Lab 1

Overview

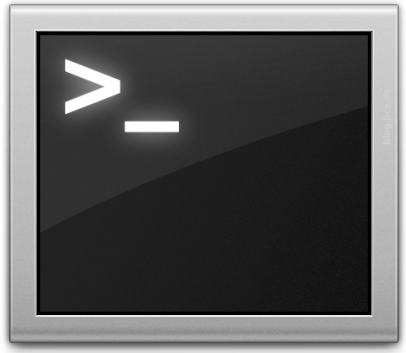
- Learn how to use the command line to navigate and manipulate files as well as compile and run your embedded programs
- Install the Arduino compiler and other software
- Test your connection by modifying a pre-defined program and flashing it to the Arduino to see it execute
  - If you have not received your Arduino yet this step can be done later.

Using the Command line

- Startup Windows Command Prompt

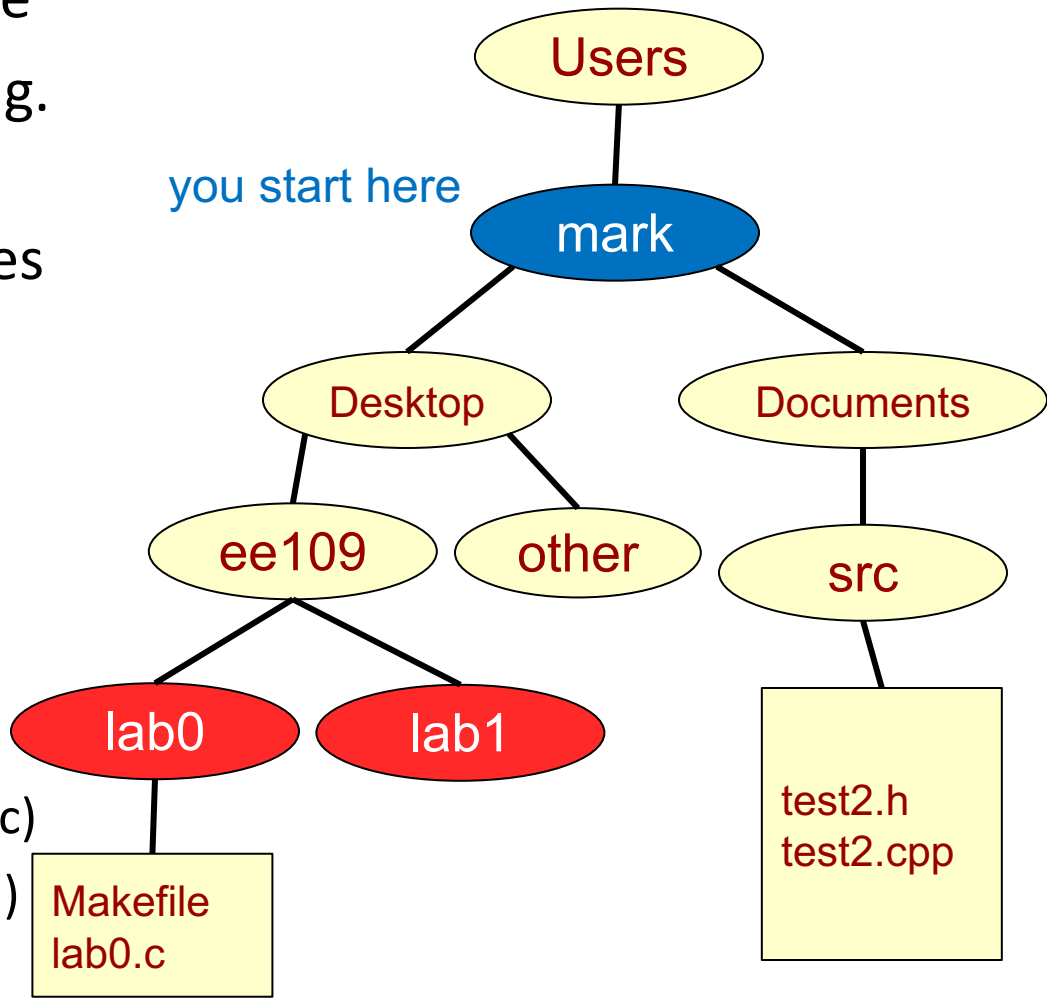
  OR

- Startup Mac Terminal



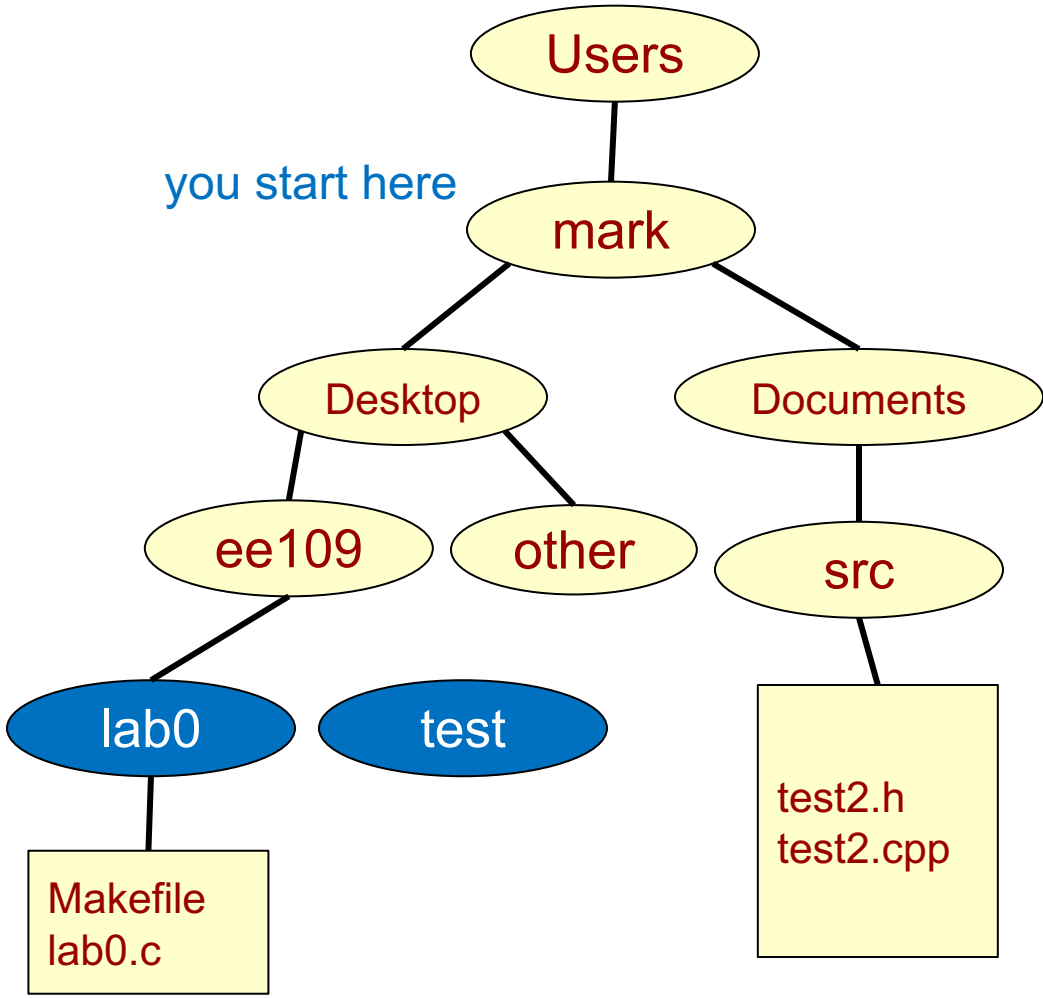
Directory Structure Ex. 1

- Each circle is a directory
- Each name in the box is a file
- Starting from your home (e.g. 'mark') directory/folder…
- Use 'cd' to change directories (folders)
  - cd Desktop
  - cd ee109
  - cd lab0
- Or go multiple folders at a time
  - cd Desktop/ee109/lab0 (Mac)
  - cd Desktop\ee109\lab0 (Win)



