Lab 1 : First Steps in C Programming

Part 1 : Compile in the command line

To program in C, we need an editor to write our code (program) and a compiler to translate our code into machine language and create the executable file.

- A compiler is a software program that translates a program written in a high-level programming language into a low-level programming language that can be executed by a computer.
- Machine language is the language that computers understand.
- Executable file is a file that can be executed by a computer.

Exercise :

1. Create your own directory (using mkdir) and then access it (using cd).
   - Create the directory: `mkdir my_directory`
   - Change to the directory: `cd my_directory`
   - Use the pwd command to verify that you are in the directory you just created. The output of the pwd command should be the path to the directory. For example, if you are in the my_directory directory, the output of the pwd command would be:
     `/home/pc/my_directory`
2. Use the **gedit** text editor to create the file program1.c:

   gedit program1.c &
3. Add the following code to your file:

```
#include<stdio.h>
int main()
{
    printf( " Hello, world! \n" ) ;
    return 0;
}
```

4. Use the gcc compiler to compile your program:

   gcc program1.c -o program1

   This command will create an executable file called *program1*.
5. Run your program. To run your program, you can use the following command:

   ./program1

   This will print the following output to the screen:

```
Hello, world!
```

6. Modify your code by adding another printf:

   printf("This is my first program \n") ;

   Compile and execute. What do you notice?
7. Change \n to \t in the printf. Compile and execute. What do you notice?

8. Add comments to your code:

```
/* This is my first C program.
   It prints messages to the screen.
*/
#include<stdio.h>
int main()     // main function
{
      printf( " Hello, world! \ n" ) ;  //statement to print on the screen
      return 0;
}
```

Compile and execute. What do you notice?

Part 2 : Using an IDE (Code:Blocks)

- Open CodeBlocks.
- Click on **File** > **New** > **Project**.
- In the **New Project** dialog box, select **Console Application** and click **Go**.
- In the **Console Application** dialog box, select **C** and click **Next**.
- In the **Project Properties** dialog box, give your project a name and choose the directory where it should be saved. Click **Next**.
- In the **Compiler Selection** dialog box, keep the default settings and click **Next**.
- Click **Finish** to create your project.

A new window will open with the source code editor.

- In the left pane "Projects", expand the tree by clicking on the small "+" to display the list of project files. You should have at least one main.c with some source code in it. You can open the main.c file by double-clicking on it.
- To compile and run your program, click on the **Build** menu and select **Build and Run**. You should see the message "Hello, world!" printed to the console.
- Modify the content of the file as in the previous exercise.
- Save your file.
- Compiler and run your program.

Exercise 1: Declare and print variables / Operators

1) Declare two integer variables, x and y, and assign them the values 5 and 10, respectively. Then, write a program to print the sum (x + y), difference (x - y), product (x * y), quotient (x / y), and module (x % y).

Example of the output : 5 + 10 = 15

2) Same question using real variables. What do you notice for the operators / and %.

Exercise 2:

Write a program to calculate the area of a triangle. The area of a triangle is calculated using the following formula: Area = 1/2 * base * height

base and height are two real variables and their values should be given by the user.