EECS 402 – Discussion 1
Logistics, Connecting to CAEN

Jan 15th, 2024 – BBB 1620

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Logistics, Connecting to CAEN

Jan 15, 2025 – GFL 224

Welcome to EECS 402!

- See Canvas for Detailed Syllabus
- Discussion:
  - Reinforce Concepts from Lecture
  - Discuss projects
  - Practice course content using examples and problems
  - Ask questions about course content, concepts, projects, etc.

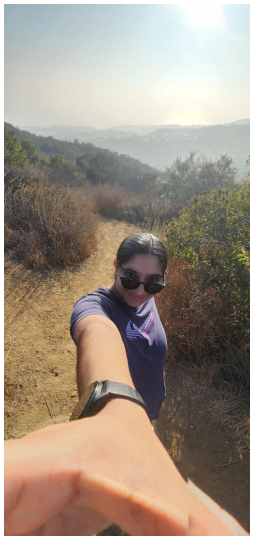
A Little About Me

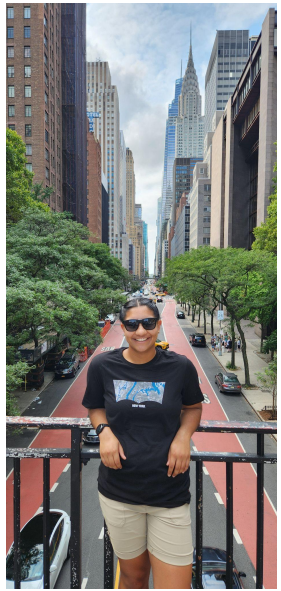
- From the DC area!
- Senior in Computer Science (CoE)
- Starting at Microsoft full-time in August!
  - Azure Kubernetes Service team
- Hobbies (when I have time): hiking, swimming, cooking, playing guitar
- 3rd time IA for 402
- Please reach out to me for anything you need!!

Email: abiduke@umich.edu

A Little About Me

- From the East Lansing area!
- Junior, major in Computer Science and minor in Statistics
- Interned at General Motors this past summer in Warren
  - Infotainment System
- Hobbies (when I have time): hiking, tennis, reading, dancing
- 1st time IA for 402





Email: pawarp@umich.edu

Some Course Tips

- **Start projects early**
- Come to office hours if you need help
- Check Piazza often

Useful resources:

- https://en.cppreference.com/w/cpp
- https://www.cplusplus.com
- https://www.stackoverflow.com
- Google searches

Be careful that external resources comply with course standards and the honor code

Course Logistics

Discussion

Feel free to go to either discussion (space permitting).

Prabhleen:

- 9:30–10:30 AM every Wednesday
- 224 GFL

Abby:

- 3:30–4:30 PM every Wednesday
- 1620 BEYSTER
- You are here!

Office Hours

Abby:

- M/W 12:30-2:30
- BBB Learning Center
- Can ask for Zoom if necessary (email me!)

Prabhleen:

- TBA

Please reach out to us in office hours – We are here to help! Feel free to stop by to say hi

Discussion Assignments

- Weekly assignments related to material covered in discussion
- Released Wednesday mornings and due by 11:59 pm that day
- Format: Canvas quiz
- Three attempts, but **you will not see your score** until grading is finished
  - To prevent issues with accidental/blank submissions, etc.
- Your **Final Attempt** will be graded
- Should be possible to complete most or all of the assignment in the discussion period
- Time will be given and we will collaborate on some problems

Recordings

- Discussion recordings will be released approx. the day after the discussion takes place.

Piazza

Please register for the course piazza ASAP if you have not already!

