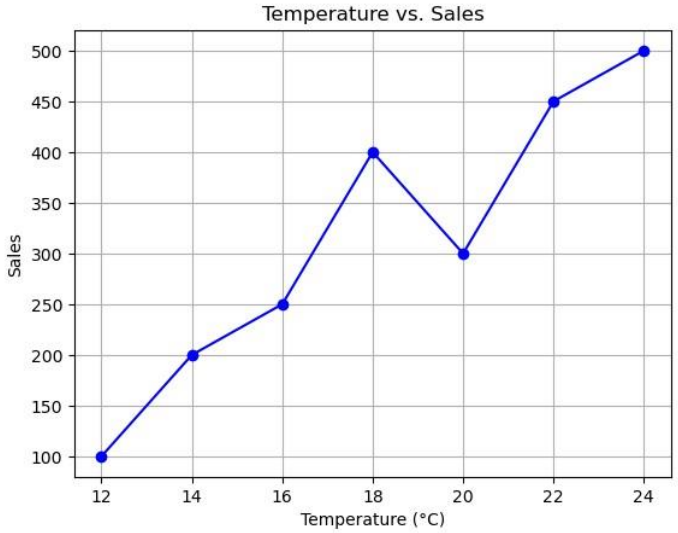
Sample Data:
Means (men) = (22, 30, 35, 35, 26)
Means (women) = (25, 32, 30, 35, 29)

Output:

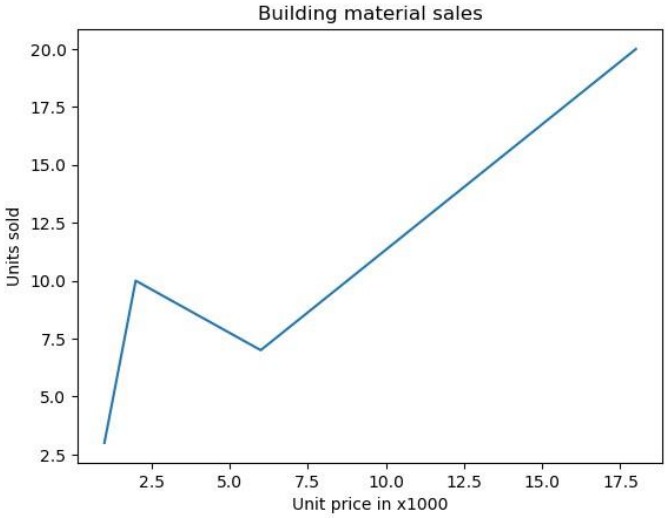
Output 1:



Output 2:



Output 3:



Program 1:

```
import matplotlib.pyplot as plt
x = [1, 2, 6, 18] y = [3, 10,
12, 20]
plt.plot(x, y, marker='o', linestyle='--', color='red',
markerfacecolor='green', markersize=8) plt.title('Line
Chart') plt.xlabel('X-axis') plt.ylabel('Y-axis')
plt.grid(True) plt.show()
```

Program 2:

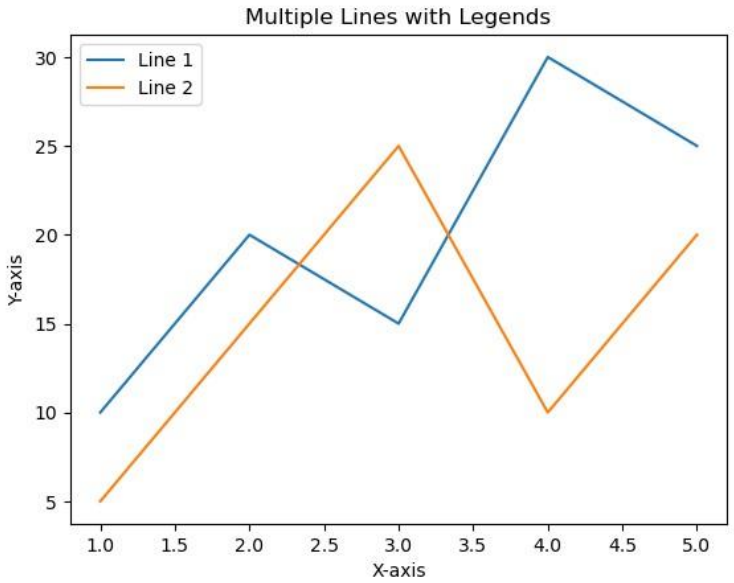
```
import matplotlib.pyplot as plt temperature
= [12, 14, 16, 18, 20, 22, 24] sales =
[100, 200, 250, 400, 300, 450, 500]

plt.plot(temperature, sales, marker='o', linestyle='-', color='blue')
plt.title('Temperature vs. Sales') plt.xlabel('Temperature (°C)')
plt.ylabel('Sales') plt.grid(True) plt.show()
```

