# **Lab Manual 3**

### **Practice Problems:**

### C programs to demonstrate bitwise operators:

```
1. #include <stdio.h>
     void main()
             int i = 3, num = 48;
             printf("Right shift by %d: %d\n",i,num>>i);
             printf("\n");
             printf("Left shift by %d: %d\n",i,num<<i);</pre>
2. (same as above, except now we are using hexadecimal values)
  #include <stdio.h>
     void main()
             int i = 0x3, num = 0x30;
             printf("Right shift by %x: %x\n",i,num>>i);
             printf("\n");
             printf("Left shift by %x: %x\n",i,num<<i);</pre>
     }
3. #include <stdio.h>
  void main()
  {
       int a=12, b=39;
      printf("AND=%d",a&b);
      printf("\nOR=%d",a|b);
      printf("\nXOR=%d",a^b);
  }
4. #include<stdio.h>
  void main()
  {
      char c = 105;
      printf("%X", ~c);//1's complement of c
      printf("\n%X", -c); //2's complement of c
  }
```

### 5. C Program to demonstrate the usage of assignment and increment operators:

```
#include<stdio.h>
void main()
{
    char a;
    printf("enter a lowercase letter:");
    scanf("%c",&a);
    a-=32;//not recommended, since it replaces the original character
    printf("Uppercase of given letter is: %c",a);
    ++a;//not recommended, ...
    printf("\nUppercase of next letter is: %c",a);
}
```

6. C Program to find surface area of a sphere:

```
#include <stdio.h>

#define PI 3.14

int main()
{
   float radius, sa;
   printf("\n Please Enter the radius of a Sphere \n");
   scanf("%f", &radius);

   sa = 4 * PI * radius * radius;

   printf("\n The Surface area of a Sphere = %.2f", sa);
}
```

#### **Exercise Problems:**

- 1. Read an integer number n from user. Compute the bitwise AND of n and 1. Do you see a pattern in the result? (Hint: observe the difference in the result when n is odd vs. when n is even)
- 2. Read two integer numbers m, n from user. Compute the value of m\*2<sup>n</sup> as well as the value of m <<n. Do you see a pattern in the result? Now compute the value of m/2<sup>n</sup> as well as the value of m >>n. Do you see a pattern?
- 3. Compute the volume of a sphere; read the radius from user.
- 4. Read the co-ordinates of two points (x1,y1) and (x2,y2) from user. Compute the midpoints of these two points and print it up to 2 decimal points.
- 5. Find the angle of a segment in a circle; read the arc length and radius from user.

## **Homework Questions:**

- 1. Compute the area of a (a) trapezoid and (b) parallelogram. Read necessary inputs from user.
- 2. Compute the volume and surface area of a cone. Read the radius and height of the cone from user
- 3. Read the lengths of base and height of a right angle triangle. Then compute the length of its hypotenuse using Pythagorean theorem.
- 4. Write a C program to count total number of notes in given amount.

### Tentative Input/Output (bold ones are user inputs):

```
Enter amount: 1176
Total number of notes: 500: 2
100: 1
50: 1
20: 1
10: 0
5: 1
2: 0
1: 1
```