Important updates will be posted here – you are responsible for keeping up to date

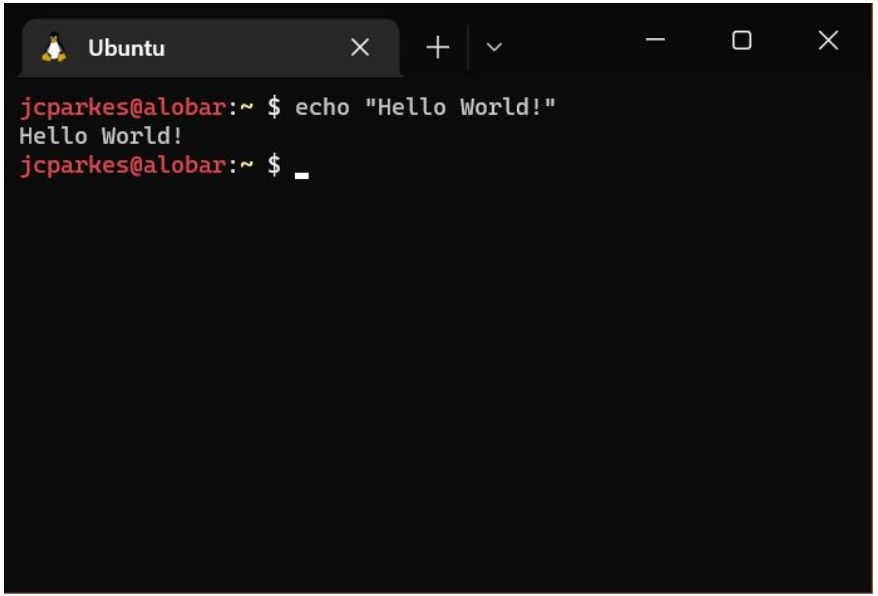
Helpful when working on your projects

Terminals / Connecting to CAEN

Terminals

Terminal – interface that lets you ‘talk to’ the computer through the shell/command line

- Issue commands
- Modify files
- Execute programs



Terminals

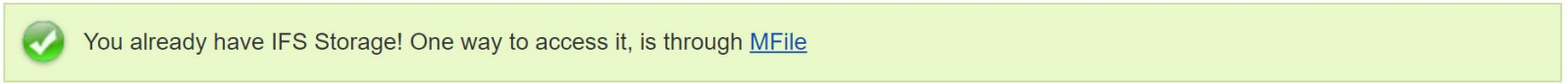
Your operating system likely has a built-in terminal emulator program:

- Windows: windows key ➔ command prompt OR powershell
- MacOS: search apps for terminal
- Ubuntu Linux: Ctrl+Alt+T
  - If you have a Windows machine, I would recommend installing Ubuntu!
  - https://learn.microsoft.com/en-us/windows/wsl/install

Try opening the terminal on your machine

Getting a CAEN Account

- Go to https://ifsprovisioning.its.umich.edu/ifs_storage/request
- If you see the following, you're set



- Otherwise, you need to request a CAEN account

Connecting to CAEN (ssh)

ssh: “secure shell,” lets you login to University linux servers remotely

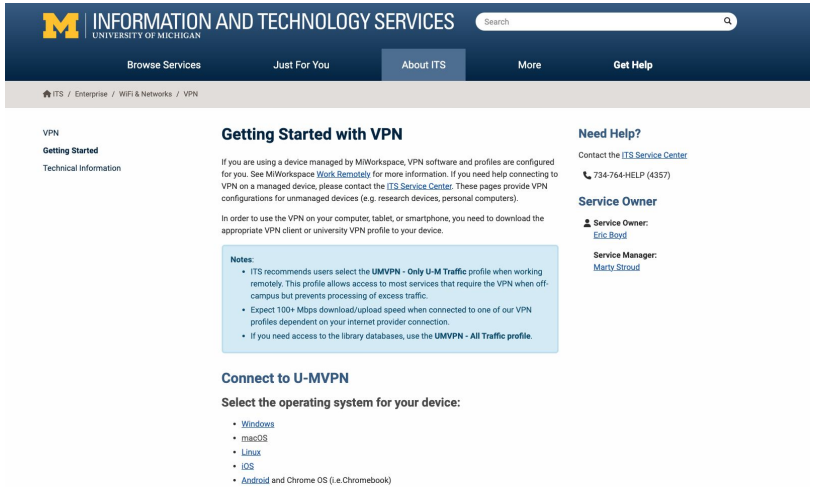
CAEN: “Computer Aided Engineering Network,” the University’s computing network that you can access

