EECS 1710
LAB 0 :: Getting Started & Lab Environment Familiarization

Prerequisites –
1. *Please ensure that you have an EECS account setup. Go to the following link to sign up for an EECS account if you have not already:*
   https://webapp.eecs.yorku.ca/activ8/

2. **WATCH THIS VIDEO BEFORE YOU START!**
   An introduction to the Rocky Linux Environment, Linux file browser, Linux Terminal, how to configure Processing, and options for submitting lab files
   *https://echo360.ca/media/d1e83bd5-6858-4f57-83e3-0a8d7bea0d32/public*

   ** some of the topics discussed in this video are addressed in detail in this lab

1) The Linux File System

If you are familiar with Windows, you might realize that each storage device (e.g. hard drive) on the system is organized in a hierarchical way. For example, if you have one hard drive on your computer, the drive would be referred to as a letter (e.g. C:). Files are then organized within that particular drive into folders according to a specific hierarchy (folders within folders). The top of this hierarchy (parent folder) is typically "C:\", which then has sub-folders (e.g. "C:\Windows", or "C:\Program Files", etc.). If you have other storage devices, they have a different letter (e.g. D: or E:), and each has its own hierarchy of folders, and so on. If you double click on one of the "Devices and drives" shown in the figure below, you would be able to see the contents of that device/drive (its files and sub folders).
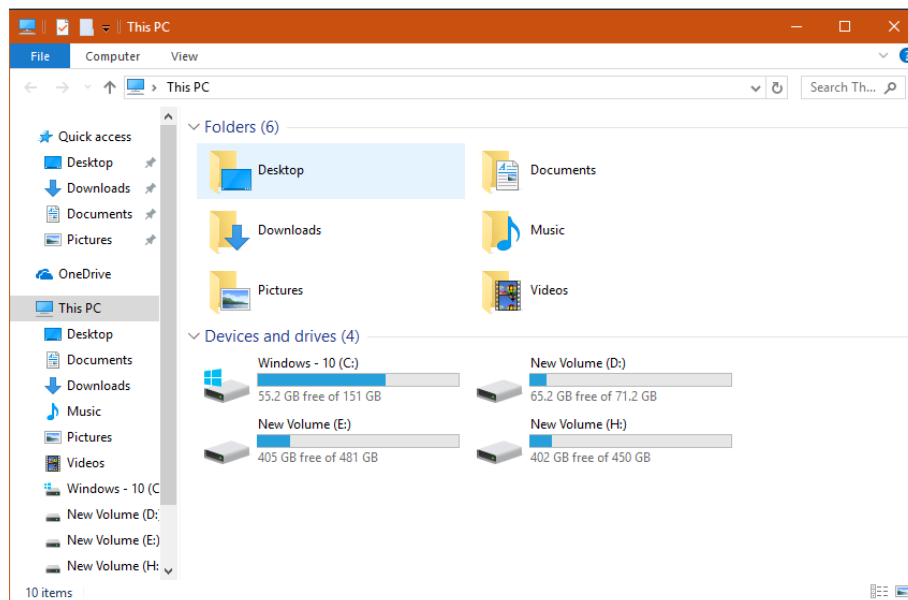
In MacOS, things are a little different, and you would use the Finder to locate and navigate through the file system. The top directory is a little more similar to the way things are organized in Linux. For example, on your main hard disk: e.g. Macintosh HD, you might see something like this, where your local folders sit in a folder with your login name, under the /Users folder on your main hard drive:
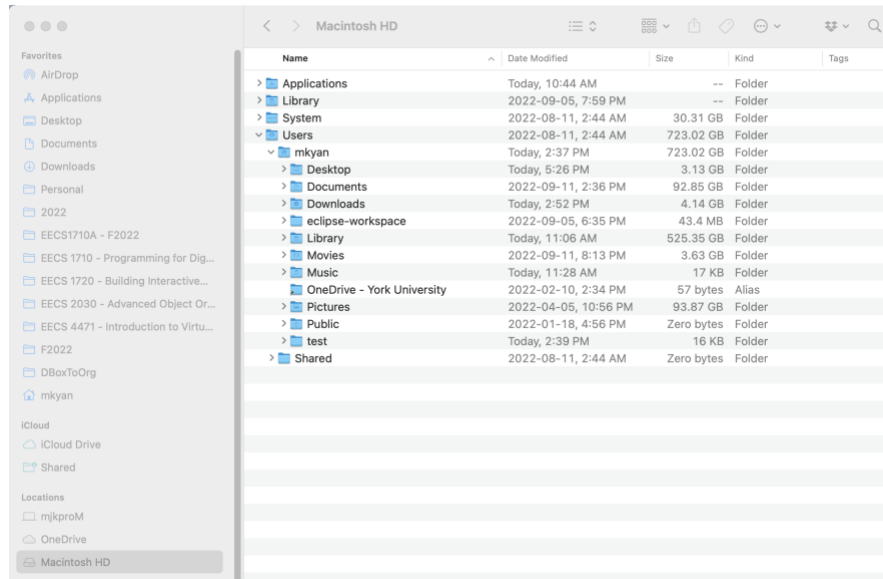
In Linux, similar is true, however the organization of all files on the system is extremely simple. Basically, all files are organized into a **single** hierarchy (a folder is referred to as a directory), beginning with the main (or parent) directory called "/", which is known as the *root* directory. If you have logged into the lab remotely via eecs remotelab, you may have browsed some of the file system already.

