**CS 299 Project #1 (60 points)**

(Note: from now on “program” always referring to “Python program”)

1. Write a program to play a “rock, paper, scissors” game. Rules are: The paper covers rock, the rock breaks the scissors, and the scissors cut the paper. You enter your guess, and the computer makes random choice, and the program should declare a winner or draw/tie. Perform at least three sets of testing.

To generate a random number in range p[0, 2], use the following:

***import random***

***choice = int (random.random() \* 100) % 3***

(in Python you actually can randomly generate “rock”, “paper”, or “scissors” – see Lecture 4 random number generator)

1. A perfect number is one whose factors (except itself) sum to itself. For example, the factors of 6 are 1, 2, 3, and 6. Since 1+2+3=6, so 6 is a perfect number. Write a program to check if an input number is a perfect number or not. If it is, write out the whole sequence. For example, enter 6, the output should be: 6 is a perfect number, 6 = 1+2+3. (Note: your output format may vary.)

Test for: 6, 28, 325, 496

1. Use MonteCarlo method to calculate π. (See lecture explanation on MonteCarlo method.) Test for n = 100, 1000, and 10000 where n is the number of random points. Also, Timing the execution time for each test case. Create a script file that includes all three test cases. For each test case, your output should include: value of n, pi value, as well as execution time.

Note: (1) to use random number, import random, use random.uniform(0,1)

(2) to measure time, import time, and use time.time() to get current time

**Submission instruction**

Upload (1) **source codes only** (e.g. program1.py etc.) and (2) the **script file**

to blackboard along the Project #1 link.