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## Linux Command Line

* Linux General Introduction
	+ uname -r
	+ lsb\_release -a
	+ Shell/bash: interface, which includes lists of command to interact with OS
	+ Console
	+ lscpu: info about CPU
	+ free -g: how many space freed/used
	+ sudo command: for super user to execute (Sudo fdisk -l display all the partitions of resources)
* Basic Command
	+ cat: directly output the input
		- E.g. cat hello / cat trash.cpp / cat -n trash.cpp (display the number of line)
	+ head: head trash.cpp / head -n 7 trash.cpp (first 7 lines)
	+ g++ -v : version of g++ / g++ --version
	+ Ctr+ r: reverse history search
	+ Ctr + l: clear the output
	+ cd + file: beginning with Tab it will display the option with the beginning of file name
	+ touch x : create a file x -> cat x : printout x -> rm -i x : remove x, ‘-i’ will prompt with confirmation message
	+ rm x : remove file from the directory
	+ pwd : get current directory
	+ Regular expression:
		- \* : wildcard (e.g. ls cs4414/wc++/\*.cpp)
		- ? : match a character
	+ type cd : a command on top of bash command
	+ Bash script:
		- cat ~/../../xxx.sh : show the script in bash script -> xxx.sh : to run the script
	+ Alias
		- Define an alias: alias clean=’rm -f \*~’ (delete all the file ending with ~)
		- Create some files with ~ ending: touch a~ b~ x~
		- Clean the files with ~ ending: Type clean
	+ which g++ : shows which compiler is running
	+ man ssh: show all the documentation of ssh
		- [-p ...] means -p is an optionally argument
		- Destination: doesn’t have [..], means it is not an optionally argument
	+ man getline: shows how to getline (contains example of calling this function in C)
* Output redirection
	+ cat > x: ‘>’ means redirect the output --> type something --> the typed content will be written to x
	+ cat < x: display the content in x
	+ cat x trash.cpp: concatenate trash.cpp to x
	+ yes > output : write content in yes to output -> du -h output : shows the size of output -> wc output : wordcount the output content -> less output: only print and display the output page by page
* Directories:
	+ cd / : the root directory
	+ ls : show the content of directory
		- bin: contains binary files
		- proc: processes running
		- etc: etcetera (network packages doesn’t fil elsewhere)
	+ cd home → ls → sudo adduser student1 (adding another user account, in home directory)
	+ ls /temp : check the temporary data doesn’t need after reboot
	+ ~ : expand to home directory
	+ file trash.cpp: check the type of trash.cpp
	+ ls -a: show the hidden files as will (filename starts with ‘.’)
* Permissions:
	+ ls -l x : shows the permission of a file
	+ Permission character: start with ‘-’: if it is not a directory; if it is a directory start with ‘b’
	+ chmod : change the permissions
		- chmod u-r x : remove read permission from x → cat x : will be permission denied, since it doesn’t have read permission anymore
		- chmod u+r x / chmod 664 x

 chmod 755 x (r/w permissions to file x)

* + Check directores:
		- Relative path
		- Absolute path
		- . : current directory ; .. : parent directory
		- Find the directory of a file: ls command with cd command to find
		- mkdir hw1: create directory hw1
		- cp dir1 dir2 : copy the file from dir1 to dir2
* Processes:
	+ ps aux : show all the processes
	+ piping: cat output | less
	+ ps aux | grep : grep(search the output of input)
	+ ps aux | grep gnome-terminal : show all the processes related to gnome-terminal
	+ Sleep 10: it will sleep for 10 secs
	+ Ctr+ c: send a signal to the process, which will terminate the process
	+ Sleep 10 **&** : turns into background
	+ ps: show all the processes running
	+ bg: will run the process in background
	+ fg : will run the process in foreground
	+ echo $? : show the return value
* Configuration file
	+ E.g.
		- .ssh/config
		- .bashrc
		- echo $PATH: find the library file path
* What difficulties someone might face when starting from the command line?
	+ Can not organize file to directories
	+ Not thinking carefully before running command (some command not reversible: e.g. (bad command line) #rm -rf \* will remove everything from the system)
* Additional reading recommendation: [The Linux Command Line](http://linuxcommand.org/tlcl.php)