Department of Statistics & Computer Science, University of Kelaniya

ACADEMIC YEAR – 2022/2023

BECS 11223 – Fundamentals of Programming

Lab Session 04

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 implement a simple calculator. Follow the following steps to build the calculator.
    - Create two integer variables called as `num1` and `num2`.
    - Assign any two values to `num1` and `num2` variables.
    - Create a float variable called as `result`.
    - Add as `num1` and `num2` together and store the result in the `result` variable.
    - Print the result of the additional operator with an appropriate message.
    - Subtract as `num1` and `num2` and store the result in the `result` variable.
    - Print the result of the subtraction operator with an appropriate message.
    - Multiply as `num1` and `num2` together and store the result in the `result` variable.
    - Print the result of the multiplication operator with an appropriate message.
    - Divide as `num1` by `num2` and store the result in the `result` variable. (Hint: Explicit type casting might require getting the real number division)
    - Print the result of the divisional operator with an appropriate message.

Upload your completed C program into the Lab 04 – Program 01 submission folder.

2. 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 worked for 47 hours and display it with an appropriate message. (Note: In this program, you do not need to consider the if else statements.)

Copy your completed C program in to the MS Word document.

Upload your completed C program into the Lab 04 – Program 02 submission folder.

3. 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 C program into the Lab 04 – Program 03 submission folder.

4. 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 C program into the Lab 04 – Program 04 submission folder.

5. 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 C program into the Lab 04 – Program 05 submission folder.

6. Evaluate the following expressions and get the value of `a`, `b`, `c` and `d` by hand.

```
x = 10;
y = 20;
z = 30;

a = x++ + 10;
b = --x - x--;
c = ++x - ++y  - ++z;
d = ++y * ++y;
```

Write a C program and check your answers.

Upload your completed C program into the Lab 04 – Program 06 submission folder.

7. Write a C program to switch the sign (positive to negative or negative to positive) of these values:

```
x = 10;
y = -20;
z = -30;
```

Upload your completed C program into the Lab 04 – Program 07 submission folder.

8. Evaluate the following expressions and get value of `x` and `y` by hand.

```
x = 3 + 4 - 7 * 8 / 5 % 10
y = 3 / 2 + 3 * 8 / 3 - 3 + 1.5 / 3
```

   Write a C program and check your answers.

Upload your completed C program into the Lab 04 – Program 08 submission folder.