Here is a typical diagram of how files/directories are organized in Linux:
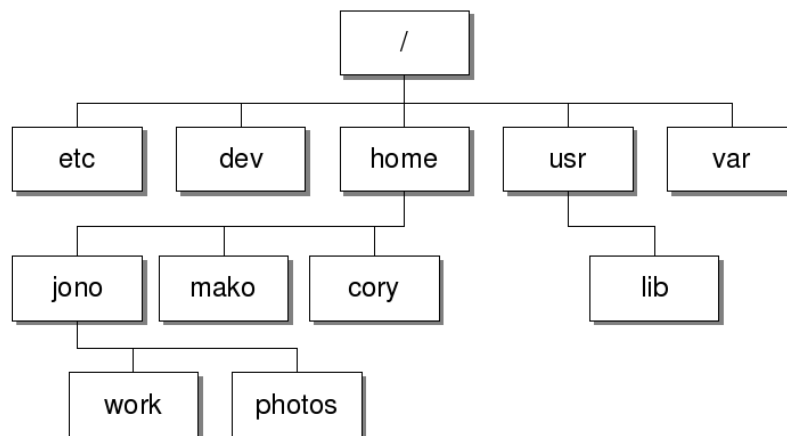
Of course, there are more folders typically than this. However, we are mostly concerned with the *home* directory (`/home`), and its sub directories, which is where you will be creating, storing and running most of your programs.

The home directory houses one directory for each user on the system (when you log into Linux, you are auto-magically connected to your own directory). For instance, in the above graphic, `/home/mako` is the directory belonging to the user "mako", while `/home/jono` is the directory belonging to the user "jono". If jono logs into the system, usually they will create files/sub-directories (such as work or photos) in their personal home directory `/home/jono`. If you open a terminal and type "cd" you will always be placed directly into *your* home directory (since the system knows who you are after login).

** make sure you have reviewed the video linked at the top of this lab, as it will illustrate how to navigate using both the file browser, and the terminal window. In the first task, we will focus on using the terminal window to do this.

Task 1: Navigating the file system, recording command output, and submitting work.

In this first set of tasks, we are going to learn and use a set of basic Linux commands for moving around the file system, displaying contents of directories and files, and creating new files. First, here is a quick summary of some standard linux commands you will typically use:

Summary

Command	Meaning
pwd	Print the full (absolute) pathname of the current working directory.
cd *dirname*	Change to the named directory.
cd ..	Change to the parent directory of the current working directory.
cd	Change to the user's home directory.
ls	List the contents of the current working directory.
ls *dirname*	List the contents of the named directory.
ls -l	List using long format the contents of the current working directory.
ls -l *dirname*	List using long format the contents of the named directory.
ls -ld *dirname*	List using long format the name (but not the contents) of the named directory.

i)   Firstly, lets **open a terminal window** and navigate (using the "cd" command) to the root folder on your system, and list its contents. Type:

```
cd /
```

(This points the terminal to the system's root directory)

Type
```
pwd
```

(This shows you where you are w.r.t. the root folder "/")

Type
```
ls -la
```

(this lists the files and their details in the current directory. Observe the output in the terminal)

** see if you can confirm this using a file manager "Files" application (a graphical way to access the same file system) – this can be launched by selecting + *Other Locations* → *Computer* from the left margin in the *Files* application.

ii)   Now we will learn two more Linux commands: "concatenate" (`cat`) and "redirect" (`>`) so that we can dump some output from the "list" (`ls`) command into a text file.

