Write a python code to find the roots of the given equation using bisection method. Y=sin(x) for 0.785<= x <=4.712.

```
import numpy as np

x=np.linspace(0.785,4.712,51)

y=np.zeros(x.shape,dtype=float)

for i in range(len(x)):

    y[i]=np.sin(x[i])

import matplotlib.pyplot as plt

plt.plot(x,y,'r')

plt.axhline()

plt.xlabel('anges in rad')

plt.ylabel('y=sin(x)')

plt.grid()

plt.show()

# bisection method

x1=x[0];x2=x[-1];

print('x1=',x1,'x2=',x2)

y1=np.sin(x1);y2=np.sin(x2);

print('y1=',y1,'y2=',y2)

if (y1*y2>0.0):

    print('error: revise the data')
```

```
i=0
maxterm=6
tol=0.001
while(i<=maxterm):
    xm=(x1+x2)/2.0;
    ym=np.sin(xm);
    i=i+1
    if (y1*ym<0.0):
        x2=xm;y2=ym
    else:
        x1=xm;y1=ym;
    if(np.abs(ym)<tol):
        break
print('i=',i,'ym=',ym)
print('root of eqn y=sin(x) is xm =',xm,'rad')
```

OUTPUT

x1= 0.785 x2= 4.712

y1= 0.706825181105366 y2= -0.9999999243471311

i= 7 ym= -0.005743252336259024

root of eqn y=sin(x) is xm = 3.1473359375000003 rad