note @7   **723** views

Software setup -- please read (and do parts of) this before the first lecture

CSC209 Software Setup

Credits: parts of this guide are taken from the software setup guide from a previous offering.

Please work through the different parts of this guide as soon as possible so that you are ready for CSC209 this term. Take this as an opportunity to really start the course with your best foot forward!

You may be used to doing most of your work on your own computer. In this course, much of your work will need to be done on a Linux machine, and all of your submissions **must** work on the lab machines. You can still do quite a bit of work on your own computer, but it will help to be comfortable with logging into the lab machines and working remotely.

A Unix-like environment on your computer

You'll want to set up a unix-like environment on your computer. This does not mean you have to install a new operating system, quite the contrary. For macOS, using terminal should be just fine, and for Windows 10, this guide will go through installing Windows Subsystem for Linux 2 (WSL2), which has good coverage for the needs of this course. In fact, WSL2 will work for CSC369 as well, if you choose to take that course in the future.

macOS instructions

This part of the guide was tested on macOS Catalina 10.15.7 but should work for later versions as well.

The good news here is that there isn't much to install. You'll just need to install `Command Line Tools for Xcode`, which you can do by opening up terminal and typing `git` or `gcc`. If you don't already have the tools installed, a popup should show up prompting the install. Otherwise, it's likely that you already have it installed. You can check by typing `gcc -v` into your terminal, something along the lines of `Apple clang version 11.0.0 ...` should show up.

Windows 10 instructions

Requirements: `Windows 10 version 2004, build 19041 or higher`. Open command prompt and type `ver` to check this.

```
C:\Users\haoch>ver

Microsoft Windows [Version 10.0.19041.508]

If your Windows version is older than the requirements, please update.
```

Follow these steps to install WSL on your computer. What this will do is install a virtual Linux kernel on your computer and allow you to use the command line tools necessary for this course.

1. **Enabling WSL**
   Go to `Control Panel` > `Programs` > `Programs and Features` > `Turn Windows features on or off`.
   Enable `Windows Subsystem for Linux` and `Virtual Machine Platform`.
   Click OK and restart your PC.

2. **Setting WSL to version 2**
   Open Windows PowerShell and run the command `wsl --set-default-version 2`.
   You might get a message that says `"WSL 2 requires an update to its kernel component."`.

If you get the above message, follow the link in the message and download and run the kernel installer (a `.msi` file), then run the wsl command again, which should succeed this time.

3. **Installing Ubuntu**
   Go to the Microsoft Store and install `Ubuntu 20.04 LTS` from `Canonical Group Limited`.
   Launch the app and set up a user account with your desired username and password.
   Run `sudo apt-get update`.
   Run `sudo apt-get upgrade` and enter `y` to confirm the command when prompted.

4. **Installing necessary tools**
   Within the Ubuntu shell, run `sudo apt-get install build-essential`.
   This will install the required tools like `gcc`, `make`, `valgrind`, etc which you will need for this course.
   Alternatively, you can choose to install each tool individually when you need it, a prompt will show up telling you what command needs to be run when you try to use a tool you don't have installed yet.

Note: be careful about using different versions of git on the same repository. The Ubuntu shell that you just installed comes with its own version of git, and you likely have some other version of git installed on Windows, make sure to only use one of these to manage your repository, or things could get messy!

Installing a good text editor (for both Windows and macOS)

When you program in C, like most other languages, each "C" file is just a text file, and can be edited by any text editing program. Some can run in terminal itself, like `vim`, `emacs`, or `nano`, and others are programs that you install separately. You can technically complete the course just by using Notepad (or Textedit in macOS), but that will probably be very painful. A good text editor will offer you luxuries like syntax-highlighting and some form of autocompletion.

With all that being said, my go-to recommendation for a text editor is VScode. You can also check out other text editors like Sublime Text or Atom.
These text editors are our default recommendation for most CSC209 students.

You may also choose to install a full-fledged IDE such as CLion, but these programs often have the effect of distancing you from the command-line processes that you should be learning about as part of this course. Furthermore, due to the complexities of these programs, course staff will not help provide technical support should you choose to use them.

