Department of Statistics & Computer Science, University of Kelaniya
ACADEMIC YEAR – 2020/2021
COSC / COST 11023 – Fundamentals of Programming
Lab Session – 10

Throughout this lab session, you will learn about functions in C language.

1. Complete the following program using the C library functions.

```
/**************************************
Author:
Date Created:
Date Modified:
Purpose:
**************************************/

#include <stdio.h>
//include the math library here

int main () {
     float value;

     printf("Please enter your number\n");

     //scan the user entered


     //find the cosine value of the user input


     //find the sin value of the user input


     //raise the user value to the third power


     //find the nearest integer value which is less than
     //or equal to the user input


     //find the smallest integer that is greater than
     //or equal to user input


     //find the natural log(e) of the user input
```

```
     //find the log base 10 value of the user input

     return 0;
}
```

Upload the completed program into lab 10 – Program 01 folder.

2. Complete the following program to print out your name, student id and your address.

```
/****************************************
Author:
Date Created:
Date Modified:
Purpose:
****************************************/

#include <stdio.h>

//function prototype

int main () {
     //function call

}
/********************
Input: No input
Return: None
Purpose: To print out the personal information
********************/
void personal_info()
{
     //print your name here

     //print your student id

     //print your address here

}
```

Upload the completed program into lab 10 – Program 02 folder.

3. Write a C function to find the largest number of three user input numbers and display the largest number.

Upload the completed program into lab 10 – Program 03 folder.

4. Write a C function to check whether an input number is a prime number test your function with three different user inputs.

Upload the completed program into lab 10 – Program 04 folder.

5. Develop a calculator using functions in C. Addition, Subtraction, Multiplication and Division of two numbers need to call the relevant function in your implementation.

Upload the completed program into lab 10 – Program 05 folder.

6. Complete the following program.

```
/****************************************
Author:
Date Created:
Date Modified:
Purpose:
****************************************/

#include <stdio.h>
//include the function porotypes here

int main () {
     int input, answer;

     //call the read input function and store the return value to input

     //square the user input number using the square function

     printf("square of %d is : %d \n",input, answer);

     return 0;
}
/*******************
Pre-Condition: No input
Post-Condition: Integer
Purpose: To read an integer from the keyboard
*******************/
int read_input()
{
     //complete the function definition
}

/*******************
Pre-Condition: Integer
Post-Condition: Integer
Purpose: Finds the Square of the input number
```

```
******************/
int square(int x)
{
     //complete the function definition
}
```

Upload the completed program into lab 10 – Program 06 folder.

7. Write a program in C to find the factorial of any number using the value returning function. Use the following program template to develop your program.

```
/***************************************
Author:
Date Created:
Date Modified:
Purpose:
***************************************/

#include <stdio.h>
//include the function porotypes here

int main () {
     int input, answer;

     //call the read input function and store the return value to input

     //find the factorial value of the input using factorial function

     printf("factorial(%d) = %d\n",input, answer);

     return 0;
}
/*******************
Pre-Condition: No input
Post-Condition: Integer
Purpose: To read an integer from the keyboard
******************/
int read_input()
{
     //complete the function definition
}

/*******************
Pre-Condition: Integer
Post-Condition: Integer
Purpose: Finds the factorial of the input number
******************/
```

```
int factorial(int n)
{
     //factorial(n) = 1 * 2 * 3 * ……. * (n-1) * n
}
```

Upload the completed program into lab 10 – Program 07 folder.

8. An incomplete C program is given below. The output of the program is a=2, b=30. Write down the prototype of the function mystery and complete the details of the function mystery.

```
#include <stdio.h>

void main()
{
     int a=2, b=15;

     b=mystery(a,b);

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

Upload the completed program into lab 10 – Program 08 folder.

9. Write a function that takes a positive integer as input and returns the leading digit in its decimal representation using a value returning function. For example, the leading digit of 234567 is 2.

Upload the completed program into lab 10 – Program 09 folder.

10. The program computes the number of values (**nc**) less than the average value of a set of n integer values (stored in **a**) using a function **nvalav**.

```
#include <stdio.h>

//Write the function prototype here
int main()
{
     int a[10] = { 1, 10, 20, 25, 34, 12, 4, 8, 7, 10};

     nc=nvalav(a,n);

     printf("Number of value less than average value is %d\n",nc);

     return 0;
}
```

```
//Write the function here
/*******************
Pre-Condition: Array and an integer
Post-Condition: Integer
Purpose: Counts how many values are less than the array average
*******************/
int nvalav(int arr[], int size)
{

}
```

Upload the completed program into lab 10 – Program 10 folder.

11. Complete the following program to fill an array with random numbers.

```
/****************************************
Author:
Date Created:
Date Modified:
Purpose:
****************************************/

#include <stdio.h>
#include <stdlib.h>
#include <time.h>

//include the function prototypes here

int main ()
{
int values[10];

     //call the function to fill the array with random numbers

     //call the display array function to display the array

     return 0;

}

/*******************
Pre-Condition: int array and size of the array
Post-Condition: None
Purpose: Fill the array with random numbers
*******************/
void fill_array(int ar[], int size)
{
```

```
	//setting the seed to generate random numbers
	srand(time(NULL));

	for(int i = 0; i < size; i++)
	{
		ar[i] = rand() % 1000;
	}

}

/********************
Pre-Condition: int array and size of the array
Post-Condition: None
Purpose: Display the array values
*******************/
void display_array(int ar[], int size)
{
	//write a code to display the array elements

}
```

Upload the completed program into lab 10 – Program 11 folder.

12. Write a C function which takes three integer pointers as an input and update those original integer values by multiplying its current value by 2.

Upload the completed program into lab 10 – Program 12 folder.