C Language Basics

1.1 Objectives

1. To get acquainted with the programming editor or the Code::Blocks Integrated Development Environment (IDE).
2. To learn the basics of program coding, compilation, run and the usage of `printf()` and `scanf()`.

Time-span: Two lab days (4 hrs)

1.2 Instruction:

We prefer to use either a plain text editor or Code::Blocks[1] IDE to write the computer programs in C. You might have other options as well.

1.2.1 Using a text editor: gedit

a) Create a folder where you want to place your C program source, you can use `mkdir <folder_name>` command to do so.

b) Open a terminal and go to your newly created folder using `cd` command.

c) Create your first C program source file with the following command.

```
$gedit <your_program.c>
```

Note: `<your_program.c>` is the file name you want give to your new program.

1 https://www.codeblocks.org/downloads/

d) Now you are ready to write your first program in C. Type the following code:

```c
/* Hello World */
#include <stdio.h>
int main() {
     printf("Welcome to the programming world !\n");
     return(0);
}
```

e) To compile your program, use the following command in the terminal. (You might need to open another instance of terminal.)

```
$gcc <your_program.c> -o your_program
```

f) To run your program, use the following command in the terminal.

```
$./your_program
```

1.2.2 Using the Code::Blocks IDE:

a) Create a folder where you want to place your C program source, you can use `mkdir <folder_name>` command to do so.

b) Find Code::Blocks IDE from the application explorer and Open it.

c) Go to File => New => File => C/C++ Source and give name <your_program.c>.

d) Type the following code:

```
/* Hello World */
#include <stdio.h>
int main() {
    printf("Welcome to the programming world !\n");
    return(0);
}
```

e) Save your code with `Save file` option in file menu Or you can use **Ctrl + S** shortcut to save your new changes in the source file.

f) To compile your program, select `Compile current file` option from the **Build** menu. It will show errors if you write incorrect syntax or some warning in many cases. You can press **Shift + Ctrl + F9** for shortcut to compile the source file.

g) To run your program: select `Run` from **Build** menu. It will display your program output. You can press **Ctrl + F10** for shortcut.

1.3 Problems

a. Use the `printf()` function for drawing (a) a house, (b) a tree and (c) any figure from your imagination. Make appropriate

use of escape sequences, the escape sequences in C are "\n", "\t", "\\" etc.

b. Calculate the mass of air in an automobile tyre, using the formula:

$$PV = 0.37m(T+460)$$

where P is the air pressure in the tyre (pounds per square inch), V is the volume (in cubic feet), m is the mass of air (in pounds), T is the temperature in Fahrenheit.

Note: Algorithm and Flowchart needed.

c. Write a program that reads the name of the user and greets him/her. Refer the following sample output.

```
Enter your name: Ramesh
Hello Ramesh! Welcome to the world of programming.
```

Note: The students should make a list of **syntax errors** that may occur while attempting the programming problems and mention why each of those errors occurred.

1.4 Format of the Lab Report

You need to submit the report of the laboratory work after completion of each sheet. The report should have a cover page mentioning:

(i) Your name and Class Roll Number,

(ii) Lab sheet title and problem.

The body of the report should include the following components for each problem.

1. The question.
2. Flowchart and algorithm (only for the questions which explicitly asks to give flowchart/algorithm).
3. Properly commented and well-structured source code.

The last section of the report should include the Discussion of your learning outcome. The reports for the lab sheets 1, 2 and 3 should also include an appendix describing the syntax errors you faced while attempting the problems.