SSH-ing into the lab machines

As mentioned in the beginning of this guide, all the code that you write must compile and work properly on the school servers. In order to test this, you can access the school server by running the command `ssh` `YOUR_UTORID@teach.cs.utoronto.ca` from `terminal` (macOS) or `WSL2` / `Command prompt` / `Powershell` (Windows). Once you are inside, obtain a copy of your code by git-cloning your MarkUs repository and test out your code there. Alternatively, you can figure out how to use the `scp` command to transfer files from your local computer to the server.

`Tip: you can set up ssh to not require a password every time you log in, Google how if you get tired of typing in your password.`

#pin

logistics

Updated 3 months ago by Haocheng Hu

followup discussions *for lingering questions and comments*   **3 endorsed followup comments**

◉ Resolved   ◯ Unresolved

Anonymous Helix 3 months ago
For ssh, is it the same password for your UTORID? I can't login.

helpful! | 0

> **Haocheng Hu** 3 months ago It is your teach.cs account password. You should have received an email to set that up
>
> good comment | 0

> **Anonymous Mouse** 3 months ago I don't recall receiving an email regarding this setup on my regular (@mail.utoronto.ca) email. Is there a way I can be forwarded the information necessary to complete my setup?
>
> helpful! | 0

> **Haocheng Hu** 3 months ago https://www.teach.cs.toronto.edu/winter2021
>
> This website should contain the links that you need.
>
> good comment | 1

> **Pouya G**   3 months ago I don't have teach.cs either. The create password page on the page you linked gives me the error *"Sorry, I don't know a Computer Science Teaching Labs account name for the UTORid [...]"*
>
> I am from UTM if that makes a difference. Should I email sysadmin?
>
> helpful! | 1

> **Haocheng Hu** 3 months ago If you are from UTM, you'll get an account created if this is your first course Downtown. That being said, I'm not sure when that will happen, so yup, you can email the sys admin.
>
> good comment | 0

◉ Resolved   ◯ Unresolved

Anonymous Beaker 3 months ago
I'm on Windows version 1909, latest build. I can update to version 20H2. Is 1909 okay or should I update to 20H2? Not sure how to get version 2004.

helpful! | 0

> **Haocheng Hu** 3 months ago 1909 doesnt work, 20H2 is fine, its the version after 2004
>
> good comment | 1

> **Anonymous Beaker** 3 months ago Wow never had such a fast response time. Thank you :)
>
> helpful! | 0

> **Haocheng Hu** 3 months ago None of your courses have hired me before ;)
>
> good comment | 0

> **Danny Chen**   3 months ago The wild Haocheng uses his Linux prowess to pounce problematic programs.
> It's a rare species and truly a sight to see... :P
> helpful! | 1

○ Resolved ○ Unresolved

Anonymous Calc 3 months ago

```
Installing, this may take a few minutes...
WslRegisterDistribution failed with error: 0x80370102
Error: 0x80370102 The virtual machine could not be started because a required feature is not installed.

Press any key to continue...
```

I keep getting this when launching ubuntu, followed all previous steps and I am on the right version.

helpful! | 0

> **Anonymous Calc** 3 months ago nvm I fixed it, I had to enable virtualization of my CPU in the BIOS if anyone else runs into this issue. For AMD CPUs the setting is SVM Mode.
>
> helpful! | 2

> **Haocheng Hu** 3 months ago Thanks for posting your fix!
>
> good comment | 0

> **Anonymous Poet** 3 months ago How did you access BIOS to enable the virtualization of Intel CPU?
>
> helpful! | 0

> **Haocheng Hu** 3 months ago Depends on the bios, it's usually a key like F12 on startup. You'll have to google.
>
> good comment | 1

> **Anonymous Poet** 3 months ago Hey yall, this is how I accessed BIOS + enabled virtualization on Intel CPU. The same steps can be used for most Windows 10 devices, so try this if you are stuck with the problem described above:
> 1. go to settings > update & security > recovery, under advanced startup, select restart now
> 2. this should bring you to a blue screen with a few options, select troubleshoot > advanced options > UEFI Firmware settings
> 3. a very sketchy looking BIOS setup utility interface should be displayed, use your arrow keys to navigate to configurations, under configurations, enable Intel Virtualization using your enter key & navigate to exit menu and select exit saving changes
> 4. your device will shut down, just restart again and run Ubuntu again, it should tell you to enter a username and password (ps. you cannot see your password in the Ubuntu shell when you enter it, this is normal)
>
> **~ An instructor (Haocheng Hu) thinks this is a good comment ~**
>
> helpful! | 3