Program 3:

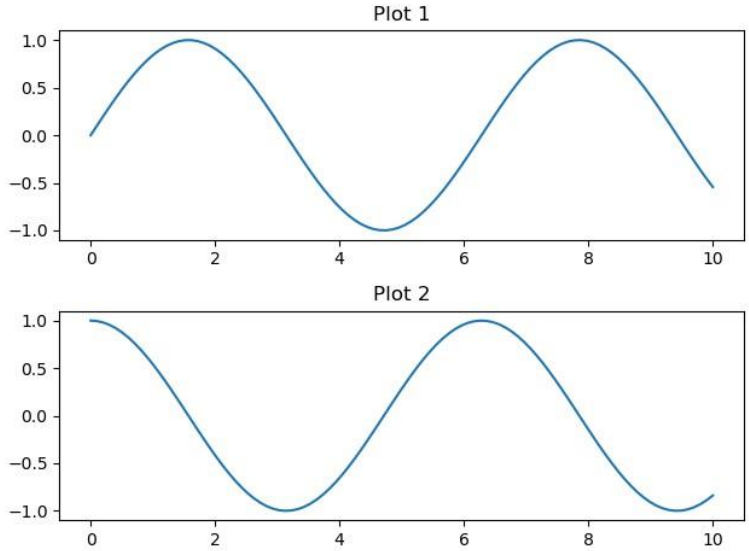
```
import matplotlib.pyplot as plt

with open('data.txt', 'r') as file:
    data = file.read().splitlines()

x_values = []
y_values = []

for line in data:
    x, y = map(float, line.split())
    x_values.append(x)
    y_values.append(y)
```

```
plt.plot(x_values, y_values)
plt.xlabel('Unit price in x1000')
plt.ylabel('Units sold')
plt.title('Building material sales')
plt.show()
```

4:



Output 5:



Program 4:

```
x = [1, 2, 3, 4, 5] y1 =
[10, 20, 15, 30, 25] y2 =
[5, 15, 25, 10, 20]

plt.plot(x, y1, label='Line 1')
plt.plot(x, y2, label='Line 2')

plt.xlabel('X-axis') plt.ylabel('Y-
axis') plt.title('Multiple Lines with
Legends') plt.legend() plt.show()
```

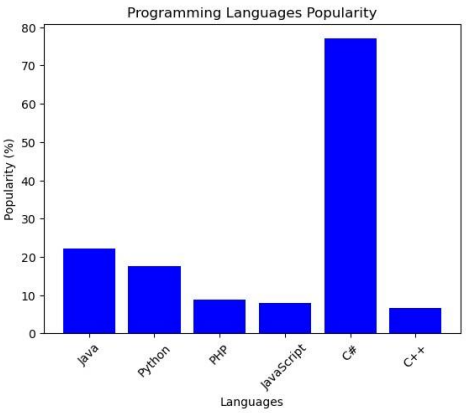
Program 5:

