Visvesvaraya Technological University,Belagavi

POST GRADUATION CENTRE ,KALABURAGI

BACHELOR OF TECHNOLOGY(B.Tech)
IN
COMPUTER SCIENCE & ENGINEERING

A
Laboratory Report
On

DATA VISUALIZATION WITH PYTHON

Submitted as a part of Academic Requirement for Third Semester

By

_____

(USN:)

Department of Computer Science & Engineering,
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KALABURAGI

2023-2024

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

CPGS,KALABURAGI

U.S.N:_____ DATE: / /2024

CERTIFICATE

This is to certify that Mr./Ms……..
Studying in the Department of CSE 3rd- Semester has successfully completed all the Programs in……with subject as prescribed by the *Visvesvaraya Technological University,Belagavi CPGS Kalaburagi*
For the academic year 2023- 2024.

FacultyIncharge **ProgrammeCoordinator**

Examiners:

1.InternalExaminer **2.InternalExaminer**

1 a)Write a python program to find the best of two test average marks out of three test's marks accepted from the user.

Solution:

```
marks1=int(input("Enter test 1 marks : "))
marks2=int(input("Enter test 2 marks : "))
marks3=int(input("Enter test 3 marks : "))

minimum=min(marks1,marks2,marks3)
sumofbest2=marks1+marks2+marks3-minimum
avgofbest2=sumofbest2/2
print("Average of best 2 = ", avgofbest2)
```

output:

Enter test 1 marks : 23
Enter test 2 marks : 24
Enter test 3 marks : 25
Average of best 2 = 24.5

1b)develop a python program to check wether a given number is pallindrome or not and also count the number of accurense of each digit in the input number.

Solution:

```
num=input("enter the number: ")
num_list=list(num)
rev_num=num_list[::-1]
if num_list==rev_num:
    print("the number is pallindrome.")
else:
    print("the nuber is not pallindrome.")
counter=dict()
for i in num_list:
    if  counter.get(i)==None:
        counter[i]=1
    else:
        counter[i]=counter[i]+1
print(counter)
```

output:
enter the number: 1234321
the number is pallindrome.
{'1': 2, '2': 2, '3': 2, '4': 1}

enter the number: 567887654
the nuber is not pallindrome.
{'5': 2, '6': 2, '7': 2, '8': 2, '4': 1}

2a)Defined as a function F as Fn=Fn-1+Fn-2, Write a python progrom which accepts a value for N(where N>0) as input and pass this value to the function.
Display suitable error message if the condition for input value is not followed.

Solution:

```
def    Fibonacci(n):
    if n==0 or n==1:
        return 1
    else:
        return  Fibonacci(n-1)+Fibonacci(n-2)
num=int(input("Enter the the value of N: "))
if num>0:
    fib=Fibonacci(num)
    print("Fibonacci value is: ",fib)
else:
    print("Incorrect value of N")
```

Output:

Enter the the value of N: 0
Incorrect value of N

Enter the the value of N: 1
Fibonacci value is: 1

Enter the the value of N: 3
Fibonacci value is: 3

Enter the the value of N: 5
Fibonacci value is: 8

2b) Develop a python program to convert binary to decimal, octal to hexadecimal using functions.

Solution:

```
dec=123
print("the decimal value of :",dec,"is.")
print(bin(dec),"in binary.")
print(oct(dec),"in octal.")
print(hex(dec),"in hexadecimal.")
```

Output:

the decimal value of : 123 is.
0b1111011 in binary.
0o173 in octal.
0x7b in hexadecimal.

