Lab – 01

Instructions:

- Work on this lab individually. Discussion is not allowed.
- Evaluation of tasks will be conducted in lab.
- Anyone caught being indulged in the act of plagiarism would be awarded an "F" grade in this lab.

Objective:

The purpose of this lab is to familiarize you with the programming tool. Lo and behold! You will be working on the **Microsoft Visual Studio** through your journey to learn programming in this course. You will be able to understand how to make a project in visual studio, how the program is executed and what the sequence of the output is.

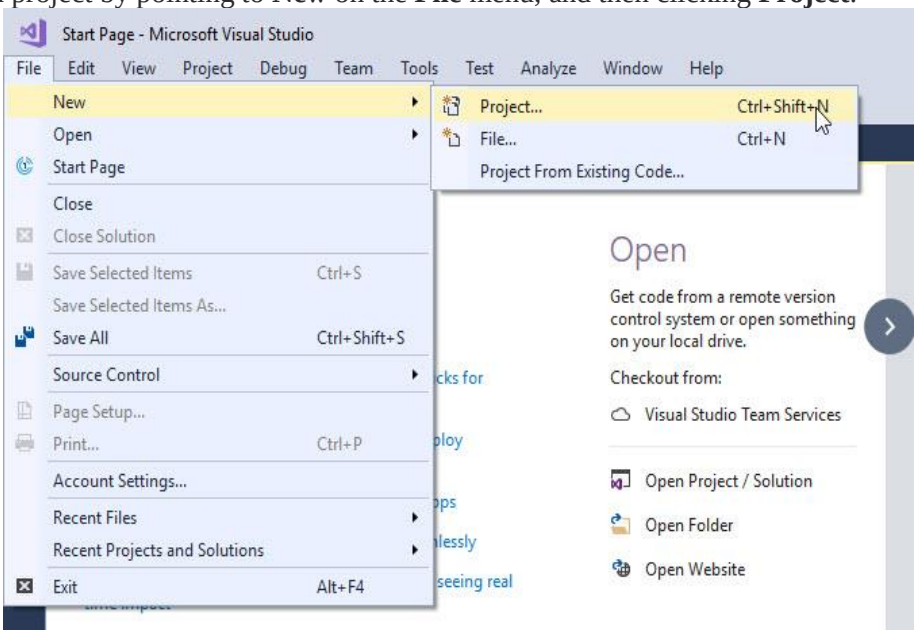
Task 0: My First Computer Program

Creating a New Project

It's time to start! Go ahead and open up Visual Studio from the desktop or start menu.

When you create an app in Visual Studio, you first create a project and a solution. For this example, you'll create a Windows console application.

- Create a project by pointing to **New** on the **File** menu, and then clicking **Project**.