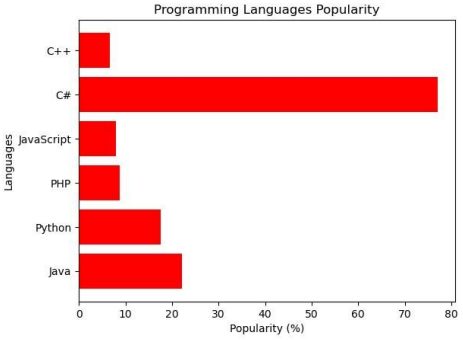
```
import
numpy as np
```

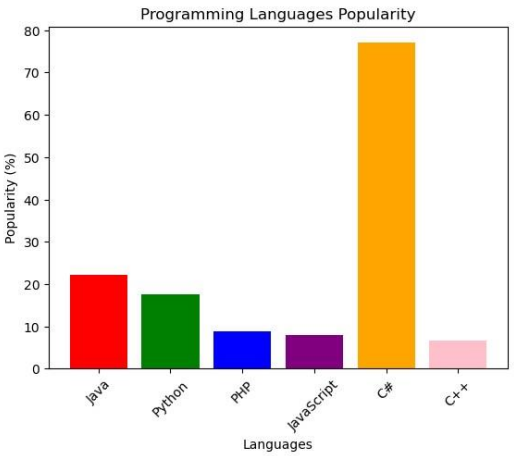
Output

```
x = np.linspace(0, 10, 100)
y1 = np.sin(x) y2 =
np.cos(x)

plt.subplot(2, 1, 1)
plt.plot(x, y1)
plt.title('Plot 1')

plt.subplot(2, 1, 2)
plt.plot(x, y2)
plt.title('Plot 2')

plt.tight_layout()
plt.show()
```

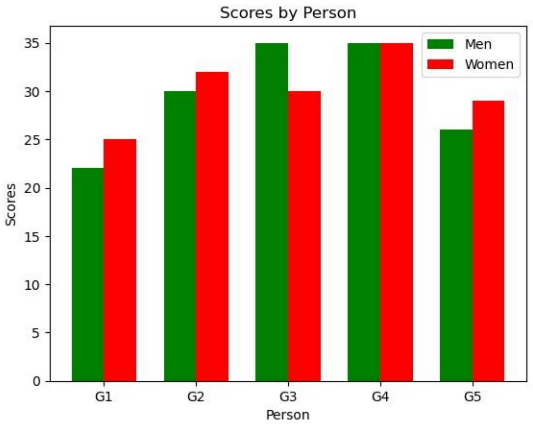
6:







Output 7:



Program 6:

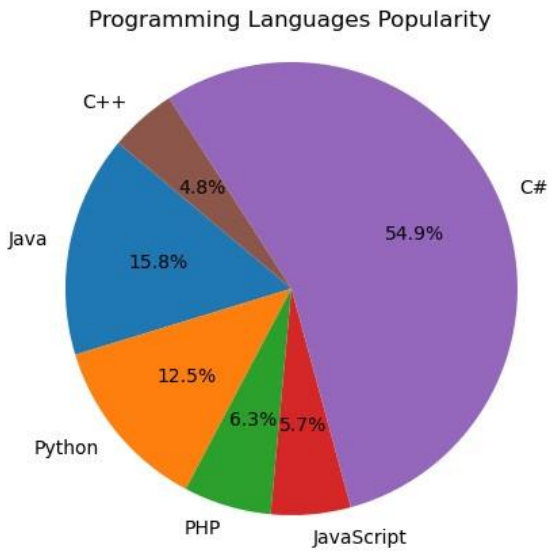
```
import matplotlib.pyplot as plt languages = ['Java', 'Python',
'PHP', 'JavaScript', 'C#', 'C++'] popularity = [22.2, 17.6,
8.8, 8, 77, 6.7]

plt.bar(languages, popularity, color='blue')
plt.title('Programming Languages Popularity')
plt.xlabel('Languages')
plt.ylabel('Popularity (%)')
plt.xticks(rotation=45) plt.show()

plt.barh(languages, popularity, color='red')
plt.title('Programming Languages Popularity')
plt.xlabel('Popularity (%)')
plt.ylabel('Languages') plt.show()
colors = ['red', 'green', 'blue', 'purple', 'orange', 'pink']
plt.bar(languages, popularity, color=colors)
plt.title('Programming Languages Popularity')
plt.xlabel('Languages') plt.ylabel('Popularity (%)')
plt.xticks(rotation=45) plt.show() ue) plt.show()
```

Program 7:

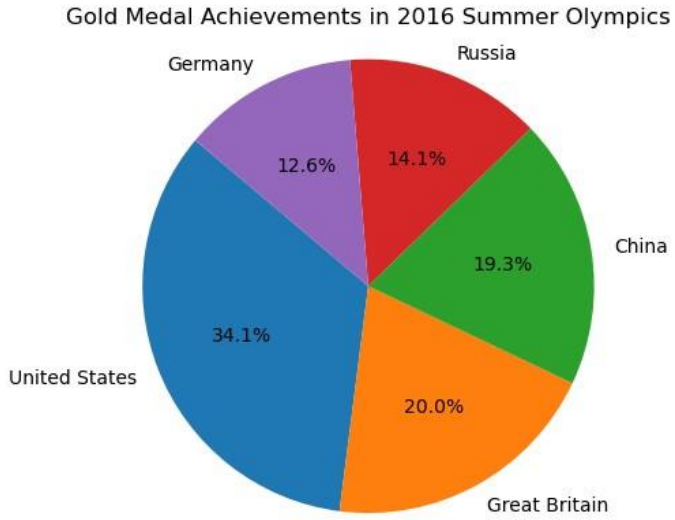
```
import numpy as np men_means = (22, 30, 35, 35, 26) women_means =
(25, 32, 30, 35, 29) ind = np.arange(len(men_means)) width = 0.35
plt.bar(ind, men_means, width, label='Men', color='green')
plt.bar(ind + width, women_means, width, label='Women',
color='red') plt.xlabel('Person') plt.ylabel('Scores')
plt.title('Scores by Person') plt.xticks(ind + width / 2, ('G1',
'G2', 'G3', 'G4', 'G5')) plt.legend() plt.show()
```

8:

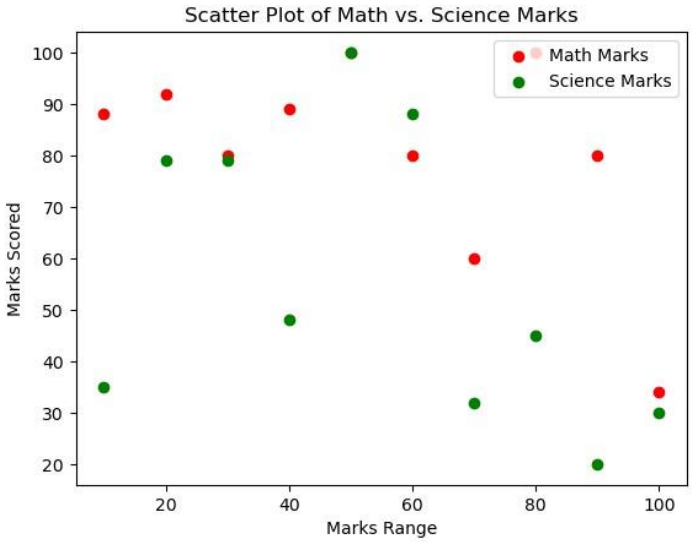
Output



Output 9:



Output 10:



Program 8:

```
import matplotlib.pyplot as plt languages = ['Java', 'Python', 'PHP',
'JavaScript', 'C#', 'C++'] popularity = [22.2, 17.6, 8.8, 8, 77, 6.7]
plt.pie(popularity, labels=languages, autopct='%1.1f%%', startangle=140)
plt.title('Programming Languages Popularity') plt.axis('equal') # Equal
aspect ratio ensures that pie is drawn as a circle. plt.show()
```

Program 9:

```
import pandas as pd import
matplotlib.pyplot as plt

data = pd.read_csv('medal.csv')
countries = data['country']
gold_medals = data['gold_medal']

plt.pie(gold_medals, labels=countries, autopct='%1.1f%%', startangle=140)
plt.title('Gold Medal Achievements in 2016 Summer Olympics')
plt.axis('equal') plt.show()
```

Program 10: `import`

```
matplotlib.pyplot as plt

math_marks = [88, 92, 80, 89, 100, 80, 60, 100, 80, 34]
science_marks = [35, 79, 79, 48, 100, 88, 32, 45, 20, 30]
marks_range = [10, 20, 30, 40, 50, 60, 70, 80, 90, 100]

plt.scatter(marks_range, math_marks, c='red', label='Math Marks', marker='o')
plt.scatter(marks_range, science_marks, c='green', label='Science Marks',
marker='o') plt.title('Scatter Plot of Math vs. Science Marks')
plt.xlabel('Marks Range') plt.ylabel('Marks Scored') plt.legend(loc='upper
right') plt.show()
```

Result: Program is executed and output is verified.