3.a) Write a Python program that accepts a sentence and find the number of words, digits, uppercase letters and lowercase letters

Solution:

```
s="Today the Date is 06-03-2024"
words=s.split()
print("Number of words:",len(words))
digits=[]
u_letters=[]
l_letters=[]
spl_chars=[]
for i in s:
    if i.isdecimal():
        digits.append(i)
    elif i.isupper():
        u_letters.append(i)
    elif i.islower():
        l_letters.append(i)
    else:
        spl_chars.append(i)
print("Number of digits:",len(digits))
print("Number of upper case letters:",len(u_letters))
print("Number of lower case letters:",len(l_letters))
```

Output:

Number of words: 5
Number of digits: 8
Number of upper case letters: 2
Number of lower case letters: 12

3b) Write a Python program to find the string similarity between two given strings

Solution:

```
From difflibimport  SequenceMatcher
s="python Exercise"
s1="python Exercise"
print(SequenceMatcher(None,s,s1)
.ratio())
```

Output:

1.0

```
from difflib impor SequenceMatcher
s="python Exercise"
s1="python Examination"
print(SequenceMatcher(None,s,s1)
.ratio())
```

Output:

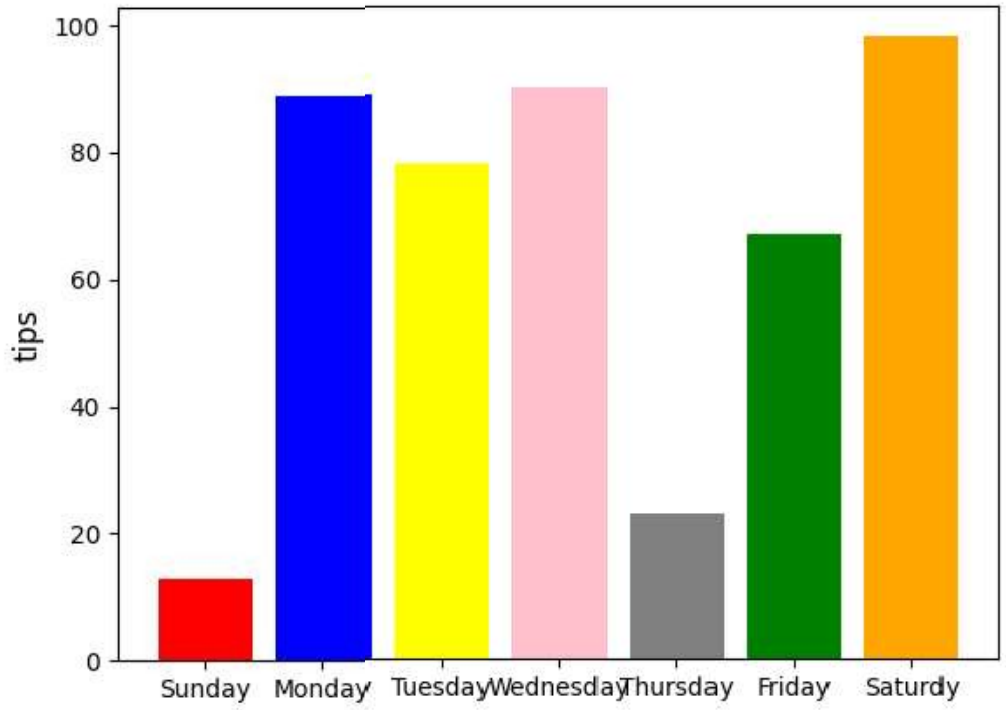
0.6060606060606061

4a) Write a Python program to Demonstrate how to Draw a Bar Plot using Matplotlib.

Solution:

```
from matplotlib.pyplot import *
days=['Sunday','Monday','Tuesday','Wednesday','Thursday','Friday','
Saturdy']
values=[13,89,78,90,23,67,98]
bar(days,values,color=('red','blue','yellow','pink','grey','green',
'orange'))
ylabel("tips",fontsize=12)
show()
```

output:

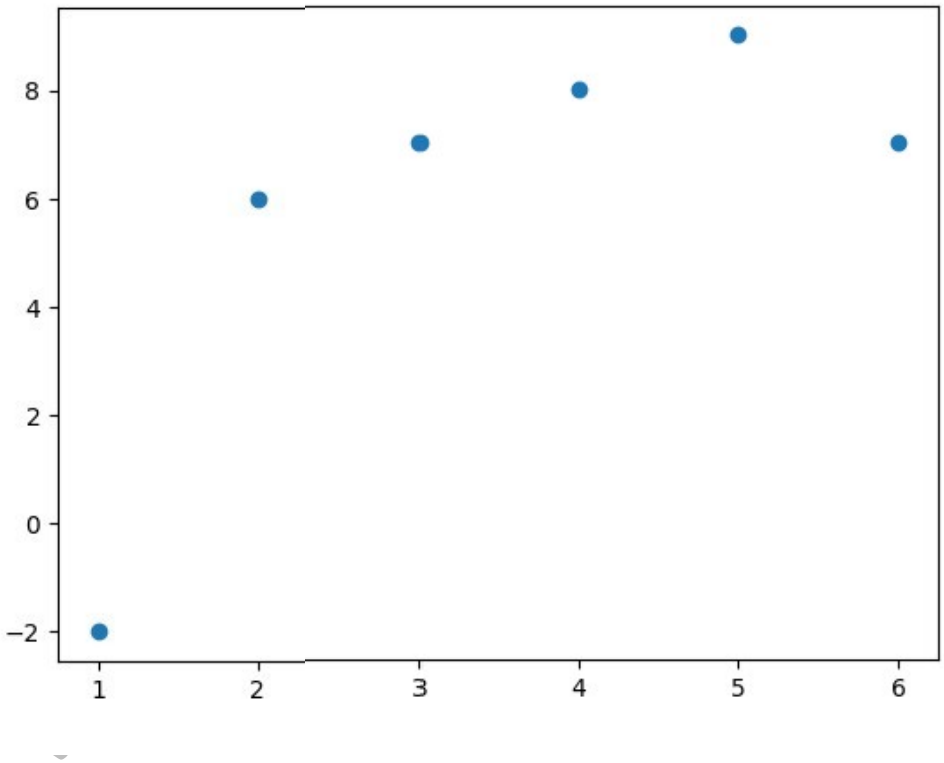


4.b) Write a Python program to Demonstrate how to Draw a Scatter Plot using Matplotlib.

Solution:

```
from matplotlib.pyplot import *
X=[1,2,3,4,5,6]
Y=[-2,6,7,8,9,7]
scatter(X,Y)
show()
```

Output:

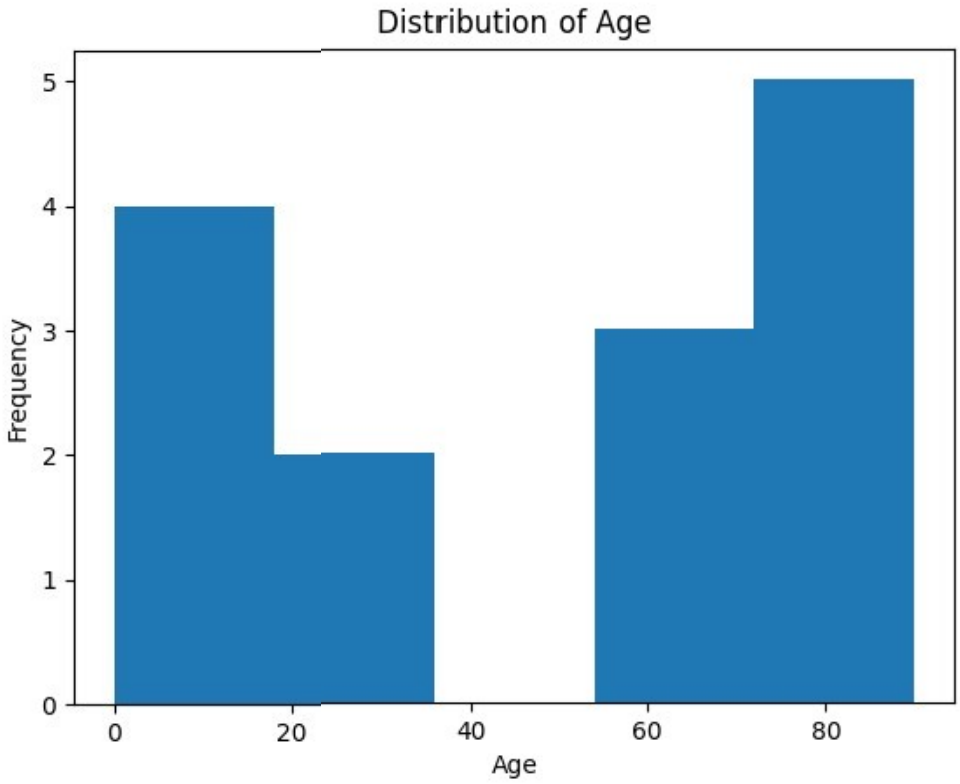


5a) Write a Python program to Demonstrate how to Draw a Histogram Plot using Matplotlib

