Computer Programming [IIITS]
First Semester 2020-2021
Lab-04(31/12/2020)

Goals for the lab:

1. Learn about basic data types: variables, data types and sizes, operators, expressions, precedence and associativity.

2. Experiment with arithmetic operations involving integers and floating point numbers.

Float Operations:

```
#include<stdio.h>
#include<math.h>
main( )
{
   float x,y;
   printf(``\nGive a number");
   scanf(``%f",&x); /*reading x of type float*/
   y=cos(x); printf("%f",y);
}
```

The above program finds the cosine of an angle. However the angle must be specified in radians. If input is 1.05 then output is 0.5. It is because 1.05^c is approximately 60^0.
To compile the program use gcc filename.c -lm

```
#include<stdio.h>
#include<math.h>
main( )
{
   float x,y,z;
   printf(``\nGive a number");
   printf(`` between -1 and 1");
   scanf(``%f",&x);
   y=acos(x);
   z=y*180/3.14;
   printf(``cos inverse in radians %f",y);
   printf(`` and in degrees %f",z);
}
```

Here $acos(x)$ means $cos^{-1}(x)$
Input 0.5 output 60^0. Input 0.87 output 300

1. Write program, which reads a, b and c as sides of a triangle and prints area.
   Hint: $area = \sqrt{s(s-a)(s-b)(s-c)}$. [Hint: s is $(a+b+c)/2$] [$sqrt(x)$ will find square root]. Input 5 7 10 output 16.24

2. Write program, which reads a, b, c and d and finds distance between points (a, b) and (c, d). Input 3, 7, 11, 13 output 10.

3. Write program, which reads 6 numbers a, b, c, d, e and f. The program outputs the area of the triangle whose end points are (a, b), (c, d) and (e, f). [Hint: use above two questions]. Input 7 3 11 3 7 6 output 6.

4. Write program, which reads a, b, and c. Let $ax + by + c = 0$ be equation of a line. The program outputs the slope. Input 3 5 8 output -0.6

5. Write program, which reads a, b, c, d and e and prints the distance between point (a, b) and line $cx + dy + e = 0$. [Hint: $(ac + bd + e)/(c^2 + d^2)^{1/2}$.] Input 6 7 3 4 2 output 9.6

LOGICAL OPERATORS

Operator	Description
&&	Logical AND operator. If both the operands are non-zero, then the condition becomes true.
||	Logical OR operator. If any of the two operands is non-zero, then the condition becomes true.
!	Logical NOT operator. It is used to reverse the logical state of its operand. If a condition is true, then Logical NOT operator will make it false.

RELATIONAL OPERATORS

Operator	Description
==	Checks if the values of two operands are equal or not. If yes, then the condition becomes true.
!=	Checks if the values of two operands are equal or not. If values are not equal then the condition becomes true.
>	Checks if the value of left operand is greater than the value of right operand. If yes, then the condition becomes true.
<	Checks if the value of left operand is less than the value of right operand. If yes, then the condition becomes true.
>=	Checks if the value of left operand is greater than or equal to the value of right operand. If yes, then the condition becomes true.
<=	Checks if the value of left operand is less than or equal to the value of right operand. If yes, then the condition becomes true.