Princeton University
COS 217: Introduction to Programming Systems
A Minimal COS 217 Computing Environment

1. Access the Fall 2020 COS 217 Account on Ed

1.1. You can access Ed through Canvas.

1.2 Post questions and comments (that comply with the course communication policies) to Ed. Posts will be available to all other students and instructors. Remember to check Ed often, especially while working on assignments and preparing for exams.

2. Activating Your University Computing Account

One time only…

2.1. (If you're working off-campus) Perform the instructions on this web page to use SRA (secure remote access): http://helpdesk.princeton.edu/kb/display.plx?ID=6023

2.2. Use a Web browser to visit the *OIT Account Activation Page* at http://helpdesk.princeton.edu/kb/display.plx?ID=9973

2.3. Perform the five steps listed in the *Set Your Security Profile* section of the page to set your security profile.

2.4. In the *After You Have Activated Your Account* section of the page, click on the *Enable your Unix account* link. If you do not see these options on the page, then from the webpage in Step 2.2, in the gray box on the right, click on "*How to activate your Princeton University Account and manage personal information*." On that new page, scroll down to "*Enable your Unix account.*"

2.5. In the resulting *Unix: How do I enable/change the default Unix shell on my account?* page, click on the *Enable Unix Account* link.

2.6. In the resulting dialog box, type your Princeton netid and password, and click the *OK* button.

2.7. In the resulting *Update your Unix account* page:
Select the *Enable my Unix account* radio button.
Click on the *Enable my Account* button.

3. Making Bash Your Login Shell

One time only, continued from the previous section…

3.1. In the *Update your Unix* account page:

Under the *Advanced settings* heading, select the */bin/bash – GNU Bash (/bin/bash)* radio button.
Click on the *Submit Change* button.
Wait about 5 minutes for the change to take effect.

If you enroll in the COS 217 course after the start of the semester, then there will be a delay – typically a day or two – before you have authorization to perform the following steps.

4. Conducting an armlab Terminal Session

- The COS 217 course uses the armlab computer cluster. The cluster consists of 2 computers named armlab01 and armlab02. Both use the same file system.
- The first time you log into an armlab computer, you will be using an impoverished computing environment. Only after you configure the Bash shell (see the *Configuring the Bash Shell* section of this document) will your environment be reasonable.
- Your computer communicates with an armlab computer via any terminal application that can use the SSH (secure shell) protocol. Two such programs are PuTTY (for MS Windows) and Terminal (for Mac OS X).

Repeatedly throughout the semester as required…

4.1. Option 1: Use a computer running Microsoft Windows.

If your computer is running Microsoft Windows and you did not purchase your computer through Princeton in recent years, then you may need to download and install PuTTY. To do that:
Use a web browser to visit the page http://www.putty.org/.
Click on the *You can download PuTTY here* link.
In the resulting page, click on the *putty.exe* link.
In the *File Downloading* dialog box, click on the *Save* button.
In the *Save As* dialog box, choose some appropriate location in your local file system.

Launch PuTTY.
Using Windows Explorer, double-click on the putty.exe file.

Log into the armlab computer.
In PuTTY:
Click on the *Window* | *Colours* Category, and make sure the *Use system colours* checkbox is checked.
Click on the *Session* Category.
In the *Host Name (or IP address)* text box, type this:
`armlab.cs.princeton.edu`
Make sure that the *Port* text box contains *22*.
Make sure the *Connection type* radio button panel is set to *SSH*.
Make sure the *Close window on exit* radio button panel is set to *Only on clean exit*.
Click on the *Open* button.
If a *PuTTY Security Alert* dialog box appears, click on the *Yes* button.
In the PuTTY window:
In response to the *login as:* prompt, enter your Princeton netid. If an *Access denied* message appears, ignore it.
In response to the *password:* prompt, enter your Princeton password. (The password will not echo as you type.)

Confirm that the PuTTY window displays a Linux shell prompt.

Use the armlab computer via PuTTY as desired.

Log out of the armlab computer.

In the PuTTY window, issue the `exit` command to disconnect from the armlab computer.
(PuTTY will exit automatically.)

4.2. Option 2: Use a computer running Mac OS X.

Open a Terminal window.

Launch Spotlight by clicking on the magnifying glass icon at the right side of the menu bar. Type `Terminal` in Spotlight. In the resulting pop-up list click on *Terminal*.