Solution :

```
from matplotlib.pyplot import *
hist([23,67,89,78,12,90,24,78,87,65,12,1,0,56],bins=5)
title('Distribution of Age')
xlabel('Age')
ylabel('Frequency')
show()
```

Output:

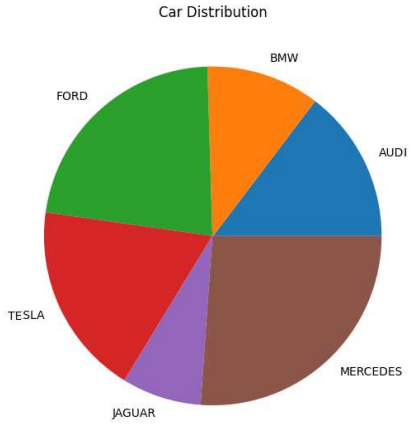


5b) Write a Python program to Demonstrate how to Draw a Pie Chart using Matplotlib.

Solution

```
import matplotlib.pyplot as plt
cars = ['AUDI', 'BMW', 'FORD', 'TESLA', 'JAGUAR', 'MERCEDES']
data = [23, 17, 35, 29, 12, 41]
plt.figure(figsize=(10,  7))
plt.pie(data, labels=cars)
plt.title('Car Distribution')
plt.show()
```

Output:

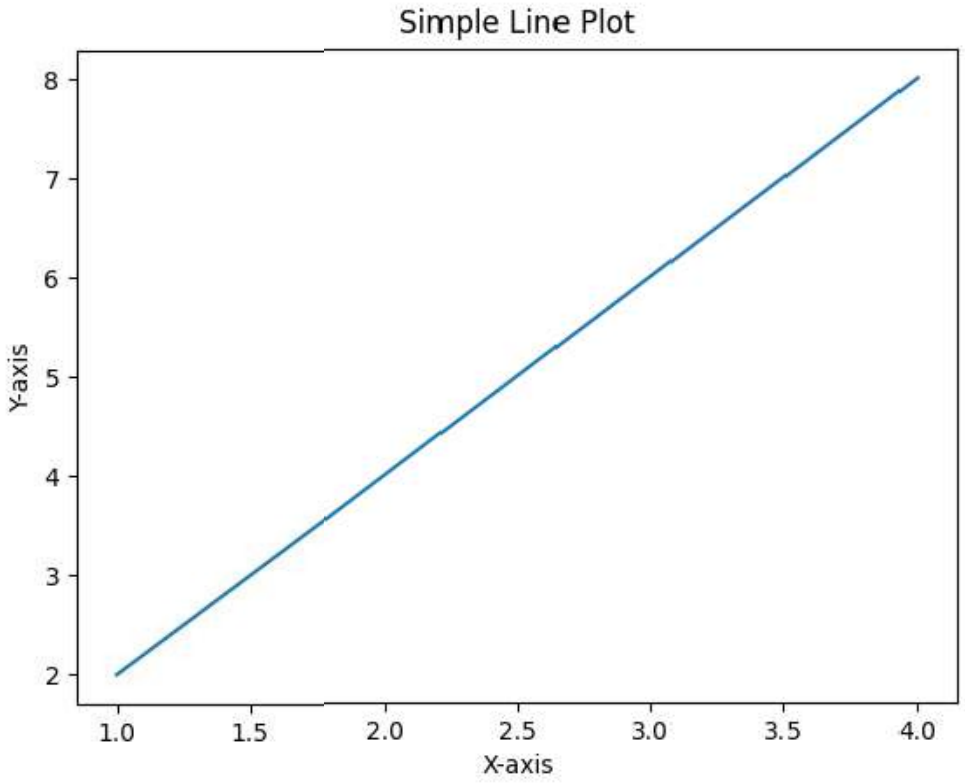


6 a) Write a Python program to illustrate Linear Plotting using Matplotlib.