Output:

Output 1:

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

Output 2:

```
    DatetimeIndex(['2021-05-01', '2021-05-02', '2021-05-03', '2021-05-
          04', '2021-05-05', '2021-05-06', '2021-05-07', '2021-05-08',
               '2021-05-09', '2021-05-10', '2021-05-11', '2021-05-12'],
              dtype='datetime64[ns]', freq='D')
```

EXERCISE 4: Introduction to Pandas

October 30, 2023

1. Write a python program to implement List-to-Series Conversion.

2. Write a python program to Generate the series of dates from 1st May, 2021 to 12th May, 2021 (both inclusive).

3. Given a dictionary, convert it into corresponding dataframe and display it.

4. Given a 2D List, convert it into corresponding dataframe and display it.

5. Given a CSV file, read it into a dataframe and display it.

6. Given a dataframe, sort it by multiple columns.

7. Given a dataframe with custom indexing, convert and it to default indexing and display it.

8. Given a dataframe, select first 2 rows and output them.

9. Given is a dataframe showing name, occupation, salary of people. Find the average salary per occupation.

10. Given a dataframe with NaN Values, fill the NaN values with 0.

11. Given is a dataframe showing Company Names (cname) and corresponding Profits (profit). Convert the values of Profit column such that values in it greater than 0 are set to True and the rest are set to False.

12. Given are 2 dataframes, with one dataframe containing Employee ID (eid), Employee Name (ename) and Stipend (stipend) and the other dataframe containing Employee ID (eid) and designation of the employee (designation). Output the Dataframe containing Employee ID (eid), Employee Name (ename), Stipend (stipend) and Position (position).

Program 1:

```
import pandas as pd my_list =
[10, 20, 30, 40, 50] my_series
= pd.Series(my_list)
print(my_series)
```

Program 2:

```
date_range = pd.date_range(start='2021-05-01', end='2021-05-12')
print(date_range)
```

Output 3:

```
     Name  Age
0 Rijfas    25
1 Rifana    30
2 Aflah     35
```

Output 4:

```
     Name  Age
0 Rijfas    25
1 Rifana    30
2 Aflah     35
```

Output 5:

```
          country gold_medal
0     United States     46
1     Great Britain     27
2     China 26 3  Russia      19
4        Germany          17
```

Output 6:

```
     Name  Age  Score
2 Aflah     35     98
1 Rifana    30     99
0 Rijfas    25    100
```

Output 7:

```
     Name  Age  Score
A Rijfas    25    100
B Rifana    30     99
C Aflah     35     98
     Name  Age  Score
0 Rijfas    25    100
1 Rifana    30     99
2 Aflah     35     98
```

Output 8:

```
     Name  Age  Score
0 Rijfas    25    100
1 Rifana    30     99
```

Program 3:

```
data = {'Name': ['Rijfas', 'Rifana', 'Aflah'],
        'Age': [25, 30, 35]}
df = pd.DataFrame(data)
print(df)
```

Program 4:

```
data = [['Rijfas', 25], ['Rifana', 30], ['Aflah', 35]]
df = pd.DataFrame(data, columns=['Name', 'Age'])
print(df)
```

Program 5:

```
df = pd.read_csv('medal.csv')
print(df)
```

Program 6:

```
data = {'Name': ['Rijfas', 'Rifana', 'Aflah'],
        'Age': [25, 30, 35], 'Score': [100, 99, 98]}
df = pd.DataFrame(data) df =
df.sort_values(by=['Score', 'Age']) print(df)
```