> **Haocheng Hu** 3 months ago Thanks for sharing!
>
> good comment | 0

> **Anonymous Beaker 2** 3 months ago For me I couldn't access the bios like that, maybe cause my laptop is using fast startup. I had to reboot and press enter to interrupt normal startup. I found virtualizaiton settings in the security menu.
>
> helpful! | 0

○ Resolved ○ Unresolved

Anonymous Comp 3 months ago
Is there an instruction on how to update the OS version of windows 10? I am not sure what's happening. I try to update the version using the setting tool of windows, but after that, my windows version is still 18363.

I will really appreciate if someone knows how to fix this. `10. 0. 18363. 1256]`

helpful! │ 0

> **Anonymous Gear** 3 months ago   The update usually takes 3 hours I think you checked for updates and so you have to download the updates
> helpful! │ 0

> **Anonymous Beaker** 3 months ago   In the Windows Update settings screen you download the update and then it'll ask you to restart your pc to update it. Do that. Or are you saying that your installation failed? If it did try the windows update assistant on the Microsoft website. I had some strange issues as well and I tried a bunch of things but using the assistant fixed it somehow.
> helpful! │ 0

> **Haocheng Hu** 3 months ago   Hard for me to diagnose over piazza, you can try to get help during the tutorial, im sure some TA will be using windows and will know how to update
> good comment │ 0

> **Nabeel Rafid**   3 months ago   I had the same problem where I was stuck in some older version and even though I would keep checking for updates it would say my Windows version is up to date. To fix it I joined the Windows Insider program. Once you join the Insider program you can pick three different options: Dev Channel (least stable updates), Beta Channel, and Release Preview Channel (most stable). You can pick any three but I decided to go with Release Preview Channel as it was the most stable option. Then Windows Update let me update to version 20H2 which is high enough.
> **~ An instructor (Haocheng Hu) thinks this is a good comment ~**
> helpful! │ 1

● Resolved   ○ Unresolved

Anonymous Scale 3 months ago
Hi, I have difficulty with the **SSH-ing into the lab machines** part. In particular, I'm stuck here at this step: "once you are inside, obtain a copy of your code by git-cloning your MarkUs repository". How do we find out the name of our Markus repository? I tried my utorid but it didn't work.
helpful! │ 2

> **Nabeel Rafid**   3 months ago   You can't find the name of your Markus repo as the Markus page for 209 hasn't been released yet.
> helpful! │ 1

> **Haocheng Hu** 3 months ago   ^yup, your markus hasnt been released yet, as long as you managed to ssh thats good!
> good comment │ 2

● Resolved   ○ Unresolved

Anonymous Atom 3 months ago
I'm a little confused by the ssh-ing into lab machines and Markus part. I know how to ssh into a teaching lab machine and transfer files to and from the lab to my local machine and run a C program remotely. I also understand how to clone, add, commit and push to the Markus server, for example, using the interface provided by VScode. But I don't know if there's a connection between the two, will the Markus repo appear on the lab machine once it is set up, or the idea of ssh-ing into a lab machine is just for testing purposes.

That means we clone or transfer our files onto the lab machine and do a test run, but this does not affect the submission of the files, submission is just pushing onto Markus repo.

helpful! | 0

> **Haocheng Hu** 3 months ago Thats right. The point is that after you push, you clone again on the remote server to ensure that it works on the lab machine
>
> good comment | 0

◉ Resolved ○ Unresolved

Anonymous Helix 2 3 months ago
I have problems with the part **SSH-ing into the lab machines**. I'm wondering what's the meaning of **WSL2/Command prompt/Powershell (Windows).** Could someone please explain that where should I type this line of code?

helpful! | 0

> **Haocheng Hu** 3 months ago Its 3 separate programs, choose one
>
> good comment | 0

> **Anonymous Helix 2** 3 months ago Thanks for the help!
> However, then I meet this problem...
>
> ```
> The authenticity of host 'teach.cs.utoronto.ca (128.100.31.200)' can't be established.
> ECDSA key fingerprint is SHA256:40s6nimYtOYH3dWrCOGFYOU8SvOdT/24s4d3NHM96P8.
> Are you sure you want to continue connecting (yes/no)?
> ```
>
> helpful! | 0

