PROGRAMMING IN C

Lab Manual

Prepared By

Pradip Paudel
Department of computer Engineering
Everest Engineering College, Sanepa-2 Lalitpur

FOR

BE. FIRST SEMESTER

Dear Students, Welcome to C programming Lab. For the practical works of C programming, you have to complete at least ten to twelve lab activities throughout the course. These lab sheets will guide you to prepare for programming and submission of lab reports. Further, it helps you to understand practically about the knowledge of programming. You can use this lab guide as the base reference during your lab. You have to submit lab report of previous lab into corresponding next lab during when your instructor shall take necessary VIVA for your each lab works.

This Lab Manual is prepared to help the students with their practical understanding and development of programming skills, and may be used as a base reference during the lab/practical classes. Students have to submit Lab Exercise report of previous lab into corresponding next lab, and can be collected back after the instructor/course coordinator after it has been checked and signed. At the end of the semester, students should compile all the Lab Exercise reports into a single report and submit during the end semester sessional examination.

For your reference, "how to write a complete lab report ?"is being prepared as sample report for **LAB Sheet 1** in this manual. For the rest of your labs, please follow the reporting style as provided. Your lab report to be submitted should include at least the following topics.

1. Cover page *(to be attached with every Lab Exercise)*
2. Index *(to be used while compiling all the Lab Exercise reports into single report)*
3. Lab title
4. Objective(s)
5. Theory
6. Title of Program
7. Problem Analysis
8. Algorithm*(optional)*
9. Flowchart*(optional)*
10. source code
11. Output (Compilation, debugging & testing)
12. Discussion & Conclusion.

On each lab, you have to submit the report as mentioned above however for additional lab exercises; you have to show the coding and output to your instructor.

Note: The lab exercises shall not be completed on a single specific lab. Students are encouraged to complete the programming questions given in the Exercise prior to come to the lab hour and do the lab for the given title/objectives

EVEREST ENIGNEERING COLLEGE
Sanepa-2, Lalitpur
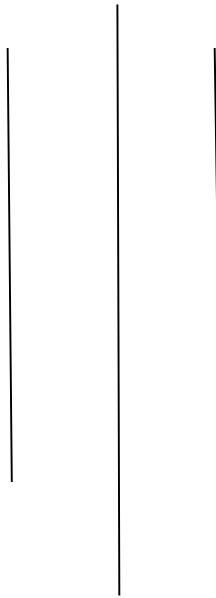
Programming in C Lab Report

Submitted By

Name: _____

Faculty:_____

Semester:_____

Section: _____

Roll. No. _____

Submitted to

Instructor-I:_____

Instructor-II: _____

Department: _____

Lab Date:_____

Submission Date _____

INDEX PAGE

S.N	Lab No.	Lab Title	Date	Remarks

Lab -1

Title: Basic Introduction to C programming

Objectives:
- To be familiar with syntax and structure of C- programming.
- To learn problem solving techniques using C

Theory:
Syntax basically refers to the protocols to be followed while writing a program. It is very necessary to follow proper syntax while coding to get the desired set of output. The C basic syntax consists of header files, main function, and program code. This is the most fundamental structure in the C program. A C program necessarily consists of the main function because the execution of the program starts from this line.

<u>Header files</u>

Files ending with .h are what known as header files. C has a series of predefined functions embedded in the header files in the C library. We use these functions to perform a specific task with the help of a header file. we can add header files using the preprocessor directive #include.

Some of the functions used in header files are as follows

<u>Main Function</u>

Void main( )
{

}

Opening Curly Braces { -Beginning of instruction for the main function
Closing Curly braces } - End of instruction for the main functions.

When your operating system runs a program in C, it gives the control of the computer to the C program. If a program consists of only one line of code in the main function, then the program can run successfully.
As the program execution starts from this line, it becomes compulsory for every C program to have the main function.

<u>Variables</u>

A variable is a name of the memory location. It is used to store data. Its value can be changed, and it can be reused many times. They are a combination of letters and digits.
Rules for naming identifiers or variables

- No special character can be used to name a variable except underscore(_).
- The variable name cannot start with a digit, it can be a letter or an underscore.
- No keyword can be used as an identifier.
- Whitespace cannot be used.

<u>Constant</u>
Constants are those values that cannot be changed during program execution
.

Keywords
Keywords are a set of words used for a special purpose in the program. They are reserved words. Some examples are for, while, switch, break, goto, int,float,if etc.