Program 7:

```
data = {'Name': ['Rijfas', 'Rifana', 'Aflah'],
        'Age': [25, 30, 35], 'Score': [100, 99, 98]}
df = pd.DataFrame(data) custom_index = ['A', 'B',
'C'] df = pd.DataFrame(data, index=custom_index)
print(df) df.reset_index(drop=True, inplace=True)
print(df)
```

Program 8:

```
data = {'Name': ['Rijfas', 'Rifana', 'Aflah'],
        'Age': [25, 30, 35], 'Score': [100, 99, 98]}
df = pd.DataFrame(data) first_two_rows = df.head(2)
print(first_two_rows)
```

Output 9:

```
Occupation
Artist      40000.0
Doctor      80000.0
Engineer    60000.0
Lawyer      75000.0
Teacher     50000.0
Name: Salary, dtype: float64
```

Output 10:

```
     Name Age Score 0
Rijfas  25  100.0  1
Rifana 30 99.0
2   Aflah 35      0.0
```

Output 11:

```
       cname profit 0
Company A   True 1
Company B False 2
Company C   True
3   Company D False
```

Output 12:

```
   eid    ename stipend Designation
0 101 Rijfas 600 Engineer 1 102
Rifana 700 NaN
2  103      Aflah 800   Teacher
3  104 Suhail     900   Lawyer
4  105 Shammas    750   Artist
```

Program 9:

```
data = {'Name': ['Rijfas', 'Rifana', 'Aflah', 'Suhail', 'Shammas'],
        'Occupation': ['Engineer', 'Doctor', 'Teacher', 'Lawyer', 'Artist'],
        'Salary': [60000, 80000, 50000, 75000, 40000]} df =
pd.DataFrame(data) average_salary_per_occupation =
df.groupby('Occupation')['Salary'].mean()
print(average_salary_per_occupation)
```

Program 10:

```
data = {'Name': ['Rijfas', 'Rifana', 'Aflah'],
        'Age': [25, 30, 35], 'Score': [100, 99, np.nan]}
df = pd.DataFrame(data) df.fillna(0, inplace=True)
print(df)
```

Program 11:

```
data = {'cname': ['Company A', 'Company B', 'Company C', 'Company D'],
        'profit': [10000, -5000, 7500, 0]}

df = pd.DataFrame(data)

df['profit'] = df['profit'] > 0

print(df)
```

Program 12:

```
employee_data = {
    'eid': [101, 102, 103, 104, 105],
    'ename': ['Rijfas', 'Rifana', 'Aflah', 'Suhail', 'Shammas'],
    'stipend': [600, 700, 800, 900, 750]
}
```

```
designation_data = {
    'eid': [101, 103, 104, 105],
    'Designation': ['Engineer', 'Teacher', 'Lawyer', 'Artist']
}

employee_df = pd.DataFrame(employee_data) designation_df =

pd.DataFrame(designation_data) result_df =

employee_df.merge(designation_df, on='eid', how='left')

print(result_df)
```

Result: Program is executed and output is verified.

Output:

Output 1:

```
Accuracy is
            95.55555555555556
['setosa']
```

EXERCISE

Nov

1.

5: Implementation of KNN

6, 2023

Implement KNN Neighbours using scikit-learn .

Program 1:

```
from sklearn import datasets from sklearn import
neighbors from sklearn.model_selection import
train_test_split from sklearn.metrics import
accuracy_score iris = datasets.load_iris()

X, y = iris.data, iris.target

classifier = neighbors.KNeighborsClassifier(n_neighbors=3) x_train, x_test,

y_train, y_test = train_test_split(X, y, train_size=0.7)

classifier.fit(x_train, y_train) result = classifier.predict(x_test)

accuracy = accuracy_score(y_test, result) * 100 print(f'Accuracy is

{accuracy}') features = [[int(i) for i in input(f'Enter

{iris.feature_names}').split()]] result = classifier.predict(features)

print(iris['target_names'][result])
```

