Department of ICT
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Programming Practicum – ICT1142   **Level 1- Semester 1**

Lab Sheet 03   **| 2022**

Objectives:
   To familiarize with operators and expressions.

Arithmetic Expressions

Some examples of C arithmetic expressions are shown in the table given below.

Algebraic Expression	C Expression
ab – c	a * b – c
(m + n) (x + y)	(m + n) * (x + y)
(ab / c)	a * b / c
$3x^2 + 2x + 1$	3*x*x+2*x+1
(x / y) + c	x / y + c

Exercise 01

Write a C program to convert Celsius to Fahrenheit. Get Celsius value from the user.

$$F = C \cdot \frac{9}{5} + 32$$

Exercise 02

```
#include <stdio.h>
 int main()
{
        char ch1 = 'A';
        char ch2= ch1+5;
        printf("%c\n",ch2);
        int x= 'B'*2-7;
        printf("%c", x);
```

```
  return 0;
  }
```

First predict the output of the above program. Then run the written program to get the exact answer.

Exercise 03

Type the program given below to calculate the volume of a sphere when the radius is given.

```
#include<stdio.h>
int main()
{
        float PI = 22/7;
        float radius , volume ;
        printf(" Enter radius value\n")
        scanf(%f, radius);
        volume = 4/3 * PI * radius * radius * radius ;
        printf("Volume is = %d", volume);
        return 0;
}
```

     i.   Compile the program and correct syntax errors.
    ii.   Compare the output with the expected answer when radius is 10.
   iii.   Make necessary changes if they are not similar.
   iv.   Check the answer when radius=100.
    v.   Make necessary changes to get the answer precise up to 8 decimal points.

Exercise 04: Assignment Operator

Type the following program to understand shorthand assignment operators.

```
#include<stdio.h>
int main ()
{
        int a = 3;
        printf( "\nValue of a is : %d",a );
        a += 1;
        printf( "\nValue of a is : %d",a );
        a -= 1;
         printf( "\nValue of a is : %d",a );
        a *= 2;
        printf( "\nValue of a is : %d",a );
```

```
        a /= 2;
        printf( "\nValue of a is : %d",a );
        a %= 2;
        printf( "\nValue of a is : %d",a );

 return 0;
}
```

First predict the output of the above program. Then run the written program to get the exact answer.

Exercise 05: Increment / Decrement Operators

Study the following codes and write down the expected outputs. Then write a program to verify your answers.

```
int   a, b = 0, c = 0;
a = ++b + ++c;
printf("%d %d %d\n", a, b, c);
a = b++ + c++;
printf("%d %d %d\n", a, b, c);
a = ++b + c++;
printf("%d %d %d\n", a, b, c);
a = b-- + --c;
printf("%d %d %d\n", a, b, c);
```

Exercise 06: Relational Operators

Study the following codes and write down the expected outputs. Then write a program to verify your answers.

int a = 5, b = 5, c = 10;

printf("%d == %d = %d \n", a, b, a == b);

printf("%d > %d = %d \n", a, c, a > c);

 printf("%d < %d = %d \n", a, b, a < b);

 printf("%d != %d = %d \n", a, c, a != c);

 printf("%d >= %d = %d \n", a, b, a >= b);

printf("%d <= %d = %d \n", a, c, a <= c);

Operator precedence and associativity

( )	left to right (inside out)
! – (unary) ++ --	right to left
* / %	left to right
+ – (binary)	left to right
< <= > >=	left to right
== !=	left to right
&&	left to right
||	left to right
= += –= *= /= %=	right to left

Exercise 7

Get the manually calculated result for the bellow expression. Then execute the following program and verify the answer.

```c
#include<stdio.h>
void main ()
{
    float a, b, c, x;
    a = 9;
    b = 12;
    c = 3;
    x = a – b / 3 + c * 2 – 1;
    printf ("x = %f\n",x);

}
```

Insert parentheses (where necessary) to the expression in the above program and try to obtain following values for x.

x = 7.00
x= 4.00

Exercise 08

Write a C program to input principle (amount), time and rate (P, T, R) from user and find Simple Interest.

Formula for simple interest is given below.

$$SI = \frac{P \times T \times R}{100}$$

Where,
P is the principle amount
T is the time and
R is the rate

Exercise 09

Write a program to find diameter (D), circumference (C) and area (A) of circle.

$$D = 2r$$

$$C = 2\pi r$$

$$A = \pi r^2$$

Where r is radius of the circle. Radius is user input from the keyboard. Declare π (PI) as constant variable.