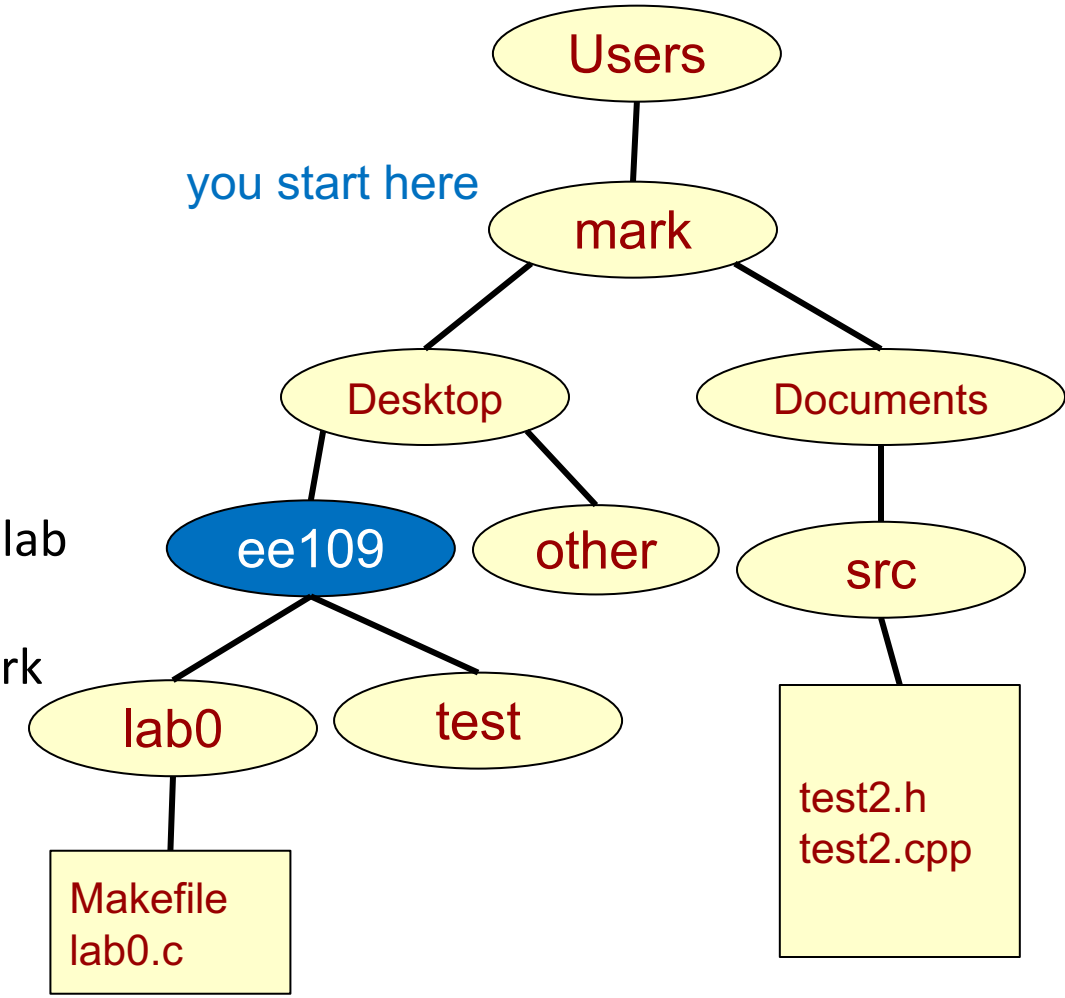
Directory Structure Ex. 1

- To go up a level use
  - cd ..
- To go up 2 levels use
  - cd ../.. (Mac)
  - cd ..\.. (Win)
- Let's go one level to 'ee109'
  - cd ..
- Now make a directory
  - mkdir test



