Department of ICT
Faculty of Technology
University of Ruhuna

Programming Practicum – ICT1142 **Level 1- Semester 1**

Lab Sheet 02 **| 2022**

Objectives:

- To familiarize with variables, data types of C language, format specifiers, escape sequences, sizeof() operator.
- To work with constants, standard inputs and type casting.

Exercise 01: Escape Sequences

This program will demonstrate you how to use escape sequences to print special characters like new line, tab space, quotes etc. within printf( ) statements.

Create a new program "escape.c" and type following code sample. Compile and run the program to observe the output.

```
#include <stdio.h>
int main()
{
   printf("Hello\nWorld!");            //use of \n
   printf("\nHello\tWorld!");          // use of \t
   printf("\n\"Hello World!\"");        //use of \"
   printf("\nHello\bWorld!");          //use of \b
   return 0;
}
```

Commonly used escape sequences are:
- \n (newline)
- \t (tab)
- \v (vertical tab)
- \b (backspace)
- \r (carriage return)
- \" (double quotes)
- \' (single quotes)

Exercise 02: Escape Sequences - Practice

Write a C program to produce this output.

```
Item Name       Price
-------------   -------
Banana          Rs:150
Apple           Rs:200
Orange          Rs:40
```

Exercise 03: Declaring and Printing variable values

a. Create a program called *"**Cvariable.c**"*
b. Declare three integer type variables ***a, b*** and ***c*** and a floating type variable ***r***.
c. Assign values for ***a, b*** as **10** and **20** respectively.
d. Get the sum of *a, b* and assign the result to *c*.
e. Assign r variable following expression

r = 70.0/3.0

Print values of four variables as given.

```
value of a : 10
value of b : 20
value of c : 30
value of r : 23.333334
```

Exercise 04: format specifiers and sizeof() operator

The given table shows a list of common Format Specifiers for different data types in C language. Write the following program and observe the output.

```
#include <stdio.h>
int main() {
        int a = 72;
        char b = 'A';
        float c= 13.8;
        float d= 10.1234567;
        int e = a/10;

        printf("a equals: %d \n", a);
        printf("char value of a: %c \n", a);
        printf("integer value of b: %d \n", b);
        printf("b equals: %c \n", b);
        printf("c equals: %f \n", c);
        return0;
}
```

Data types	Format Specifier
Integer (signed)	%d
Integer (unsigned)	%u
char	%c
Array of char	%s
float / double	%f
long float	%lf
Pointer value(address)	%p

Justify the output.
Add the followings into the program and observe the output.

```
printf("\n sizeof(a)= %d bytes",sizeof(a));
printf("\n sizeof(b)= %d bytes",sizeof(b));
printf("\n Adress of a=%p",&a);
printf("d variable store:%7.3f \n", d);
```

Try this also,
printf("the value of e=%d",e); → Is the answer precise ? Make necessary changes.

Exercise 05: Read data from Standard Input (Keyboard)

scanf("Format Specifier", &Variable);

***Example*:**
int marks;
printf("Enter marks \n");
scanf ("%d", &marks);

Write a C program to accomplish each of following:

a. Declare four variables *x, y, z* and *result* of type *int* .
b. Prompt messages to the user to enter values for three integers *x, y, z.*
c. Read three integers from the keyboard and store them in corresponding variables.
d. Compute the product of the three integers and assign the result to the variable *result.*
e. Print "*The product is:*" followed by the value of the integer variable *result.*
f. Modify the same program to print the average of three integers.

Exercise 06: Formatting, Standard inputs, Type casting

Write a C program to perform followings.

a. Declare four different types of variables (char, int, float and double) by giving var1, var2, var3 and var4 as identifiers.
b. Input values to these variables through runtime keyboard.
c. Print values of all flour variables using a **single printf( ) statement**. Output should be in bellow format.
d. Convert the value of the int variable(var2) into a float value and add it to the float variable (var3). Print sum value.

Value of var1:	val1
Value of var2:	val2
Value of var3:	val3
Value of var4:	val4
Sum of floats:	value

Exercise 07: Declare Constants

Two simple ways in C to define constants:
– Using #define preprocessor
Syntax: #define length 25
– Using const keyword
Syntax: const int length=100;

a. Write a program to convert inches into feet. Take inches as a key board input. Declare a constant type variable to store inches per foot as follows;

    const int inches_per_foot = 12;

b. Write a program to calculate the circumference of a circle (Circumference= $2\pi r$). The radius should be taken by the user. Define π as a preprocessor directive constant. (π = 3.143)

c. Write a program to input the value in meters and output the corresponding values in centimeters and kilometers. Define centimeters per meter =100 and meters per kilometers =1000 as constants.

Exercise 08

Write a C program to swap two numbers. Take the numbers as keyboard inputs. Display the swapped numbers. (Hint: You may need to use a third variable). Output should be as bellow.

Numbers before swap: 45 89
Numbers after swap: 89 45