Type
```
cd
```

(This returns the terminal to your home directory)

Type
```
ls -la > output_homeDir
```

(this lists files in current directory and redirects (dumps) the resulting output into a new file called "output_homeDir" instead of showing it on the screen)

Type
```
ls -la
```

(this lists the files in the current directory again, notice the new file that was just created)

Type
```
cat output_homeDir
```

(this shows the contents of the file "output_homeDir" in the terminal window)

iii)   Type
```
ls -la / > output_rootDir
```

(this lists the contents of the root directory, and redirects the output into a new file called "output_rootDir")

iv)   Type
```
more output_rootDir
```

(the more command is much like cat, only it shows one page of output at a time, and allows you to press a key to continue (make your terminal window smaller than the size of the output and try this to see how it works). The command will gradually output the contents of the file output_rootDir to the terminal window).

v)   On your own, download the code from the lectures for Week2 Lecture2 and unzip it as discussed in the video at the top of this lab. Navigate to the directories discussed and use cat and more to display the contents of your *.pde files. They should be in your home directory in subdirectories (sub folders) under:
```
/eecs/home/<lname>/1710/lectures/W2_BasicAnatomies/
```

**where <lname> is your login name

vi)   Finally, let's learn a special command that allows you to **submit** components of your lab work (for grading/assessment) from the terminal (this works on a lab machine or from a virtual machine in the remotelab portal. Note this will NOT work from your home computer. If you do your lab work (for future labs) from your machine, then you will submit your work using a special web submit tool (outlined later).

Submitting work from the **terminal window** (in lab or via remote lab):

Essentially, let's say we want to submit all files that start with "output_" in the current directory to the "lab0" assignment defined under the course "1710":

Type
```
submit 1710 lab0 output_*
```

(this will upload/send all the files that start with the word "output_" for submission for lab0. Actually, we plan to submit a number of different files in this lab. We can do each file separately, or in groups, or we can even submit all the files in a given directory. However, we will usually be very specific about what you will need to type to submit at various places in each lab (or in a single location at the end of the lab document – so you will be reminded of this command in every lab document).

You should see some output indicating the files that were submitted. You can always re-submit these files up until the lab deadline. Any files with the same name submitted multiple times will just overwrite older versions of those files.

To list the files you have submitted, you can type the following:
```
submit -l 1710 lab0
```

Alternative way to submit – using **web submit** (submitting files from home):

The other way to submit files for a lab (which you need when submitting from home), is called web-submit. To submit files this way, you need a browser pointed at the following URL: https://webapp.eecs.yorku.ca/submit/

If you use your EECS account name and password to login, you will see a screen like that above (right). Choose the current year (2022-2023) Choose *F* from the Term dropdown menu and *1710* from the Course dropdown menu, and you will see a list of assignments that are open for submission (only listed if submission is available).

In the Assignment dropdown menu you will see *lab0*. Then you must individually *Browse* for each file you want to submit (see the figure below-left, note that the academic year will be **2022-23** not 2018-19 as in the figure below). When you have chosen the files to submit, hit the *Submit Files* button at the bottom of the page. The web page will then indicate the files that have been successfully submitted (shown in the figure below-right).

** when labs are marked, feedback can also be accessed through this web-submit page!!
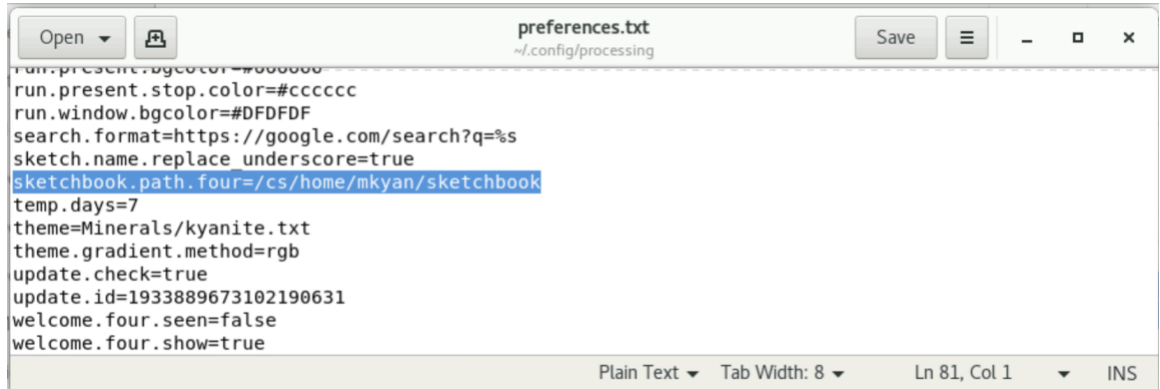
TASK 2: Edit and Run simple Processing programs

i)   Launch the Processing PDE and configure your preferences from the File menu on the sketch window (File → Preferences), as described in the 2nd prerequisite for this lab.