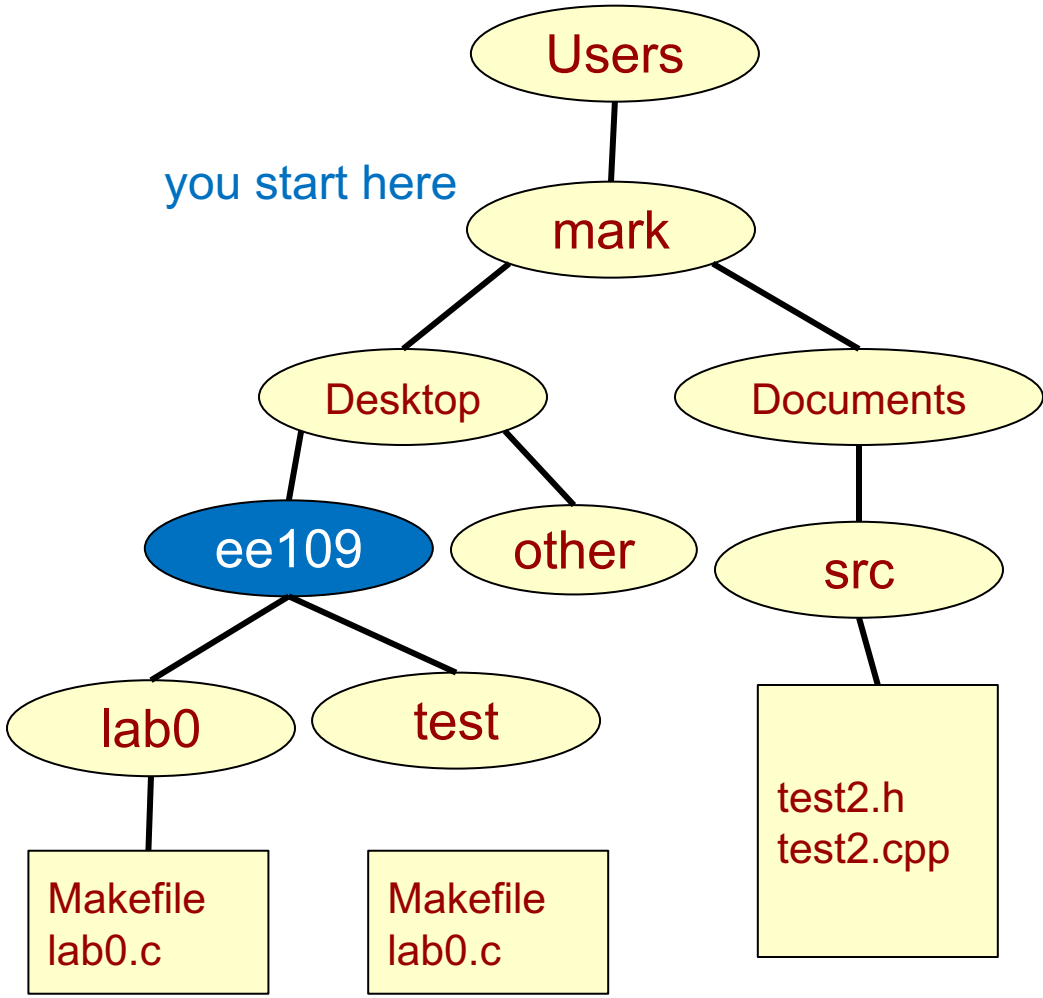
Directory Structure Ex. 1

- To go up a level use
  - cd ..
- To go up 2 levels use
  - cd ../.. (Mac)
  - cd ..\.. (Win)
- Let's go one level to 'ee109'
  - cd ..
- Now make a directory
  - mkdir test
- Let's say we want to start a new lab with a copy of our old work and just modify it. Let's copy our work
  - Recall I'm in ee109 folder currently
  - cp lab0/* test/ (Mac)
  - copy lab0* test\ (Win)



Directory Structure Ex. 1

- Let's now go into the test folder
  - cd test
- Now rename the lab0.c
  - mv lab0.c test.c (Mac)
  - rename lab0.c test.c (Win)



Tips

- Use up-arrow to cycle through commands
- Start a folder or filename and hit tab
  - cd Desk [TAB] will complete the command to be
  - cd Desktop

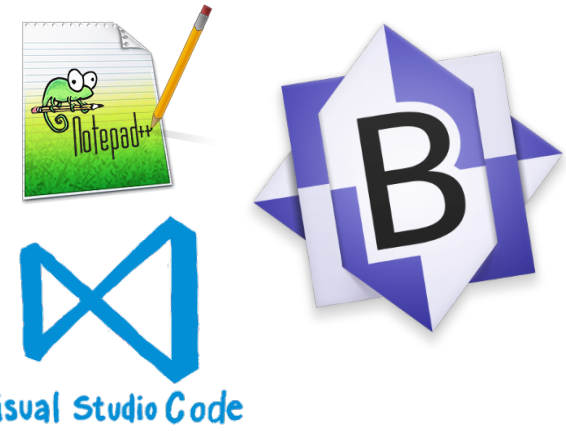
COMPILING AND RUNNING A PROJECT

Compilers

- Windows requires 2 installs
  - The first (WinAVR) is the compiler & tools
  - The second is the Arduino IDE that is only used to managing your USB connection
- Mac only requires 1 download (Arduino IDE)
  - On occasion some Mac OS'es raise a security violation when you try to install it.
  - Follow the instruction on the web page for installing the software

Editors

- You need a text editor to write your code and edit the 'Makefile'
  - Windows Notepad++
  - Mac BBEdit



Source Code & Makefiles

- Download a sample C-file and a 'Makefile'
  - Makefiles are scripts for how your program should be compiled and how it should be downloaded
  - With a correct Makefile you will only need to run 2 commands to compile and download your program:
    - make (will compile your code)
    - make flash (will download your code)
  - Actually just running 'make flash' will do both but doing them separately gives you the chance to see if the compilation ('make') step completed successfully
- Note 1: For each new assignment/project, you will need to edit the Makefile to point it to the correct filenames for compilation and for the right USB connection
- Note 2: There should be no extension on the filename 'Makefile'. Some editors add .txt (Makefile.txt). In the lab writeup we describe some commands to rename it back to 'Makefile' if that happens

Testing Your Installation

- Once you've edited the source code and Makefile you can connect an Arduino to your laptop and do ‘make flash’.
- When run the first time you should see a small, yellow LED blinking at a rate of 1 second
- If you like change the values of 500 in your code to 100, then rerun 'make' and 'make flash'. You should see the LED blinking at a much faster rate