# OpenMP program for Pi value approximation using Monte Carlo method

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Estimation if Pi

The idea is to simulate random (x, y) points in a 2-D plane with domain as a square of side 1 unit. Imagine a circle inside the same domain with same diameter and inscribed into the square. We then calculate the ratio of number points that lie inside the circle and total number of generated points.
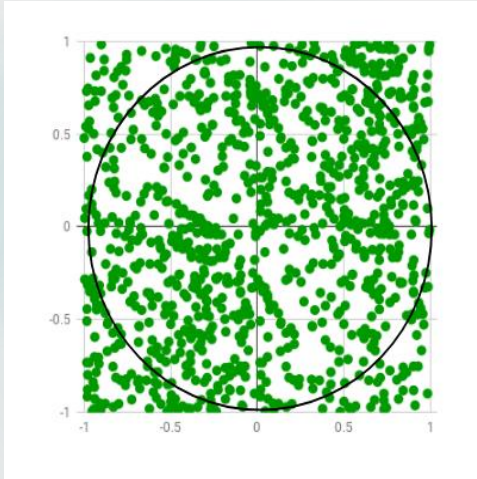
```c
#include <stdlib.h>
#include <stdio.h>
#include <math.h>
#include <string.h>
#include <omp.h>
#define XYZ 35791246

int main(int argc, char* argv)
{
    double x,y,realpi=3.1415,acc;
    int i,count=0; /* # of points in the 1st quadrant of unit circle */
    double z;
    double pi;
    /*the number of iterations used to estimate pi  is 'n'*/
     int n=10000;
```
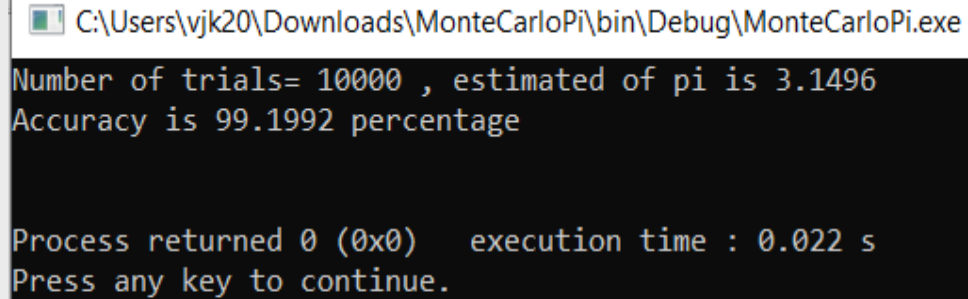
```c
/* initialize random numbers */
srand(XYZ);
count=0;
int tid=omp_get_num_threads();
#pragma omp parallel private (tid)
{
#pragma omp for schedule(static,tid)
for ( i=0; i<n; i++) {
    x = (double)rand()/RAND_MAX;
    y = (double)rand()/RAND_MAX;
    z = x*x+y*y;
    if (z<=1) count++;
  }
}
pi=(double)count/n*4;
printf("Number of trials= %d , estimated of pi is %g \n",n,pi);
acc=(1-(pi-3.141592))*100;
```

Output


```
C:\Users\vjk20\Downloads\MonteCarloPi\bin\Debug\MonteCarloPi.exe

Number of trials= 10000 , estimated of pi is 3.1496
Accuracy is 99.1992 percentage


Process returned 0 (0x0)   execution time : 0.022 s
Press any key to continue.
```

Total Number of trials=10000
Estimated Value of Pi= 3.1496
Accuracy of calculation is 99.192%