Create a new directory in your home directory called "1710" (as shown in the video), and setup the sketchbook to point to this directory. Confirm that the examples and other folders have been generated and loaded into this directory (see video). To make this persist when you close and re-open Processing, you will need to edit the preferences.txt file. First click on the link at the bottom of preferences. Double click on preferences.txt in the files app to open.
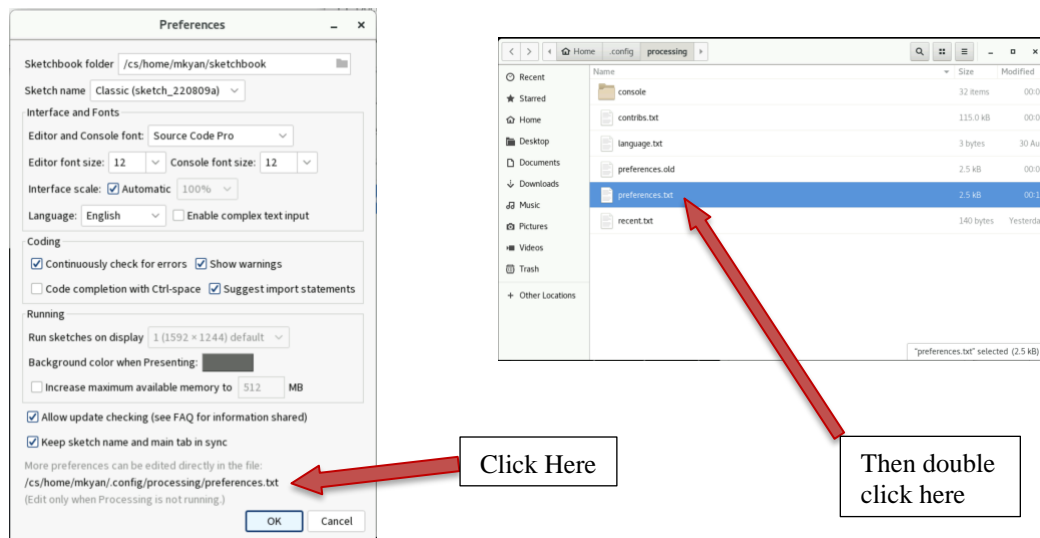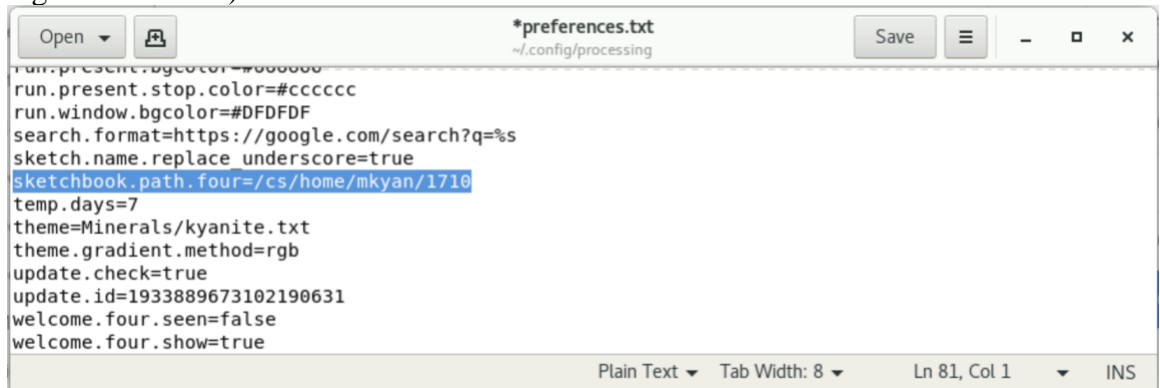
Scroll down to where the sketchbook path is defined, and change sketchbook to the folder 1710 (note your home folder will have your login name, not mkyan):

It should now have sketchbook replaced like so (again, keep your home folder and login name intact):

Press the Save button and close this window. Now close Processing and re-open to check that the sketchbook is pointing at the 1710 folder (in preferences).

ii) Open a new sketch (or use the blank one already opened), and try to re-create the StaticSketch example from week 2 lecture 2. In your sketch, modify the program to display the following message to the console: "Welcome to EECS1710 F2022 <login>" – where <login> is your login name.

iii) Make a new folder within your 1710 directory called "labs", and a subfolder within this called "lab0". Then save/rename this sketch to "lab0_sketch" → save it to the lab0 folder you have just created. You will need to create this folder either through the terminal method outlined in task1, or by using the files application.

iv) Review the slides from Week2 Lecture2 (slides 29 – 36) – which discuss the coordinate system in Processing, and some methods to draw simple primitive lines and shapes (and control the stroke colour and thickness).

v) Modify your `lab0_sketch` file to create a simple graphic using combinations of at least 3 or more different shape commands, along with `line()` commands, to create a simple video game character of your choosing. This could be an attempt at re-creating a logo or simple character from an existing 2D game, or something of your own design.

