Lec 2. Unix file system, Basic navigation, E-mail

Unix file system

- Unix file system uses a tree structure of directories (folder) for storing files. The directory at the lowest level (for the whole machine or system) is called the root directory and is denoted by a slash "/".
- One of the subdirectories is your main (or *home*) directory. Your home directory can be addressed as ~ or ~`username`.
- The current directory (the one you are working in now) is referred to by a single dot (.) and the parent directory (the next one up the tree) is represented by two dots (..).
- The full location of a file or a directory starting from the root directory is call the *absolute path* to that file or directory.

Unix file system

- Absolute path for a command can be found using the `which` command. Locate: python, gcc, latex, matlab, ls, cd, which
  `$ which python`
- Paths can also be defined relative to the current directory. In this case they are called relative paths. The current path can be retrieved using the `pwd` command.
- Type 'pwd' in the Unix prompt to print the working directory.
  `$ pwd`
- The directory structure can be navigated using `cd` command. Type 'cd ..', 'cd .', 'cd' and observe what happens!
  `$ cd ..`
  `$ cd .`
  `$ cd`

Unix file system

There are some default directories under "/" for some specific tasks at the operating-system level.

- /bin,/sbin, /usr/bin, /usr/sbin contains basic shell commands such as `ls, cd, pwd`
- /lib, /usr/lib contains libraries that are used by the commands
- /etc, /usr/etc contains system configuration files including options for initializing daemons (processes in background)
- /dev contains files related to system devices (hard drive, network cards)
- /opt contains optional applications
- /home contains home directories and files
- /var contains temporary data, log files
- /usr, /usr/local contains files that are available for all users.

Create/Delete directories, moving around the file system

`$ mkdir testdir` (It will create a directory named 'testdir' in your current directory.)
`$ cd testdir` (You will be in the directory 'testdir'.)

Create a directory 'dir1' in the directory 'testdir', go to the 'dir1' directory, create another directory 'dir2' inside this directory, go to 'dir2' and type the following commands:

```
$ cd ..
$ cd ../..
$ cd
$ cd testdir/dir1/dir2
$ pwd    (print working directory)
```

Try:

```
$ rmdir dir2
```

It will delete the directory named 'dir2' (if it is empty)!

- Try:
  ```
  $ mkdir MA305
  $ cd MA305
  $ mkdir Classwork
  $ cd Classwork
  $ mkdir CW0
  $ cd CW0
  ```
- To work with files, download the file 'cw0.zip' from your course Canvas and save it in the dir `CW0`.
  Try:
  ```
  $ mv ~/Downloads/cw0.zip .
  ```
  It moves the file cw0.zip from the default download directory to your current working directory (MA305/Classwork/CW0)

- Try:
  ```
  $ unzip cw0.zip
  $ ls
  ```

Compiling and Running Fortran/C/Python programs

```
$ gfortran mepsilon.f
$ ./a.out

$ gcc mepsilon.c -lm
$ ./a.out

$ gfortran mepsilon.f -o f.x
$ ./f.x
'

$ gcc mepsilon.c -lm -o c.x
$ ./c.x

$ python mepsilon.py                    (no need to compile)
```

Moving, renaming, deleting files

Try:

`$ mv file1 file2` (renames file1 to file2, file1 disappears!)

`$ mv file1 dir1` (moves file1 into dir1, file1 disappears from current dir)

`$ cp file1 file2` (renames file1 to file2, file1 is not lost!)

`$ cp file1 dir1` (moves file1 into dir1, file1 is not lost from the current dir)

`$ rm file1` (remove all files)

`$ rm *` (remove all files)

`$ rm -rf dir1` (remove dir1 and all files in it)

Work with files

`$ cat filename` (shows the contents of the file 'filename')

`$ more filename` (page by page display)

Press enter to see the next line, space bar for the next page.

Also try:

`$ head filename`

`$ tail filename`

Text Editors

- The first most important thing you need to learn is a text editor to be able to create and modify files.

  Let us try some text editors.

  ```
  $ gedit filename
  $ nedit filename
  $ emacs filename
  $ gvim filename
  $ vi filename
  ```

- We will be learning the vi-editor. It takes practice, of course! Read some fundamentals about vi from **Unix101** posted at your course Canvas.

E-mail setup for Lab submission:

- In the last class, you tried a plain mail that every Unix has a version of, so always available.
  - Send a message to me and yourself by typing:
    `$ mail harihar.khanal@erau.edu YOU@my.erau.edu`
    Tell me: your name, major and your last math course
    Finish with a . (dot) on a new line and q to exit mail.
- You will have to email us your work, so let's make this simpler once and for all.
  - Create a file '.mailrc' (mail resource file, in your home dir), using vi-editor (`$ vi ~/.mailrc`) and insert this, all on a single line:

    ```
    alias 305 harihar.khanal@erau.edu telwalaf@my.erau.edu YOU@my.erau.edu
    ```
  - This tells the mail command to replace the string "305" by what follows it. You type 305 and it is replaced by the rest. From now on, you can email us (and you) simply by typing:
    `$ mail 305`
  - Please ALWAYS enter a Subject, e.g.: **305:Lab0** then type the body of the message. Terminate with a · (dot) on a new line. q to exit mail.

Next

Lab 0. Finite Precision Arithmetic Woes

Editing, compiling and running programs