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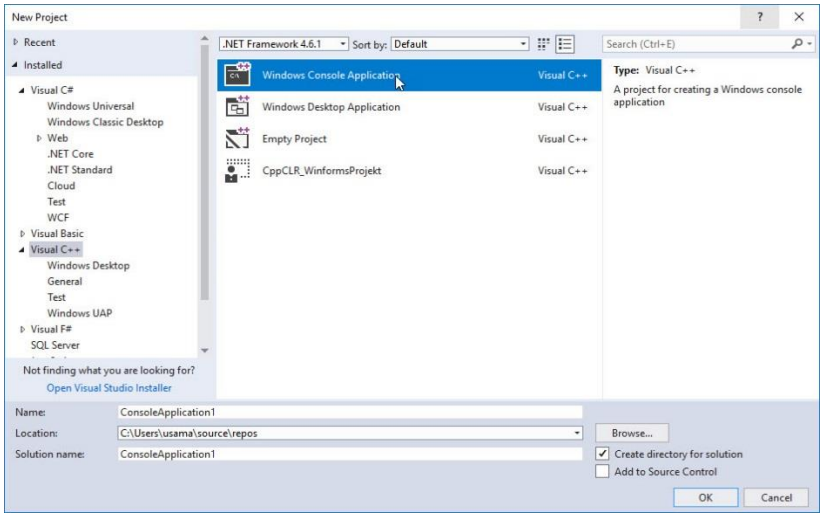
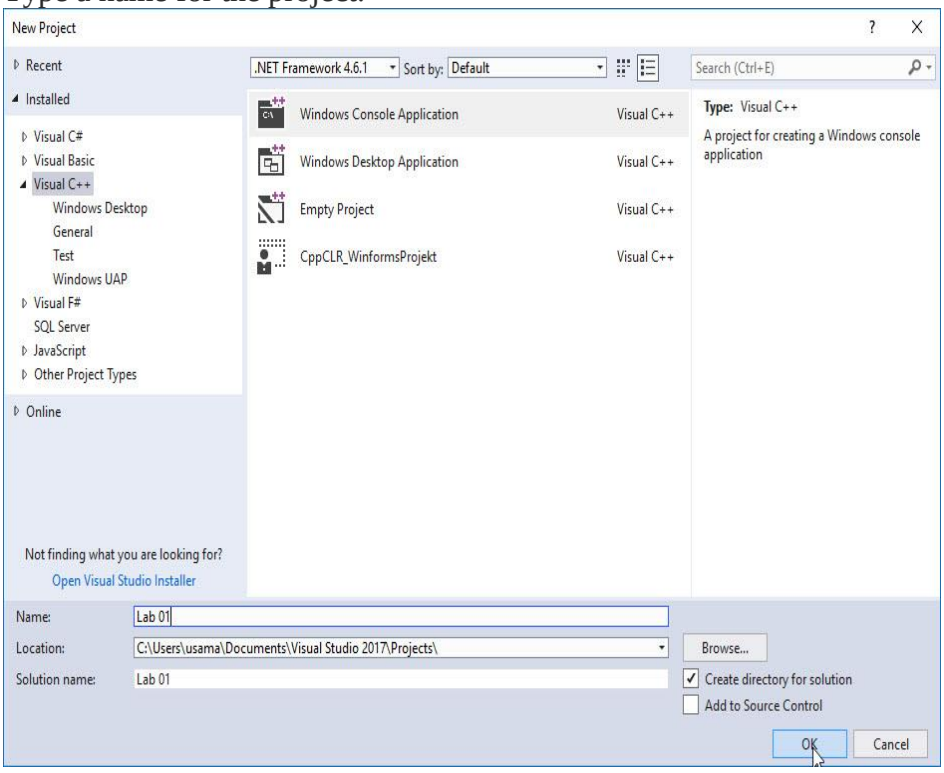
- In the **Visual C++** project types pane, click **Win32**, and then click **Win32 Console Application**.



- Type a name for the project.



- By default, the solution that contains the project has the same name as the project, but you can type a different name. You can also type a different location for the project.
- Click **OK** to create the project.
- In the **Win32 Application Wizard**, click **Next**, select **Empty Project**, and then click **Finish**.

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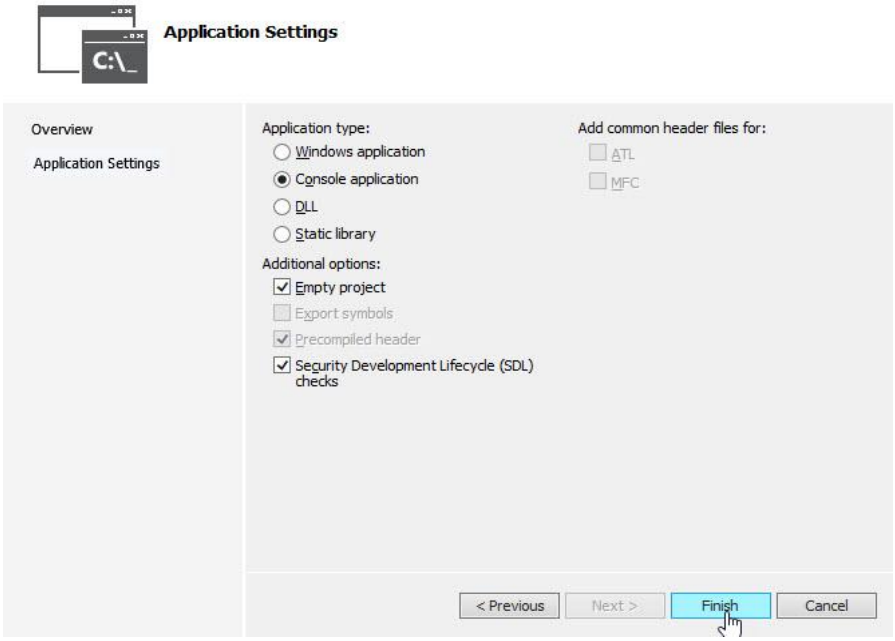
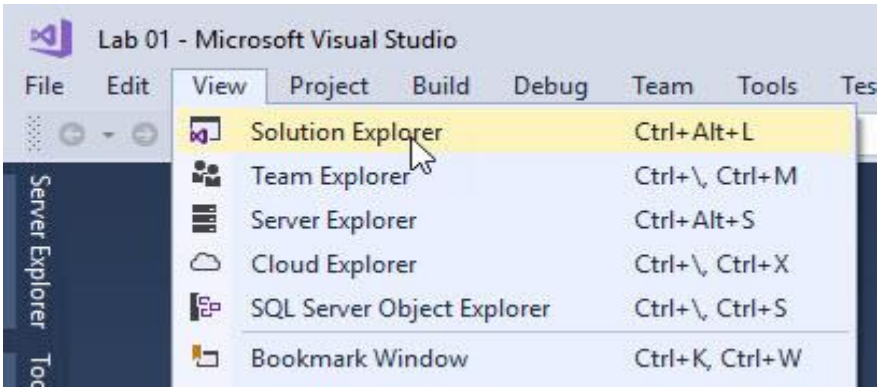


- If **Solution Explorer** is not displayed, on the **View** menu, click **Solution Explorer**.



- Add a new source file to the project, as follows.
  - In **Solution Explorer**, right-click the **Source Files** folder, point to **Add**, and then click **New Item**.

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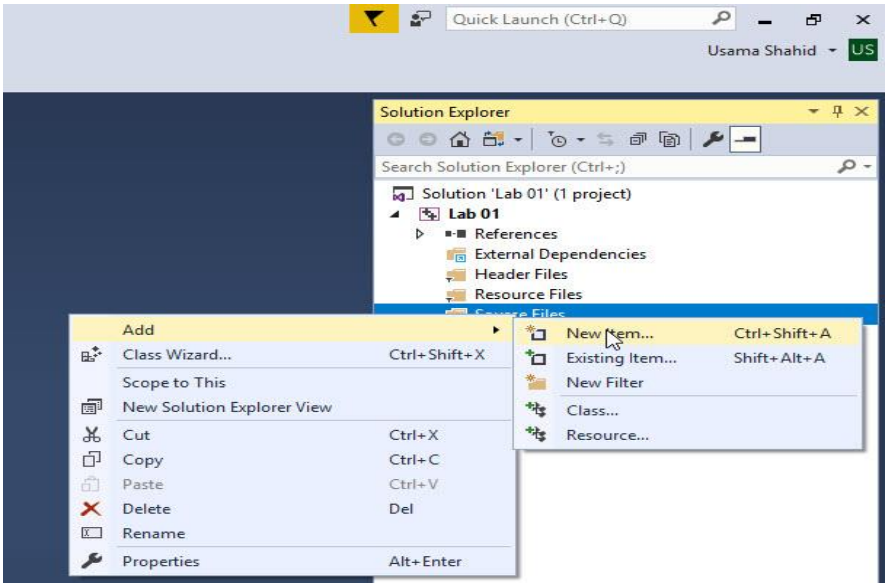
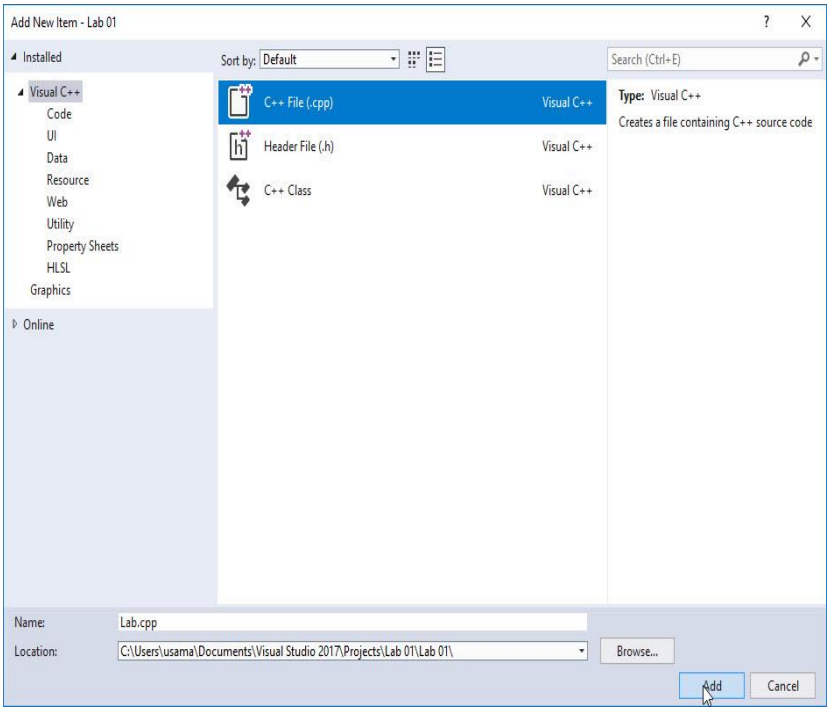


- In the **Visual C++** node, click **C++ File (.cpp)**, type a name for the file, and then click **Add**.



- The **.cpp** file appears in the Source Files folder in **Solution Explorer**, and the file is opened in the Visual Studio editor.
- In the file in the editor, type a valid C++ program.

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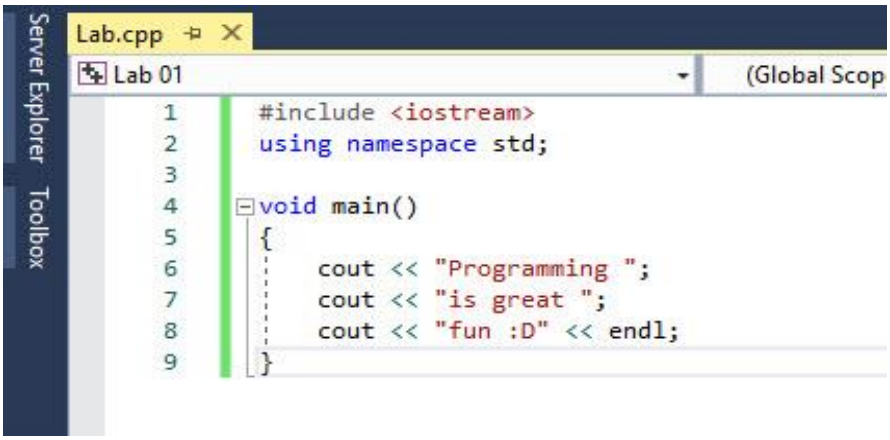
➢ Task 1:



- Write the above code in the file in the editor.
- Compile the code and observe the program output.
- Try to remove semicolon from end of statements and then compile your code and observe the output.
- Try to put semicolon at the end of **preprocessor directive** and observe the output (**Preprocessor directives** are lines included in a program that begin with the character #, which make them different from a typical source code text.)
- Remove line # 2 and observe the output of program.
- Change the case of **main** and **cout** and observe the output.
- Replace line # 7 with `7 cout << "is great " << endl ;` and remove `<< endl` form line # 8 and observe the output.
- Remove line # 8 and write it above the line # 6 and then observe the output.

➢ Task 2:

Write a C++ program to print **"Hello!! Welcome in the world of programming"** on console.

➢ Task 3:

```
1  # include <iostream>
2  using namespace std;
3  int main()
4  {
5
6      int num1 = 0;
7      int num2 = 0;
8      int sum = 0;
9
10     cout << "Enter first number: " <<endl;
11     cin >> num1;
12
13     cout << "Enter second number: " << endl;
14     cin >> num2;
15
16     sum = num1 + num2;
17
18     cout << "The sum is: " <<sum ;
19
20     return 0;
21
22 }
```

- Write the above code in the file in the editor.

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- Compile the code and observe the program output.

Task 4:

```cpp
#include <iostream>
using namespace std;
int main()
{
    int i = 0, var = 5;
    i = i + 1;
    cout << var << " * " << i << " = " << var * i << "\n";
    i = i + 1;
    cout << var << " * " << i << " = " << var * i << "\n";
    i = i + 1;
    cout << var << " * " << i << " = " << var * i << "\n";
    i = i + 1;
    cout << var << " * " << i << " = " << var * i << "\n";
    i = i + 1;
    cout << var << " * " << i << " = " << var * i << "\n";
    i = i + 1;
    cout << var << " * " << i << " = " << var * i << "\n";
    i = i + 1;
    cout << var << " * " << i << " = " << var * i << "\n";
    i = i + 1;
    cout << var << " * " << i << " = " << var * i << "\n";
    i = i + 1;
    cout << var << " * " << i << " = " << var * i << "\n";
    i = i + 1;
    cout << var << " * " << i << " = " << var * i << "\n";
    return 0;
}
```

- Write the above code in the file in the editor.
- Compile the code and observe the program output.
- Change the above code to print the table 10 and 3

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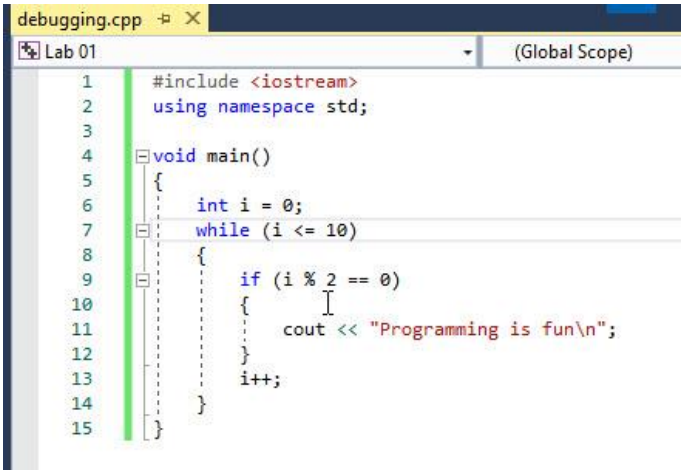
Debug the application (Line by Line execution)

Task 5:

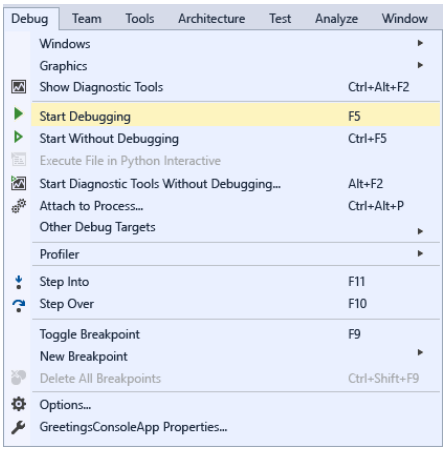


- Write the above code in the file in the editor.

By now, you must have some code written in front of you, begging to be debugged. But what is debugging? For now, let's just say it is a way to demonstrate how each of the line in your code is executed and in what sequence.

To debug the application

- Start the debugger. Find the **Debug** option in the **Menu Bar.**



The debugger starts and runs the code. The console window (a separate (black) window that looks like a command prompt) appears for a few seconds but closes quickly when the debugger stops running. To see the text, you need to set a breakpoint to stop program execution.

To add a breakpoint

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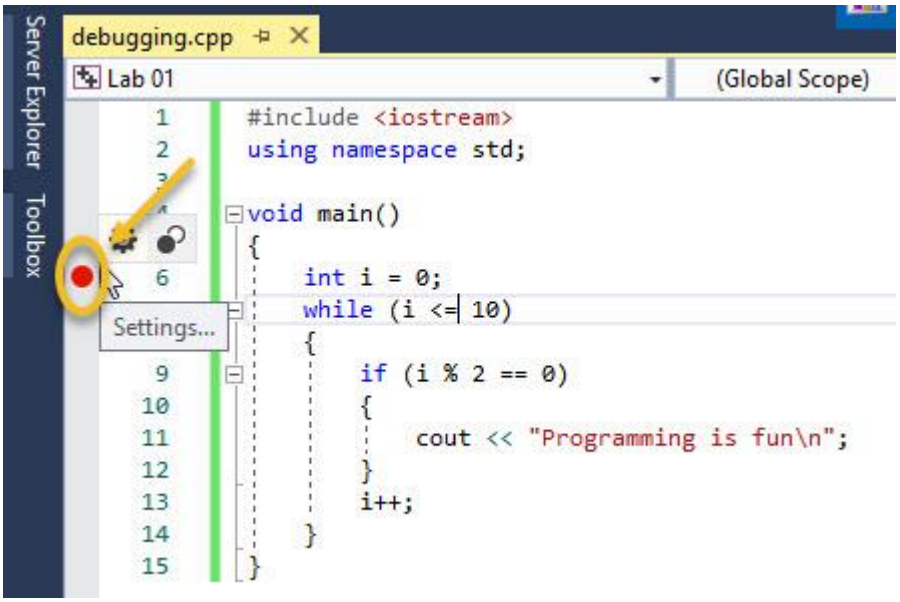
1. Add a breakpoint at the line of cout. Click in the left margin to set a breakpoint.

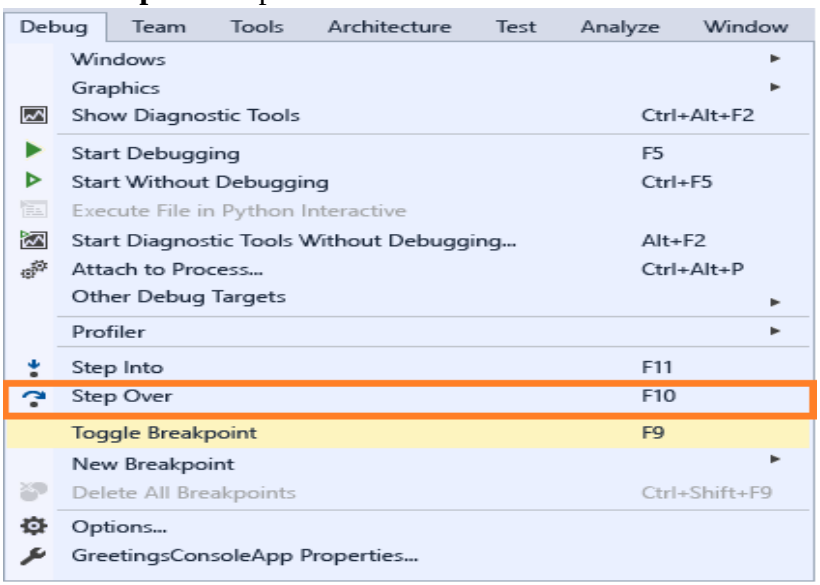


A red circle appears next to the line of code in the far-left margin of the editor window.

2. Press the **F5** key to start debugging.

The debugger starts, and a blank console window appears.

3. To run the current instruction and go to the next one, press **F10** or go in the **Debug** menu and choose the **Step Over** option.



4. While executing code line by line in visual studio the yellow block shows the process memory, the red highlighted block shows all the variables of the program and their state and their current values. All the changes in values of variables can be seen there. Yellow arrow on the left in black line show the current line to be executed.

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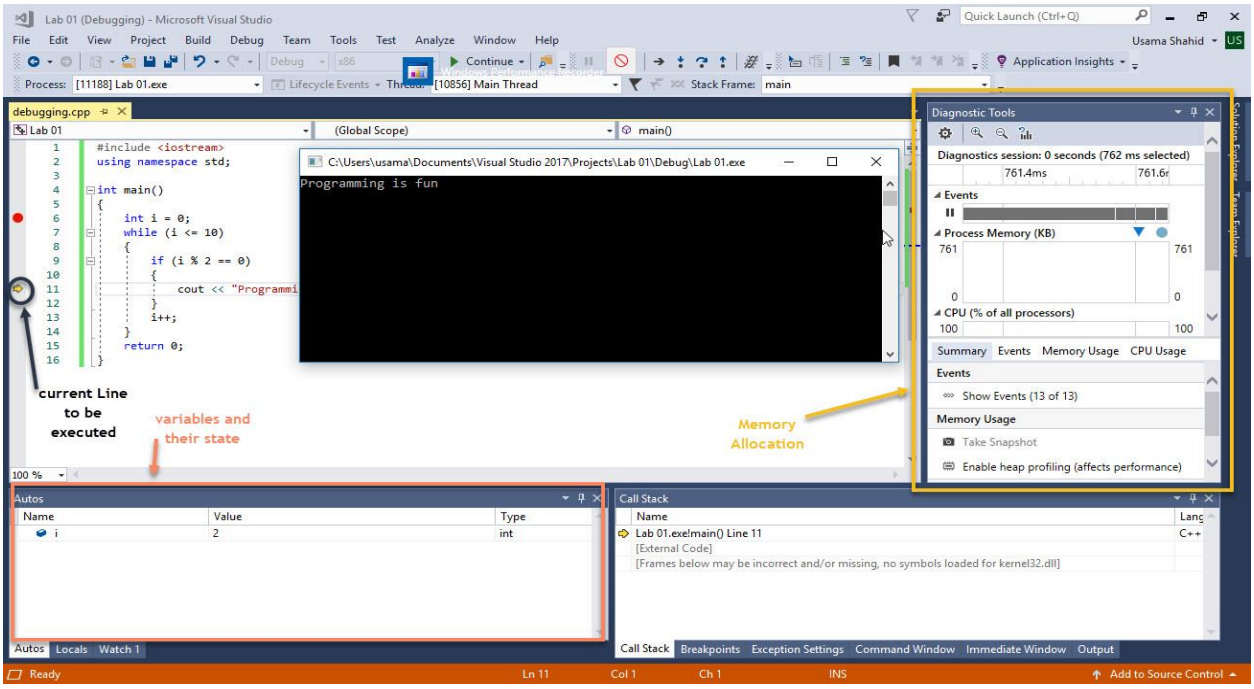

5. Repeat the process and check the console window after cout statement is executed. When the text "**Programming is fun" is written six times on the console window**, your task is complete.

Task 5 Completion Criteria:

If the text "Programming is fun" is written six times in the console window, your task is complete. Keep the console window open and you can ask any T.A. to come and evaluate this task.

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Task 06:

Try the following example where a variable has been declared at the top, but it has been defined inside the main function −

```
#include <iostream>
using namespace std;

// Variable declaration:
extern int a, b;
extern int c;
extern float f;

int main () {
   // Variable definition:
   int a, b;
   int c;
   float f;

   // actual initialization
   a = 10;
   b = 20;
   c = a + b;

   cout << c << endl ;

   f = 70.0/3.0;
   cout << f << endl ;

   return 0;
}
```

Task 07:

Length and breadth of a rectangle are 5 and 7 respectively. Write a program to calculate the area and perimeter of the rectangle.

----------THE END----------

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