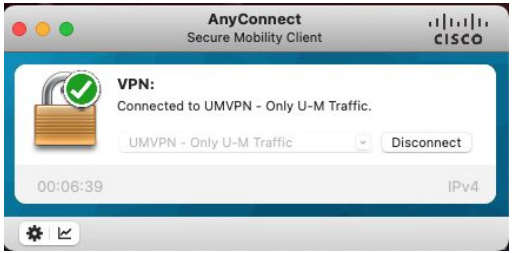
- Provides a linux environment to work in
- Has all of the software that you need for this course, preinstalled
- Has the version of gcc that we will use to grade your work

Alternative: If you have a Windows machine and you want to install an ubuntu subsystem, follow EECS280 tutorial – WSL

Connecting to CAEN with the VPN

- Can’t ssh into CAEN when not on the UofM network now
- Need to use a VPN (Cisco AnyConnect)
- https://its.umich.edu/enterprise/wifi-networks/vpn/getting-started





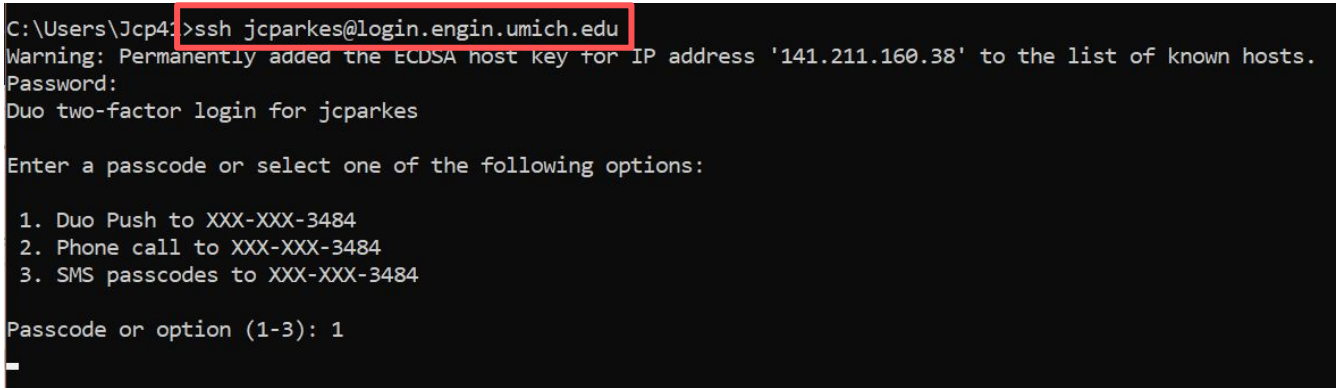
Connecting to CAEN (ssh)

To ssh into CAEN:

- Open your terminal or command line, if not opened

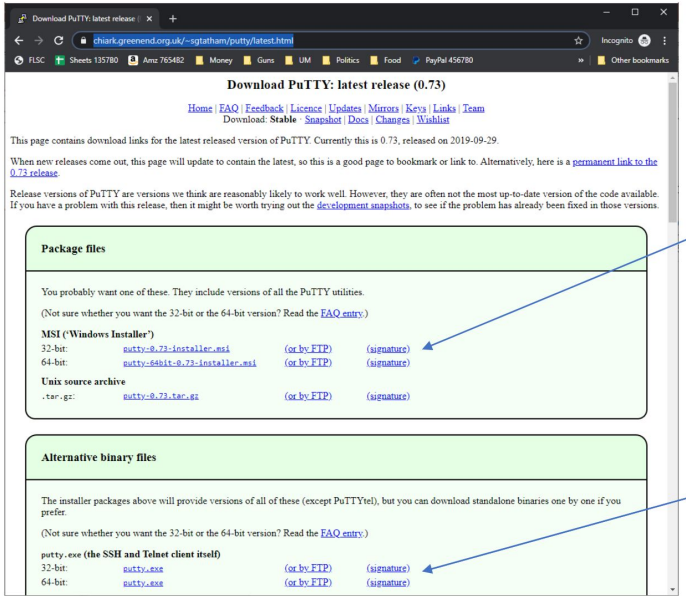
  $ ssh <uniqname>@login.engin.umich.edu

- Enter your password and deal with duo



Connecting to CAEN (PuTTY)

