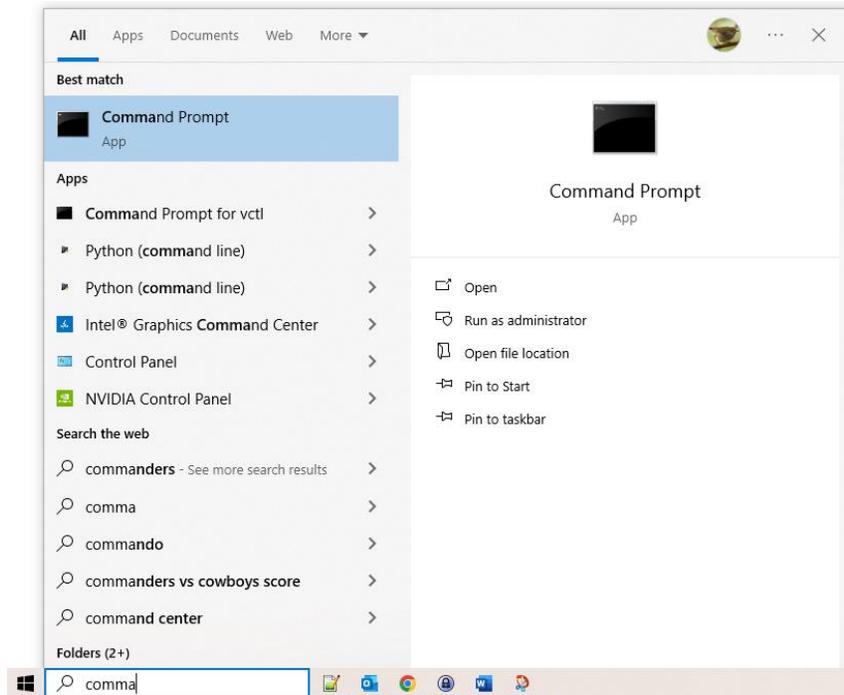


Windows users: see pages 1-3. Mac users: see page 4-5. Linux users: see page 6.  
On the last page is a quiz question to test your installation.

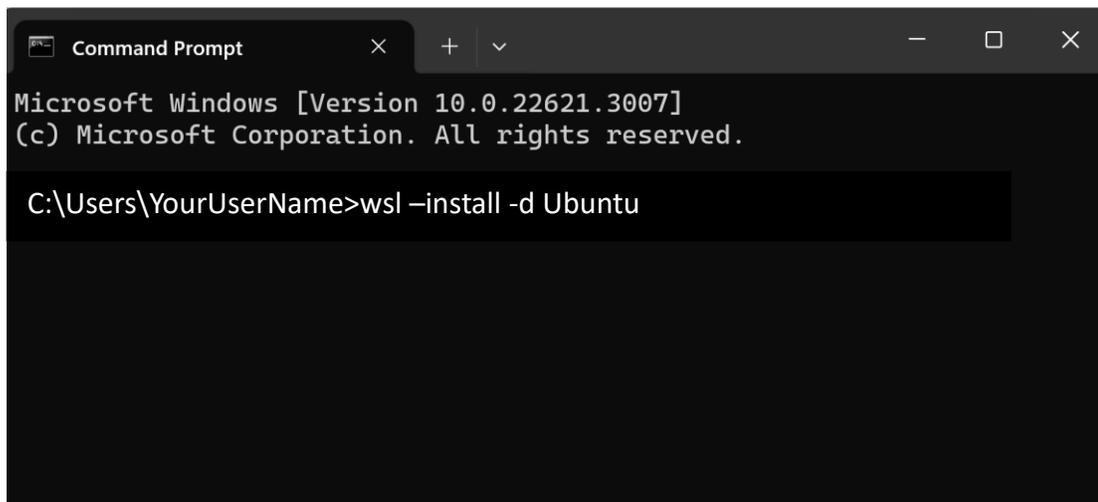
## Windows

Installing WSL (Windows Subsystem for Linux):

1. Open the **command prompt**:



2. Enter `wsl --install -d Ubuntu`  
This will take a moment to install.



3. Once installation is complete, **restart your computer**. (If you received an error during installation, simply restart your computer and retry the installation command.)

4. You will be prompted for a **username and password**. It does not matter what you choose. Note your password will be invisible as you type it.

That's it! You are now running Linux inside Windows.

You can access the WSL terminal at any time by running the WSL app that was just installed (see right).

You can **transfer files to/from Linux** via the `/mnt/c/` folder.

