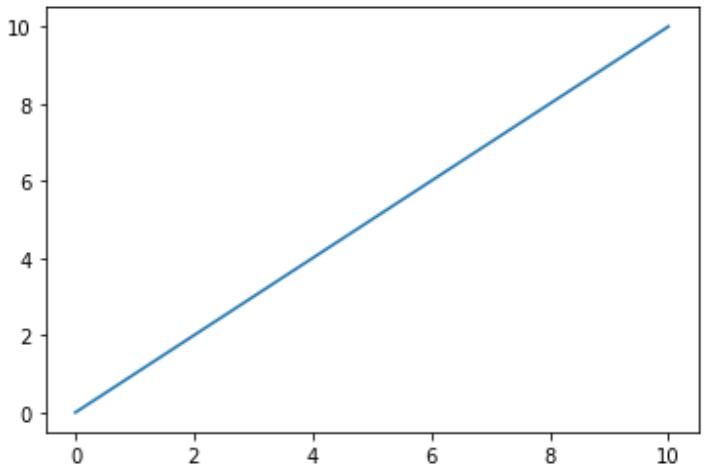
PROGRAM 5

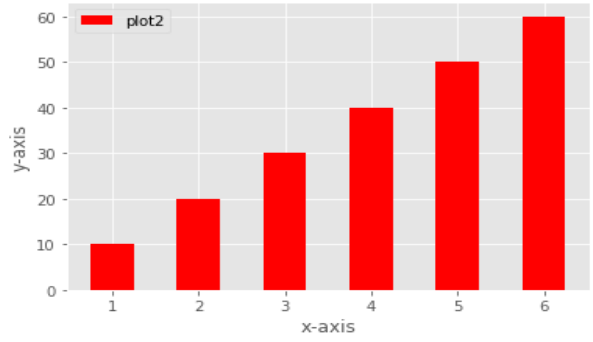
Aim: Demonstrate the use of Matplotlib.

Code:

```
import matplotlib.pyplot as plt
import numpy as np
x = np.linspace(0, 10, 100)
#simple plot
plt.plot(x, x, label='linear')
plt.legend()
plt.show()
```




```
from matplotlib import pyplot as plt
plt.bar([1,2,3,4,5,6],[10,20,30,40,50,60],label="plot2",color="r",width=0.5)
plt.xlabel("x-axis")
plt.ylabel("y-axis")
plt.legend()
plt.show()
```



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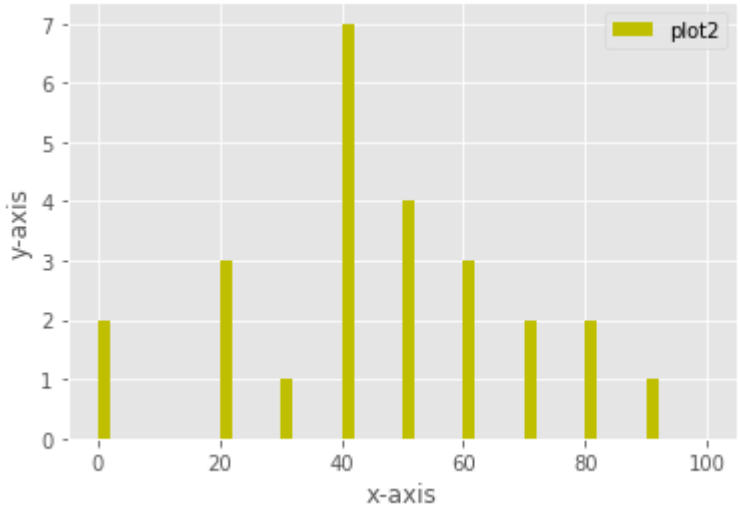
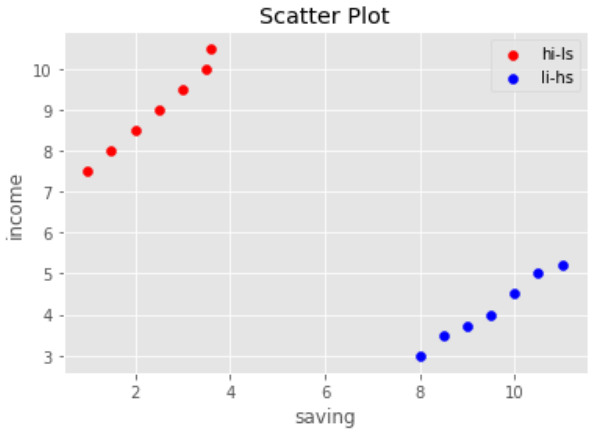
```
from matplotlib import pyplot as plt
plt.hist([22,55,62,45,21,22,34,42,42,4,2,102,95,85,55,110,120,70,65,55,111,115,80,75,65,54,44,43,42,48],[0,10,20,30,40
plt.xlabel("x-axis")
plt.ylabel("y-axis")
plt.legend()
plt.show()
```



