Project Three

Due @ 11:55PM 9/17/13

Objective:

1. Become familiar with looping and control structures
2. Become familiar with arithmetic in Java
3. Become familiar with Math object in Java

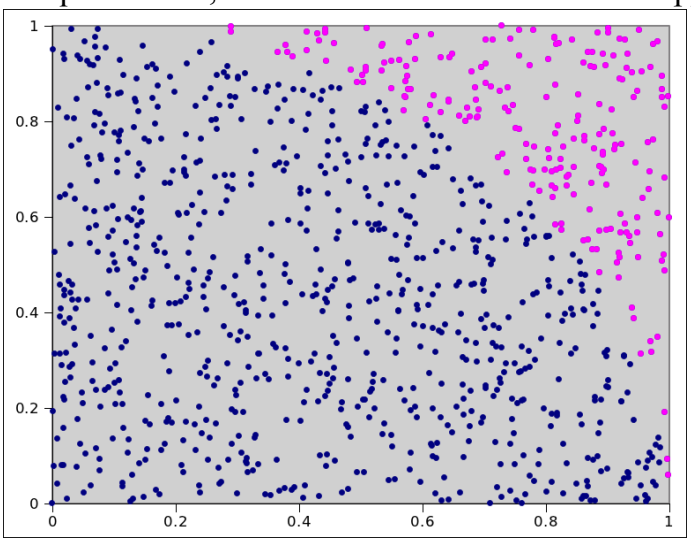
Description:

Create a program that approximates the value of PI using the standard Monte Carlo approach.

Background:

Consider the unit disk of all points (x, y) such that $x^2+y^2=1$. This disk has area equal to p. The upper right quarter of this disk, with (x,y) satisfying $0 = x = 1$, $0 = y = 1$ and $x^2+y^2=1$ obviously has area equal to $p/4$. The surrounding unit square $0 = x = 1$, $0 = y = 1$ has area equal to 1.

If we randomly throw N darts at the square, then the expected number of darts to land inside the quarter-disk is $N\ p/4$. Instead of throwing darts, if we randomly generate N points inside this square, and if M of these lie inside the quarter-disk, then M/N should be a reasonable approximation to $p/4$.



Your program:

- Should prompt the user for the number of random samplings(N)
- Run a loop N number of times and find the number of points inside the quarter disk (M)
- Display the estimated value of p at the end of the program

Example output:

Example 1:

Please enter the number of points to sample:

10

Estimated value of Pi = 3.1589

Example 2:

Please enter the number of points to sample:

100

Estimated value of Pi = 3.2023

Example 3:

Please enter the number of points to sample:

1000

Estimated value of Pi = 3.148890

Example 4:

Please enter the number of points to sample:

10000

Estimated value of Pi = 3.1415...