> **Haocheng Hu** 3 months ago Type yes
>
> good comment | 0

> **Anonymous Calc 3** 3 months ago after I type yes here, I see this and nothing happens:
>
> ```
> The authenticity of host 'teach.cs.utoronto.ca (128.100.31.200)' can't be established.
> ECDSA key fingerprint is SHA256:40s6nimYtOYH3dWrCOGFYOU8SvOdT/24s4d3NHM96P8.
> Are you sure you want to continue connecting (yes/no)? yes
> Warning: Permanently added 'teach.cs.utoronto.ca' (ECDSA) to the list of known hosts.
>         ⱥteach.cs.utoronto.ca's password: 🔒
> ```
>
> helpful! | 0

> **Anonymous Calc 3** 3 months ago never mind, apparently the terminal just hides your password input but i typed my password then pressed return and it worked :)
> helpful! | 0

◉ Resolved ○ Unresolved

Anonymous Mouse 2 3 months ago
I cannot find the *windows system for Linux* option on my computer. I have win10 and the version is up-to-date.

helpful! | 0

> **Haocheng Hu** 3 months ago Which version do you have?
>
> good comment | 1

> **Anonymous Mouse 2** 3 months ago Version 10.0.19042.685

would this be enough?

helpful! | 0

Haocheng Hu 3 months ago Should be, you have windows home or pro right?

good comment | 0

Anonymous Mouse 2 3 months ago yup! I can only find the Virtual Machine Platform

helpful! | 0

Haocheng Hu 3 months ago That's weird, could you look at the options one more time? wsl should be there

good comment | 0

Anonymous Mouse 2 3 months ago omg! nvm I find it! Really thank you for your help !!!

helpful! | 0

Haocheng Hu 3 months ago Ok!

good comment | 0

◉ Resolved ◯ Unresolved

Ali Syed 3 months ago Hello there,

Just wanted to confirm, but these are the only software installation instructions needed for CSC209. Professor Nathan mentioned that we should also take a look at Quercus, but I don't think there are any software installations on Quercus.

Please let me know and thank you.

helpful! | 1

Haocheng Hu 3 months ago following this should be fine for now

good comment | 1

◉ Resolved ◯ Unresolved

Ali Syed 3 months ago Hi there!

I had a question about the following note on the software installation instructions:

"Note: be careful about using different versions of git on the same repository. The Ubuntu shell that you just installed comes with its own version of git, and you likely have some other version of git installed on Windows, make sure to only use one of these to manage your repository, or things could get messy!"

How do we make sure that we don't run into this issue? Should be simply be checking the verison of git we are using, or we should only be using Ubuntu to process git commands? Is that enough to avoid any issue with the note above.

Thank you in advance.

helpful! | 0

Haocheng Hu 3 months ago   this depends on how you are using git, what are you using now? git bash?

good comment | 1

Nathan Wiebe 3 months ago   I would recommend just using the git that comes installed with Ubuntu in the windows subsystem. I had no problems git cloning the repo from the command line (command: git clone <url>) once there. There's a bunch of other stuff you could use, but I'd recommend focusing on doing this in bash in WSL myself to avoid confusion about different git installs.

good comment | 1

Ali Syed 3 months ago   Oh awesome, thank you so much. Previously I used the Windows command line and used git commands through that. I will follow Professor Nathan's advice and just use Git in the Ubuntu shell.

helpful! | 0

⦿ Resolved   ◯ Unresolved

Anonymous Calc 2 3 months ago
I am having some trouble SSHing into the lab machines. When it asks me for the password, I simply cannot type in anything from the keyboard or copy-paste. The only working key is ENTER which doesn't really helped :/ I think I was able to login the first time, but not in any of the subsequent attempts. Does anyone know how to fix this?