Solution :

```
import matplotlib.pyplot as plt
import numpy as np
x = np.array([1, 2, 3, 4])
y = x * 2
plt.plot(x, y)
plt.xlabel("X-axis")
plt.ylabel("Y-axis")
plt.title("Simple  Line  Plot")
plt.show()
```

output:

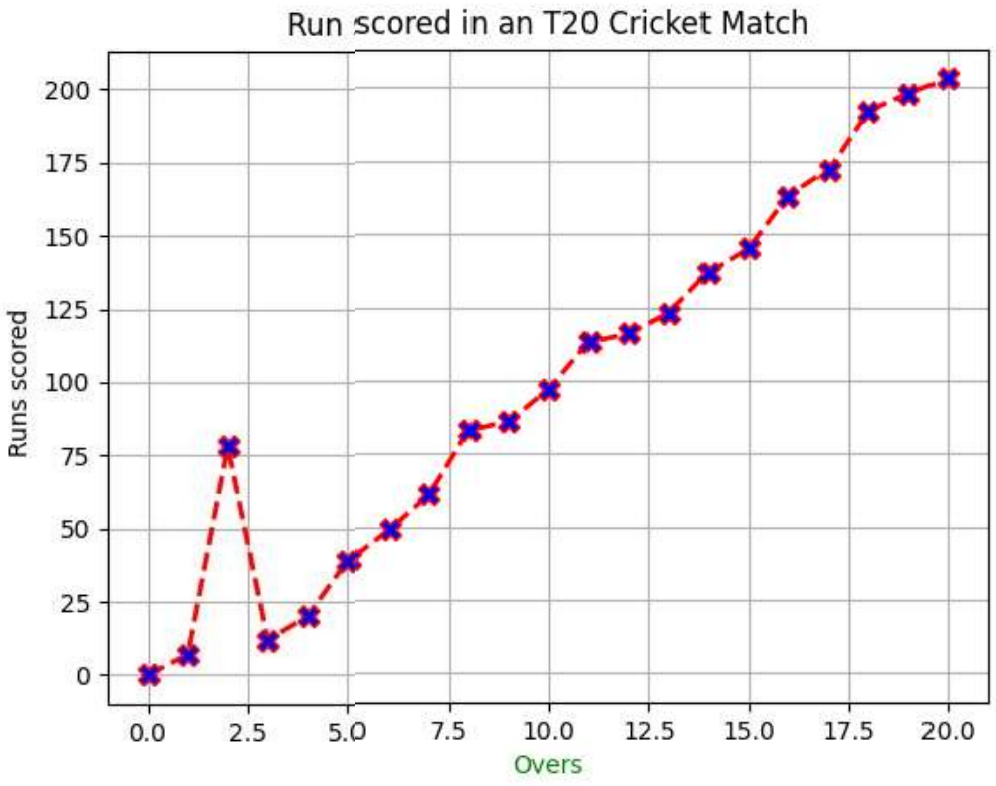


6b) Write a Python program to illustrate liner plotting with line formatting using Matplotlib.

Solution :

```
from matplotlib.pyplot import *
overs=[0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20]
runs_scored=[0,7,78,12,20,39,49,61,83,86,97,113,116,123,
137,145,163,172,192,198,203]
plot(overs,runs_scored,marker='X',linestyle='dashed',
color='red',linewidth=2,markerfacecolor='blue',markersize=8)
xlabel('Overs',color='green')
ylabel('Runs scored ')
title('Run scored in an T20 Cricket Match')
grid()
show()
```

Output:

