

echo "Hello World" ☺

## TB7 A Basic Raspian Toolbox

## 8 "Urgent" Things to Know Before You Begin

- ♦ Much you will find on the web is not current.
- ♦ Raspian (like all Linux versions) is case sensitive.
- ♦ Stuck? try (ctl-c). q exits many listings.
- ♦ The prefix command **sudo** gives you elevated or "root" permissions. It is quite often essential if you want something to work.
- ♦ From **PIXEL**, 7 command-line environments can be entered with <Ctl><Alt><F#> where <F#> is a function key from <F1> to <F7>. Use <Alt><F7> to return to **PIXEL**.
- ♦ Raspian hates spaces and sometimes capitals - enclose strings with spaces in quotes. Use underscores instead, and use lower case.
- ♦ 2 Sanity savers: #1 <ctl>l (lower case L) or <clear> clears the screen, and puts the prompt at the top; #2 up/down arrows (↓ and ↑) scroll through previous commands.
- ♦ To get help: **help**; **help<command>**; **info**; **info<command>**; **"man -k man | less"**; **<command><spc>--help**[| more]

## 4 Commands You Need Immediately

- ♦ **pwd** will display your present working directory – this is the directory you are "in" at any given moment. (If you have not changed your default user from pi, you start out in /home/pi.)
- ♦ **cd<spc><some path modification string>** changes your working directory. **cd /** moves you to root, **cd /mnt** moves to root/mnt
- ♦ **ls** lists directories in your current directory location. **ls**, like almost all commands, can be modified with "flags" like -l or -a and these flags can be combined. Try "ls -lah"
- ♦ **cat<spc><file>** lists contents of a file, for long files try **cat | less**

## 7 Shortcuts You Need to Know Now

- "." an alias for the current directory
- ".." an alias for the parent directory
- "~" is an alias for the absolute path shortcut to the user's home directory. Type "cd ~" to return to your home directory
- "/" alias for the root directory
- "\*" a wildcard character for one or more possible but unknown character(s), "?" is a wildcard for a single character
- "|" constructs a "pipe" that joins commands output to input – frequently used with the commands less, more, and cat

## The Most Important RPi Command Line Tools?

Special Note: **apt** is an updated utility that replaces **apt-get**. The **aptitude** command suite combines the best of **apt-get** and **apt-cache**.

According to the Raspberry Pi folks, the two most used command line functions are part of the **apt** utility:

- (1) **apt update** - more likely called as **sudo apt update**, but ... if you run **apt update**, thinking you have updated anything, you have made a bad assumption. **apt update** only gives you a list of packages that could be updated. You need to call **apt upgrade** (if nothing has to be removed) or maybe **apt full-upgrade** (if packages need removal) – and usually prefix commands with **sudo** unless you have established root privileges (**sudo -i** locks root on).
  - (2) **apt install <a program or utility>** (again you may require **sudo**)
- \*Note: Other important apt commands include: **install**, **remove**, **purge**, **autoremove**, **search**, **show\_information**

## Working with Files and Directories

(start with "3 Commands".... above)

**chmod<spc><options><spc><filename>** changes file permissions. In a file and directory listing generated by a command, like **ls**, the first 10 characters are the "permissions string". Character 0 defines the entry as a directory (r) or a file (-). The next 9, in groups of 3, establish **read**, **write**, and **execute** permission for the owner (u), the group (g), and others (o) respectively. One way to set them is to define the desired values in string equations for each set separately. Ex: "**chmod u=rwx,g=rw-,o=r-- myfile**" gives the owner (user) all privileges, the group read or write, and other gets read only with respect to the file "myfile"

		chmod permission string values								
		owner "u"			group "g"			other "o"		
character position	dir or file	1	2	3	4	5	6	7	8	9
"-" is a file	-									
Options										
"r" is a directory	r	read	write	execute	read	write	execute	read	write	execute
permission granted (r,w,x)		r	w	x	r	w	x	r	w	x
or permission denied (-)		-	-	-	-	-	-	-	-	-

**cp<spc><file><spc><path or path and file name>** copy a file and put it in the directory as specified

**curl** download or upload a file to or from a server

**diff<spc><file1><spc><file2>** compares file1 to file2

**dir** displays a list of directories only, add -a to get everything  
**find<spc><options><spc><path-name / for root><spc><file name can use wildcards>** note: <options> are advanced. Also see **locate**.

