Essentials_0x01

(I don’t actually mean to say that this stuff is hard, although this stuff is a piece of cake, we still have this dumb quote lying around just for the sake of formality)

And just like that, computer science is a field where you cannot simply say “I’ve learnt it all” Because you can never learn anything to its fullest, there's always a bigger fish in the sea, same applies to computer science, there's always something more to learn if you recall the previous write-up.

That being said, let's set up a modern-good-looking environment for programming.

Before we proceed, keep this in mind, Our motive and theme revolve around extreme **Aesthetics**, whatever we do here, whatever we do- our motive revolves around the same idea, to achieve **simplicity**, **beauty** and **accessibility** all at once

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Setting up VS Code

Visual Studio Code, also commonly referred to as VS Code, is a source-code editor made by **Microsoft** for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git

In short, it is the `IDE` (Integrated Development Environment) for almost every possible programming language. The only IDE you know I assume, is the **TurboC/C++** right? **LOL**! that thing is outdated, you know(almost 4 decades!), and you cannot even use it in real-world C/C++ development. All the people around the world use mostly `VS Code`, it offers all the three things I mentioned: simplicity, beauty and accessibility while being lightweight and portable

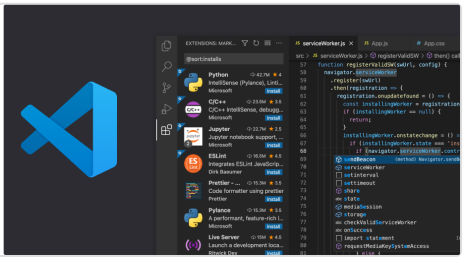
So we'll be using VS Code for programming in Python, and C/C++. But you can literally program any language on it, once you know how to set them up.

To install VS Code head over to their official website

Visual Studio Code - Code Editing. Redefined

Visual Studio Code is a code editor redefined and optimized for building and debugging modern web and cloud applications. Visual Studio Code is free and available on your favorite

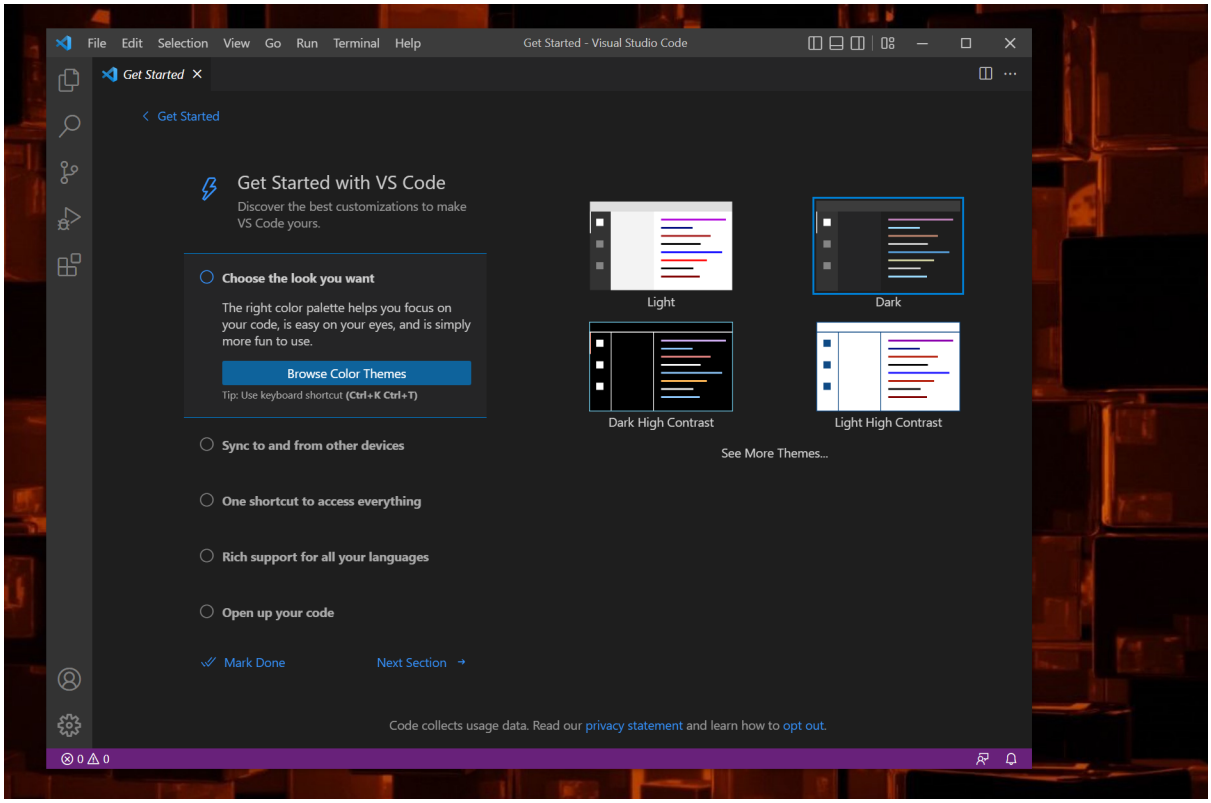
https://code.visualstudio.com/



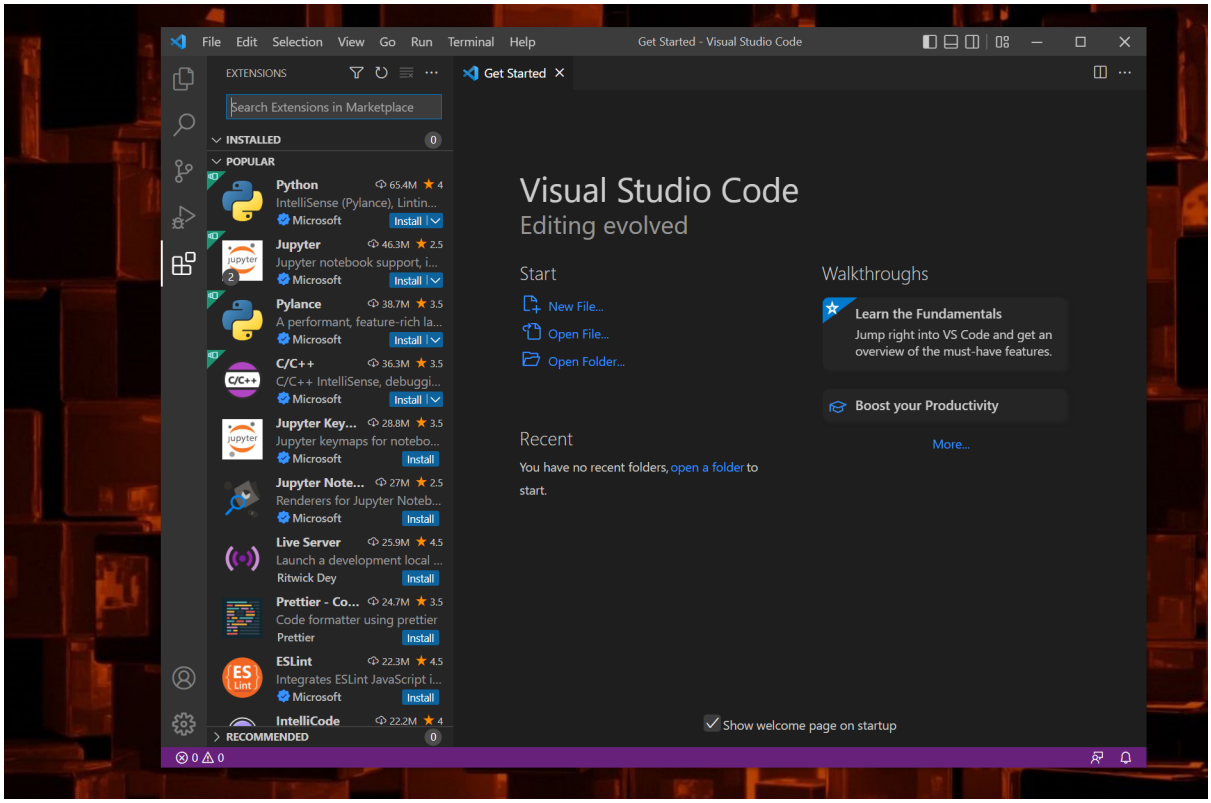
💡 Alternatively, if you have Windows (8,10,11), you can simply get VS Code from the Microsoft Store) app

So let's consider you got it installed on your computer using one of the two ways mentioned above

Now when you open it for the very first time, this is what you must see

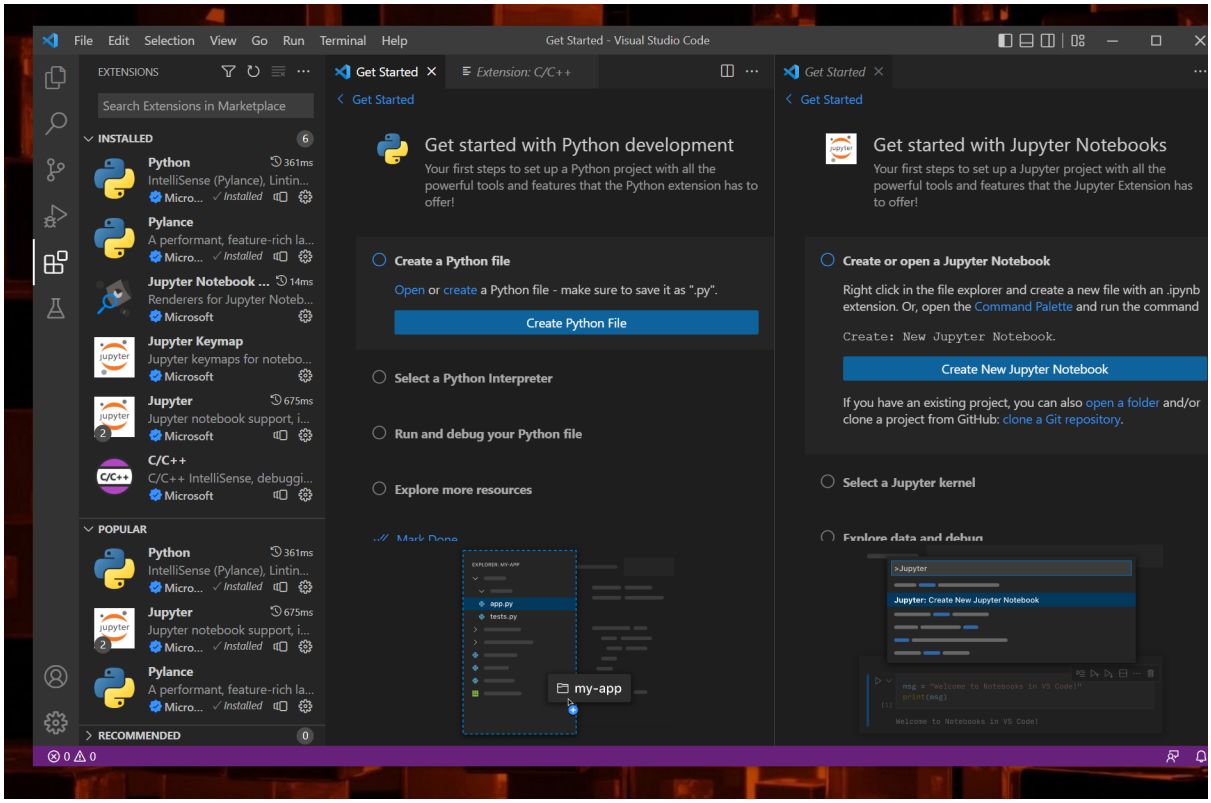


I suggest poking around some stuff and seeing what does what, but first, click on the bottom checkmark which says `Mark Done`.
Now you need to go to the extensions tab, you can see its icon on the left vertical bar, it looks like blocks (haha, minecraft!)



Here You can see all the available extensions, guess what? We're gonna install the `Python` and `C/C++` extensions, click on the respective install buttons one after the other completes, and be patient.

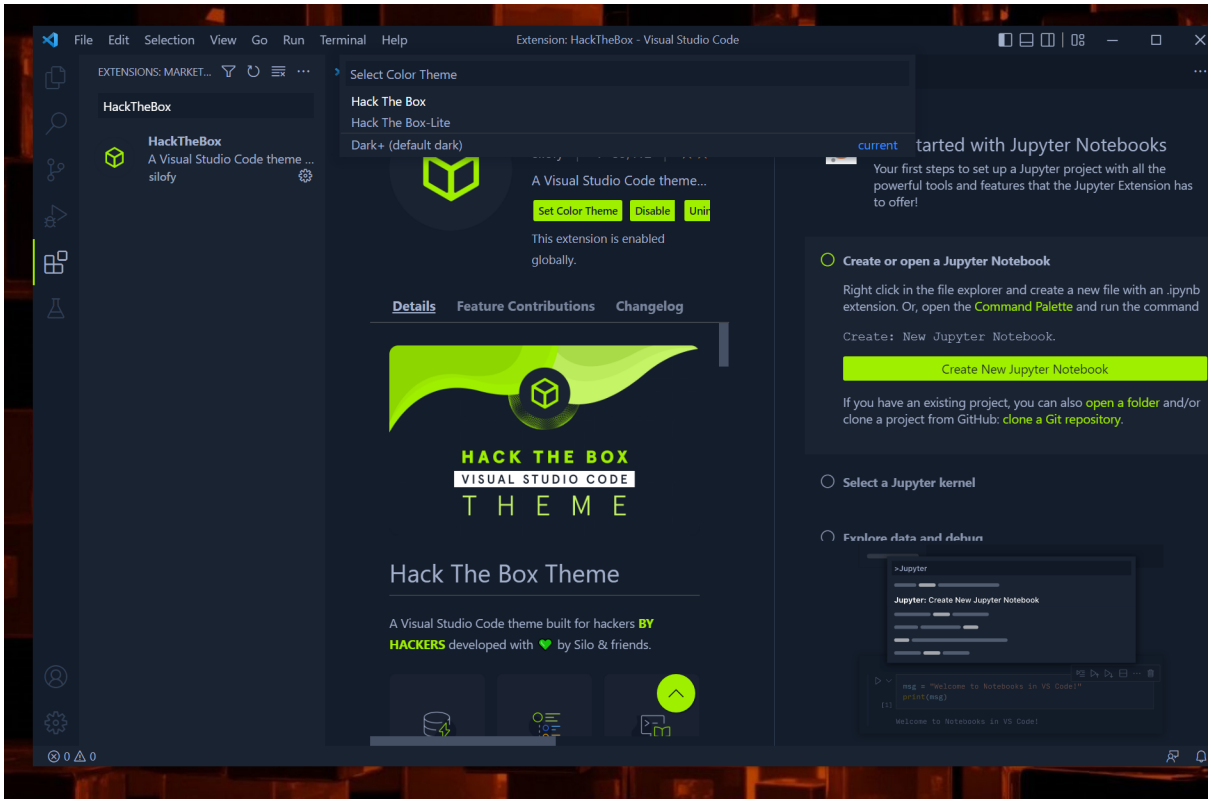
After installing python and C/C++ extensions this is something that you must see:



You should have an installed menu on the left, with 6 extensions installed. Pretty much how my screen looks like

Next, we're gonna install a cool theme called `HackTheBox` (Its case sensitive so type it the same way) Search the marketplace for `HackTheBox` and install it as its seen below

It'll ask you to select a colour theme so just click on the first entry in the pop-up menu



VS Code setup is now complete (you may close it)

Getting Python

Welcome to Python.org

The official home of the Python Programming Language

https://www.python.org/

Python is a high-level, general-purpose programming language. Its design philosophy emphasizes code readability with the use of significant indentation. Python is dynamically-typed and garbage-collected. It supports multiple programming paradigms, including structured, object-oriented and functional programming

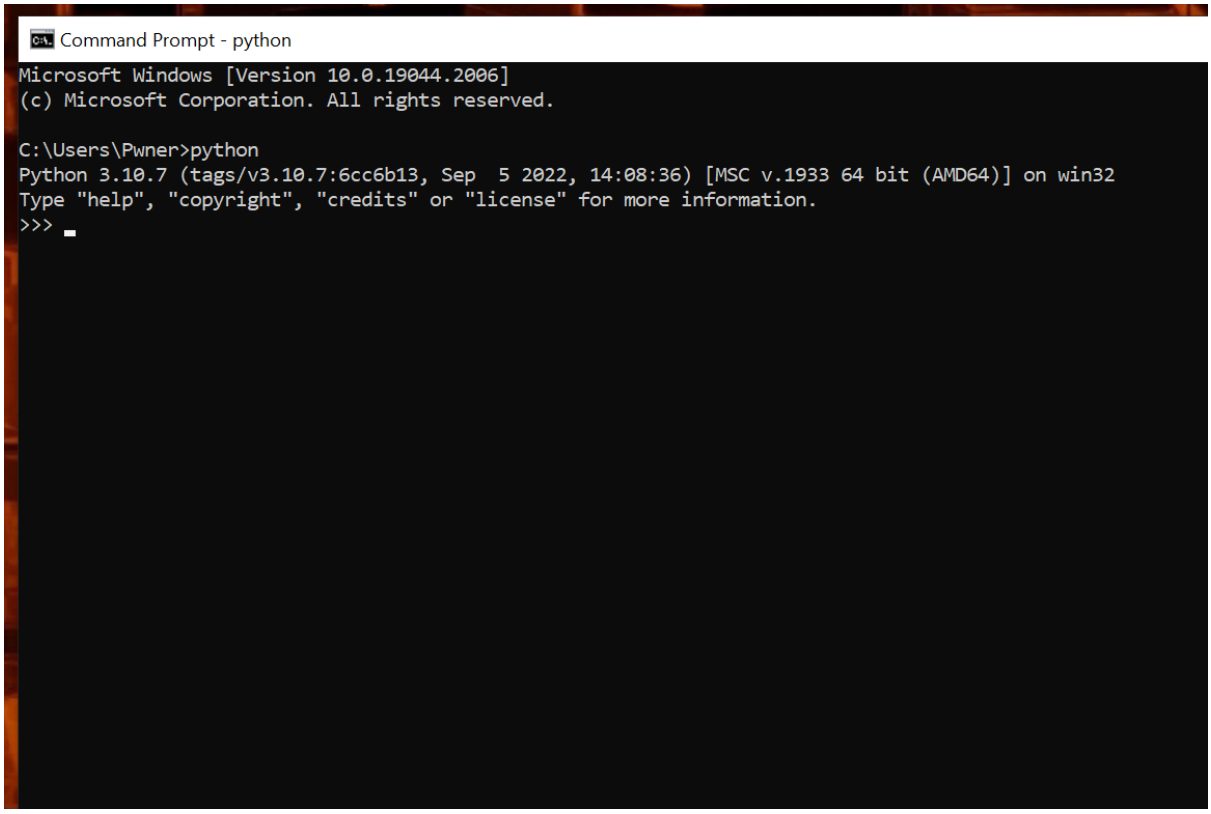
To install it, simply head over to the downloads section on the above website and pick up the latest release, at the time of writing this, 3.10.7 is the most recent release, although nothing will be affected as the language will support all the commands we talk about, even if python gets a lot of updates

Again, python is available to install using **Microsofts's Store** and you need not worry about any setup things, just download the one from the store and it sets up the PATH variable for you.
For macOS and Linux, python comes pre-installed

In case you are installing python from its website, there's just one thing you must do
(Only follow this if you do not wish to install python from MS Store)

- this step is important, you have to check the PATH option as shown in the screenshot above
- The rest of the things are self-explanatory, it will install python and before exiting, it will give an option to truncate the PATH length limit, you just need to ignore that and click on close, now you have python installed

To confirm you have successfully installed python, open up a command prompt, and type: `python` and hit enter



If you see this screen, it means you know have a python environment set up correctly!

Getting C/C++

(It doesn't have an official web front, so no stylish bookmark, also, recall the quote I had put at the very beginning of this writeup…you'd need it)

C is a general-purpose computer programming language. It was created in the 1970s by Dennis Ritchie and remains very widely used and influential. By design, C's features cleanly reflect the capabilities of the targeted CPUs

C++ is a general-purpose programming language created by Danish computer scientist Bjarne Stroustrup as an extension of the C programming language, or "C with Classes"

> 💡 If you know C, you already know half of C++

And now we're going to set up a C/C++ coding environment, you might say

```
Wait!, I have Turbo C/C++ installed, we don't need to worry about that
```

TURBO C IS AN OUTDATED PIECE OF EVIL AND DOES NOT HAVE MODERN AESTHETICS, SYNTAX HIGHLIGHTING AND GIT INTEGRATION WHAT NOT STOP BLABBERING ABOUT TURBO AND GET SOME REAL-WORLD KNOWLEDGE

That being said, you also need to know that there isn't an official way of getting a compiler for windows.
So what can we do? It's simple, delete windows and get Linux

lol nobody wants to do that right? Hopefully, the Linux community is not as toxic as yours, so being open source is what allows us to have a Linux C/C++ compiler work on windows. So be thankful for the open source movement. I'm gonna introduce you to a Linux compiler vendor for windows

> Cygwin
>
> The most recent version of the Cygwin DLL is 3.3.6 . The Cygwin DLL currently works with all recent, commercially released x86_64 versions of Windows, starting with Windows Vista. For more information see the FAQ.
>
> https://www.cygwin.com/

Cygwin is a Unix-compatible programming and runtime environment that runs natively on **Microsoft Windows**. Under `Cygwin`, source code designed for Linux operating systems may be compiled with minimal modification and executed

> 💡 I think you got the idea of what Cygwin is, it provides source codes for Linux binaries/programs that can be easily installed on Windows operating systems. So what Linux program are we gonna install? Damn right. gcc

Linux compiler has a name. Which is **GCC (GNU's C compiler)** and yes it's a recursive acronym

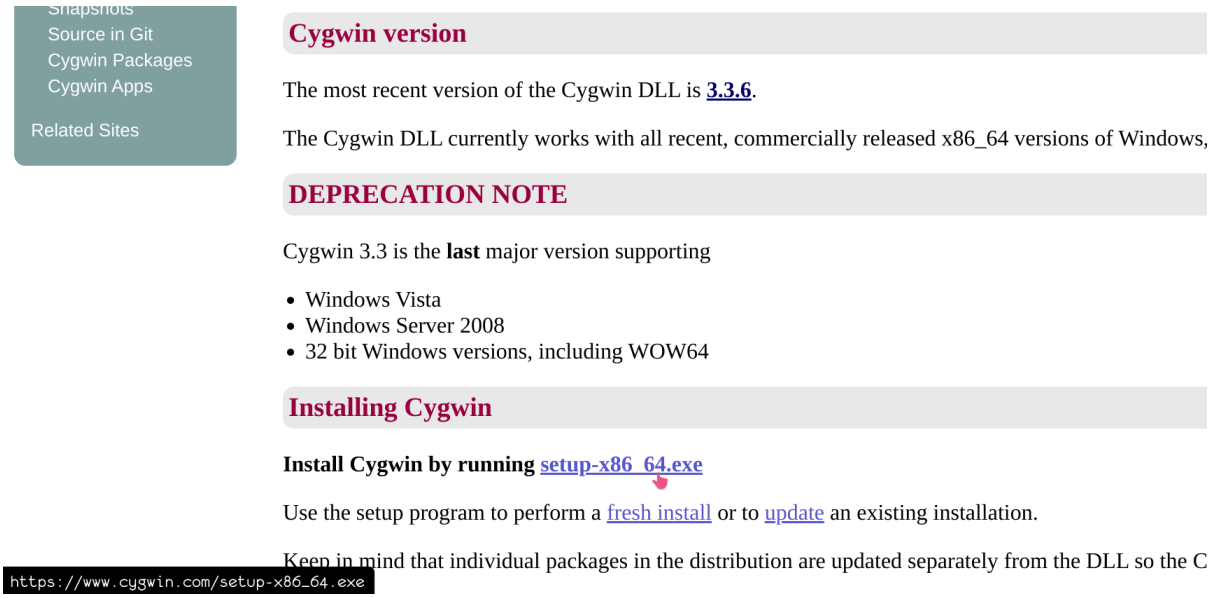
GCC, the GNU Compiler Collection

The GNU Compiler Collection includes front ends for C, C++, Objective-C, Fortran, Ada, Go, and D, as well as libraries for these languages (libstdc++,...). GCC was originally written as

https://gcc.gnu.org/

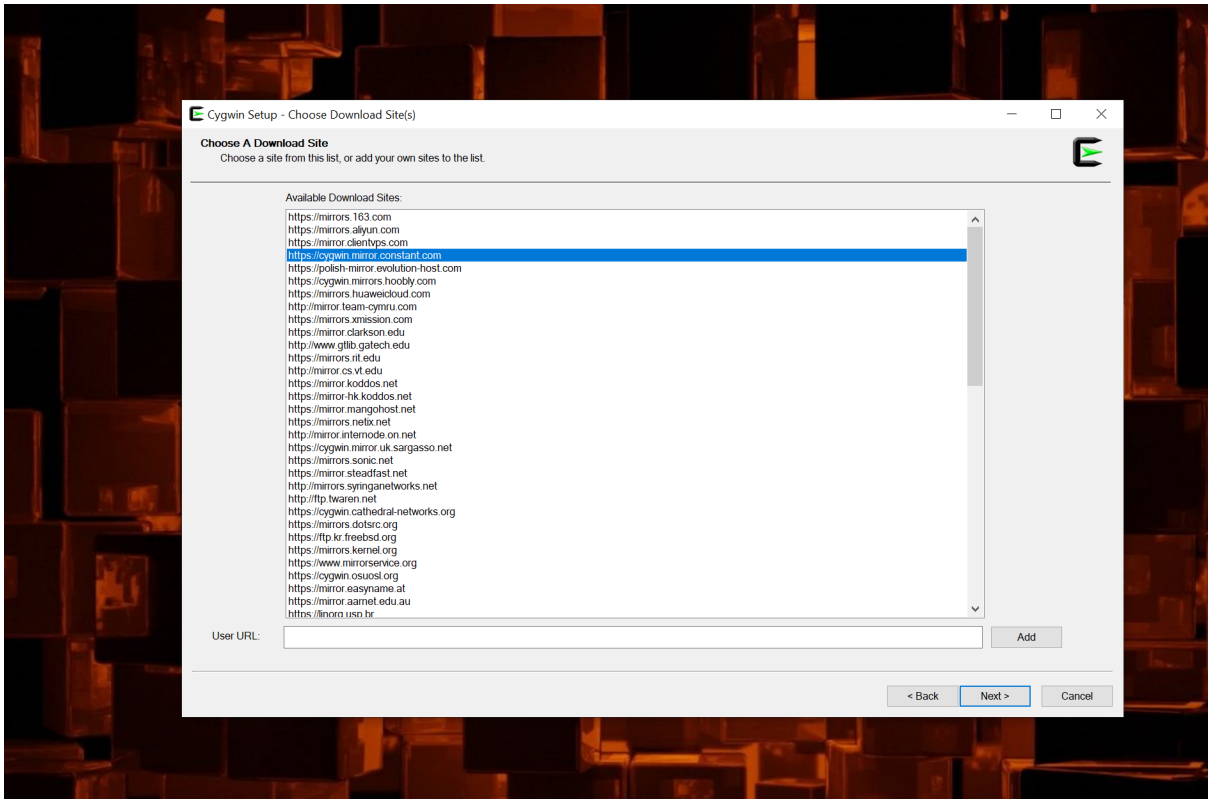
You need not get carried away if all this information makes you confused. **In short, what we're gonna do is, install a compiler on windows via Cygwin**

So head over to Cygwin and install the setup



Now follow these steps, as they are most important, you need not mess this up. (Recall the quote again lol)

- Run the setup_x86_64.exe and allow `Yes` to `administrator` privileges
- Then click on Next, Next, Next, Next, Next
- Then you'll land on a screen like this, Select the fourth one (this index could be different for you but try to search for this URL)



Just a little disclaimer, I created this write-up using a windows virtual machine okay? First of all, I am not a fan of Windows, so the screenshots I have included here are of windows running under virtualization, so don't get the wrong Idea, I do not use windows and am certainly not a fan of light mode!

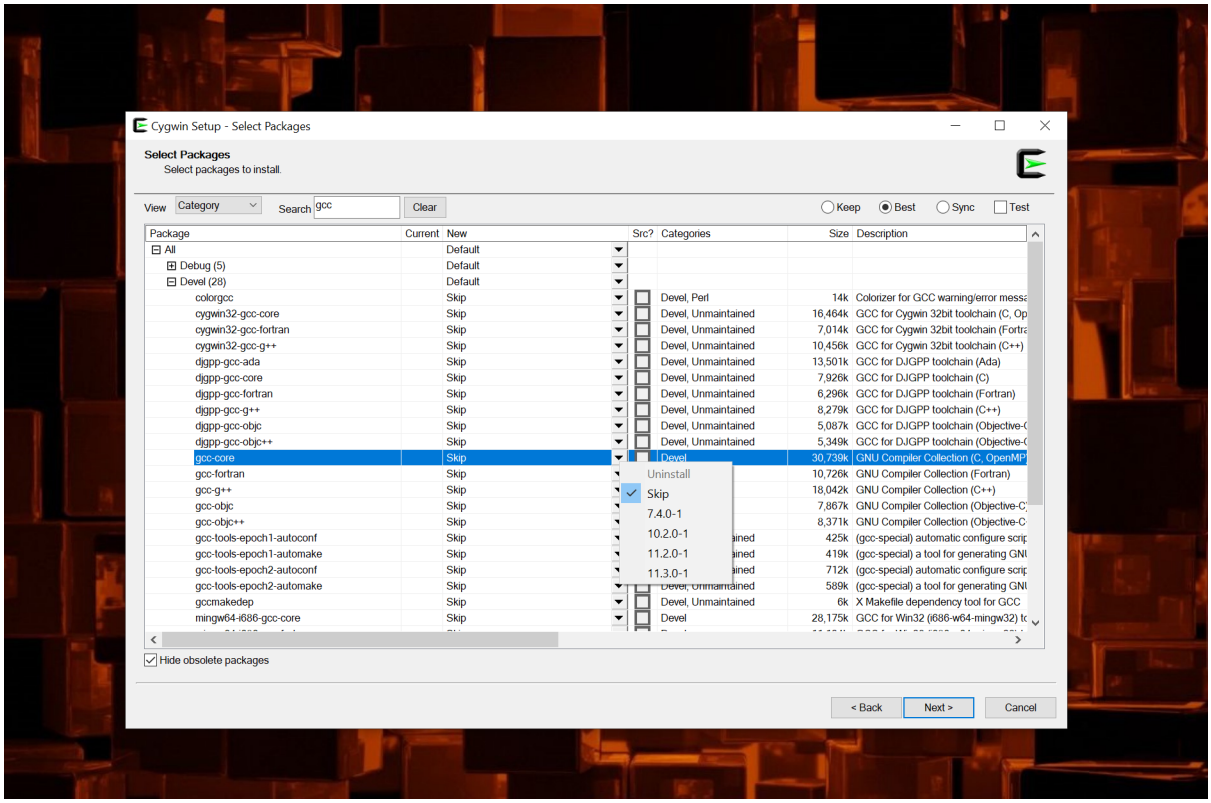
I'm gonna be doing all this stuff in Windows 10, although these steps would also work in 8 and 11 versions

Just be aware of one thing, Antiviruses on windows are not fond of Linux source codes being ported to windows, so if you have an Antivirus software running (especially McAfee) **you might not be able to get a compiler running** 💀

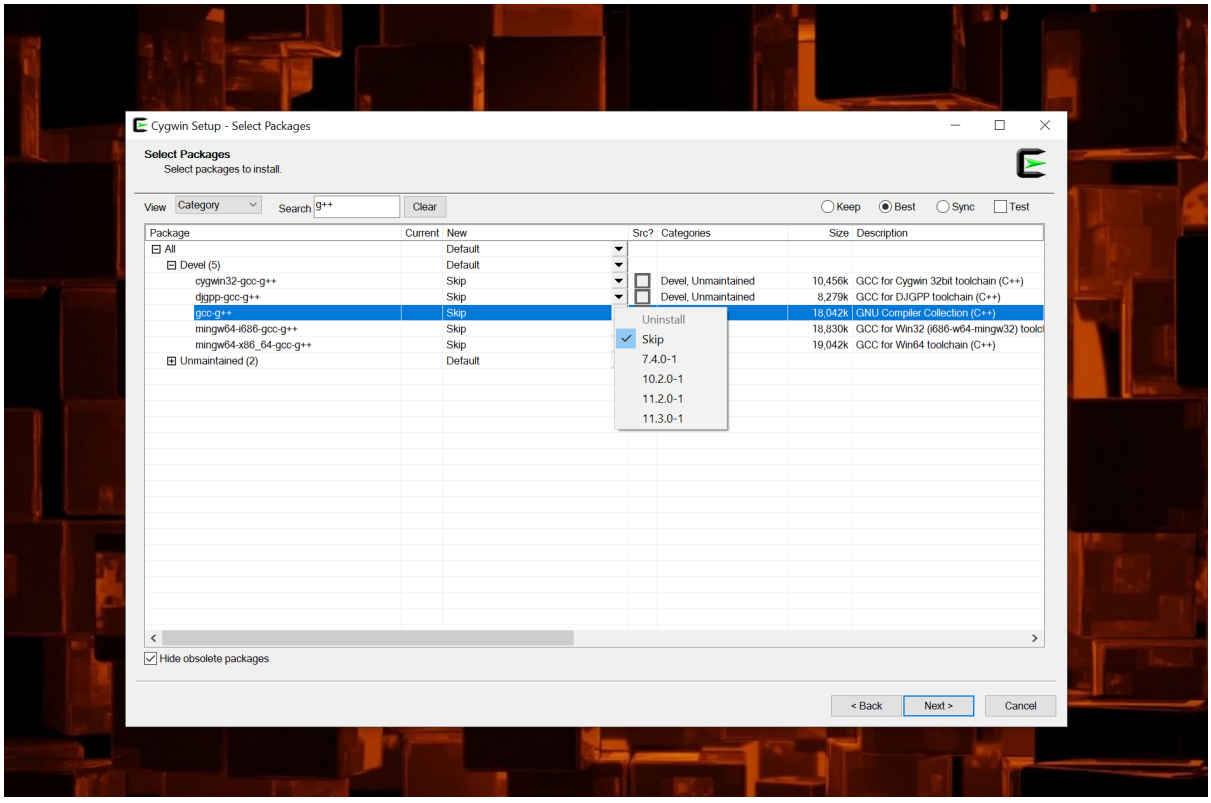
figure out how to uninstall antiviruses and stick to windows Defender, it is better

And then you'll see a blank screen, with a search bar, just enter `gcc` on there

then go to `All> Devel> gcc-core` click the down arrow and select the 7.4.0-1 version (here I have checked skip, but you should checkmark 7.4.0-1)

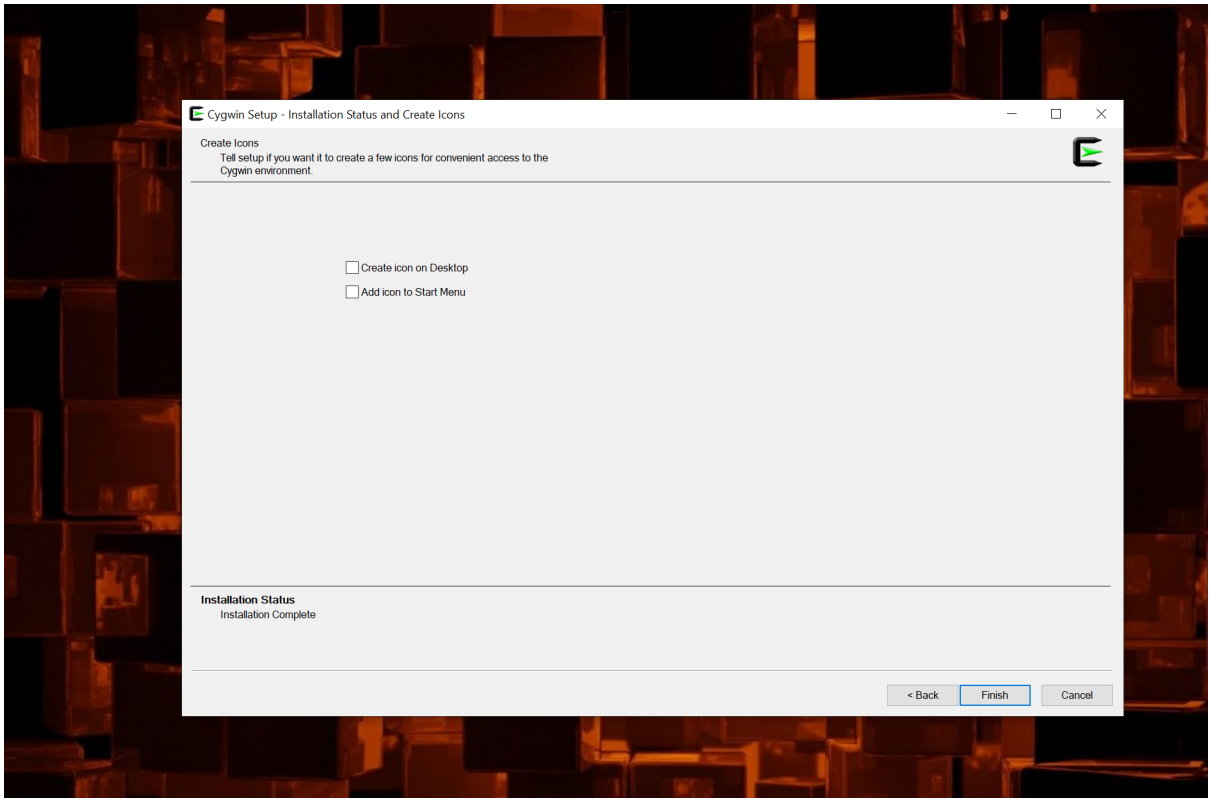


Now search for g++, this time around the process is the same, `All>Devel>gcc-g++` > down arrow and make sure the checkmark is on `7.4.0-1` (I know my checkmark is on the skip but yours shouldn't)



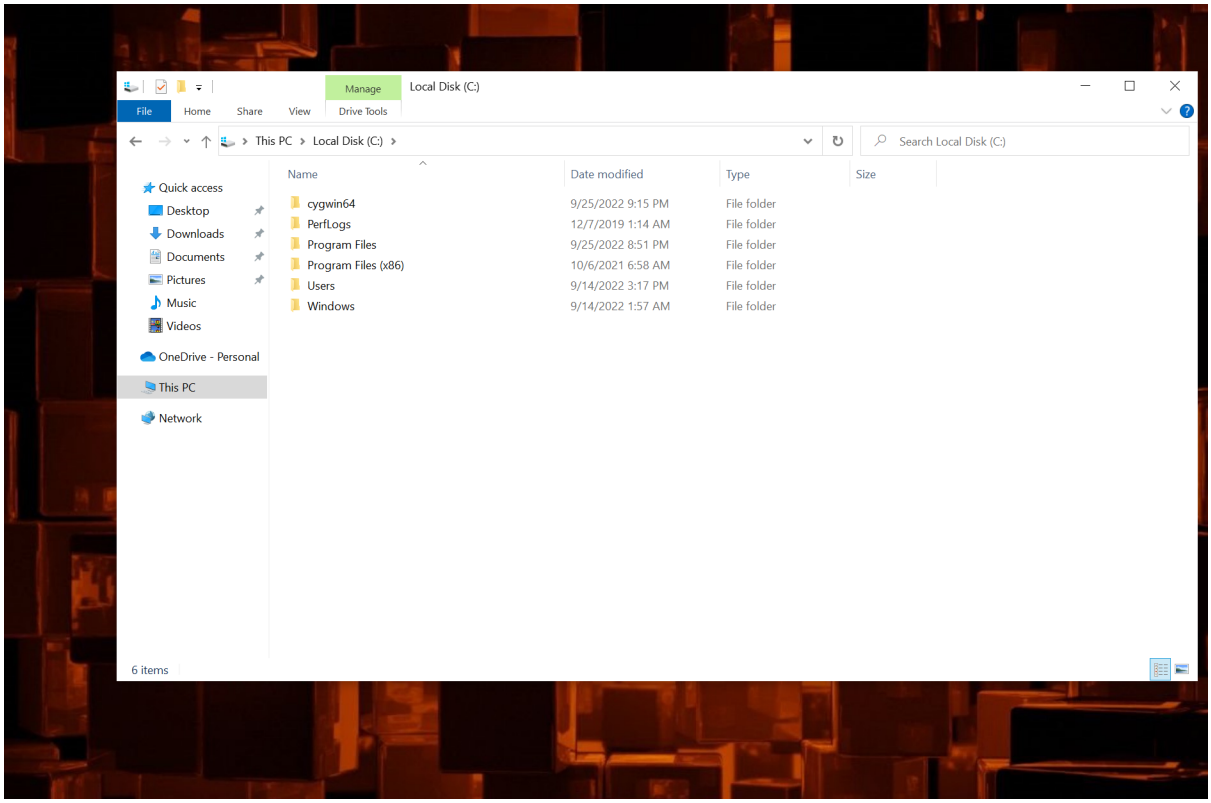
- When you have selected the versions for both of them just hit next, next and wait for it to download

After completion of the download, the setup will ask to create shortcut entries, which we won't, so uncheck them and `finish` the setup



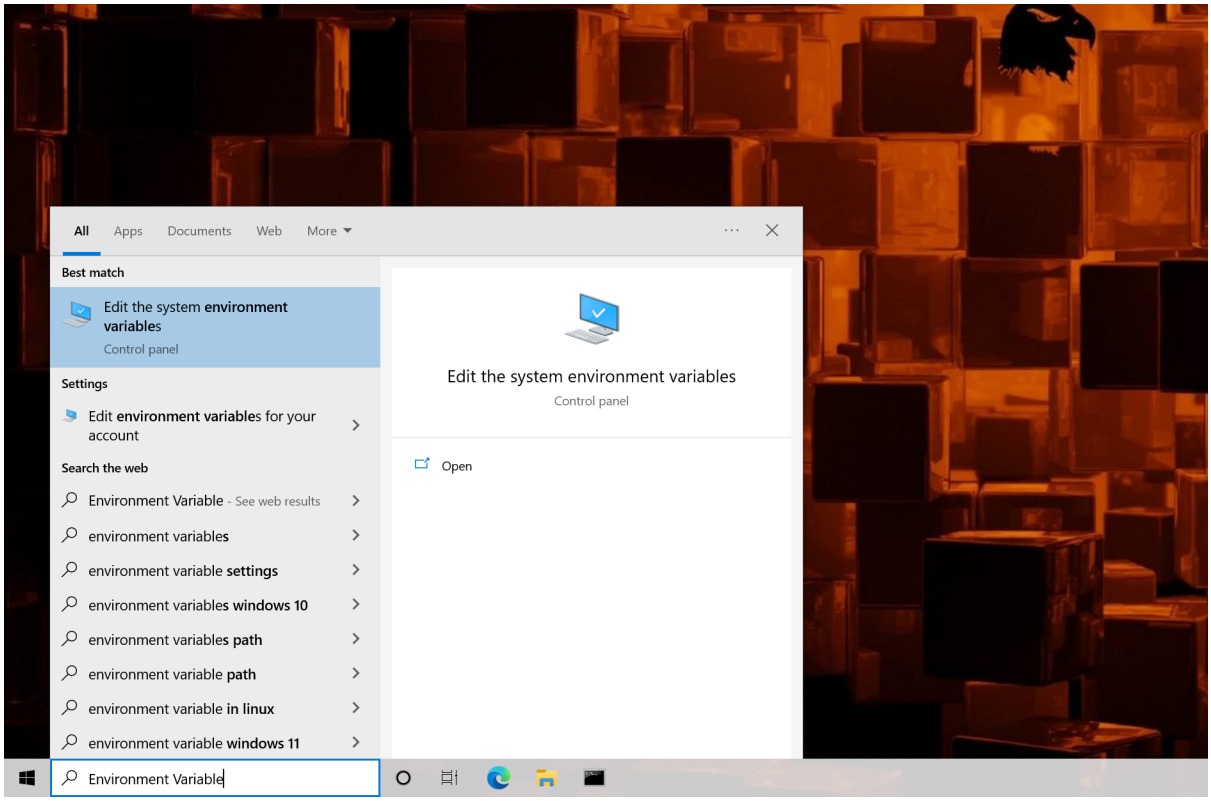
At this point, you have completed half of the setup already!
But the problem is, VS Code doesn’t know where this compiler is stored, so it’ll search on the PATH environment variable

If you open your file explorer and go to This PC>C drive, you must now see a `cygwin` directory (64 or 32 depending on your architecture)

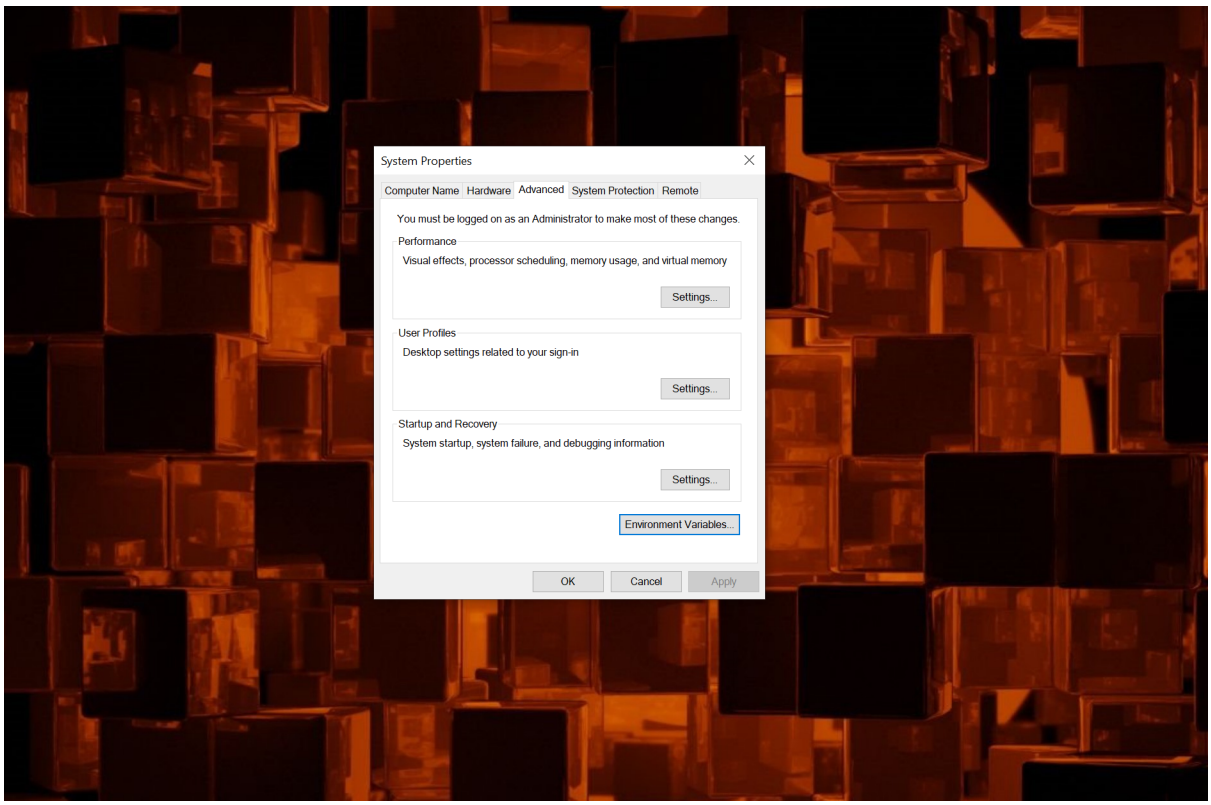


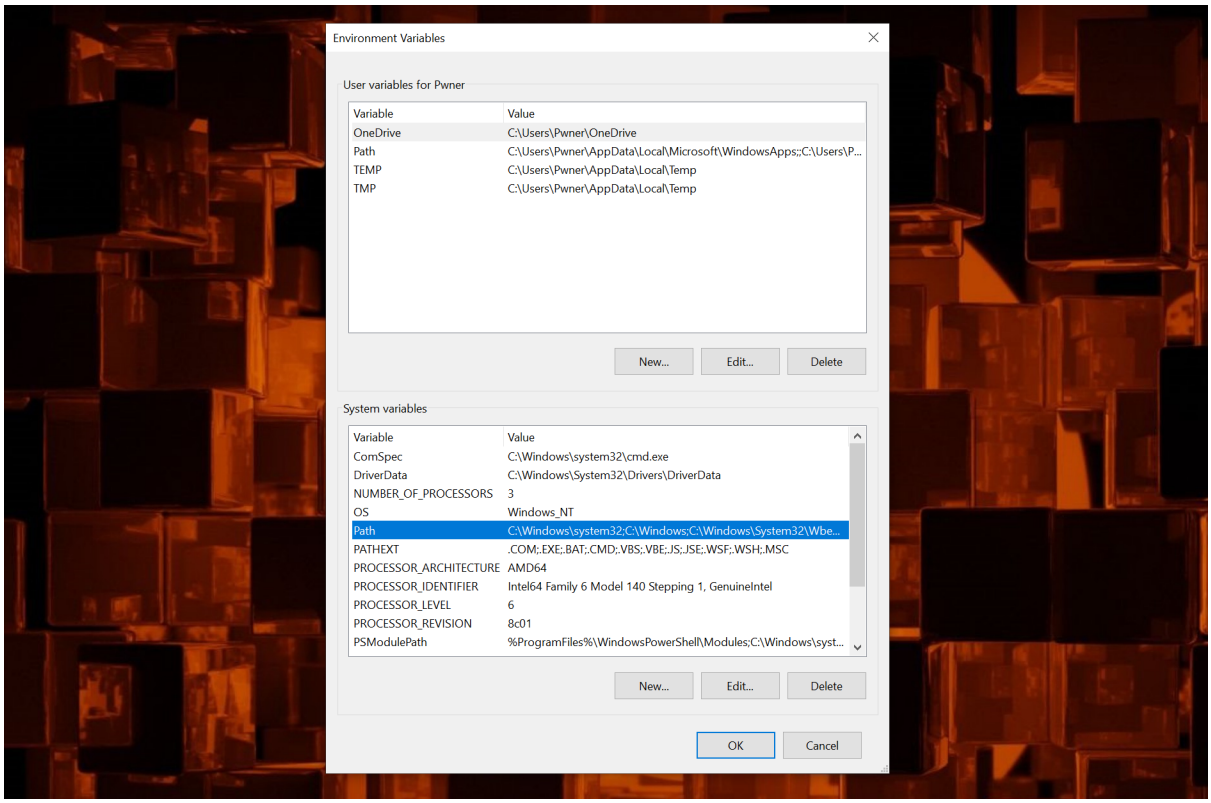
Now all we need to do is, add this directory path to the system's `PATH` environment variable

Simply search for `Environment Variables` and hit enter



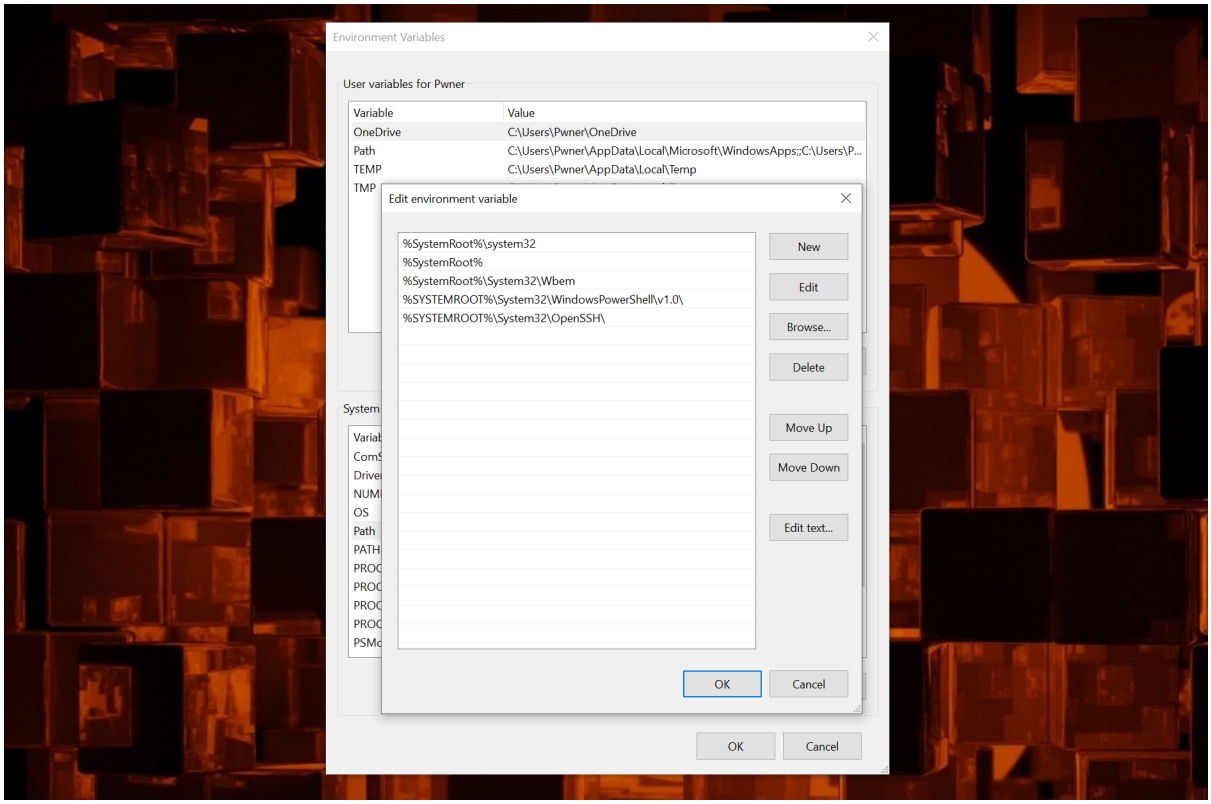
Go to environment variables





Now, when this screen pops up, click on Path under ‘System variables’ and click on `edit` as shown in the above picture

> 💡 Now now, be careful not to mess this up, you could potentially brick your system here

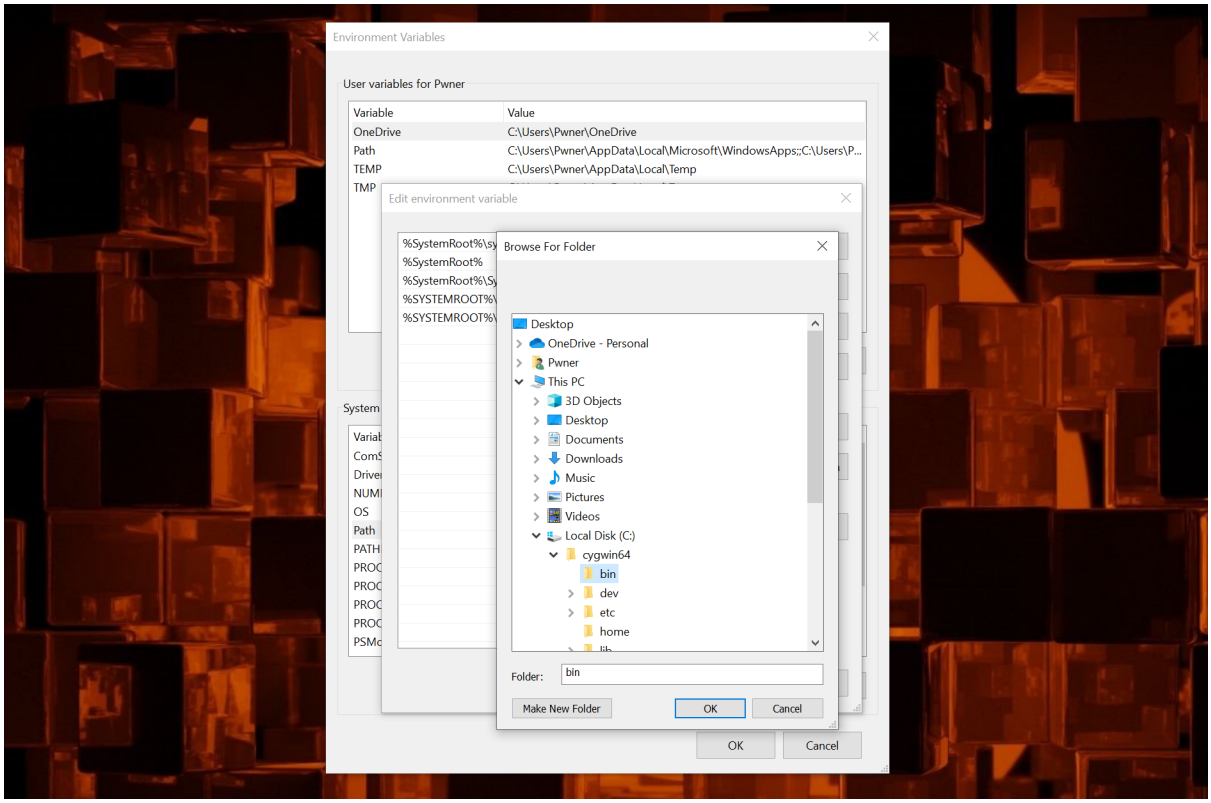


This is what you’re gonna see,

Just click on `New` and then `Browse`

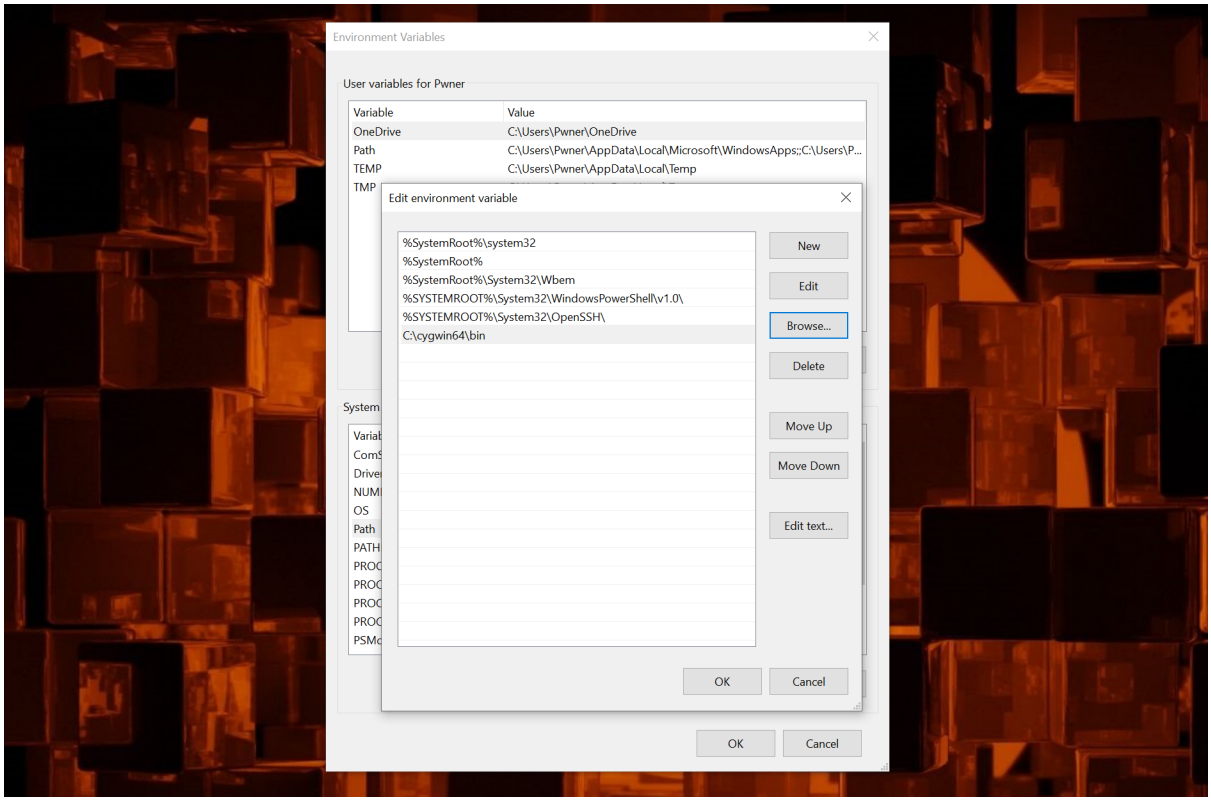
> 💡 You have to let windows know what and where you installed the compiler

Remember, we know that the Cygwin directory is located under `This Pc > Local Disk (C:) > Cygwin` right? So just navigate to it



There it is, just click on `This PC`, then click on `Local Disk C` , then click under `cygwin`, select the `bin` folder, and then hit `ok`

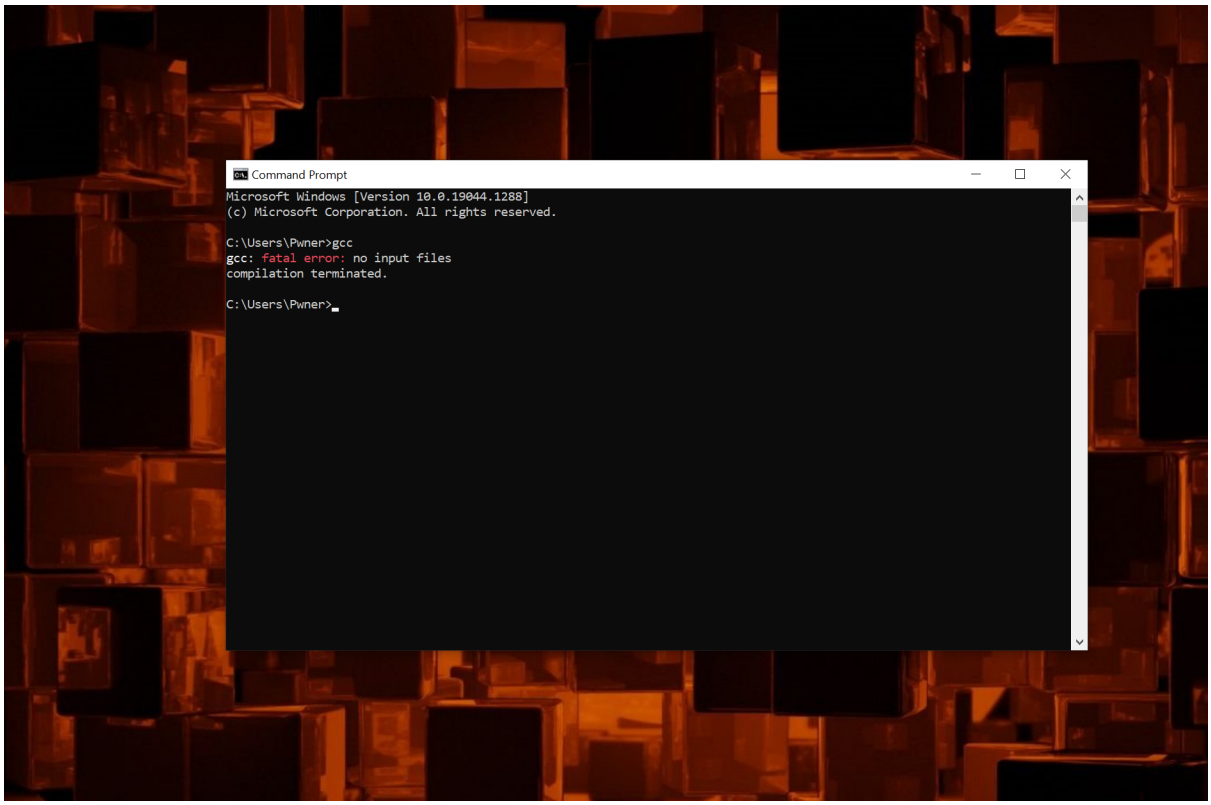
You'll now have an entry in the path



Congratulations, now close all these windows by pressing Ok> Ok> Ok

> 💡 At this point you have a compiler set up to use, let's test it out by probing gcc on the command prompt (or) Windows Terminal If you like

just open the command prompt and type `gcc` and hit enter, no spaces, no uppercase required



If you see this screen, you have successfully installed a C/C++ compiler ready and working on your computer

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> 💡 This write-up was geared towards getting the environment set up.
> In the next write-up, we're gonna see basic use cases of Python and C/C++, Virtualization.
> We also gonna write some code and see how C/C++ programs are `written`, `compiled` and `run` in the real world.