Department of Statistics & Computer Science, University of Kelaniya
ACADEMIC YEAR – 2020/2021
COSC / COST 11023 – Fundamentals of Programming
Lab Session – 03

Throughout this lab session, you will learn more about variables, constants, arithmetic operators, and type casting in C language.

1. Write a C program to perform the following operations. (Not: Add header comments and the program comments when necessary.)
    - Create an integer variable called as `age`.
    - Assign your age to the `age` integer variable.
    - Print the value of the `age` variable.

Upload your completed program to the Lab 03 – Program 01 folder.

2. Write a C program perform the following tasks. (Not: Add header comments and the program comments when necessary.)
    - Create variables to store the following information:
        - Your birth year.
        - A/L Z-Score.
        - Your Letter grade for the A/L Physics (A, B, C).

    - Assign the values to each variable you have declared in the previous step.
    - Print the values of each variable in separate line.

Upload your completed program to the Lab 03 – Program 02 folder.

3. Write a C program contains the following variable declarations and assignments:

```
int test1Score = 90;
int test2Score = 80;
int sumOfScores = test1Score + test2Score;
```

Write output statements that would produce the output below (notice that the values stored in the variables have been output):

```
Test Score 1 = 90
Test Score 2 = 80
The sum of the scores = 170
```

Upload your completed program to the Lab 03 – Program 03 folder.

4. Write the following C program.

```
int main()
{
   int a = 25;
   float b = 45.0;
   char c = 'A';
   float sum;
   sum = a + b + c;
   printf("Result = %f\n", sum);
   return 0;
}
```

   - What is the output of the above program? Include your answer as a program comment in the bottom of your program.
   - Explain reasons for the above output. Include your answer as a program comment in the bottom of your program.

Upload your completed program to the Lab 03 – Program 04 folder.

5. Write a C program to print the memory allocation of all the basic datatypes. Hint: Use the sizeof function to find the memory allocation of a give data type: Eg:

```
int intsize =  (int) sizeof(int);
```

Upload your completed program to the Lab 03 – Program 05 folder.

6. Write a C program to find the following information:
   - Maximum and minimum number that can be stored in `int` data type.
   - Maximum and minimum number that can be stored in `float` data type.
   - Maximum and minimum number that can be stored in `double` data type.

   Hints:
   - To find the above information, you might need to include the following C standard libraries: `<limits.h>` and `<float.h>`.
   - Use the following constants to find the relevant maximum and minimum in each data types.

```
INT_MAX, INT_MIN, FLT_MAX, -FLT_MAX, DBL_MAX, DBL_MIN
```

Upload your completed program to the Lab 03 – Program 06 folder.

7. Write a C program to determine an employee weekly salary based on the following information.
   - Employee regular hourly pay rate is Rs. 250.00.
   - Employee overtime pay rate is Rs. 300.00.

- Assume that employee worked 40 regular working hours and 15 overtime hours.
- Then, calculate the total weekly pay for the employee and display it with an appropriate message. (Note: In this program, you do not need to consider the if else statements.)

Upload your completed program to the Lab 03 – Program 07 folder.

8. Write a C program to find the results of the following expressions. Display the result of each expression separately.

    201 % 12
    122 % 3
    5005 % 103
    100005 % 23
    2085 % 13

Upload your completed program to the Lab 03 – Program 08 folder.

9. Consider the partially completed C program below. Complete the blanks in the program and write a complete C program to determine the cost of renting a boarding place for number of years.

```
/*This program determines the cost for renting a boarding place
for a set number of years.*/

//preprocessor section
# _____________

__________ main ()
{

     //constants declarations
     __________ int RENT_RATE = 350;

     int years = 3;     //# of years over which rent is computed
     int costOfRent____ //cost for renting

     //calculate the rent
     costOfRent = years * RENT_RATE;

     //output the results
     ________("The cost per month for rent is: ______",_______);
     ________("The number of years is: ______",_______);
     ________("The total cost of rent is: ______,"_______);
______
```

Upload your completed program to the Lab 03 – Program 09 folder.

10. Write a C program to determine the area and the circumference of a circle of radius 12.

$$Area\ of\ a\ circle = \pi r^2$$

$$\text{Circumference of a circle} = 2\pi r$$

For the above calculations, create **PI** as a **constant** and assign the value **3.14519** to it.

Upload your completed program to the Lab 03 – Program 10 folder.