- Download Putty: https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html



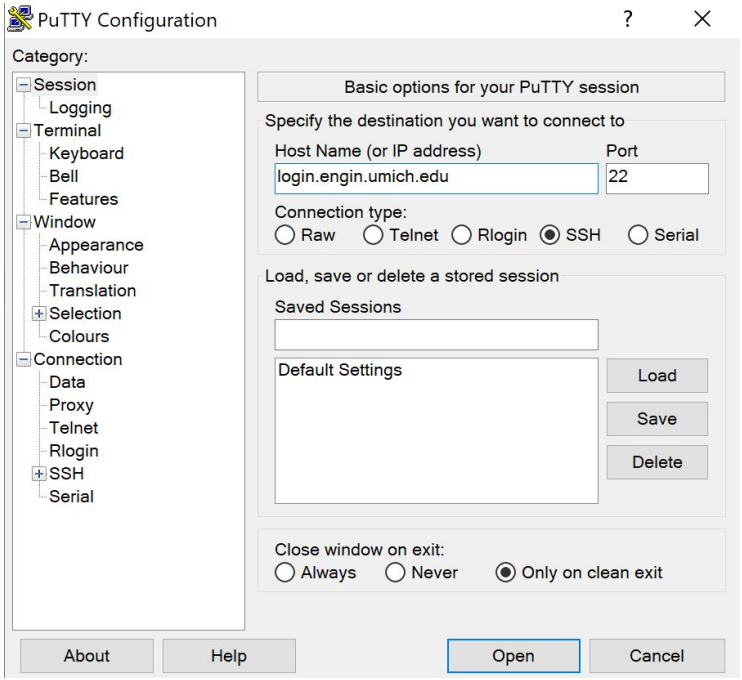
Download this one to install the putty program as you would any other program

If you don't want to install it, or don't have permissions to install it, download this one instead. You can execute this directly, without installing anything.

Connecting to CAEN (PuTTY) Cont.

Open PuTTy

ENGR



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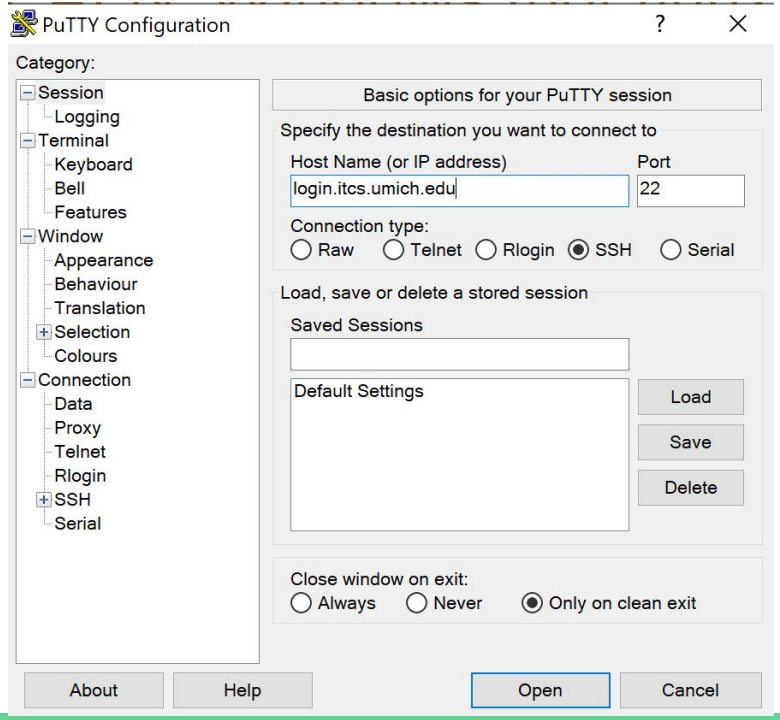


You Are Now Connected to CAEN :)

Working on CAEN Linux

Linux Commands

- **pwd** (print working directory): prints current working directory
- **ls** (list): prints a list of the contents of your current directory
- **ls -l** : lists all the contents with extra information
- **mkdir <name>**: makes a new directory with the name you give
- **cd <directory name>**: changes your current directory to be the name you give if that directory exists within the current directory
- **cd ..** : changes your current directory to be “up one” from the directory you are in
- **rm <filename>** : removes a file of the name you give if that filename exists
- **touch <filename>** : adds a file to the current directory with given name

Note: usually exclude the ‘<’ and ‘>’ symbols when typing a command!!

