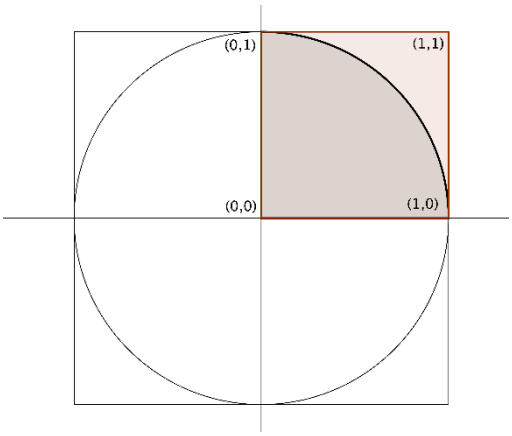
Hacettepe University
Department of Electrical and Electronics Engineering
ELE122 - Computers And Programming Laboratory

05.04.2021

Experiment 2

Q1) Write a C program that gets the input number from user and finds the integer square root of that number without using sqrt function and "math.h" library.
Some examples for integer square roots:
Integer square root of 26 = 5
Integer square root of 16 = 4
Integer square root of 80 = 8
Integer square root of 25 = 5

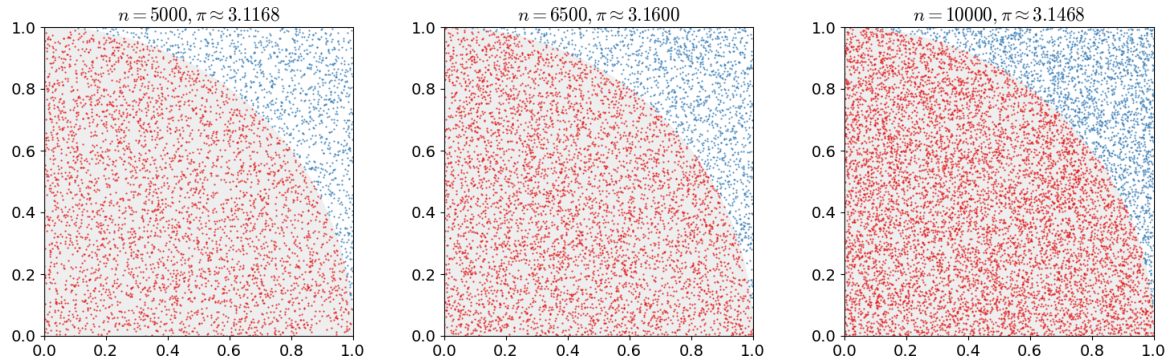
Q2) When you are in 3rd grade, you will enroll to the "ELE 302 Probability Theory" course, and you will learn that you can use probability and statistics to calculate special mathematical values.



An example of this is the number Pi. When you draw a unit square and a unit circle inside, you can use the quarter part of the graph and put random points in it. When you count the number of **points in the quarter circle** (gray part in the figure) as **A** and the number of **points out of the quarter circle** (red part without the gray in the figure) as **B**, you can approximately calculate the number Pi as

$$\pi \approx 4 * \frac{A}{A+B}$$

As you get more random numbers, it generally gets closer to the real value of pi. Here are some examples for how close we get with more numbers.



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Write a C program that calculates number Pi by generating 10000 random coordinates (x,y) and finding the ratio of the inner and outer numbers. Very simple method to generate a random value is given below. **Do not forget to add "`#include <stdlib.h>`" to use "`rand()`" function.**

Hint: You can check if a point is in the quarter circle by finding the distance to (0,0) and compare with the radius of unit circle.

Generating a random number between 0 and 1

```c
#include <stdio.h>
#include <stdlib.h>

int main(){
        float x;
        x = (float)rand()/RAND_MAX;
        printf("Hello i am a random number between 0 and 1: %.2f\n", x);

        x = (float)rand()/RAND_MAX;
        printf("Hello again, i am another random number: %.2f\n", x);

        x = (float)rand()/RAND_MAX;
        printf("...and another: %.2f\n", x);

        x = (float)rand()/RAND_MAX;
        printf("...and another: %.2f\n", x);

        return 0;
}
```