**grep<spc><"string"><spc><filename>** looks for a string pattern  
**head<spc><-##>** or **tail<spc><-##>** print first or last ## file lines

**locate<spc><option><spc><target>** not default installed, must "sudo apt install locate" & maybe "sudo updatedb" - many options.

**mkdir<spc><new directory name>** create a new directory in pwd  
**mkdir<spc><-p><spc><path/dir name>** make a new directory on the path specified

**mv<spc><file><spc><newfilename>** **renames** or moves a file

**mv<spc><file><spc><path or path and file name>** moves a file to the directory specified (⚡ **mv** works; **rename** usually does not)

**rename<spc><current file name><spc><new file name>** renames

**rm<spc><file>** removes a file \*Note: Danger Will Robinson - there is no way to recover a deleted file

**rm<spc><file list>** removes a list of files

**rm<spc><-r><spc><directory name>** removes a directory. Note: it is gone forever.

**rm<spc><-R><directory name>** removes everything

**rmdir<spc><directory name>** removes an empty directory

**touch<spc><newfile name>** create a new empty file in pwd or change its time stamp

**shred<spc><file>** ultra secure file destruction (paranoid a little?)

**tree** show a tree structure of directories and files

**vdirc** verbosely list directories – editor's fav

**wget<spc><url of file location>** download a file to Pi from the web

**whereis** finds a command file in standard program location

**wc<center>** list the number of lines, words, and characters in a file

## Get Information About

## PEOPLE

**groups** displays a list  
**id** current uid's group  
**logname** user's name  
**users** everybody logged in  
**who** shows users by tty  
**whoami** shows user logged in

## NETWORK ENVIRONMENT

**ifconfig** network status info  
**hostname** <spc><-l> (*capital eye*)  
 the **host** ip will be first 4, dot separated, number series. It is also the "inet" in ifconfig listing  
**ping** checks communication with another host  
**ssh** the secure shell that makes your RPi into a command-line client - not enabled by default - can be activated in "interfacing options" using the **raspi-config** utility. For a non-permanent solution use: "**sudo systemctl enable ssh**" and then "**sudo systemctl start ssh**"  
**tty** displays active terminal #

## HARDWARE

**arch** you processor name/id  
**du**<spc><"filename"> shows disk space usage of files and directories; use "**du | less**"  
**pinout** – this is a fun one for RPi hardware users – a contrived graphic and gpio list of your Pi  
**lscpu** will present summary info on the cpu

**uname**<spc><-a> extensive critical info about your system  
**vcgencmd** - vast hardware info about RPi, NOT in help or info so Google it Ex: **vcgencmd**<spc><get\_config><int>

## SYSTEM AND SOFTWARE

**df** mounted partition usage  
**ps**<spc><aux><spc><|><spc><less> view all running processes  
**ps**<spc><-u><spc><your user name> info on your processes, including id needed to **kill** one  
**stat**<spc><filename> get the status information on a file  
**stty** print or change current terminal baud setting  
**top** will list running processes showing real time activity

**Find packages installed:** (see Debian: <https://wiki.debian.org/ListInstalledPackages>)

**dpkg-query**<spc><-l> a very nice table with version and description; "-l" is lower case L.  
**dpkg-query**<spc><-f><spc><'\${binary:Package}\n'><spc><-W> one per line

**dpkg-query**<spc><-l><spc><'search pattern'> add search pattern to list command

*NOTE: The Debian site is a good resource. A place to begin is : <https://wiki.debian.org/WordIndex>. Also, a critical look at the Raspberry Pi and some of its problems is at: <https://wiki.debian.org/RaspberryPi>*

## MULTIPLE INFORMATION TYPES

Accessing the <proc> information has more than a hundred status and environment attributes to be displayed.