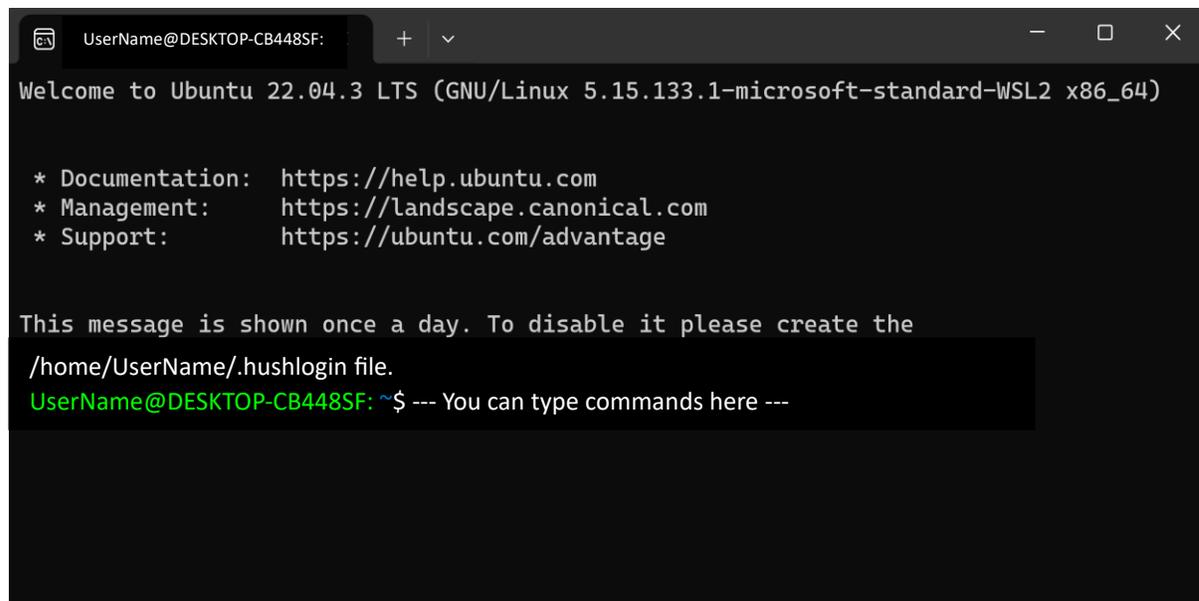
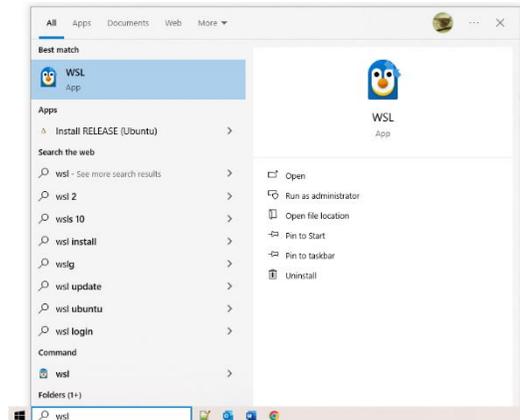
All transfers must be done on the Linux side.

For example, I would type in the WSL terminal:

```
cp /mnt/c/Users/WINDOWS_USERNAME/Desktop/myfile.txt /home/LINUX_USERNAME/  
to copy "myfile.txt" from my Desktop into my Linux home folder.
```

Note: **to paste text** in the WSL terminal, **right-click** instead of Ctrl-V.

Note: **to cancel a command** that is taking too long, press **Ctrl+C**.



## Installing METAL & GWAMA (for [Windows](#))

How to navigate inside the WSL terminal:

Use `ls` to list files/folders inside the folder you are currently in.

Use `cd` to move inside a folder, and `cd ..` to move out by one level.

### Setup

0. **Install dependencies** by copying the following into your WSL terminal:

```
sudo apt-get update
sudo apt-get install cmake make g++ zlib1g-dev unzip
```

### METAL:

1. In your WSL terminal, change directory (`cd`) to your home folder (abbreviated `~`) if you are not there already:  
`cd ~`
2. Download the METAL source code from GitHub:  
`git clone https://github.com/statgen/METAL.git`
3. Go inside the folder you just downloaded:  
`cd METAL`
4. Follow the instructions on the [METAL GitHub page](#) to build the program. That is:  
`mkdir build`  
`cd build`  
`cmake -DCMAKE_BUILD_TYPE=Release ..`  
`make`  
`make test`

That's it! You can find the METAL executable in `METAL/build/metal/` (i.e. it is the file named `metal` in the folder also named `metal`).