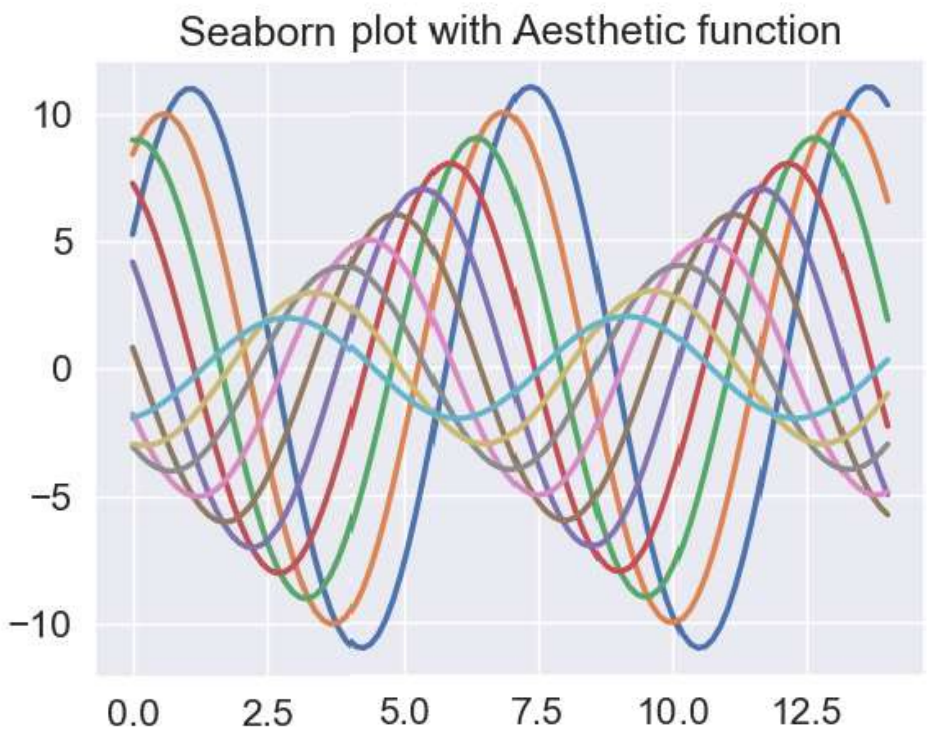


7)Write a Python program which explains uses of customizing seaborn plots with Aesthetic functions

Solution:

```
from numpy import *
from matplotlib.pyplot import *
from seaborn import *
 def sinplot(n=10):
    x=linspace(0,14,100)
    for i in range(1,n+1):
         plot(x,sin(x+i*.5)*(n+2-i))
set_theme()
set_context("notebook",font_scale=1.5,rc={"lines.linewidth":2.5})
sinplot()
title("Seaborn plot with Aesthetic function")
show()
```

Output:

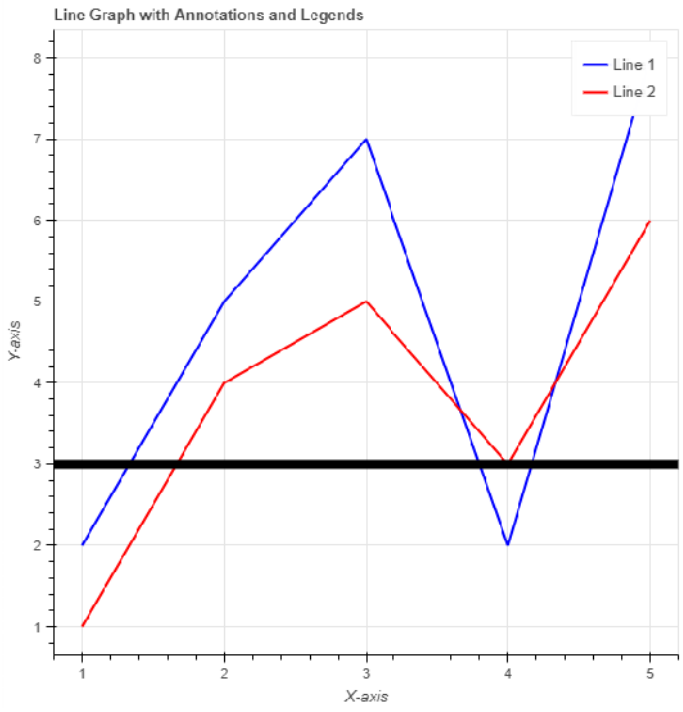


8a) Write a Python program to explain working with bokeh line graph using Annotations and Legends

