Fundamental Programming Lab Manual

2020



**S1 Computer Systems Engineering**

**School of Applied STEM – Prasetiya Mulya University**

## Module 1. Introduction to C++

**Topic**

**Simple mathematic equation**

**Input/Output**

**Data Type**

**Logical Operation**

**Introduction to Programming Environment**

In this lab session, we use linux server based as our target system. Each student has login and password to the server.

**Please make a new directory with name module1 and put all your source code for this lab session there.**

To make a new folder, type mkdir and press enter.

>> mkdir ↵

In this lab we use vim as our text editor. We will learn how to use the editor while making our first program, helloWorld.cpp.

Type vim and enter

>> vim helloWorld.cpp ↵

Now you are in vim editor. In vim we have two mode, insert mode and command mode. In insert mode, we can edit our source code. In command mode, we cannot edit our source code, but we can give command to the editor.

To start coding, go to insert mode by typing i.

To go from insert mode to command mode, press Esc key.

Below are some shortcut in editor in command mode.

* dd - delete whole line
* v - start blocking
* y - copy
* p - paste
* :w – save
* :q – quit
* -wq – save and quit
* -q! – quit without save

Now let’s start coding!

Listing 1. Hello World Example

1 #include <iostream>

2 using namespace std;

3

4 //main program is start here

5 int main()

6 {

7 cout<<"Hello World\n";

8 return 0;

9 }

10

After finished, please save the file. Compile your source file with this command.

>> g++ -o helloWorld helloWorld.cpp

If you succeed with no error message, then execute your program.

>> ./helloWorld

**User input**

In C++, the program can ask user to put input to the console. To use the input, the value should be save to a variable. The variable must be declare first with the default data types in C++. Please try to follow the example in userInput.cpp and compile the source code.

>> vim userInput.cpp

Listing 2. Age Calculator with User Input

1 #include <iostream>

2 using namespace std;

3

4 int main()

5 {

6 unsigned short yob,age;

7 cout << "Your year of birth : ";

8 cin >> yob;

9 age = 2019-yob;

10 cout <<"Your age this year is "<< age<<endl;

11 return 0;

12}

13

>> g++ -o userInput userInput.cpp

Run the executable file and input various value of year of birth and see if the program working properly.

Now that you can perform user input, do the tasks below. You have to be familiar with mathematical operation in doing below tasks.

**Tasks**

1. Write a program that convert days unit into hour unit, minutes unit and seconds unit. **The days unit input by user**. Display the result of convert for each unit with below format. Output of the program example is shown below. (In here, xx is a number).

**xx days is equal to xx hours**

**xx days is equal to xx minutes**

**xx days is equal to xx seconds.**

Save the program with name convertDay.cpp.

Remember to compile your code and test your code if it works as per problem requirement.

1. Write a program that calculate money into Rp 10.000,00, Rp 1.000,00, Rp 100,00 unit. Display the amount of each unit and the remainder. Example:

**Input the amount : Rp. 23750**

**Rp. 23750 will have 2 in Rp 10.000,00 and 3 in Rp 1.000,00 and 7 in Rp 100,00**

**Remainder is 50**

1. Remainder is 50

Save it with name moneyChanger.cpp.

Remember to compile your code and test your code if it works as per problem requirement.

**Lab Report (due on Thursday)**

1. During lab session, the compiler change the source code into executable file. What is the content of executable file? Can you open it with vim editor? If not, why?
2. Explain your program in for task 1. Make the flowchart too.
3. Explain your program for task 2. Make the flowchart too.
4. In userInput.cpp, what happen if the data type change to unsigned char? Explain with example of input = 1997 and output of the program.