UNIVERSITY OF LINCOLN

SCHOOL OF MATHEMATICS AND PHYSICS

MTH2008 SCIENTIFIC COMPUTING

LAB 1

23/11/2024

Objectives of this lab:

1. Learn the basic use of Microsoft Visual Studio 2019/22
2. Start to learn about the software life cycle by compiling your first C++ programs

Task 1: Write a simple C++ program using Microsoft Visual Studio 2019/22

NOTE: Watch the guidelines to install and use of Visual Studio on the BB. The information given for the installation of Visual Studio 2019 apply also for more recent versions.

1. Start the program by choosing

   Start > Program Files > Visual Studio 2019/22

2. Create a new project by selecting from the program menu

   File > New > Project > Visual C++ > Win32 > ***Win32 console application***.

In the file name area, write, for example, "**SClab1**" and click OK.

A window will appear, just click **Next**, then select *console application* and *empty project*. Complete by clicking the **Finish** button.

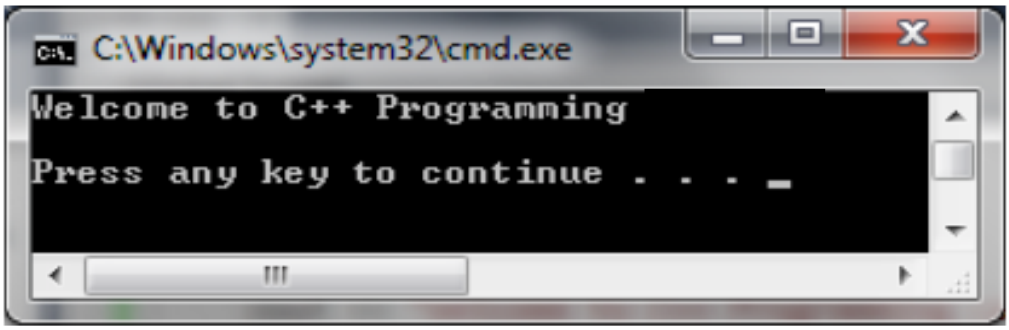
3. Select the VS2022 editor window and modify the default "Hello world" source code (the same that you see in the video).

4. Visual Study open an editor window that allow you to type you code. The editor contains already a basic template of C++ program.
5. Type your first C++ (welcome) code:[1]

```
/*
 * PROGRAM: Task1.1.cpp
 * DESCRIPTION: Use of the cout statment
 * AUTHOR: <ADD YOUR NAME >
 * DATE: < ADD DATE >
 */

#include <iostream>

using namespace std;


int main()
{
    cout << "Welcome to C++ Programming\n";
    return 0;
}
```

6. After finishing writing the code, control if there is any evident syntax error. Then proceed by compiling the code clicking on *build* button and then *compile*. If there is no error alert after compiling then build your project by click *build*, then *build solution* buttons.
7. If the program compiles successfully then you can run your program by selecting under the menu *debug* the item *start without debugging (*or by typing CTRL + F5 keys*)*. If all goes correctly, you should see a window similar to the one in the Figure.

[1] You need to add to the template automatically generated by VS C++ the lines of code that are missing. For example, you need to add the *#include <iostream>* under the include statement that already exist.



Important note: Remember to make a copy of all codes that you make during the practical sessions on your one-drive disk, stick memory or by sending it via email.

Task 2: Explore your first program

1) Check what happen if you remove the \n from the line

```
cout << "Welcome to C++ Programming\n";
```

2) The escape character \n (newline) is a feedline command that is used to return the cursor of the stream to the beginning of the next line. Other escape characters are:

\a Bell

\b Backspace

\f Formfeed

\r Return

\t Tab

3) Modify the line:

```
cout << "Welcome to C++ Programming\n";
```

adding one by one the previous escape code at the end and describe what it happens.

4) These escape character are used when you want to write a message containing the listed reserved symbols.

\\ Backslash

\' Single quote

\" Double quote

\? Question mark ('?')

Try a program containing this example:

```
cout << "Is the symbol \\n is called \' Newline \' \? \n";
```

What happen if you remove the backslash before the first single quote?

Task 2: The line terminator *endl*.

Copy this second program

```
/*
 * PROGRAM: Task1.2.cpp
 * DESCRIPTION: Use of the endl statment
 * AUTHOR: < ADD YOUR NAME >
 * DATE:   < ADD DATE >
 */

#include <iostream>

using namespace std;


int main()
{
    cout << "A rose by any other name would smell as sweet";
    cout << endl;

    return 0;
}
```

QUESTIONS

a) What does the end-of-line (*endl*) command in the second *cout*?
b) What happen if you change the first *cout* line in:
   cout << "A rose by any other" << endl;
c) What happen if you change the second *cout* line by removing the first space in the sentence between quotes:
   cout << "name would smell as sweet";

TASK 3: Write your first C++ program

Using the previous examples try to write a C++ program that output the following text on the screen:
Hint: *use space between number in the cout to format the numbers in the pyramidal shape.*

This is the Pascal's triangle until n=5

n	
0	1
1	1 1
2	1 2 1
3	1 3 3 1
4	1 4 6 4 1
5	1 5 10 10 5 1

Made by …