Note: it might be helpful to draw up a grid to work from, design your graphic on the grid, then translate the coordinates to numbers you can use as arguments in your commands. For example:
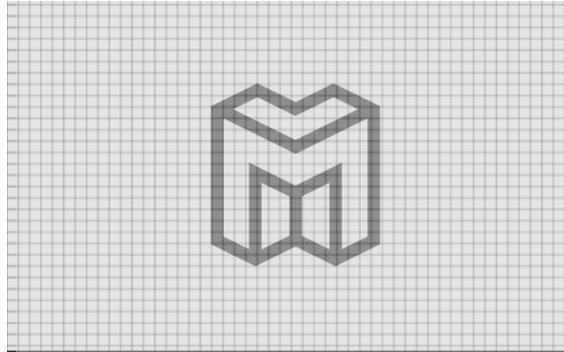
There is no limit to the number of commands you must use for this lab. Again, it will not be marked, but you will need to submit your work (as a practice run for lab1). The more you explore, the more comfortable you will become.

Useful HINT: If you type in a command, and right click on the command name in the Processing sketch window, you can select "Find in Reference" on the context (popup) menu. This will open up the browser on the reference manual page for that command, which will have an explanation and examples on how to use the command. For example, typing in triangle(); and right clicking on the command name "triangle" will show this..
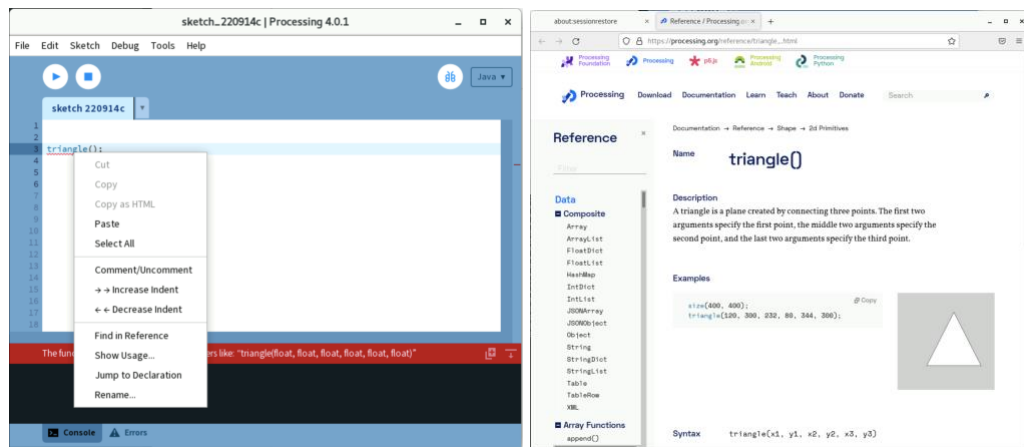
Selecting "Find in Reference" (above left), will bring up the relevant page in the reference documentation in a browser (above right).

vi) Submit your sketch file upon completion using either the terminal command (below), or through web-submit *https://webapp.eecs.yorku.ca/submit/* discussed earlier in the lab.

Note: you will first have to navigate to **where** the file is located in your sketchbook before you can type this:

```
submit 1710 lab0 lab0_sketch.pde
```

FINALLY.. you can check ALL the files you have submitted either through the web-submit portal, or within a terminal by again typing the following:

```
submit -l 1710 lab0
```

You should see 3 files submitted:

```
output_homeDir
output_rootDir
lab0_sketch.pde
```

SUBMISSION: Due: Tuesday Sept 20, 2022 – 5:00pm

You have a week to complete these tasks, so do not worry about getting everything completed in the lab session itself. You are free to finish this at home, or via remote lab, or to drop into any of the labs during open hours (i.e. any block of time that a lab is not scheduled for a class).

The lab schedules can generally be found here:
https://lassonde.yorku.ca/eecs/academics/undergraduate/research-labs/prism-labs/