### GWAMA:

1. In your WSL terminal, go to your home folder if you're not there already:  
`cd ~`
2. Download the GWAMA source code (found [here](#)):  
`curl -LO https://www.geenivaramu.ee/tools/GWAMA_v2.2.2.zip`
3. Unzip the files into a new directory, named GWAMA:  
`unzip GWAMA_v2.2.2.zip -d GWAMA`
4. Go inside:  
`cd GWAMA`
5. Build the program:  
`make`

That's it! You can now find the GWAMA executable in the folder, also called `GWAMA`.

## Mac

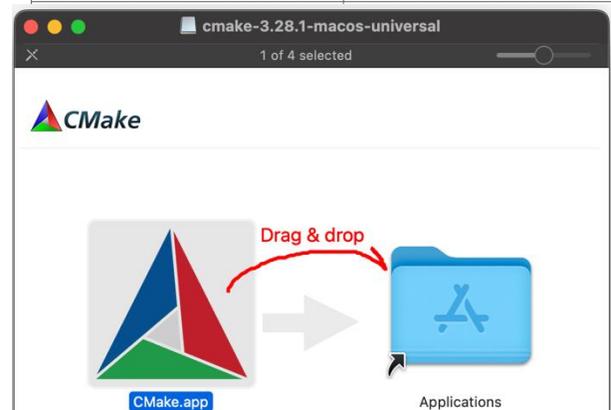
### 1. Install CMake.

Go to <https://cmake.org/download/> and download the version for Mac.

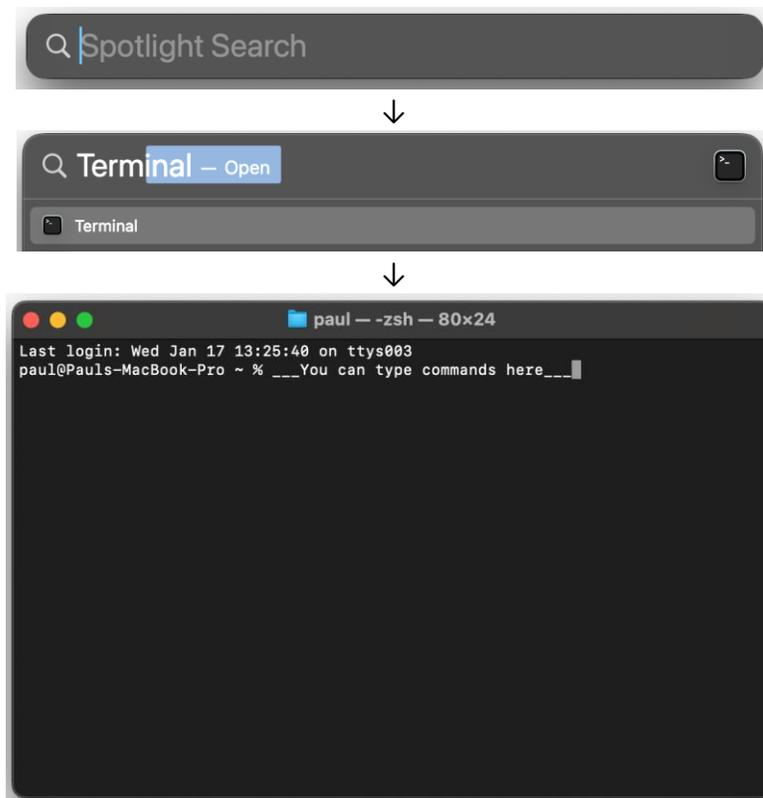
Double-click the .dmg file once it's downloaded and you will see a pop-up. Simply drag the CMake icon into the Applications folder to install.

Binary distributions:

Platform	Files
Windows x64 Installer:	<a href="#">cmake-3.28.1-windows-x86_64.msi</a>
Windows x64 ZIP	<a href="#">cmake-3.28.1-windows-x86_64.zip</a>
Windows i386 Installer:	<a href="#">cmake-3.28.1-windows-i386.msi</a>
Windows i386 ZIP	<a href="#">cmake-3.28.1-windows-i386.zip</a>
Windows ARM64 Installer:	<a href="#">cmake-3.28.1-windows-arm64.msi</a>
Windows ARM64 ZIP	<a href="#">cmake-3.28.1-windows-arm64.zip</a>
macOS 10.13 or later	<a href="#">cmake-3.28.1-macos-universal.dmg</a>
	<a href="#">cmake-3.28.1-macos-universal.tar.gz</a>



### 2. Open the Terminal app. This is pre-installed on all Macs, but does not appear in your applications by default. To find it, use the spotlight search (⌘+space).