In [33]:

```
import matplotlib.pyplot as plt
x = [1,1.5,2,2.5,3,3.5,3.6]
y = [7.5,8,8.5,9,9.5,10,10.5]
x1=[8,8.5,9,9.5,10,10.5,11]
y1=[3,3.5,3.7,4,4.5,5,5.2]
plt.scatter(x,y, label='hi-ls',color='r')
plt.scatter(x1,y1,label='li-hs',color='b')
plt.xlabel('saving')
plt.ylabel('income')
plt.title('Scatter Plot')
plt.legend()
plt.show()
```



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```
import matplotlib.pyplot as plt
slices = [7,2,2,13]
activities = ['s','e','w','p']
cols = ['c','m','r','b']

plt.pie(slices,
  labels=activities,
  colors=cols,
  startangle=90,
  shadow= True,
  autopct='%1.1f%%')

plt.title('Pie Plot')
plt.show()
```

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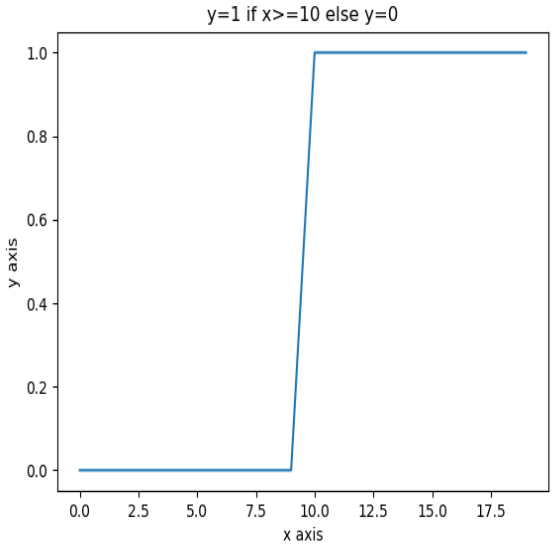
Aim: Plot the following equations:-

Code:

1. y={1 x<10 0 else
```
import matplotlib.pyplot as plt
x=[num for num in range(0,20)]
y=[]
for i in x:
    if i>=10:
        y.append(1)
    else:
        y.append(0)
plt.plot(x,y)
plt.xlabel("x axis")
plt.ylabel("y axis")
plt.title("y=1 if x>=10 else y=0")
plt.show()
```



2. **.y=eax for different values of a.**
```
import numpy as np
import matplotlib.pyplot as plt
num=[num for num in range(0,10)]
a=2 #constant value
x=np.array(num)*2
y=np.exp(x)
plt.plot(x,y)
plt.xlabel("x axis")
plt.ylabel("y axis")
plt.title("y=e**ax")
plt.show()
```

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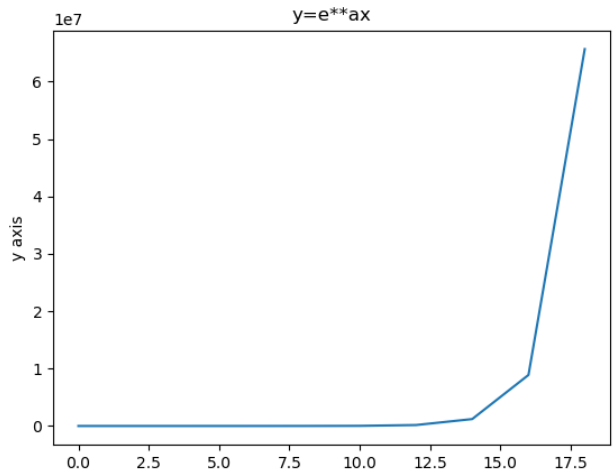

3.

y=7x2+3x+10 for 2≤x≤5

