Course Instructor: Dr. Ripon Patgiri (ripon@cse.nits.ac.in)

Subject Code: CS-101   Subject: Introduction to Computer Programming
Semester: 1st Department: CSE
Course: B.Tech   Section: J

Answers should be submitted in a scanned copy of the handwritten format.

1. Why does the value of $c1 \neq c3$ but $c2 = c4$?

```c
#include <stdio.h>
int main()
{
    int i,j,c1=0,c2=0,c3=0,c4=0;
    for(i=0;i<10;i++,c1++)
    {
        for(j=0;j<100;j++,c1++)
        {
            c2++;
        }
    }
    printf("Counter1=%d   Inside=%d\n",c1,c2);

    for(i=0;i<100;i++,c3++)
    {
        for(j=0;j<10;j++,c3++)
        {
            c4++;
        }
    }
    printf("Counter2=%d  Inside=%d\n",c3,c4);
    return 0;
}
```

2. Write a program to print the following triangle.

```
              1
         1    2    1
    1    2    3    2    1
1   2    3    4    3    2    1
```

3. Write a program to print Pascal's triangle.

```
              1
          1     1
        1    2    1
      1    3    3    1
    1    4    6    4    1
```

4. What is the output of the following random number generator? Also, describe the program in your own language.

```c
#include<stdio.h>
#include<stdlib.h>
#include<time.h>
int main()
{
    int n;
    int d,i,j;
    int r=0;
    clock_t start,end;
    start=clock();
    for(i=0;i<10;i++)
    {
        r=0;
        for(j=0;j<32;j++)
        {
            n=clock();
            d=n&1;
            r=r+d*(1<<j);
        }
        printf("%d\t",r);
    }
    end=clock();
    printf("\nTotal elapsed time=%lf\n",(end-start)/1000.0);
    return 0;
}
```

5. Write a program to reverse the digits of a given number. Hints:

```c
#include<stdio.h>
int main()
{
    int n=rand();
    int rev=0;
    printf("%d\n",n);
```

```
        /*
        Code for reversal
        */
        printf("%d\n",rev);
        return 0;
}
```

6. Write a program to generate the Fibonacci series up to n^{th} terms.

7. Write a program to find a factorial number of a given number n.

8. Write a program to sum the following series-

   (a) $\frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \ldots + \frac{1}{n}$
   (b) $\frac{1}{x^1} + \frac{1}{x^2} + \frac{1}{x^3} + \ldots + \frac{1}{x^n}$
   (c) $\frac{1}{2^1} + \frac{1}{2^2} + \frac{1}{2^3} + \ldots + \frac{1}{2^n}$