Getting to know your machine – Part 2
30-October-2019

1. OS Details

Which operating system, which version etc.,

`/usr/bin/lsb_release -a`	Description, OS, version, release. Information about the OS installed. Package: **lsb-release**
`/bin/cat /etc/os-release`	Release notes from OS vendor
`/usr/bin/hostnamectl`	Unique Ids, Kernel version and architecture
`/bin/uname -a`	Kernel version and related info. Print system information Package: **coreutils**
`/bin/cat /proc/version`	Same as above
`/etc/apt/sources.list`	Repositories used by the OS for updates and additional packages

Homework:

[1] What are the other code names for OS releases of Ubuntu?
[2] Which major flavour of Linux is Ubuntu based on? What are other major flavours out there?
[3] What are the other popular and lightweight flavours of Linux?
[4] What are the other architectures supported by Linux?
[5] What are the kind of operating systems used by most of the supercomputers in the world?
[6] Which version of Linux kernel are the popular Android operating systems based on? Check this information for your laptop and your mobile.

2. Admin privileges

Often the user is expected to install packages to get a certain software up and running in the machine. Following commands help you get around this task.

`/usr/bin/whoami`	Name of the user logged in. Package: **coreutils**
`/usr/bin/groups`	Which groups the user belongs to. Package: **coreutils**
`/usr/bin/sudo /bin/cat /etc/sudoers`	Is the logged in user part of system administrators of the machine? Package: **coreutils**
`/usr/bin/sudo /usr/bin/apt-get update`	Find out latest updates of the OS from the repository
`/usr/bin/sudo /usr/bin/apt-get upgrade`	Install the updates to bring the OS of the machine to the latest possible
`/usr/bin/sudo /usr/bin/apt-get autoremove`	Remove packages that are not needed by any installed software, to save disc space
`/usr/bin/sudo /usr/bin/apt-get install <package-name>`	Install a package to add a new functionality to the system
`/usr/bin/dpkg -S <command>`	Look for the name of the command in the packages installed on the machine – often to locate it in the filesystem. Package: **dpkg**
`/usr/bin/apt-file find <file>`	Same as above
`/usr/bin/apt-file list <package>`	Similar to above

Homework:
[1] Install packages to add the following commands to your system and explore what they do: fortune, octave, pdftk, unison, wget, curl, gftp, xfig, vlc
[2] Packages come as groups too. Explore the GUI feature for Ubuntu Software to see what those groups are – in the topics under categories like "Productivity", "Education and Science".
[3] Try and get the entire TeX document preparation software toolset installed on your machine.

3. Your shell environment

`type <command name>`	For any command you are using, you can find out if it is a feature of the shell or from the OS.
`help`	Find out what features are available within the shell itself. Run help with a keywork to know more about each of these features. Eg., "help set" tells you about the shell command "set".
`/usr/bin/which`	You should know which location the command is being run from. It is necessary that the location should be listed in your $PATH variable.
`/usr/bin/apropos`	If you can't think of the command name but want to see a list of commands available that are related to a keyword. Read the manual page on any of these commands to know more. **Discover new commands this way.**
`/usr/bin/man`	Manual pages for the command you want. Sometimes there are different sections for the same command, pick any to know more about the command.
`/usr/bin/info`	A structured way to learn about the commands available in the system.
`echo $PATH`	The path variable lists ";" separated directories where the command will be searched for before executing. Some software are installed in non-standard locations and so we need to ensure that the location is added to the path.
`The prompts: $PS1 and $PS2`	Command prompts. The strings used to know which context the shell is currently in.
`$USER`	Name of the currently logged in user.
`$HOME`	Home directory of the currently logged in user. Tilda character is an alias for this.
`Environment : /etc/profile and $HOME/.bashrc`	Everytime a shell is opened, commands in these files are executed to prepare the command line environment for the

	user.
`source <filename>`	If there is a file with a list of commands, run "source" command to execute them.
`printenv`	List all the variables defined in the current commandline environment.
`set`	To define and set values to variables.
`alias`	To define aliases. One can also unalias. Often the default options on dangerous commands (such as rm, mv, cp) are aliased to ask for confirmation (using -i option) so that one does not lose files.

Files used during opening of shell:

```
    Login shells : /etc/profile, ~/.bash_profile, ~/.bash_login,
~/.profile
    Non-Login shells : /etc/bash.bashrc, ~/.bashrc
```

Homework:

[1] Add a command like `echo "Hello"` at the bottom of your $HOME/.bashrc file and open a new shell to see for yourself.
[2] Discover say three new commands you did not know about and list their uses.
[3] Change the command prompts to something else and see.
[4] Create an alias that displays the hard discs currently mounted in the system.

4. File system

The type of files as listed by /bin/ls	"c" means its a character file. "l" means its a link. "d" means its a directory. "b" means its a block file. "p" means its a pipe file. "s" means its a socket file.
`ln <sourcefile> <linkname>`	Use command ln to create a hard link to a file. Use "ls -i" to check that both files have same inode number. Edit one file, open the other to check that its the same file. Remove one file and check if the other file is there.
`ls -lia`	Look at the inode numbers of the files like "." and ".." in any directory and see if they match with those of current directory and parent directory.
`chmod 744 <filename>`	Understand the format of the three digit number used to change permissions of a file or a directory. Compare with the listing that appears

	when you use "ls -l" and map the user / group / other user permissions of a file to the three digit number.

Home Work:

1. Create a file with a command inside it, change its permission to executable and see if you are able to create a new command for yourself.
2. Create an alias for a command your favorite options so that the output is what you desire. Eg., the directory listing with file size in human readable form.
3. Use the commands "cd" and "pwd" to navigate around the file system and locate configuration files for your system eg., for graphics, network, file systems to be mounted during booting and system service programs that run automatically when the machine is booted up.