Log into the armlab computer.

In the Terminal window:

Enter the `ssh` *`YOURNETID`*`@armlab.cs.princeton.edu` command, where *`YOURNETID`* is your Princeton netid.
If an SSH-related message appears, enter `yes`.
Enter your Princeton password. (The password will not echo as you type.)

Use the armlab computer via the Terminal window as desired.

Log out of the armlab computer.

In the Terminal window, enter the `exit` command.

Close the Terminal window.

Click on the red button at the upper left of the Terminal window.

5. Configuring the Bash Shell

One time only, in an armlab terminal session...

5.1. Enter the command `printenv SHELL` and confirm that the output is `/bin/bash`. If that is not the case, then redo the steps in the *Making Bash your Login Shell* section of this document.

5.2. Enter these two commands to copy reasonable Bash configuration files to your home directory:

`cp /u/cos217/.bash_profile /u/`*`YOURNETID`*

where *`YOURNETID`* is your Princeton netid.
Reply to the `cp: overwrite `.bash_profile'?` question by entering `y`.

`cp /u/cos217/.bashrc /u/`*`YOURNETID`*

where *`YOURNETID`* is your Princeton netid.
Reply to the `cp: overwrite `.bashrc'?` question by entering `y`.

5.3. Suggestion: Enter the `cat .bashrc` and `cat .bash_profile` commands to examine the contents of the `.bashrc` and `.bash_profile` files.

The changes take effect during your next armlab terminal session.

6. Configuring the Emacs Editor

One time only, in an armlab terminal session...

6.1. Enter this command to copy a reasonable Emacs configuration file to your home directory:

```
cp /u/cos217/.emacs /u/YOURNETID
```

where *YOURNETID* is your Princeton netid.

6.2. Suggestion: Enter the `cat .emacs` command to examine the contents of the `.emacs` file.

7. Configuring the Splint Source Code Checker

One time only, in an armlab terminal session...

7.1. Enter this command to copy a reasonable Splint configuration file to your home directory:

```
cp /u/cos217/.splintrc /u/YOURNETID
```

where *YOURNETID* is your Princeton netid.

7.2. Suggestion: Enter the `cat .splintrc` command to examine the contents of the `.splintrc` file.

8. Copying Files between armlab and Your Computer

You can use github to create a repository of each assignment. Details will be covered in lectures.

You can also use the FileZilla application to copy files between the armlab file system and your computer's file system. FileZilla uses SFTP, the secure file transfer protocol.

One time only...

8.1. Download the FileZilla client and install it.
-- (Linux) Use your Linux package manager to download and install the filezilla (or some similarly named) package.
-- (Mac and MS Windows) Download the FileZilla client from
http://filezilla-project.org/ and install it.
Note: if the link above does not work, you can try https://filezilla-project.org/download.php?show_all=1

Repeatedly throughout the semester as desired…

-- (Mac and Linux) Open a terminal application and issue this command:
ssh -L localhost:8022:armlab.cs.princeton.edu:22
yournetid@armlab.cs.princeton.edu
Reply to the prompts to complete duo two-factor authentication.
Subsequently communicating with port 8022 on your local computer(localhost) actually communicates with port 22 on armlab.
A sftp server is running on armlab at port 22.

-- (MS Windows) Open a command prompt and issue this command:
plink.exe -L 8022:armlab.cs.princeton.edu:22
yournetid@armlab.cs.princeton.edu
Reply to the prompts to complete duo two-factor authentication.
Subsequently communicating with port 8022 on your local computer(localhost) actually communicates with port 22 on armlab.
A sftp server is running on armlab at port 22.

8.2. Launch the FileZilla client application.

8.3. In the FileZilla client application:

---- In the Host text field type sftp://localhost.
---- In the Username text field type your Princeton netid.
---- In the Password text field type your Princeton password.
---- In the Port text field type 8022.
---- Click on the Quickconnect button .

8.4. In the FileZilla client application:

---- Repeatedly click in the left-side pane to navigate through your computer's file system.
---- Repeatedly click in the right-side pane to navigate through the armlab file system.
---- Drag-and-drop the name of the desired file from the right pane to the left pane, thus copying the file from the armlab file system to your computer's file system. Or drag-and-drop the name of the desired file from the left pane to the right pane, thus copying the file from your computer's file system to the armlab file system.