Solution:

```
from bokeh.plotting import figure,output_file,show
from bokeh.models import Legend,LegendItem,Title,Span
output_file("line_graph_with_annotations.html")
x=[1,2,3,4,5]
y1=[2,5,7,2,8]
y2=[1,4,5,3,6]
p=figure(title="Line Graph with Annotations and Legends",
x_axis_label='X-axis',y_axis_label='Y-axis')
line1=p.line(x,y1,line_width=2,color="blue",legend_label="Line1")
line2=p.line(x,y2,line_width=2,color="red",legend_label="Line2")
annotation=Span(location=3,dimension='width',line_color='black',
line_width=8)
p.add_layout(annotation)
legend=Legend(items=[
LegendItem(label="Line 1",renderers=[line1]),
LegendItem(label="Line 2",renderers=[line2]),])
p.add_layout(legend)
show(p)
```

Output:

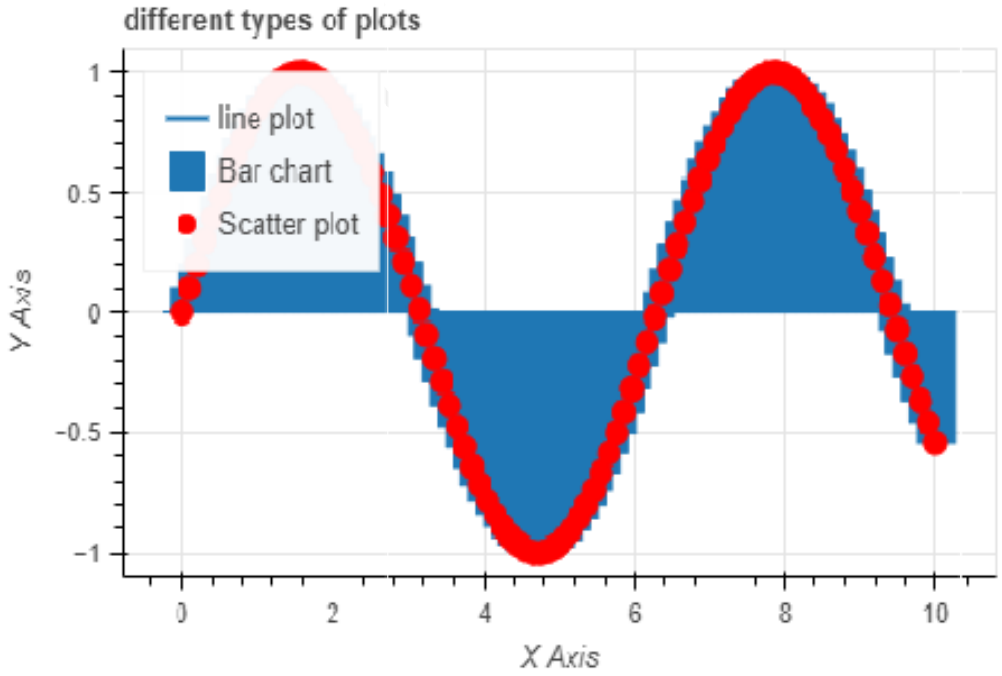


8b) Write a Python program f r plotting different types of plots using Bokeh

Solution :

```
from numpy import *
from bokeh.io import output_file
from bokeh.layouts import row ,column
from bokeh.io import show
from bokeh.plotting import figure
fig=figure(width=500,height=300,title='different types of plots')
x=linspace(0,10,100)
y=sin(x)
fig.line(x,y,line_width=2,legend_label='line plot')
fig.vbar(x=x,top=y,legend_label='Bar chart',width=0.5,bottom=0)
fig.circle(x,y,size=10,color='red',legend_label='Scatter plot')
fig.xaxis.axis_label='X Axis'
fig.yaxis.axis_label='Y Axis'
fig.legend.location='top_left'
show(fig)
```

