

NAME: WASI MAHMOOD SID: 10578 LAB: 5

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In [ ]: def fx(x):
        return x**3+x-1
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In [ ]: import math as m
        def fx1(x):
            return m.cos(x)-(1.3*x)
```

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In [ ]: def fx2(x):
        return (x*m.cos(x)-(2*x**2 +3*x-1))
```

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In [ ]: def fx3(x):
        return (2*x*m.cos(2*x)) - ((x+1)*2)
```

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In [ ]: def secent(x,y):
        return x - (fx3(x)*(x-y))/(fx3(x)-fx3(y))
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In [ ]: def tolrence(greater_val,smaller_val,tolr):
        #print("Greater val" ,greater_val , "and smaller val", smaller_val)
        result = abs(greater_val - smaller_val)
        #print("Result: ", result)

        if result <= tolr:
            #print("The tol is True")
            return True

        else:
            #print("The tol is False")
            return False

        #tolrence(1,2,1)
```

```
In [ ]: #for fx1(x)
        x = 0
        y = 1

        for i in range(10):
            secent_result = secent(x , y)
            print("Root Values at iteration" ,i, " is: ", secent_result)

            tol = tolrence(secent_result,y,0.001)

            if tol is True:
                print("Loop break")
                break
            x = y

            print("value of y: ", y,"\n")
            y = secent_result
```

Root Values at iteration 0 is: 0.5682794285261287  
value of y: 1

Root Values at iteration 1 is: 0.6202925351778242  
value of y: 0.5682794285261287

Root Values at iteration 2 is: 0.6242327112113022  
value of y: 0.6202925351778242

Root Values at iteration 3 is: 0.6241845373996717  
Loop break

```
In [ ]: #for fx2(x)
x = 0
y = 1

for i in range(10):
    secent_result = secent(x , y)
    print("Root Values at iteration",i, " is: ", secent_result)

    tol = tolrence(secent_result,y,0.0001)

    if tol is True:
        print("Loop break")
        break
    x = y

    print("value of y: ", y,"\n")
    y = secent_result
```

Root Values at iteration 0 is: 0.22423044533171288  
value of y: 1

Root Values at iteration 1 is: 0.3127058501144693  
value of y: 0.22423044533171288

Root Values at iteration 2 is: 0.36420256353015945  
value of y: 0.3127058501144693

Root Values at iteration 3 is: 0.3592125677872767  
value of y: 0.36420256353015945

Root Values at iteration 4 is: 0.3593720382339458  
value of y: 0.3592125677872767

Root Values at iteration 5 is: 0.3593725738162093  
Loop break

```
In [ ]: #for fx3(x)
x = 0
y = -1

for i in range(10):
    secent_result = secent(x , y)
    print("Root Values at iteration",i, " is: ", secent_result)

    tol = tolrence(secent_result,y,0.0001)

    if tol is True:
        print("Loop break")
        break
    x = y
```

```
print("value of y: ", y, "\n")  
y = secent_result
```

Root Values at iteration 0 is: -0.706141463718696  
value of y: -1

Root Values at iteration 1 is: -0.8511348124350965  
value of y: -0.706141463718696

Root Values at iteration 2 is: -0.8658240511347899  
value of y: -0.8511348124350965

Root Values at iteration 3 is: -0.864244142267373  
value of y: -0.8658240511347899

Root Values at iteration 4 is: -0.8642565708976652  
Loop break