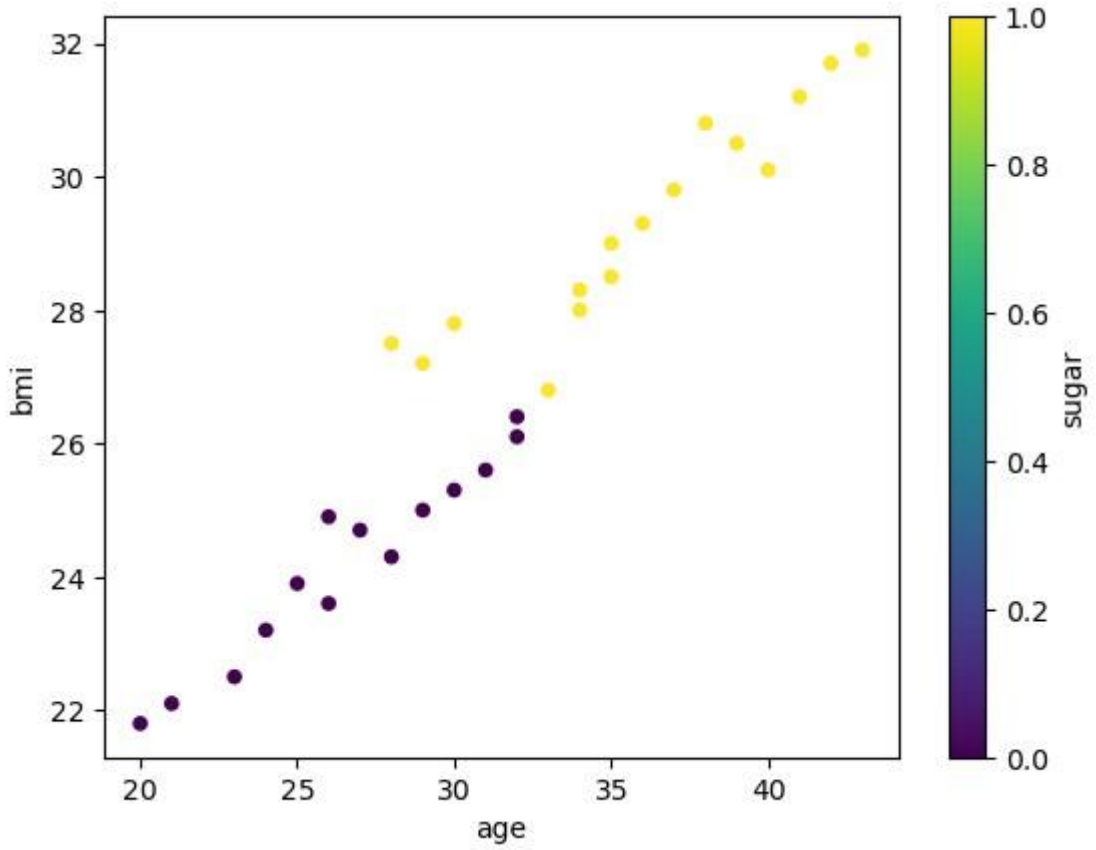
Result: Program is executed and output is verified.

```
            96.8
Not diabetic
```

Output:

Output 1:

```
Accuracy is
```



6: Predict diabetes using KNN

6, 2023

Write a python program to predict diabetes using KNN classification.

Program 1:

```
from sklearn import datasets from sklearn import neighbors
from sklearn.model_selection import train_test_split from
sklearn.metrics import accuracy_score import pandas as pd
df = pd.read_csv('diabetes.csv')
df.plot.scatter('age','bmi',c='sugar',
colormap='viridis') X, y = df[['age','bmi']], df['sugar']
```

EXERCISE

Nov

1.

```
x_train, x_test, y_train, y_test = train_test_split(X, y, train_size=0.7)

classifier = neighbors.KNeighborsClassifier(n_neighbors=3)

classifier.fit(x_train, y_train) result = classifier.predict(x_test)

accuracy = accuracy_score(y_test, result) * 100 print(f'Accuracy is

{accuracy}') features = [[int(i) for i in input(f'Enter bmi,

age').split()]] result = classifier.predict(features)

if result == 0:
    print('Not diabetic')
else:
    print('Diabetic')
```