```
import matplotlib.pyplot as plt
x=[x for x in range(2,6)]
y=[]
for i in x:
    y.append(7*pow(i,2)+3*i+10)
plt.plot(x,y)
plt.xlabel('x axis')
plt.ylabel('y axis')
plt.title('y=7x^2+3x+10')
plt.show()
```

4.

y=11+e-x

```
import matplotlib.pyplot as plt
import numpy as np
x=[x for x in range(0,20)]
p=np.array(x)
p=1+np.exp(-p)
y=1/p
plt.plot(x,y)
plt.xlabel('x axis')
plt.ylabel('y axis')
plt.show()
```

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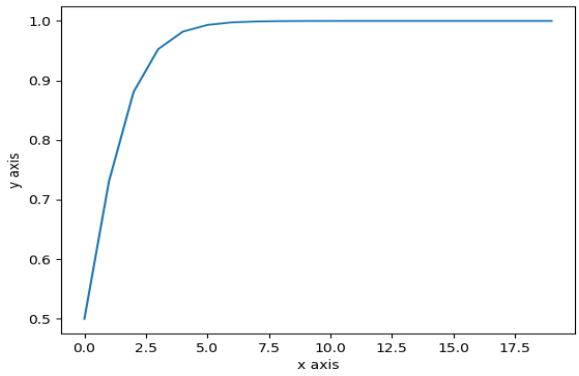
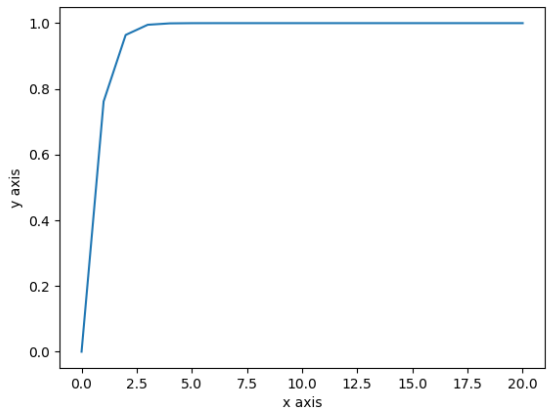


5.

y=1-e-ax1+e-ax **for different values of a.**

```
import matplotlib.pyplot as plt
import numpy as np
num=[num for num in range(0,21)]
num=np.array(num)
a=2
p=1-np.exp(-num*a)
q=1+np.exp(-num*a)
y=p/q
plt.plot(num,y)
plt.xlabel('x axis')
plt.ylabel('y axis')
plt.show()
```



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6.

y=tan hx

```
import numpy as np
import matplotlib.pyplot as plt
in_array = np.linspace(0, np.pi, 12)
h=2
out_array =h*np.tan(in_array)
print("in_array : ", in_array)
print("\nout_array : ", out_array)
# red for numpy.tan()
plt.plot(in_array, out_array, color='red', marker="o")
plt.title("numpy.tan()")
plt.xlabel("X")
plt.ylabel("Y")
plt.show()
```