CS 35L Fall 19 Section 3 Notes 1
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Command line basics:

1. man: This command can be used to check the manual for a specific command. Usage: man [command name]

2. $HOME (= ~): The home directory (usually looks like /Users/[Your user name]). You can try cd ~ or cd $HOME.

3. ls: This command is used to check the contents under a directory. An option can be added after the command to unleash the power of a specific command. E.g. ls -l will display the detailed information of the current directory. You can always put multiple options together, e.g. ls –alG. Use man page to check the options.

4. cd: change directory. Usage: cd [path]. Your command line interface has a current path, which you could use command pwd to check. Using cd command, you are able to change the current directory.

5. Absolute path vs. relative path: the absolute paths begin with "/". When you specify the absolute paths, the system starts from the root directory ("/") and goes all the way to the location you specify. When you use relative path, e.g. you try to open "test/test.txt", the system will first try to enter the test directory under your current directory, and then try to find the file test.txt under that directory. In short, it tries to find [the result of pwd command]/test/test.txt

6. cp: short for copy; mv: short for move; mkdir: create a directory; rm: short for remove; rmdir: remove directory. Please check the usage of these commands using man page or Google them.

7. ln -s: create symbolic link. Using ls -l you can check the type of a file (the first symbol). Using ls -i you can see the inode information. Check more details on inode in slides.

8. chmod: use chmod [number] [filename] to change the permission of a file. How to get the number has been specified in the slides. There are ways other than number to specify the new permission, i.e. using chmod [group][option][permission] (see slides).

9. Find command
   The general form is
   find [starting directory] [options]
   E.g.
   find . -name "test" means that you try to find the files with name "test", under the currently directory (again, single dot means current directory!).

Note that the find command will search recursively under all the accessible subdirectories.
Other than name, you can also find files that satisfy the requirement of size, type… check the man page for detail

10. Wildcard:
    Unix wildcard could be thought of as a regular expression. To put it plainly, sometimes you want to search for something whose name follows a specific feature instead of knowing its exact name– this is when the wildcard could help.

    Here let's see two very simple examples:
    ? represents any single character
    * represents zero or more characters
    [] represents only allow the characters in the bracket

11. Use tab to autocomplete when you are typing in the command line interface. When there are multiple possible choices, the interface will inform you instead of autocompleting.

12. echo: print the value of a variable

13. Each Unix-like system has some package management tools
    Debian-like Unix system: apt-get, Mac OS: brew (you might need to download), CentOS: yum. For other systems, you could search online.

14. $PATH variable is important: when you try to execute a program, your terminal loops the path inside this variable, and search for the program that matches the name you indicate.
    To execute your own program, use ./[your_program] –options, or [/absolute path]/program –options. This will force the terminal to run the program you specified, instead of searching in the $PATH.
    Alternatively, you can add your own directory into the $PATH. Use export PATH=[new path]:$PATH to update the PATH as the intended directory + colon + the old $PATH variable. Now you can directly execute your program anywhere using [your_program] –options.
    Note: . = current directory, .. = parent directory. Check

15. Some commands to check the system information:
    uname: check system distribution
    df: disk information
    whoami: check the current user

16. Download: use wget or curl to download file from online.
    wget [options] [url]
    curl [options] [url]

17. You can use ">" sign to redirect your output from command line to the file. E.g. cat file1 > file2 will redirect the output of cat file1 to file2 (which effectively equals to cp)

18. cmd1| cmd2: Pipeline takes the output of cmd1 as input of cmd2. This is equivalent to cmd1 > tmp.txt && cmd2 < tmp.txt, but much easier.

19. sort command: Used to sort a file/input. Check man page for details!

20. cat, less, more, tail, head: used to display the file. Sometimes we only want to check the contents instead of editing a file.
    Usage: cat/less/more [filename]

21. diff: used to check the difference between two files.
    diff file1 file2

22. whereis/which: used to check where the actual command program is.
    Example: whereis cp

Emacs: https://www.gnu.org/software/emacs/refcards/pdf/refcard.pdf

23. Emacs basic: Use C-x, C-c to quit the Emacs. When you learn Emacs, C means Ctrl, C-x means press C and press x and then release both of them. M means Meta, which is usually your alt/option key on your keyboard. If you are using Mac, go to your preference of the terminal, and click the option to set the option key as your meta key.

24. Move around in the Emacs (can be used in terminal too)
    Character-wise: C-b move backward; C-f move forward; Del delete backward; C-d delete character forward
    Word-wise: M-b move one word backward; M-f move one word forward; M-Delete delete one word backward; M-d delete one word forward
    Line-wise: C-a move to the beginning of line, C-e move to the end of line, C-k kill forward to the end of line

25. Search: C-s search forward, C-r search backward. M-! or M-x shell used to type commands. M-x compile to type the compile command (like gcc).

26. C-x C-b will list all buffers in Emacs. Use C-x b to switch among buffers.

27. Other than emacs, you could also use vi or nano as your editors.
    Use vi [filename] or nano [filename]. You can find good (and interactive) courses on vim editor online.