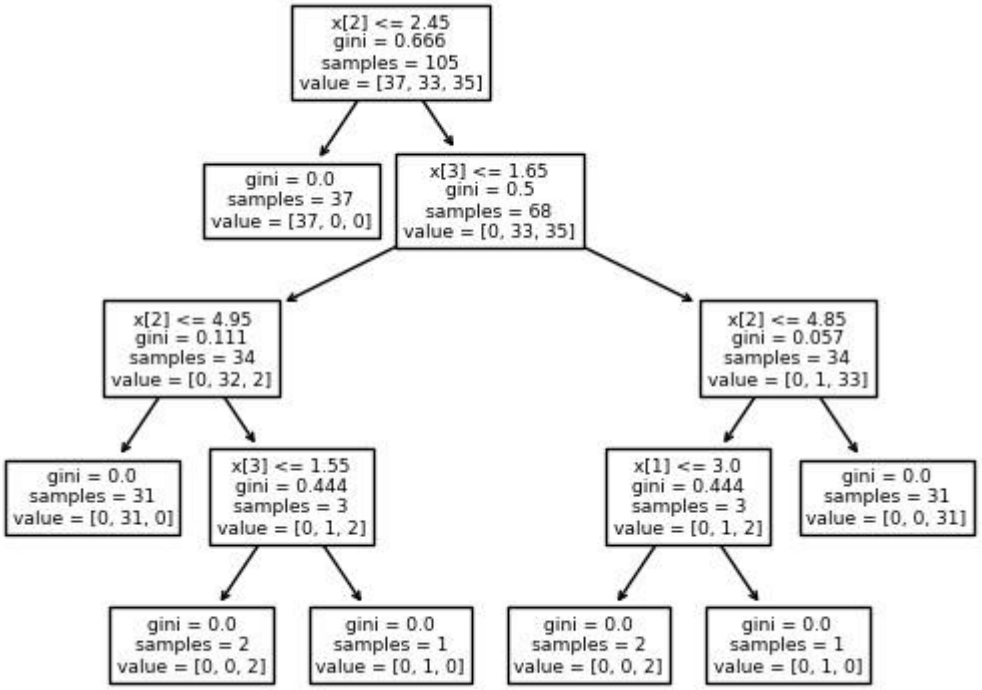
Result: Program is executed and output is verified.

```
            95.55555555555556
['setosa']
```

Output:

Output 1:

```
Accuracy is
```



7: Implementation of Decision Tree Classifier

13, 2023

Implement Decision Tree Classifier using scikit-learn .

Program 1:

```
from sklearn import datasets from sklearn import
tree from sklearn.model_selection import
train_test_split from sklearn.metrics import
accuracy_score


iris = datasets.load_iris() X, y = iris.data, iris.target classifier =

tree.DecisionTreeClassifier() x_train, x_test, y_train, y_test =

train_test_split(X, y, train_size=0.7) classifier.fit(x_train, y_train)
```

EXERCISE

Nov

1.

```
tree.plot_tree(classifier) result = classifier.predict(x_test) accuracy =

accuracy_score(y_test, result) * 100 print(f'Accuracy is {accuracy}')

features = [[int(i) for i in input(f'Enter {iris.feature_names}').split()]]

result = classifier.predict(features) print(iris['target_names'][result])
```

Result: Program is executed and output is verified.

```
            96.66666666666667
['versicolor']
```

EXERCISE 8: Implementation of Naive Bayes Classifier

Nov 13, 2023

1. Implement Naive Bayes Classifier using scikit-learn .

Program 1:

```
from sklearn import datasets from sklearn import naive_bayes from

sklearn.model_selection import train_test_split from sklearn.metrics

import accuracy_score iris = datasets.load_iris() X, y = iris.data,

iris.target classifier = naive_bayes.GaussianNB() x_train, x_test,

y_train, y_test = train_test_split(X, y, train_size=0.8)

classifier.fit(x_train, y_train) result = classifier.predict(x_test)

accuracy = accuracy_score(y_test, result) * 100 print(f'Accuracy is

{accuracy}') features = [[int(i) for i in input(f'Enter

{iris.feature_names}').split()]] result = classifier.predict(features)

print(iris['target_names'][result])
```

Result: Program is executed and output is verified.