Setting Up Macaulay2 on Windows Using WSL and VS Code

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1. Install a Linux System on Windows

To use Macaulay2 on Windows, we will set up **Windows Subsystem for Linux (WSL)** with **Ubuntu**.

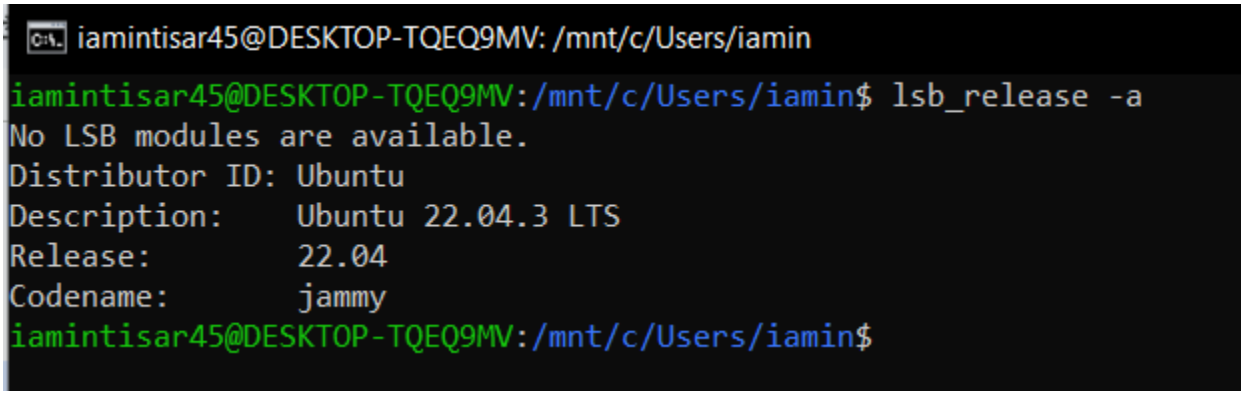
Open PowerShell/Command Prompt (as Administrator) and enable WSL:
sh
```
wsl --install
```
This installs the default Linux distribution (Ubuntu). If you need a specific version, check available distributions:
sh
```
wsl --list --online
```
Then install a specific version, e.g., Ubuntu 22.04:
sh
```
wsl --install -d Ubuntu-22.04
```
Launch **Ubuntu** by opening **Windows Terminal** and selecting "Ubuntu" or running:
sh
```
wsl
```

Set up your username and password when prompted. If installed correctly when you run wsl command in your command prompt it should look something like the following picture.

2. Check Ubuntu Version

Before installing Macaulay2, verify your Ubuntu version:

sh
```
lsb_release -a
```



3. Install Macaulay2 Using PPA

Most recent version of Macaulay2 is available for the following Ubuntu versions:

- Ubuntu 18.04 "Bionic Beaver"
- Ubuntu 20.04 "Focal Fossa"
- Ubuntu 22.04 "Jammy Jellyfish"
- Ubuntu 23.10 "Mantic Minotaur"
- Ubuntu 24.04 "Noble Numbat"

through a **Personal Package Archive (PPA)** maintained by Doug Torrance.

Add the repository:
sh
```
sudo add-apt-repository ppa:macaulay2/macaulay2
```
Update package lists:
sh
```
sudo apt update
```
Install Macaulay2:
sh
```
sudo apt install macaulay2
```
Verify installation by running:
sh
```
M2
```

This should launch the Macaulay2 interpreter. If installed properly running M2 command should look something like the following picture:

```
iamintisar45@DESKTOP-TQEQ9MV:/mnt/c/Users/iamin$ M2
Macaulay2, version 1.24.11
with packages: ConwayPolynomials, Elimination, IntegralClosure, InverseSystems, Isomorphism, LLLBases, MinimalPrimes,
               OnlineLookup, PackageCitations, Polyhedra, PrimaryDecomposition, ReesAlgebra, Saturation, TangentCone,
               Truncations, Varieties

i1 :
```