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\WINDOWS\system32> ssh          @teach.cs.utoronto.ca
          @teach.cs.utoronto.ca's password:
Permission denied, please try again.
          @teach.cs.utoronto.ca's password:
```

Thank you in advance!

helpful! | 0

Nathan Wiebe 3 months ago   Hi Jun, one of the things about SSH is that the pwd is intentionally blanked out. So the key

```
nawiebe@DESKTOP-F2QF64T:~/209-shared$ ssh nawiebe@teach.cs.toronto.edu
The authenticity of host 'teach.cs.toronto.edu (128.100.31.200)' can't be established.
ECDSA key fingerprint is SHA256:40s6nimYtOYH3dWrC0GFYOU8Sv0dT/24s4d3NHM96P8.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'teach.cs.toronto.edu,128.100.31.200' (ECDSA) to the list of known hosts.
nawiebe@teach.cs.toronto.edu's password:
Permission denied, please try again.
nawiebe@teach.cs.toronto.edu's password:
```

Above I typed an incorrect pwd and then the correct one with the login. Note that in both cases no text was output to the screen but you kinda have to just trust it that you are typing. Also if you think you made a mistake, the best way to fix the typo is just to press backspace for a while until you clear the buffer then try typing the password again.

good comment | 2

⦿ Resolved   ◯ Unresolved

Vladimir Caterov 3 months ago

Hello! I am having some trouble setting WSL to version 2. Everytime I enter the command "wsl --set-default-version 2". I have added Virtual Machine Platform and Windows Subsystem for Linux.

☑ Virtual Machine Platform
☐ Windows Hypervisor Platform
☐ Windows Identity Foundation 3.5
⊞ ☑ Windows PowerShell 2.0
⊞ ☐ Windows Process Activation Service
☐ Windows Projected File System
☑ Windows Subsystem for Linux
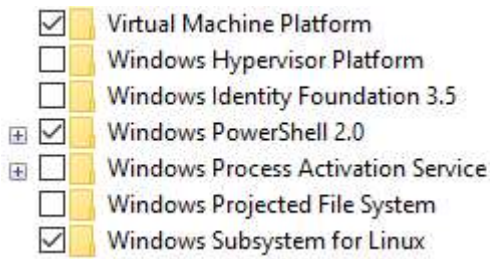
The error is:

```
PS C:\Users\Vladimir> wsl --set-default-version 2
For information on key differences with WSL 2 please visit https://aka.ms/wsl2
```

Any help would be greatly appreciated!

helpful! │ 0

Vladimir Caterov 3 months ago   Nevermind I think it's all good now

helpful! │ 0

Qiaoyiwen Wu 3 months ago   Hi, I got this same comment. Does this matter or should I fix something? Thanks!

helpful! │ 0

Qiaoyiwen Wu 3 months ago   Hi, I got this same comment. Does this matter or should I fix something? Thanks!

helpful! │ 0

◉ Resolved   ○ Unresolved

Anonymous Comp 2 3 months ago
I am had a question about the version on macOs, input gcc -v show:

"Configured with: --prefix=/Library/Developer/CommandLineTools/usr --with-gxx-include-dir=/Library/Developer/CommandLineTools/SDKs/MacOSX10.14.sdk/usr/include/c++/4.2.1
Apple LLVM version 10.0.1 (clang-1001.0.46.4)
Target: x86_64-apple-darwin18.7.0
Thread model: posix
InstalledDir: /Library/Developer/CommandLineTools/usr/bin"

Do I need to update the version and how?
Thanks.

helpful! │ 0

Haocheng Hu 3 months ago   you dont need to update, dont worry.

good comment │ 1

◉ Resolved   ○ Unresolved

Anonymous Gear 2 3 months ago
"Once you are inside, obtain a copy of your code by git-cloning your MarkUs repository and test out your code there. Alternatively, you can figure out how to use the `scp` command to transfer files from your local computer to the server."

How do I git-clone my MarkUs repository? I have the url, just not sure what to do.

helpful! | 0

Anonymous Gear 3 months ago Simply on the directory type the command git clone <url>

helpful! | 1

Anonymous Gear 2 3 months ago is this on ubuntu or powershell? does it matter where we do it?

helpful! | 0

◉ Resolved   ○ Unresolved

Anonymous Scale 2 3 months ago
Hi, I got these errors when I'm trying to do step 3. Can anyone help me?

...

helpful! | 0

Haocheng Hu   3 months ago   hi could you look at some of the follow ups? someone has run into a similar problem before

good comment | 0

Anonymous Scale 2   3 months ago   I fixed it by changing Windows Firewall settings.
Windows10 WSL2 Ubuntu / Debian # apt-get update failed # no network - Stack Overflow
      ~ An instructor (Haocheng Hu) thinks this is a good comment ~

helpful! | 1

Haocheng Hu   3 months ago   Excellent job!

good comment | 0

Anonymous Beaker 3   3 months ago   Hi I ran into the same problem but I am stuck at the step to edit the nameserver to 8.8.8.8.
When I try $ sudo nano /etc/resolv.conf, I can only read but not edit anything. If you fixed this, could you show me how?

helpful! | 0

🔵 Resolved   ⚪ Unresolved

Anonymous Poet 2   3 months ago

Are there any advantages to using Linux over WSL? Currently debating on which to boot my laptop with, or maybe even dual-booting

helpful! | 0

> **Haocheng Hu** 3 months ago not for this course imo, I'd just use WSL
>
> good comment | 0

◉ Resolved ○ Unresolved

Anonymous Atom 2 3 months ago Hi, I am unable to supply any password to the ubuntu launcher, I can type in a username but for some reason when it asks for a new password my keyboard won't accept any inputs.

helpful! | 0

> **Haocheng Hu** 3 months ago its not showing the password for security, just type it in and press enter
>
> good comment | 0

> **Anonymous Atom 2** 3 months ago ah I see thanks
>
> helpful! | 0

◉ Resolved ○ Unresolved

Anonymous Helix 3 3 months ago
Hi, I was trying to type in a password to the ubuntu launcher, and since I thought it was not accepting keyboard inputs, I tried closing ubuntu and opening it up again. I just saw the post that its not supposed to show the password. However, when I open ubuntu again, it doesn't ask me for a new username and password. Do you know how I could fix this?

helpful! | 0

> **Haocheng Hu** 3 months ago a surefire way to fix it is to just re-install the ubuntu app and go through setup again
>
> good comment | 0

> **Anonymous Helix 3** 3 months ago Thanks, I did that and I created a new account. Initially, when I closed ubuntu and reopened it and it didn't ask for a username or password did that mean an account was created? If so, will there be a problem now with having two accounts since I created a new account?
>
> helpful! | 0

> **Haocheng Hu** 3 months ago im not exactly sure to be honest, there are ways to check, but as long as its working now i dont think there is a need to
>
> good comment | 0

◉ Resolved ○ Unresolved

Anonymous Mouse 3 3 months ago
After typing gcc -v, I got this:

```
Configured with: --prefix=/Library/Developer/CommandLineTools/usr --with-gxx-inc
lude-dir=/usr/include/c++/4.2.1
Apple LLVM version 10.0.0 (clang-1000.10.44.4)
Target: x86_64-apple-darwin17.7.0
Thread model: posix
InstalledDir: /Library/Developer/CommandLineTools/usr/bin
```

Do I need to do anything?

And also, for SSH-ing into the lab machines,

```
The authenticity of host 'teach.cs.utoronto.ca (128.100.31.200)' can't be establ
ished.
ECDSA key fingerprint is SHA256:40s6nimYtOYH3dWrC0GFYOU8Sv0dT/24s4d3NHM96P8.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'teach.cs.utoronto.ca,128.100.31.200' (ECDSA) to the
list of known hosts.
Connection closed by 128.100.31.200 port 22
```

What should I do next? Thank you for your help!

helpful! | 0

Haocheng Hu 3 months ago first part is fine, for the second part are you able to run commands on the server? if so then youre good

good comment | 0

Anonymous Mouse 3 3 months ago I typed "ssh YOUR_UTORID@teach.cs.utoronto.ca" again and I am able to log in. Can I just type git clone <URL of lab1>?

helpful! | 0

Haocheng Hu 3 months ago did you replace the utorid with your actual utorid?

good comment | 0

Anonymous Mouse 3 3 months ago yes

helpful! | 0

Haocheng Hu 3 months ago you should be able to ssh, although its fine to do it on your own pc first and then try to get a TAs help on friday

good comment | 0

Anonymous Mouse 3 3 months ago Thank you so much!

helpful! | 0

Haocheng Hu 3 months ago np

good comment | 0