## Installing METAL & GWAMA (for [Mac](#))

How to navigate your computer's files from inside the terminal:

Use `ls` to list files/folders inside the folder you are currently in.

Use `cd` to move inside a folder, and `cd ..` to move out by one level.

### METAL:

1. In your terminal, change directory (`cd`) to your home folder (abbreviated `~`) if you are not there already:  
`cd ~`
2. Download the METAL source code from GitHub:  
`git clone https://github.com/statgen/METAL.git`
3. Go inside the folder you just downloaded:  
`cd METAL`
4. Follow the instructions on the [METAL GitHub page](#) to build the program. That is:  
`mkdir build`  
`cd build`  
`/Applications/CMake.app/Contents/bin/cmake -DCMAKE_BUILD_TYPE=Release ..`  
`make`  
`make test`

**Troubleshooting:** if you receive an error saying “`make: command not found`”, install `make` by running the following two commands, then try running `make` again.

```
/bin/bash -c "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/HEAD/install.sh)"  
brew install make
```

If that still doesn't work, try `xcode-select --install`. This will download a collection of tools, including `make`. It is a large download and there is no option to download `make` separately, so it may take a few minutes.

That's it! You can find the METAL executable in `METAL/build/metal/` (i.e. it is the file named `metal` in the folder also named `metal`).

### GWAMA:

0. In your terminal, go to your home folder if you're not there already:  
`cd ~`
1. Download the GWAMA source code (found [here](#)):  
`curl -LO https://www.geenivaramu.ee/tools/GWAMA_v2.2.2.zip`
2. Unzip the files into a new directory, named `GWAMA`:  
`unzip GWAMA_v2.2.2.zip -d GWAMA`
3. Go inside:  
`cd GWAMA`
4. Build the program:  
`make`

That's it! You can now find the GWAMA executable in the folder, also called `GWAMA`.

## Linux

### Setup

1. **Open a terminal.** You might already be accessing Linux via a terminal. Linux desktop users could use a terminal emulator such as `xterm`, which should already be installed on most systems.
2. Then, **install dependencies.**

If you are using Linux by connecting to a **compute cluster**, dependencies are likely already installed.

If you are using Linux on your everyday **laptop/desktop computer**, how packages are installed depends on your Linux distribution. Below are install commands for a few common distributions:

- **Debian-based, such as Ubuntu:**

```
sudo apt-get update
sudo apt-get install cmake make g++ zlib1g-dev unzip
```
- **Fedora-based:**

```
sudo dnf update
sudo dnf install cmake make gcc zlib-devel unzip
```
- **Arch-based:**

```
sudo pacman -Syu
sudo pacman -S cmake make gcc zlib unzip
```

### Installing METAL/GWAMA (for [Linux](#))

#### METAL:

5. In your Linux terminal, go to your home folder if you are not there already:

```
cd ~
```
6. Download the METAL source code from GitHub:

```
git clone https://github.com/statgen/METAL.git
```
7. Go inside the folder you just downloaded:

```
cd METAL
```
8. Follow the instructions on the [METAL GitHub page](#) to build the program. That is:

```
mkdir build
cd build
cmake -DCMAKE_BUILD_TYPE=Release ..
make
make test
```

That's it! You can find the METAL executable in `METAL/build/metal/` (i.e. it is the file named `metal` in the folder also named `metal`).

#### GWAMA:

0. In your Linux terminal, go to your home folder if you're not there already:

```
cd ~
```
1. Download the GWAMA source code (found [here](#)):

```
curl -LO https://www.geenivaramu.ee/tools/GWAMA_v2.2.2.zip
```
2. Unzip the files into a new directory, named GWAMA:

```
unzip GWAMA_v2.2.2.zip -d GWAMA
```
3. Go inside:

```
cd GWAMA
```
4. Build the program:

```
make
```

That's it! You can now find the GWAMA executable in the folder, also called GWAMA.

## Quiz question to test your installation:

While installing METAL, **what number of tests** were run when you entered the command `make test`? (If you do not remember, you can navigate back to the `METAL/build/` directory in a terminal with the `cd` command and type `make test` again.) You should get some number between 1 and 20.