Department of Computer Science and Engineering
Indian Institute of Technology, Kharagpur

Compiler Laboratory: CS39003
3rd year CSE, 5th Semester

Assignment - 1: Annotating Assembly *Marks: 50*
Assign Date: July 24, 2018 Submit Date: 23:55, July 30, 2018

1. Translate the following C program using GCC/Linux to the assembly language program of x86-64 (Intel 64-bit processor) without optimization.

```
cc -Wall -S asgn1.c
```

C Program: *asgn1.c*

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

double monteCarlo(long int n);
double iSeries(long int n);

int main()
{
   long int num;
   double piD1,piD2;

   printf("Number of iterations to estimate PI: ");
   scanf("%ld",&num);
   piD1=monteCarlo(num);
   piD2=iSeries(num);
   printf("\nPI: %10.8lf (using Infinite Series)",piD2);
   printf("\tPI: %10.8lf (using Monte Carlo method)\n\n",piD1);
   return 0;
}

double iSeries(long int n)
{
   int i;
   double pi=0.0;
```

```
   for(i=1;i<=n;i++) {
      if(i%2==0) pi-=(4.0/(2*i-1));
      else       pi+=(4.0/(2*i-1));
    }
    return pi;
}

double monteCarlo(long int n)
{
   double x,y;
   int i,count=0;

   srand(12345);
   for(i=1;i<=n;i++) {
      x = (double)rand()/RAND_MAX;
      y = (double)rand()/RAND_MAX;
      if ((x*x+y*y)<=1) count++;
   }
   return (double)count/n*4.0;
}
```

2. Rename the generated assembly file as *ass1_roll.s* (where *roll* is your roll number). Add comments for each of the assembly language instruction. Your comment should explain the functionality of the instruction and the connection to the original C program. Please make sure that your commented file can be compiled to generate executable file. Upload your file (`ass1_`*`roll`*`.s`) in Moodle server.

   Note: *Comments without connection to C program will get partial marks.*