Quesion 2

Calculation of Value of π using Monte Carlo

Report & Code Explanation

- For loop for 100000 pins faling at at random x and y position in a square
- Found using equation of usint circle pins that are falling inside the unit circle
- Counted all these pins
- divided by total number of Pins that Fell.
- This is done for every value of N (i.e. Pins)

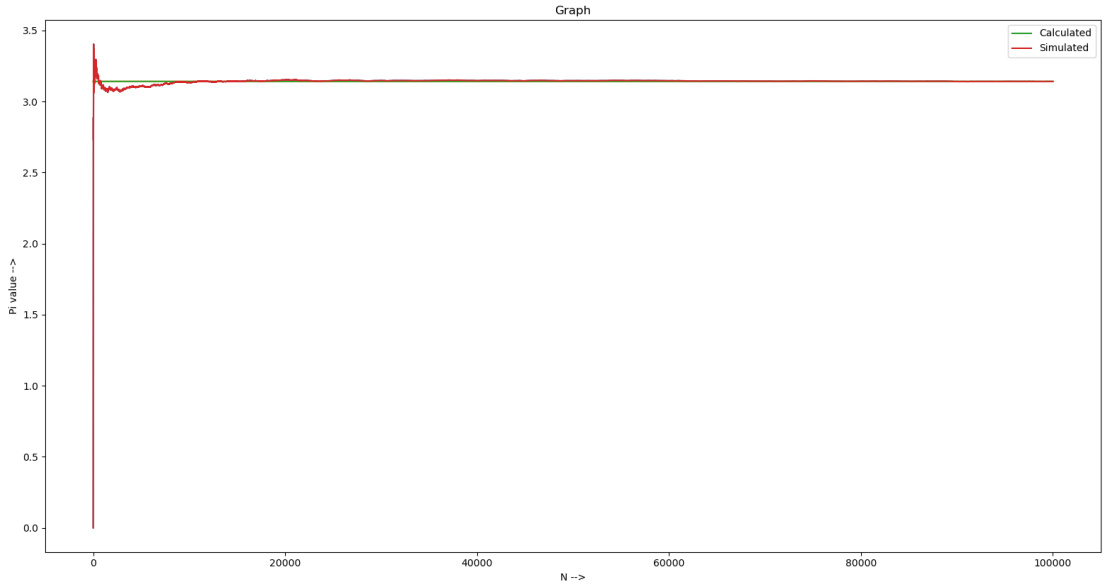
Code

```
# Question number 2 ( value of pi )
import matplotlib.pyplot as plt
import random
import math

val = 0
y_1 = []
arr = []

for i in range(1,100001):
    x_pos = random.random()
    y_pos = random.random()
    if ( x_pos*x_pos + y_pos*y_pos <= 1):
        val += 1
    arr.insert(i,4*val/i)
    y_1.insert(i,math.pi)

plt.figure(figsize=(20,20))
plt.ylabel("Pi value -->")
plt.xlabel("N -->")
plt.title('Graph')
plt.plot(y_1,label='Calculated')
plt.plot(arr,label='Simulated')
plt.legend()
plt.show()
```

Formula Used

> π = π * (r * r)/ (r * r)

Results :


Graph
Calculated
Simulated
Pi value -->
N -->
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
20000
40000
60000
80000
100000