Try these four, displayed by adding them as options to the <cat> command, i.e., **cat**<spc></proc/version> ↪ RPi version  
**/proc/cpuinfo** processor detail  
**/proc/meminfo** memory use  
**/proc/partitions** how your sd card is divvied up.

## DEVICE SETTINGS - change from Pixel or at config.txt

*file location: /boot/config.txt*

see the Raspberry Pi Foundation's overview at: <https://www.raspberrypi.org/documentation/configuration/config-txt/>  
 option sections include: *Memory, Audio, Camera, License Keys/Codecs, Boot, Video/Display, GPIOs Ports and Device Tree, Overclocking, Conditional Filters, Miscellaneous*

**Configuring bash** (your command line environment) a lot can be changed in the file **.bashrc** (in home directory - back it up first!) but a really good (and fun) place to begin is to open (or create, then open)

**.bash\_aliases** and create your own commands. Try adding alias command **alias up="cd .."** *more explanation at:*

<https://www.wikipython.com>

**Additional apt Options** besides update, upgrade, full-upgrade  
**apt**<spc><install><spc><a program or utility> install new package  
**apt**<spc><remove> package removed - leaves configuration file  
**apt**<spc><purge> removes all remnants that it can find  
**apt**<spc><auto-remove> used to remove auto installed packages

## Changing Your Command Line Environment

**alias**<'command equation'> -create your own command: For example: **alias 'lx=ls -lah'**  
**<ctl-d>** logs a user out, presents log-in que  
**exit** or **logout** terminates a session; sometimes **<ctl-D>** will work  
**kill**<PID, i.e., a process id> stop a process  
**passwd** lets you change your password  
**poweroff** will do just that  
**reboot** will also do just that if you have only one user active  
**shutdown**<spc><-h><spc><now> the safest way to shutdown  
**shutdown**<spc><-r> gives you 1 minute, then restarts computer  
**shutdown**<spc><-c> cancel a shutdown command  
**su**<spc><alternate user> change users – must have account  
**systemctl**<spc><reboot><spc><-i> will restart the Pi

## Helpful Things to Know

**pip3**<spc><command><[options]> is the command to install **Python** packages. Commands include: **help**, **install** (some options are PyPI, VCS, and Local project directories), **uninstall**, **list**, **show**, **search**). Options are -h or **-help**, -v or **-verbose**, -V or **--version**  
 Kill your PIXEL session: in terminal type: **pkill**<spc><lxsession>  
 To start a PIXEL session in your active tty type: **startx**  
 ... and note you can open terminals in multiple environments organized by tabs in PIXEL.  
 Put yourself in root mode: **sudo -i** *\*Tip: considered risky*  
 How to give a user temp sudoer privileges: log in as a root user; type **sudo**<spc><usermod><spc><-aG><spc><sudo><user name> ...or add a sudo user permanently with the **adduser** command

## More Single Character Shortcuts or Search Commands

**\** escapes itself and other special characters  
**[]** brackets pattern for matching a single character  
**\*** matches 0 to many characters **?** matches one character  
**;** separates commands on a single line; terminates a pipe  
**" "** contents in quotes will be treated as one argument  
**#** changes line to a comment  
**&** runs a command in the background – the shell is then available in the foreground  
**<** if followed by <spc><filename> means 'take input from this file'  
**>** if followed by <spc><filename> means 'send output to this file'; **cavaet**: it overwrites the file.

Many new Pi owners complain that the Raspberry Pi site makes it hard to find documentation. Not so! Go to: <https://www.raspberrypi.org/documentation/>

## Text Editors and Other Utilities: From Pixel use Leaf Pad.

From bash (command line) recommend text editor is **nano**. Others include: **ed**, **vi**, **vim**, and **emacs**. See [wikipython.com](http://wikipython.com).  
**gzip** (compress), **gunzip** (uncompress), **dc** (reverse polish calculator), **elm** (email), **talk** (chat), **ssh** (secure shell to make pi a client) **SEND ERRORS/SUGGESTIONS TO** [oakey.john@yahoo.com](mailto:oakey.john@yahoo.com)