4. Setting Up VS Code for Macaulay2

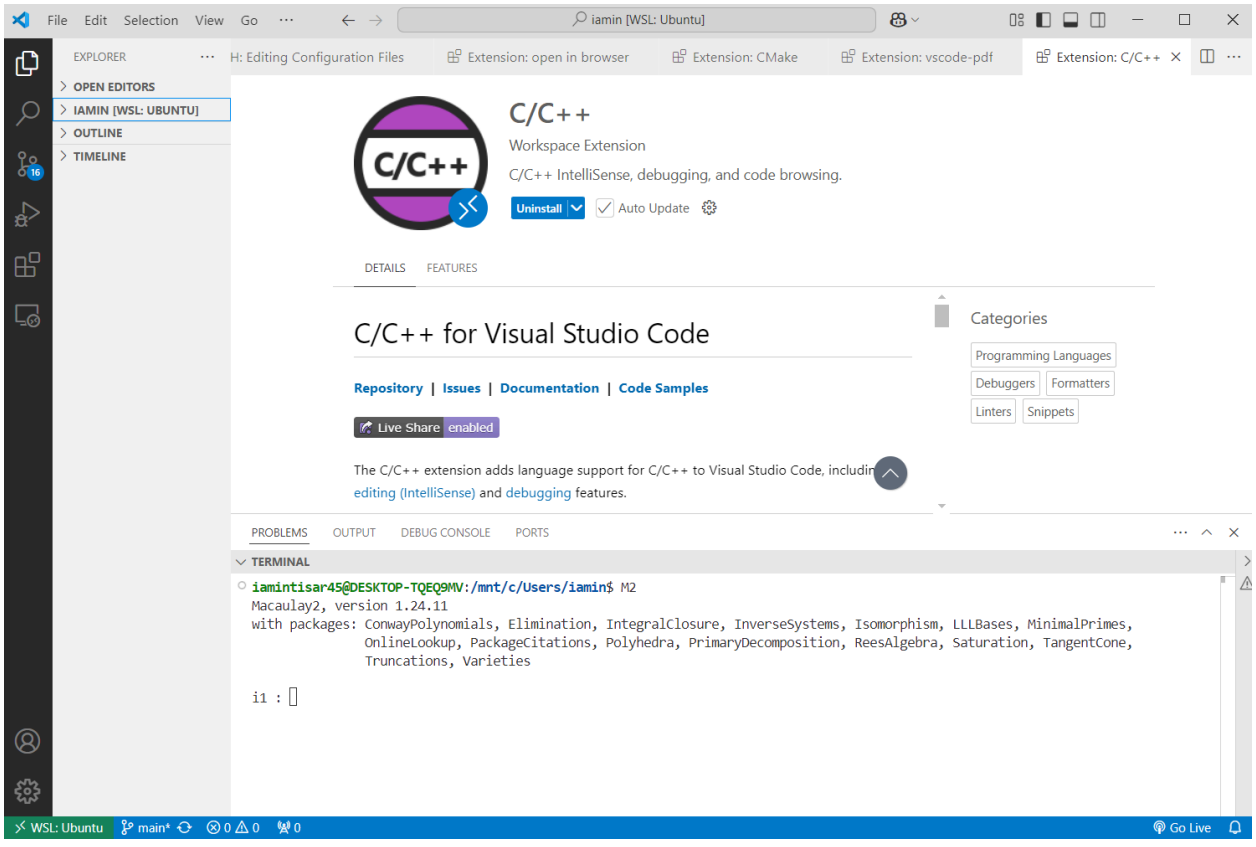
a) Install VS Code and WSL Extension

1. Download and install Visual Studio Code.
2. Open VS Code and install the **WSL extension** from the Extensions Marketplace.

Open a WSL terminal inside VS Code:
sh

```
code .
```

3. This opens VS Code inside the WSL filesystem.



b) Install Macaulay2 Extension in VS Code

1. Search for **"Macaulay2"** in the Extensions Marketplace.
2. Install the Macaulay2 extension to enable syntax highlighting and support.

5. Running Macaulay2 in VS Code

1. Open a **new file** in VS Code with a `.m2` extension (e.g., `test.m2`).
2. Write Macaulay2 code in the file.
3. Open the WSL terminal in VS Code.

Run the script using:
sh
```
M2 test.m2
```

This executes the Macaulay2 script inside WSL. Make sure you navigate to the directory where the .m2 file is stored before you run it. It should look something like the following picture.