Larger list: https://ss64.com/bash/

- man <command>: access linux manual pages (useful to learn specifics of commands!)

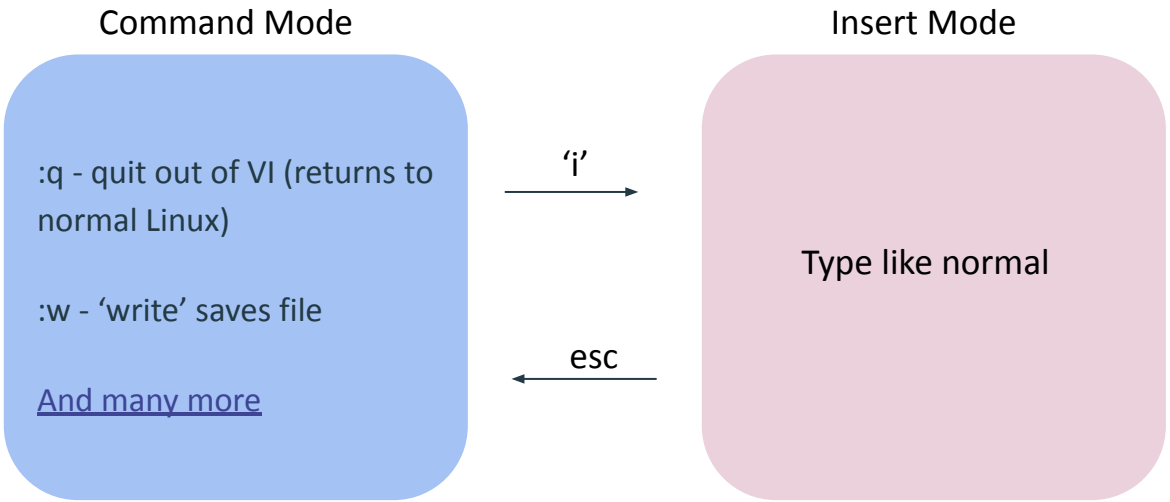
Editing Files with vim

vim: command line editor you can use to modify files on CAEN

- Stands for *vi improved*
- Available pretty much everywhere, or easily installable with a single command
- Somewhat difficult learning curve
- Can make workflow extremely efficient
- Invoke vim using **$ vim <filename>**
    - Creates file if it does not exist

Editing files with vim

- Vim is a **modal** editor



Always starts in command mode!

Copying Files to CAEN

Getting Files to CAEN

Recommended: FileZilla (https://filezilla-project.org/download.php?show_all=1)

- Note: Please use the link above. The “main download page” gave a previous IA a virus (yikes!)

Other options: **rsync**

- **Note: name files and folders without spaces to make your life easier**

Rsync

- Easy command to move things to CAEN!
- Command:

  rsync -rtv <src_folder> <username>@login.engin.umich.edu:<dest_folder>

- Example:

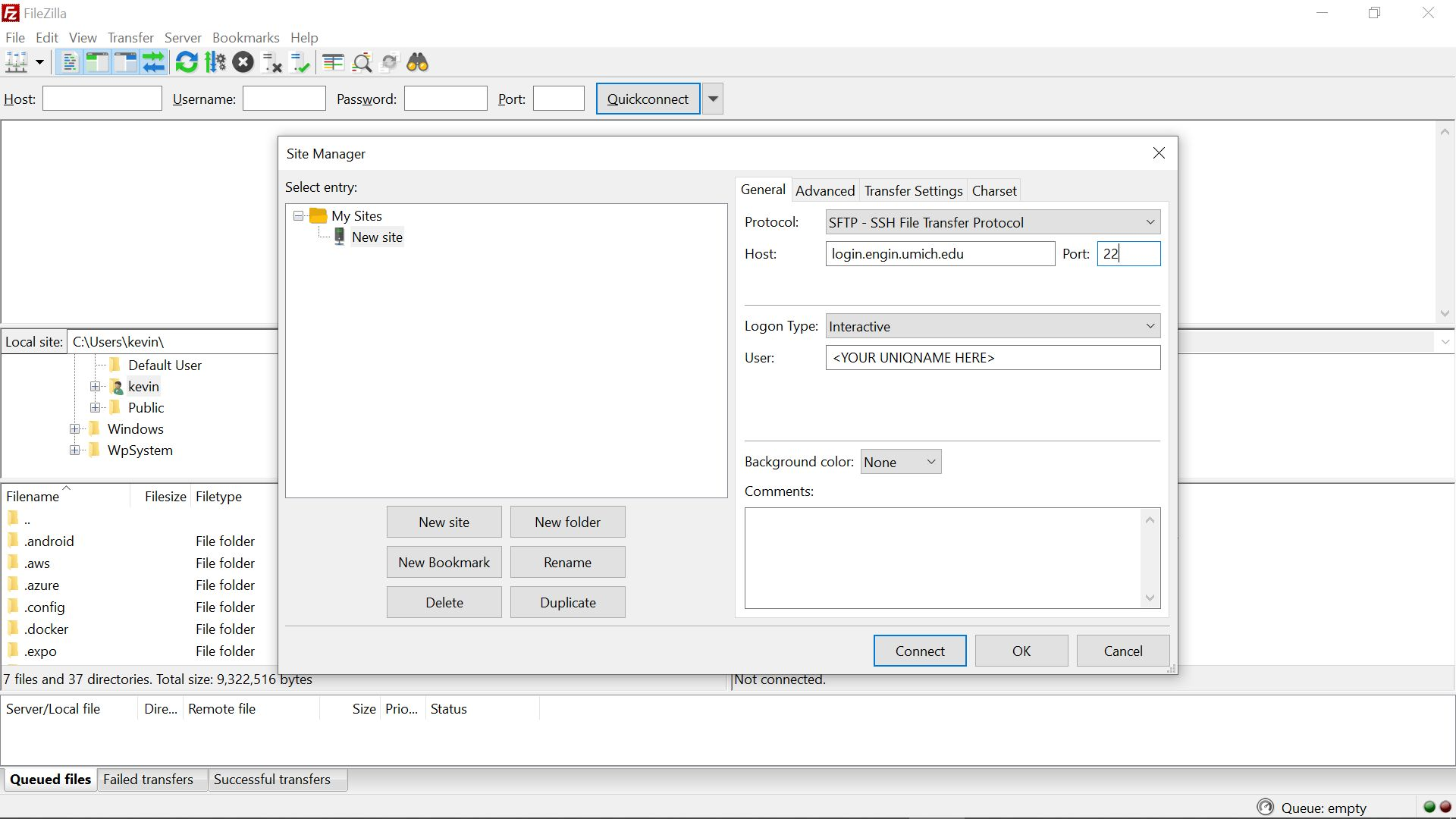
  rsync -rtv my_folder/ abiduke@login.engin.umich.edu:caen_folder/ (remote ➜ local)

  rsync -rtv abiduke@login.engin.umich.edu:caen_folder/ my_folder/ (local ➜ remote)

- Afterwards, caen_folder will contain my_folder
- Be careful with arguments!! (-rtv)
  - Could potentially accidentally overwrite things
  - I like to just use it to make copies
- See EECS 280 tutorial(s) for more information: https://eecs280staff.github.io/tutorials/setup_caen.html

Setting Up FileZilla

1. Download the version that works for your OS
    a. https://filezilla-project.org/download.php?show_all=1 (Use this link, NOT the main link)
2. Open the Site Manager (File -> Site Manager) and click “New site”
3. Set “Protocol:” to **SFTP**
4. Set “Host:” to **login.engin.umich.edu** (CoE) (and port 22)
5. Set “Logon Type:” to **Interactive**
6. Set “User:” to **your uniqname** (Ex. yankevn)


