Programming Fundamentals

Week 2 Programming Day

Learning Outcomes:

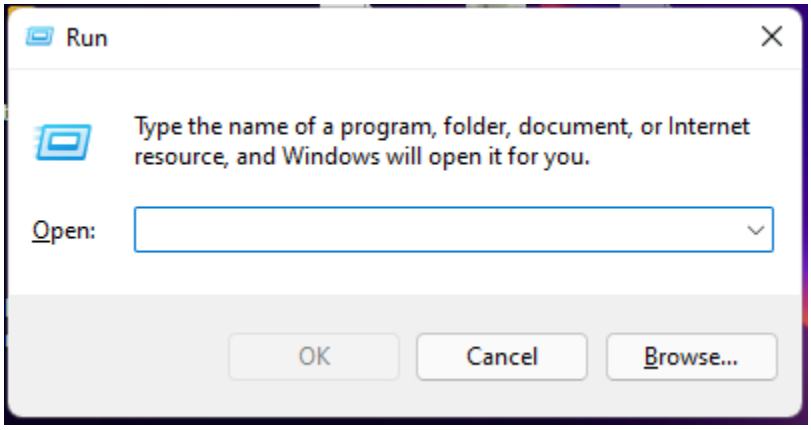
- Students should be able to install C++ Compiler
- Students should be able to write basic code of C++
- Students should be able to write programs with **cout** statement

Open Command Prompt on your computer by following the steps

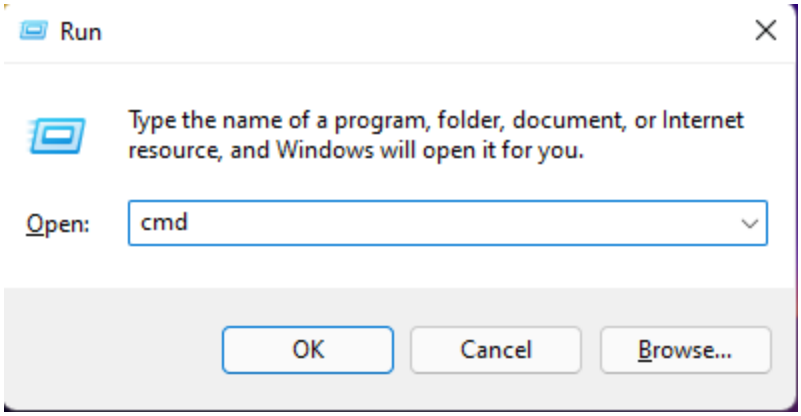
Step1:

Press **Window + R** Command with your keyboard

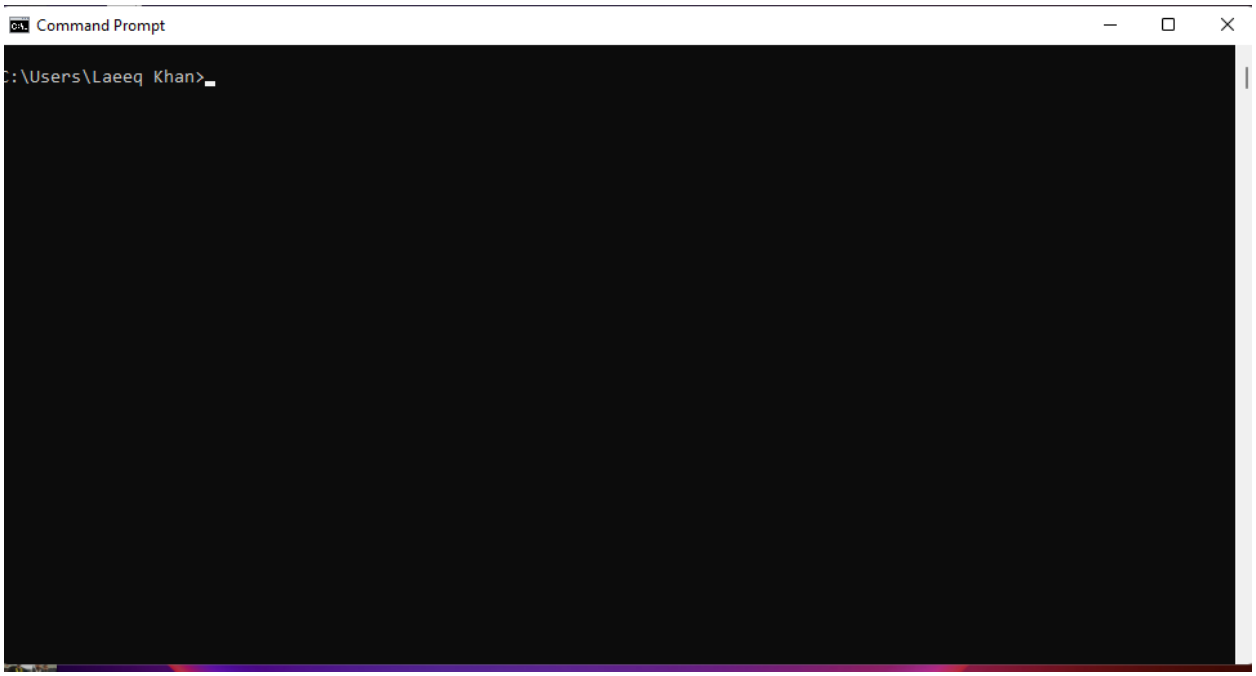
It show you the following box



Write cmd in the field and hit **enter** button or press the **ok** button



It will show you this black screen called CMD or Command Prompt.



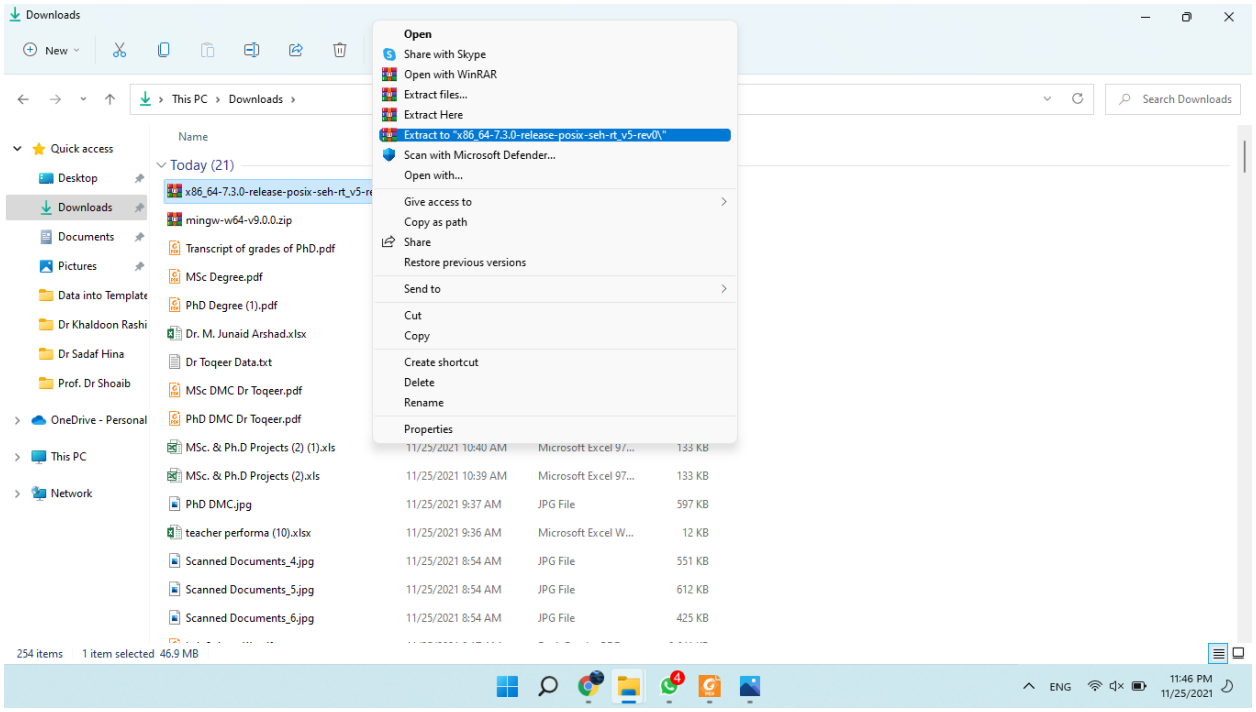
Write **gcc -v** command in your cmd and hit enter.

Its shows C++ compiler called GCC is not installed on your computer. Let's install the compiler and try this command again.

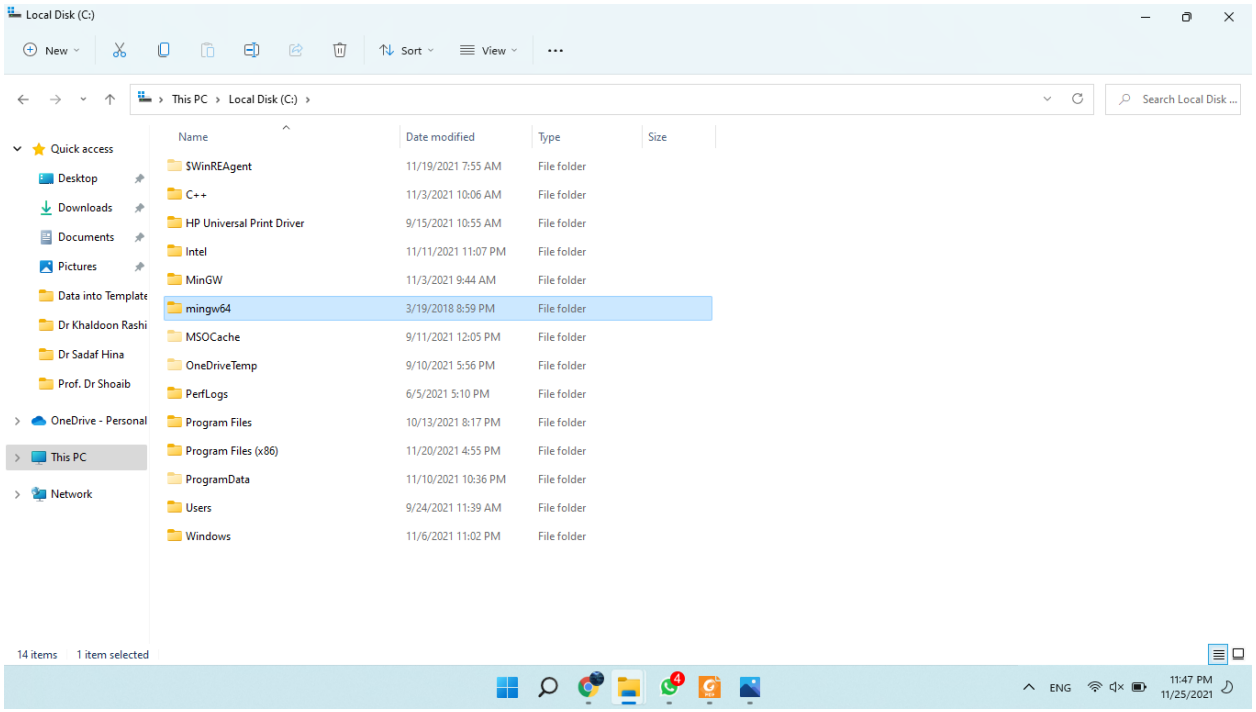
First Way download and configure MinGW

Download the Mingw from the following link
https://drive.google.com/file/d/1FB3GHfo7tPu1yykuAZlUzWV4Dy6uTDe7/view?usp=sharing

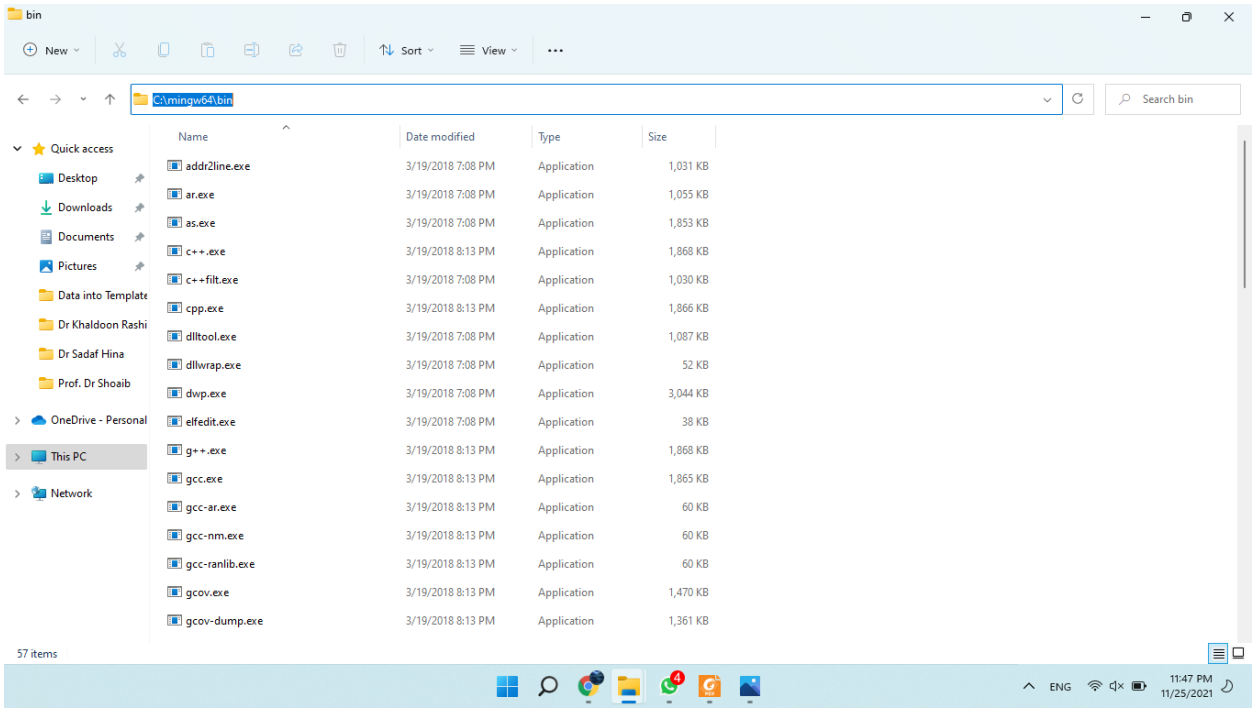
Extract the downloaded file by right-clicking on the file and chose extract here



It will create this folder called mingw64 copy that folder to your c drive.

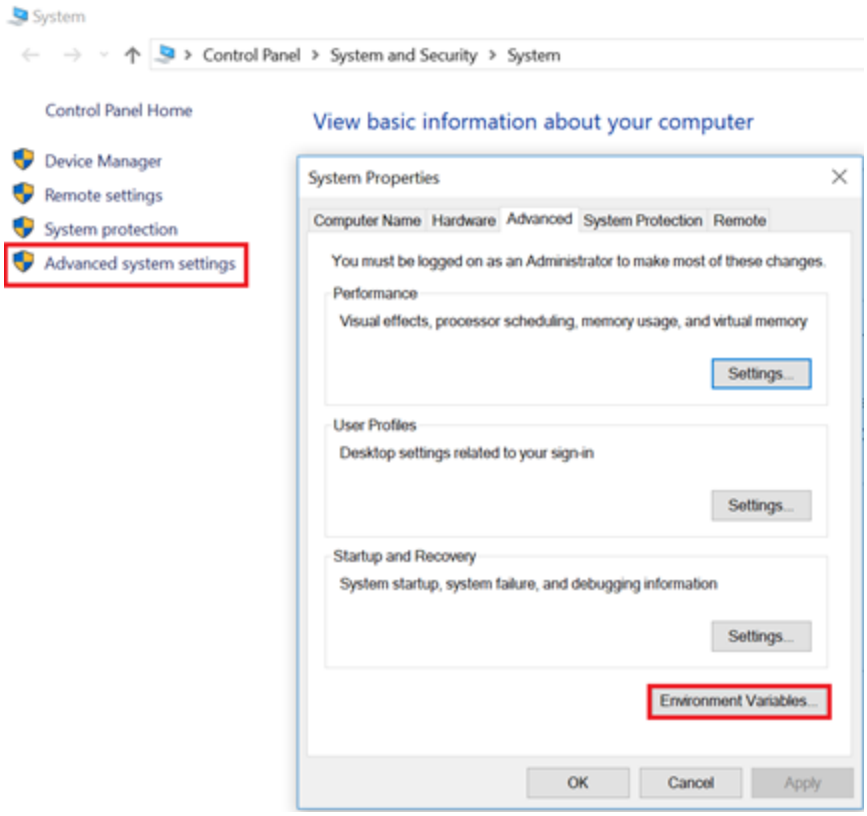


Open the mingw64 folder and open the bin folder inside this folder
Copy the bin path and add it as an environment variable mentioned in the next sections.

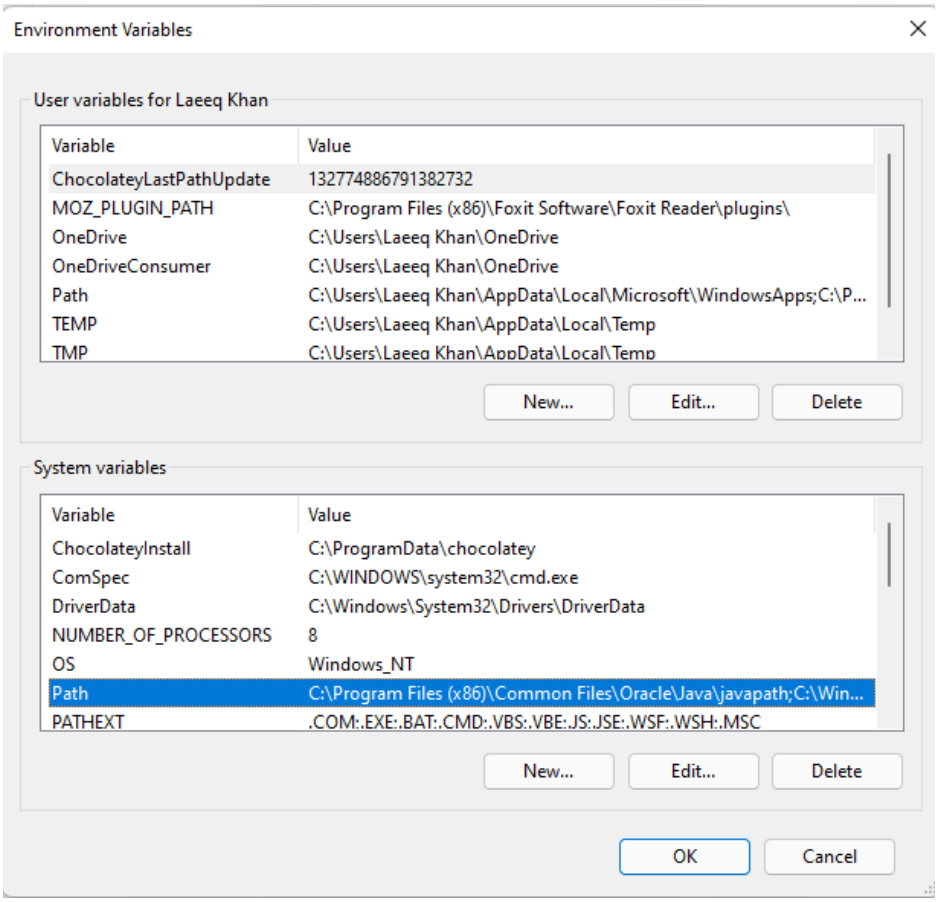


Setting up PATH Variable for Windows

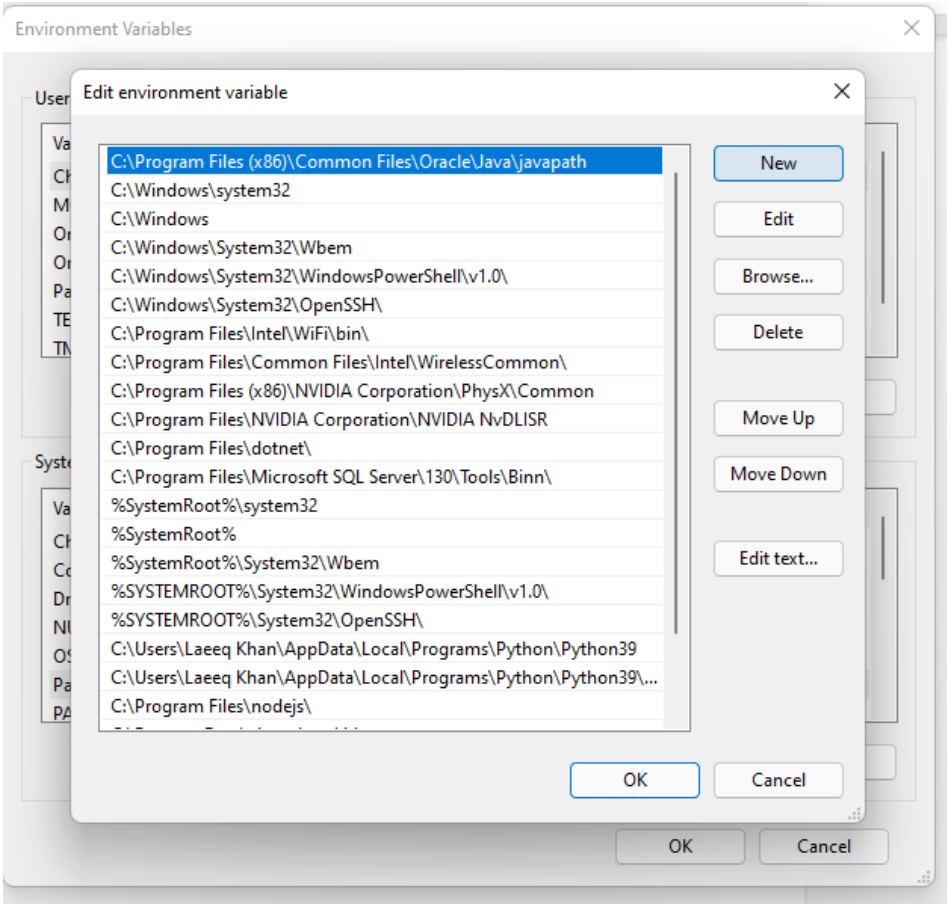
- Once Mingw is extracted, we want to execute C++ programs from the command prompt; we have to add its bin directory to the PATH variable.
- Go to the extracted directory and copy the path of the **bin** folder, e.g. “**C:\MinGW\bin**“
- Go to “Control Panel\System and Security\System”, Click “Advanced System Settings” and then “Environment Variables”.



- Find the Variable Name “Path” in User or System (if you are an administrator) Variables and click on Edit.



- Select Path and Click on Edit Button



- Click on “New” and paste the “bin” folder path.
- Press OK on all opened popup windows.
- Close all CMDs and Open cmd again and write “g++”[A1] in it, press enter/return key.G++ is successfully installed and you can exit the cmd.
- In case you get the message “‘g++’ [A2] is not recognized as an internal or external command”, follow steps correctly for installation and configuration of the Path variable.
- That’s all for installing a C++ compiler in Windows. We are ready now to explore coding features of C++ Programming.

If you are done with installation please skip the second way of installation and move to the next section where we are writing our c++ code.

Another way to download and install MinGW

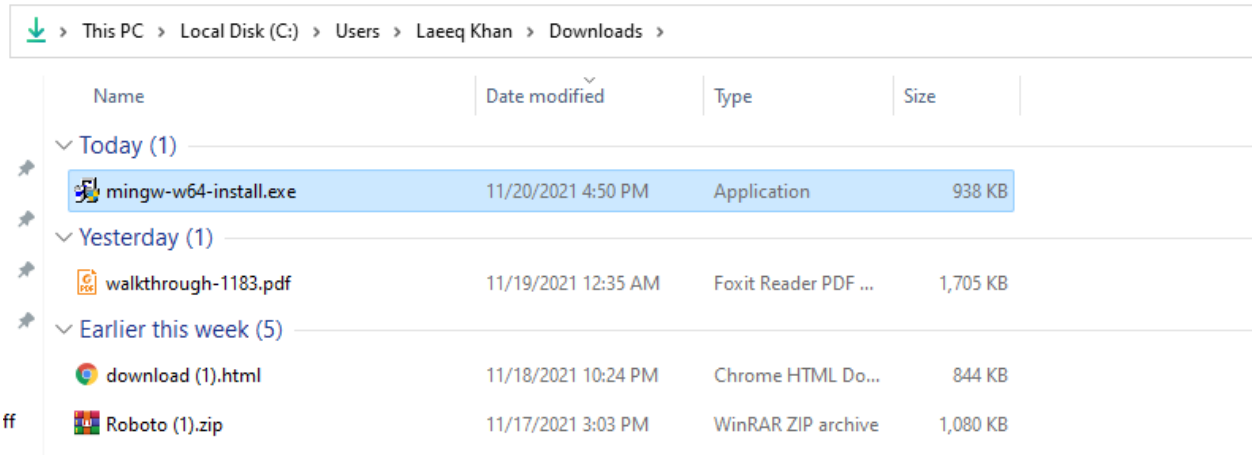
Mingw Installation and Setting Up Environment Variables

Installation of C++ Compiler

- Open the following URL into your browser

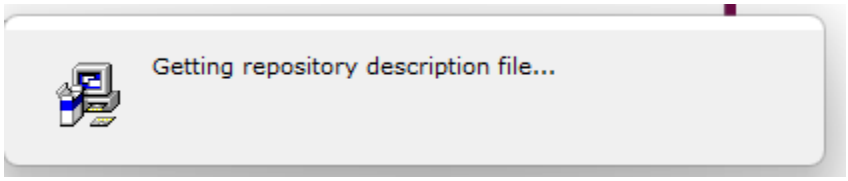
https://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win32/Personal%20Builds/mingw-builds/installer/mingw-w64-install.exe/download

It will download the MinGW file to your computer.

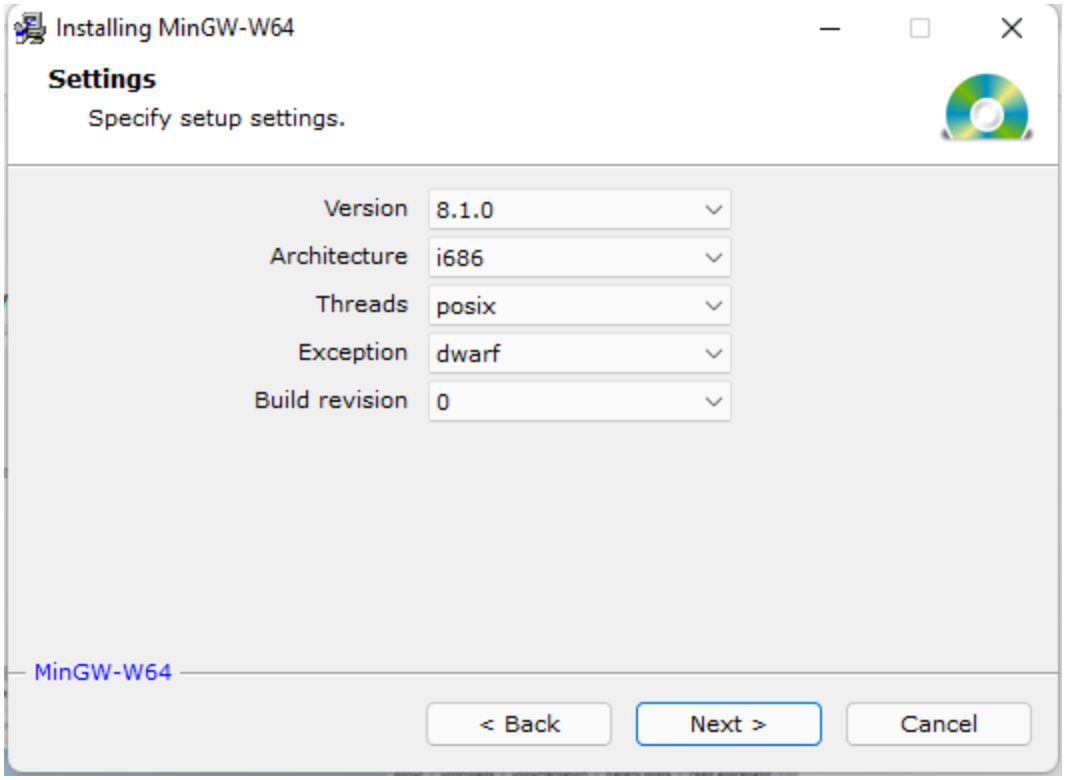


Double click on the downloaded file or right-click on the file and choose the open option from the list. It will open the following screen on your monitor

Click on the Next button.
It will show you the following box on the screen let it complete.

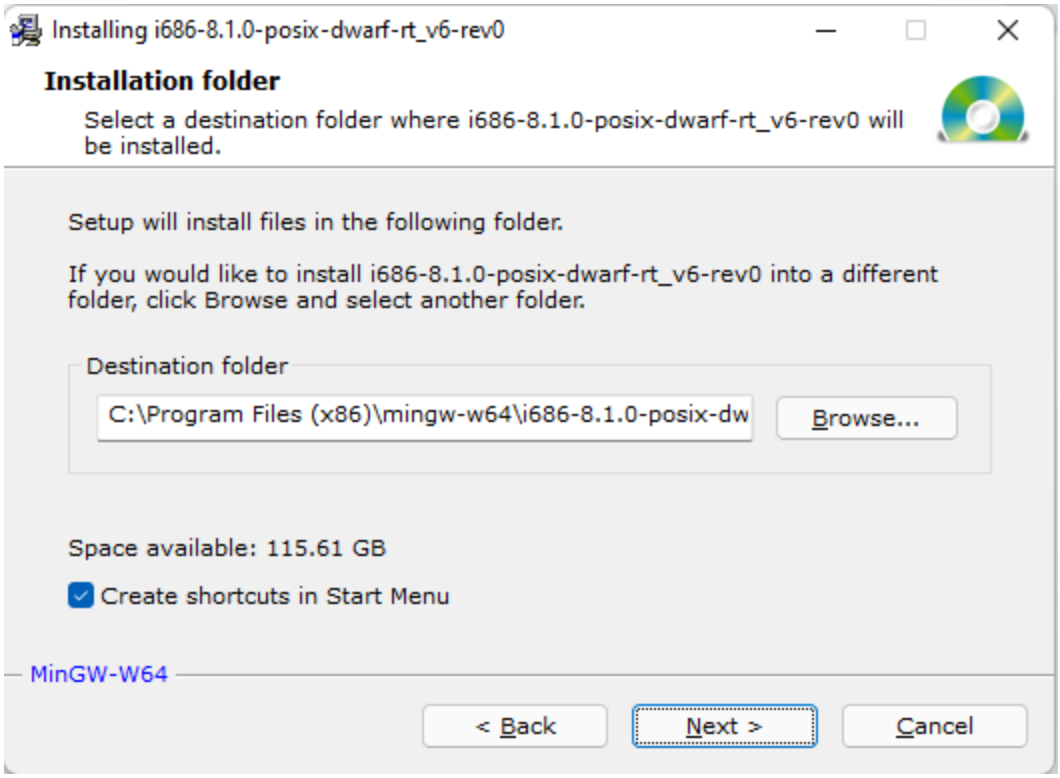


After the above, this screen will populate on monitor’.



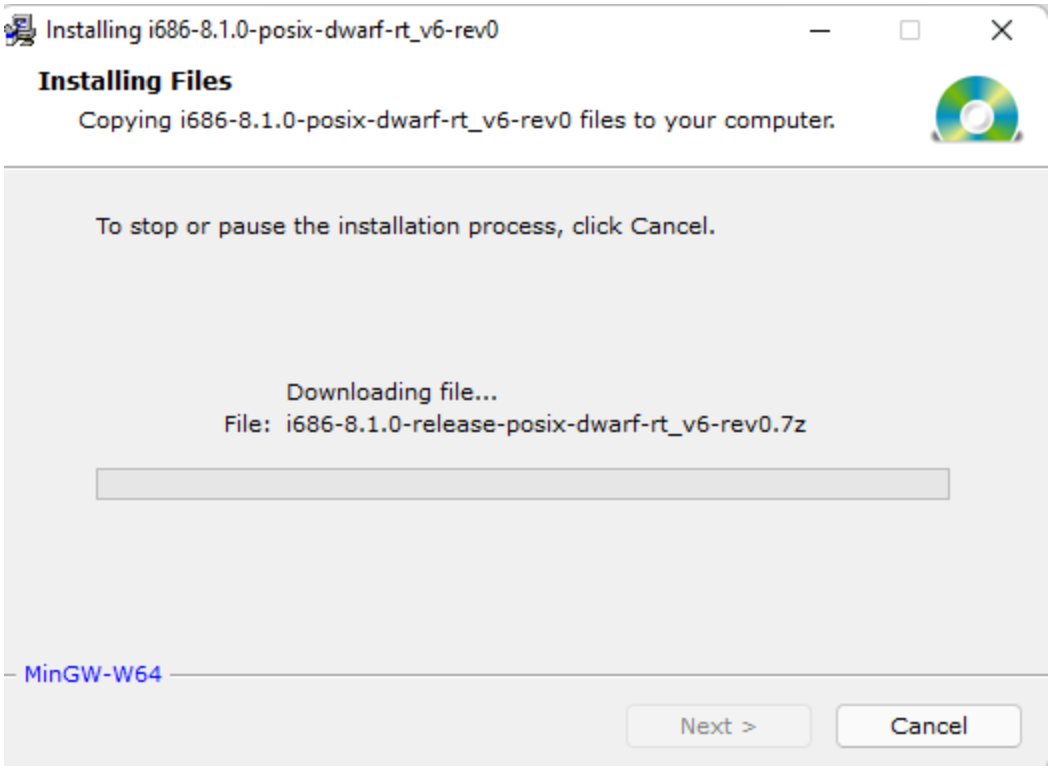
Choose Next button.

Following screen will open

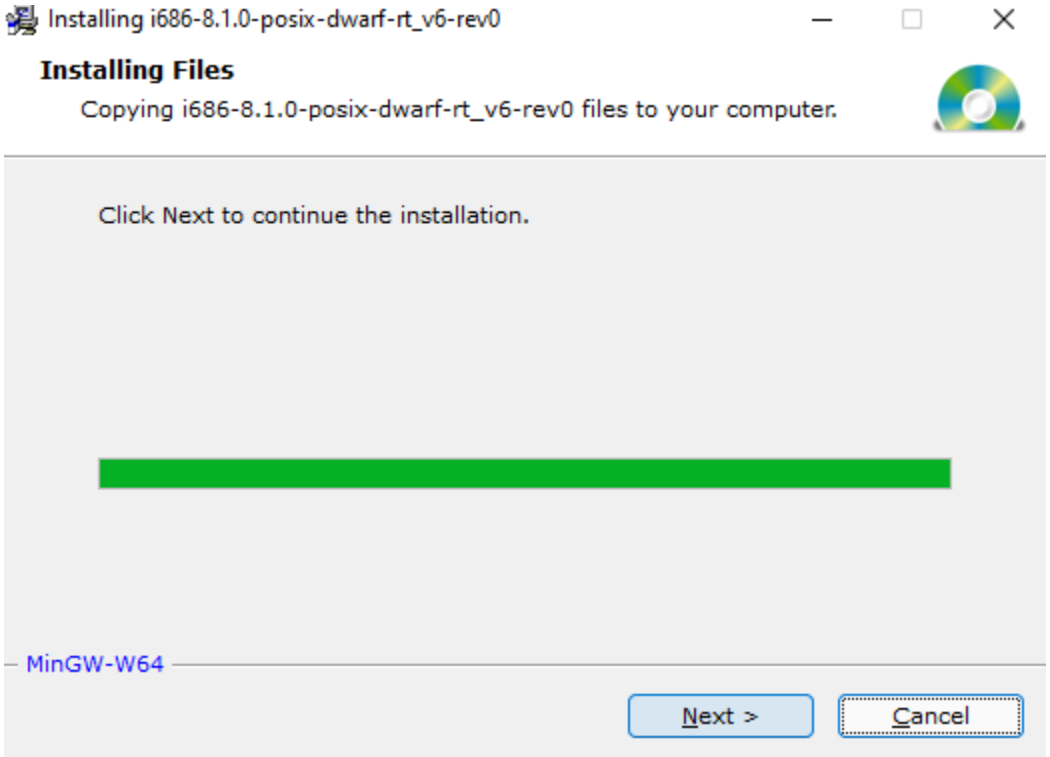


If you want to change the installation folder you can choose to browse option otherwise choose the Next button.

Make sure your computer is connected to the internet. Now your Compiler installation is started let it download and complete.



After completing downloading and installation progress press next button

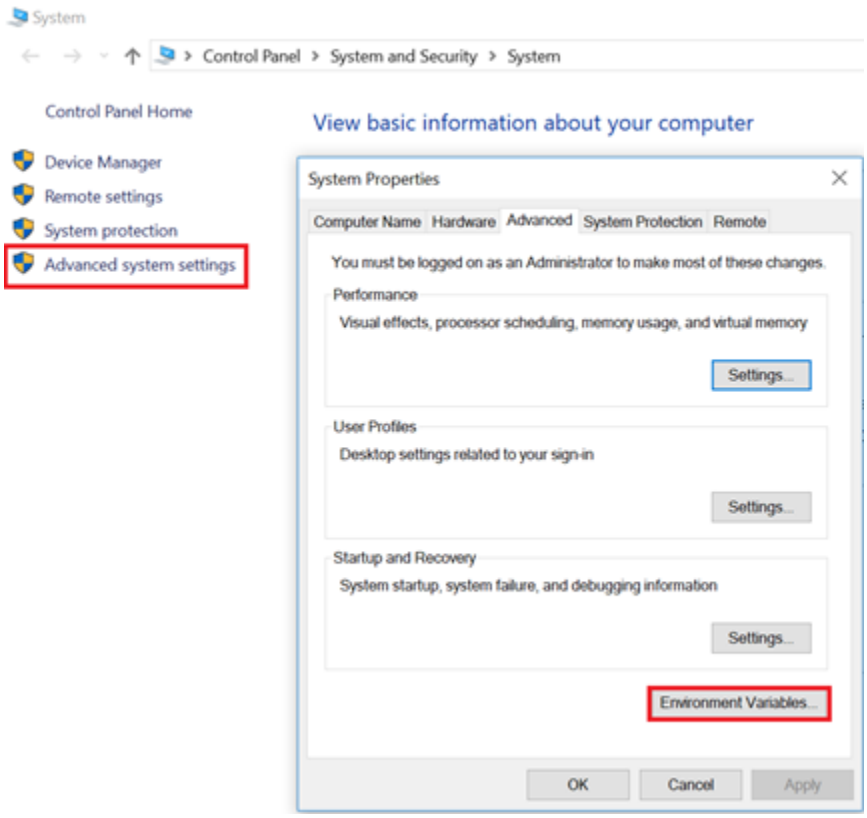


Press Finish.

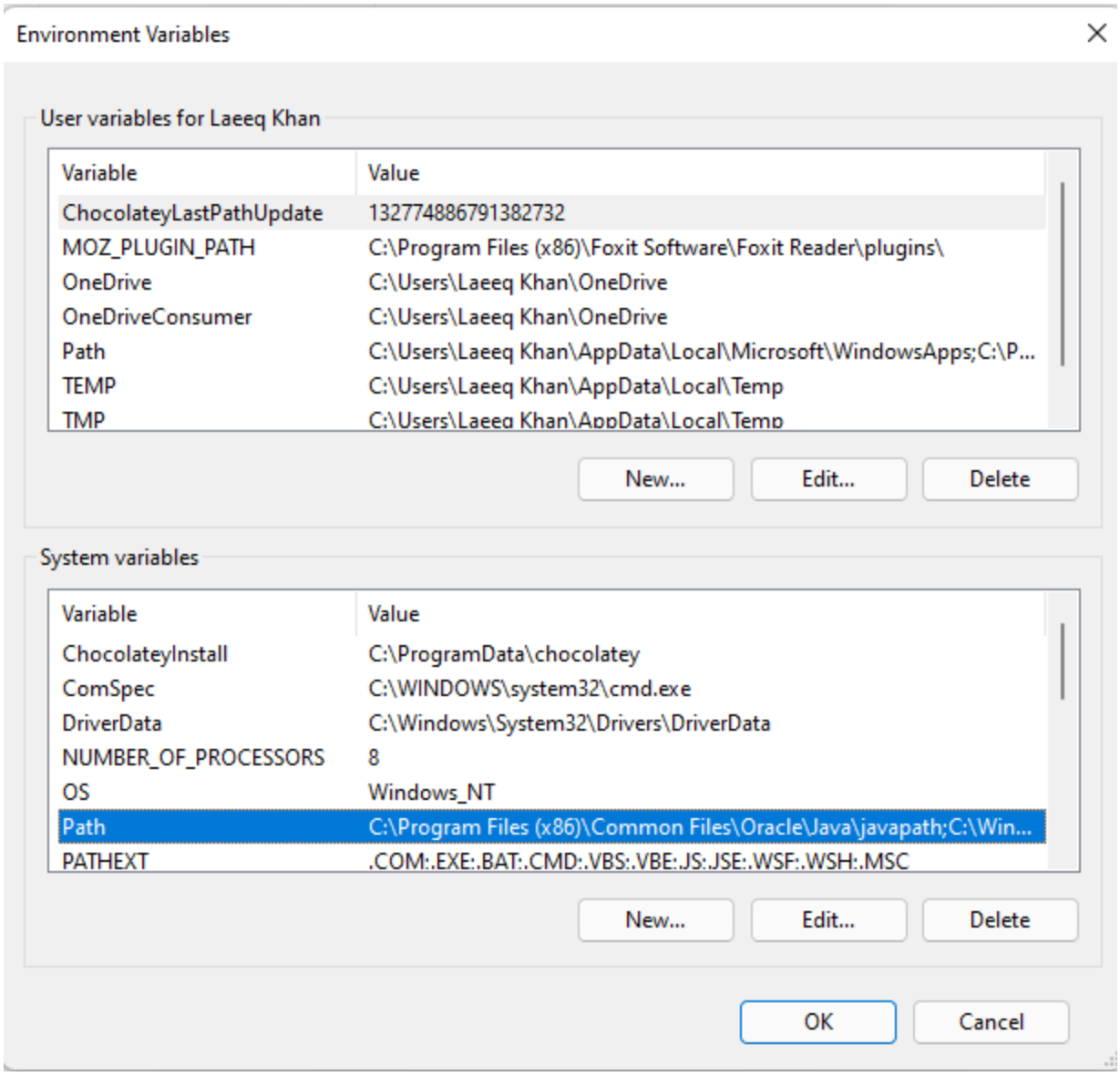
After the Compiler installation still your compiler is not accessible through cmd please follow the steps to add your compiler path.

Setting up PATH Variable for Windows

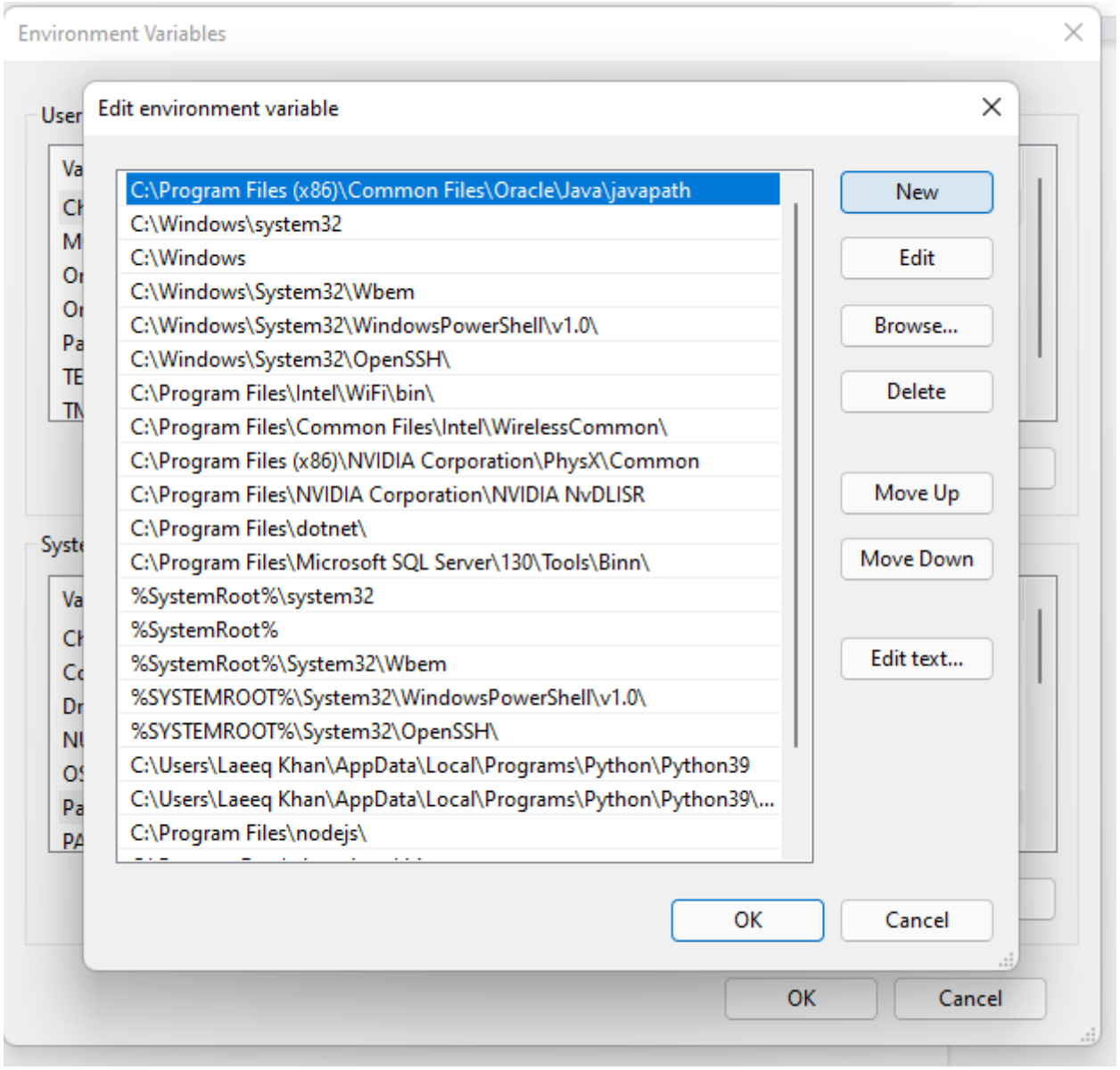
- Once Mingw is installed, we want to execute C++ programs from the command prompt; we have to add its bin directory to the PATH variable.
- Go to the installation directory and copy the path of **bin** folder, e.g. "**C:\MinGW\bin**"
- Go to "Control Panel\System and Security\System", Click "Advanced System Settings" and then "Environment Variables".



- Find the Variable Name "Path" in User or System (if you are an administrator) Variables and click on Edit.



- Select Path and Click on Edit Button



- Click on “New” and paste the “bin” folder path.
- Press OK on all opened popup windows.
- Close all CMDs and Open cmd again and write “g++”[A1] in it, press enter/return key.G++ is successfully installed and you can exit the cmd.
- In case you get the message “‘g++’ [A2] is not recognized as an internal or external command”, follow steps correctly for installation and configuration of Path variable.
- That’s all for installing C++ compiler in Windows. We are ready now to explore coding features of C++ Programming.

Note: Now that you have installed C++ Compiler on your computer, you are ready to write and run your first program on your machines.

First C++ Program:

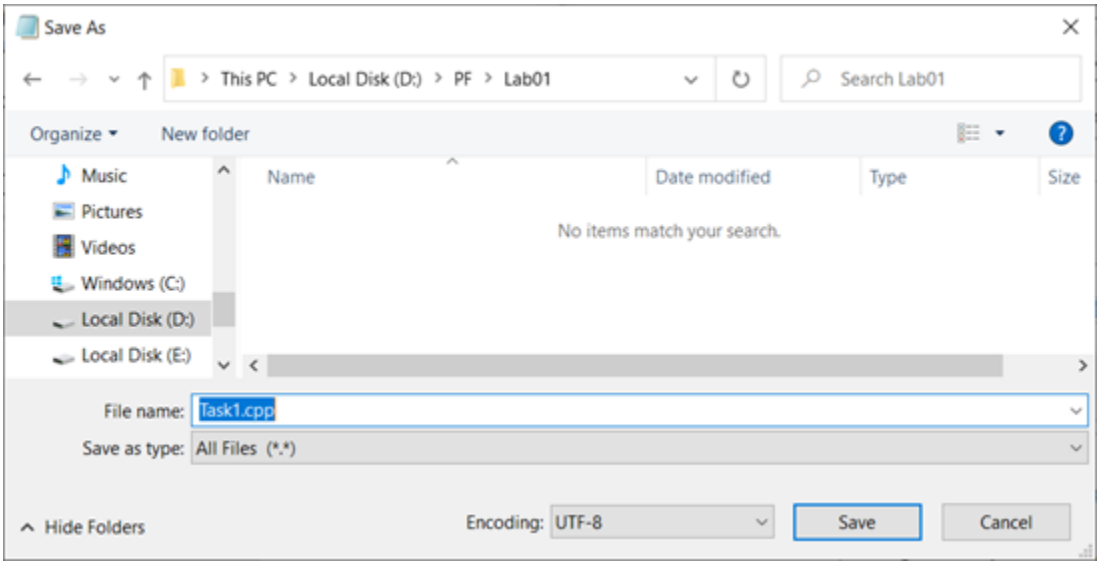
- To write the first C++ program, open the notepad on the computer.
- To open the notepad, press windows key + R from your keyboard.
- Write a notepad on the opened screen as shown in the figure.
- Press Ok.

Notepad editor will appear on screen, where you can write your first program.

- Write this code in a notepad text editor.

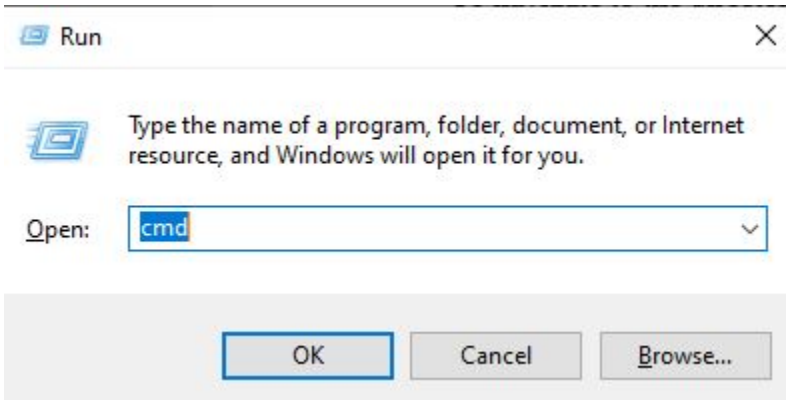
```
#include<iostream>

using namespace std;

main(){

 cout<<"Hello from UET Lahore";

}
```

- Now that we have completed code, we need to save our program. Press Ctrl + S from the keyboard.
- Navigate to the folder where you want to save the written code.
- In this case, we will save the file in directory D>> PF >> Lab01.
- Change the Save as Type to “All files”.
- Name this file as Task1.cpp



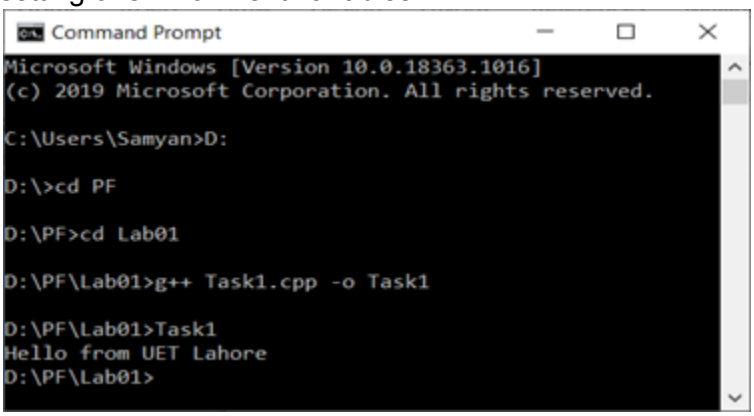
- Click on the save button.
- Now our program is saved onto the computer. We are ready to execute it.

- To execute your program, open the command prompt.
- To open the command prompt, press Windows key + R, write cmd [L1] in the text field and press enter.

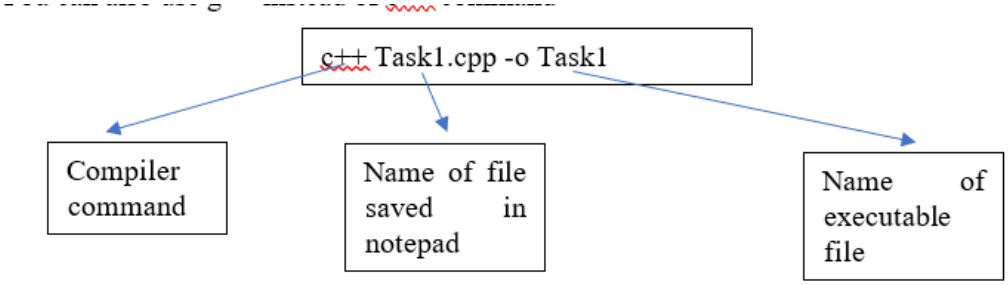


- To navigate to the directory in the cmd, we are using the given command.
- The first three commands help us to navigate to our desired directory.

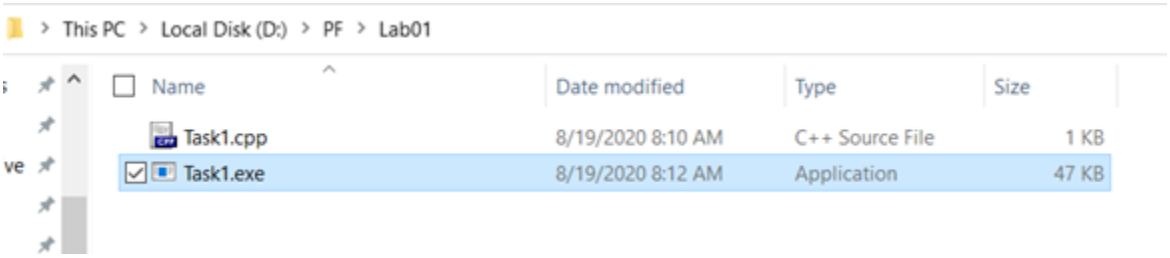
To compile the program, we will use the c++ command. If you see an error on c++ command that the c++ command is not recognized then you have to revisit the step for the setting of environment variables.



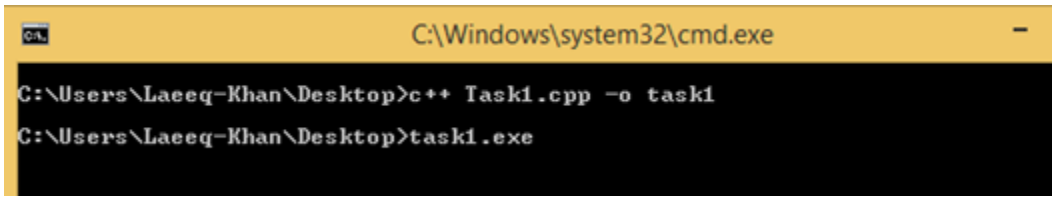
- To compile the program, the following command will be executed:
- You can also use g++ instead of c++ command



- You can set the name of the executable file to any name, we used Task1 as file name



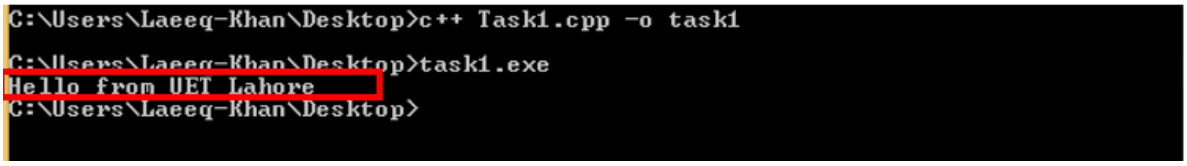
- As a result, you will see the executable file with the .exe extension in the same folder.
- Next, write the name of the executable file to like task1.ext or whatever you name chose.



• Code you can see is a template for writing any C++ program except line 4. Whenever you want to write a C++ program, you have to write this skeleton code. Without this skeleton, your C++ basics are incomplete and you cannot run your program.
• Details on the code are available in the handouts of the first week.
	`#include <iostream>`
	`using namespace std;`
	
	`main() {`
	`cout<<"Hello from UET Lahore";`
	
	`}`

endl command in cout command is use to break line in console output.	#include <iostream>
	using namespace std;
	
	main() {
	cout<<"Hello from UET Lahore"<<endl;
	
	}

Output



Congratulations! You have learned all the basic essential concepts of the MinGW compiler and executed your first c++ program by using the cmd.

Tasks

1
- Write a program to display your name on the console

2
- Write a program to display the following output on the console

```
*******
*******
*******
*******
```

3
- Write a program to display the following output on the screen

```
  ******
******
  ******
******
  ******
```

4
- Write a program to display the following output

```
*
**
***
```

```
    ****
    *****
    ******
    *******
```

- Write a program to display the following shape as output

```
**********
*        *
*        *
*        *
*        *
*        *
**********
```

- Write a program to display your name with stars
Example latters are shown in figure below.