Operators
There are various operators in C that we use in order to perform different mathematical and logical operations. Some of them are:

Arithmetic Operators : +, -, *, /
Increment/Decrement Operators : ++,–
Relational Operators: ==, <, >, <=, >=, !=
Logical operators : &&, ||, !
Conditional Operators : ?:

Comment

A comment is a simple text that makes your code more descriptive and readable. You can add comments in your code just to explain how the code is functioning. Comments aren't a necessary part of a code, you can add them according to your convenience.

There are two types of comments:

1. Single line comments
2. Multi-line comment
3.

For single line comment just put '//' before the comment line

For multi-line comment /*——*/ , the statements of comment should be enclosed within /* and */.

Title of Program
Write a Program to calculate and display the volume of a CUBE having its height (h=10cm), width (w=12cm) and depth (8cm).

Problem Analysis

The problem is to calculate the volume of a CUBE having its inputs parameters identified as: Height (integer type), width (integer type) and depth (integer type). The output of the output of the program is to display or calculation phase, we don't need any extra parameters (variables) for this problem. The volume of the cube is the multiplication of its height, width and depth, hence the mathematical formula to calculate volume is:
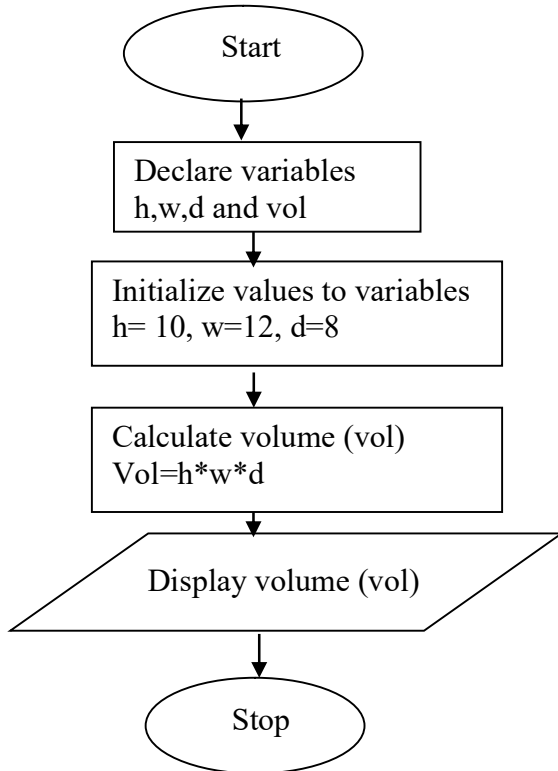Vol= height * width * depth. (vol = h * w * d)

Input variables	Processing variables/calculations	Output variables	Necessary header files/functions
h(int) w(int) d(int)	vol=h*w*d	vol(int)	stdio.h conio.h printf() and scanf()

Algorithm

1. Start
2. Declare variables h,w,d and vol
3. Initialize variables: h = 10, w = 12, d = 8
4. Calculate the volume as: vol = h*w*d
5. Display the volume (vol)
6. Stop

Flowchart

```
                    ┌─────────────┐
                   (    Start      )
                    └──────┬──────┘
                           ↓
              ┌────────────────────────┐
              │ Declare variables      │
              │ h,w,d and vol          │
              └───────────┬────────────┘
                          ↓
              ┌────────────────────────────┐
              │ Initialize values to variables│
              │ h= 10, w=12, d=8           │
              └───────────┬────────────────┘
                          ↓
              ┌────────────────────────┐
              │ Calculate volume (vol) │
              │ Vol=h*w*d              │
              └───────────┬────────────┘
                          ↓
            ╱────────────────────────────╲
           ╱   Display volume (vol)       ╱
          ╱────────────────────────────╲
                          ↓
                    ┌─────────────┐
                   (    Stop       )
                    └─────────────┘
```

source code

```c
#include<stdio.h>
#include<conio.h>
void main()
{
//start the program
int h,w,d,vol; //variables declaration
h=10;w=12;d=8; //assign value to variables
vol=h*w*d; //calculation using mathematical formula
printf("The Volume of the cube is: %d",vol); //display the volume
getch();
//end the main program
}
```

Output

The Volume of the cube is: 960

Discussion & Conclusion.

This is the first code written in C program. The program is focused on the calculation of volume of a cube for the given height, width and depth. From this lab, I understood the basic structure of C programming including the meaning of header files & steps of problem solving. Hence, volume of a cube is calculated and displayed.