Output:

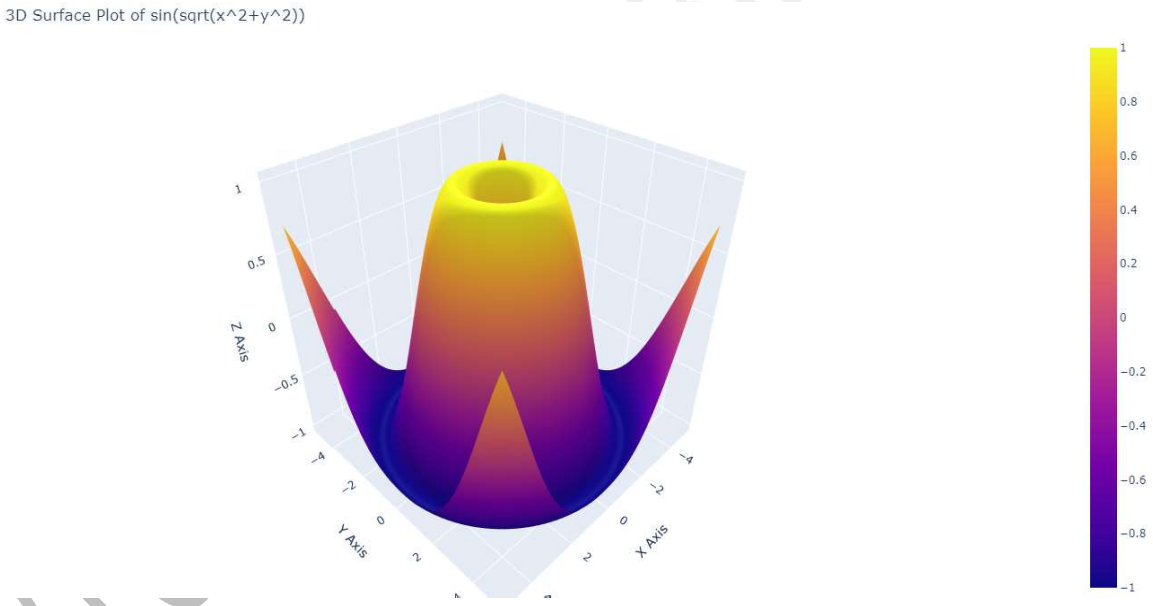


9 Write a Python program to draw 3D Plots using Plotly Libraries.

Solution :

```
import plotly.graph_objects as go
import numpy as np
x=np.linspace(-5,5,100)
y=np.linspace(-5,5,100)
x,y=np.meshgrid(x,y)
z=np.sin(np.sqrt(x**2+y**2))
fig=go.Figure(data=[go.Surface(z=z,x=x,y=y)])
fig.update_layout(scene=dict(xaxis_title='X  Axis',yaxis_title='Y  Axis',
       zaxis_title='Z Axis'),margin=dict(l=0,r=0,b=0,t=40),
       title='3D Surface Plot of sin(sqrt(x^2+y^2))')
fig.show()
```

Output:



10 a) Write a Python program to draw Time Series using Plotly Libraries

Solution:

```
import  plotly.graph_objects  as go
import pandas as pd
df=pd.read_csv('https://raw.githubusercontent.com/plotly/datasets/master/
finance-charts-apple.csv')
fig  =  go.Figure([go.Scatter(x=df['Date'],  y=df['AAPL.High'])])
fig.show()
```

Output:

10 b) Write a Python program for creating Maps using Plotly Libraries.

Solution :

```
import plotly.express as px
import pandas as pd
data=pd.read_csv('https://earthquake.usgs.gov/earthquakes/feed/v1.0/summary/
all_month.csv')
data = data.dropna(subset=['mag'])
data = data[data.mag >= 0]
fig=px.scatter_geo(data,lat='latitude',lon='longitude',color='mag',hover_name='plce',
title='Earthquakes Around the World')
fig.show()
```

Output: