

# Getting Started (Windows)

This document describes the procedure for installing a terminal on Windows and getting OpenGL projects to compile and run through this terminal.

## Installing MSYS2 and MinGW-w64

MinGW (Minimalist Gnu for Windows) is an environment that ports the GNU Compiler Collection (GCC), GNU Binutils for Windows, and other features to Windows. The original MinGW has a limited set of features since it only creates 32-bit applications and doesn't support some newer packages. For this reason we will be running a fork of this project called MinGW64 through the MSYS2 environment. MSYS2 (Minimal SYStem 2) is a command line interpreter that works like a Bash shell. It is the newer version of the original MSYS environment that the old MinGW ran on. MSYS therefore is able to run the new MinGW-w64 and the 32 bit version MinGW.

In short, MSYS2 provides the command line interface so Windows users have a terminal to work in with Unix style commands, and MinGW64 provides the Windows library files to allow for command execution.

MSYS2 already has the MinGW-w64 packages as part of its default installation. This way we just need to install MSYS2 and update all the packages to get started with our coding and code compilation.

You can follow instructions on how to setup MSYS2 here: <https://www.msys2.org/>

This document will cover the same steps with some pictures and other troubleshooting information you may encounter.

**BEFORE YOU BEGIN!** This installation process works for Windows 7 or higher. You will also want to **TURN OFF ANY ANTIVIRUS OR FIREWALL** when doing this to make sure that all packages are fetched and installed properly. Not turning off antivirus/firewalls may cause the pacman package manager to hang.

1. Download the installer from <https://www.msys2.org/>



(Direct link for install: [https://github.com/msys2/msys2-installer/releases/download/2021-07-25/msys2-x86\\_64-20210725.exe](https://github.com/msys2/msys2-installer/releases/download/2021-07-25/msys2-x86_64-20210725.exe))

2. Run the installer and set your installation folder. By default it will be on the C:\ drive , if you run multiple hard drives on your computer you can put it anywhere.

3. Once the installation is done run MSYS2 (the installation wizard gives you the option to "Run now" when it's finished).
4. Update the base packages by entering the following command into the MSYS2 terminal:

**pacman -Syu**

#### TROUBLESHOOTING:

- If pacman hangs (i.e. seems frozen) at any part, it could be that a file it is trying to download has been caught by your antivirus or firewall. Kill the program, turn off your antivirus/firewall and try again.
  - If even after turning off your antivirus/firewall a package gives an error, write down the package name and search for it in: <https://packages.msys2.org/search>. When you find it in the base package search, click on it and it will give you a list of the binaries for that package. You can try to install the individual binaries for the packages using the installation command on the package binary page.
  - If the package that is not working is p11-kit and the above solutions do not work, you can just ignore it because it won't interfere with your work in this course.
5. Update packages one more time with: **pacman -Su**
  6. Install MinGW-w64 and some of its tools through the following command:

**pacman -S --needed base-devel mingw-w64-x86\_64-toolchain**

#### NOTE:

If you want to run the MinGW-32 bit version you can instead run:

**pacman -S --needed base-devel mingw-w64-i686-toolchain**

(Optional) You can continue to run **pacman -Syu** until you start getting messages that say there is nothing to do. However at this point running it one more time should give you those messages.

With this done you have the basics of MSYS2 and MinGW-w64 set up. This will allow you to run make files and use gcc and g++ to compile your code.

## Installing OpenGL libraries (FreeGLUT)

OpenGL (Open Graphics Library) is an API for rendering 2D and 3D graphics. Every Windows OS circa 1998 has come with OpenGL installed.

We also use FreeGLUT (Free OpenGL Utility Kit) to allow us to create windows and manage input and output. FreeGLUT needs to be installed by us for use with our compiler.

1. Run your MSYS2 MINGW64 terminal
2. To install freeglut run the following command:

**pacman -S mingw-w64-x86\_64-freeglut**

#### NOTE:

If you want to run the MinGW-32 bit version, you can instead run:

**pacman -S mingw-w64-i686-freeglut**

**REMINDER:** At any point if you feel you need more functionality from MSYS MinGW64 you can search for packages at <https://packages.msys2.org/search> and install them using the pacman command.

Other packages for useful utilities are:

- Git ([https://packages.msys2.org/package/git?repo=msys&variant=x86\\_64](https://packages.msys2.org/package/git?repo=msys&variant=x86_64))