FileZilla
File Edit View Transfer Server Bookmarks Help
Host: Username: Password: Port: Quickconnect
Site Manager
Select entry:
My Sites
New site
General Advanced Transfer Settings Charset
Protocol: SFTP - SSH File Transfer Protocol
Host: login.engin.umich.edu Port: 22
Logon Type: Interactive
User: <YOUR UNIQNAME HERE>
Background color: None
Comments:
New site New folder
New Bookmark Rename
Delete Duplicate
Connect OK Cancel
Local site: C:\Users\kevin\
Default User
kevin
Public
Windows
WpSystem
Filename Filesize Filetype
.. File folder
.android File folder
.aws File folder
.azure File folder
.config File folder
.docker File folder
.expo File folder
7 files and 37 directories. Total size: 9,322,516 bytes
Not connected.
Server/Local file Dire... Remote file Size Prio... Status
Queued files Failed transfers Successful transfers
Queue: empty

FileZilla Quality of Life Change

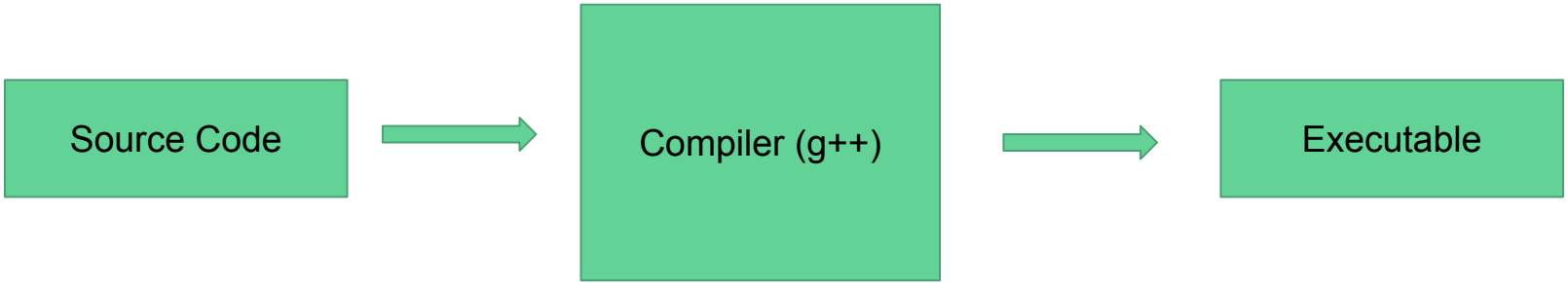
- You may notice FileZilla asks you to reauthenticate with each file transfer/operation
    a. This is because FileZilla uses a new connection for each transfer
- To fix, do the following:
    a. Open Site Manager (File -> Site Manager)
    b. Go to Transfer Settings
    c. Make sure the "Limit number of simultaneous connections" is checked and set the value to 1

Compiling With g++

Compilers

A compiler is a program that translates your code into something the machine can understand

- We write source code
- We compile the source code into an executable (*.exe)
- We can run the program



Compiling with g++

1. Connect to CAEN (ssh or PuTTY)
2. Move to the directory of your source code (*.cpp)
3. Compile the program:

   $ g++ -std=c++98 -Wall helloworld.cpp -o helloworld.exe

   - **g++** – our compiler (GNU C++ compiler)
   - **-std=c++98** – enforces the c++98 standard (the C++ version we use)
   - **-Wall** – gives you extra warnings to help find bugs
   - **helloworld.cpp** – your source code
   - **-o helloworld.exe** – output to this executable

4. Run the program:

   $ ./helloworld.exe

Compiling Exercise: Hello World

```
1  #include <iostream>
2
3  using namespace std;
4
5  int main()
6  {
7      cout << "Hello World!" << endl;
8      return 0;
9  }
10
```

```
[jcparkes@caen-vnc-mi08 eecs402]$ ./helloworld.exe
Hello World!
[jcparkes@caen-vnc-mi08 eecs402]$
```

Some quick vim config

$ cd ~

$ vim .vimrc

Add the following:

syntax on

set number

set colorcolumn=81

Lots of other cool stuff you can do – search google!

Lab Assignment

- Under the “Quizzes” Tab on Canvas
- A couple of questions on linux commands and compilation process
- Screenshot of your CAEN environment with ‘pwd’ and ‘hostname’ displayed.