

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) is case sensitive. Try avoiding spaces and capitals - enclose strings with spaces in quotes or use underscores.
- ◇ Stuck? try **(ctl-c)**. **q** exits many listings.
- ◇ The prefix command **sudo** gives you elevated or "root" permissions. It is frequently essential if you want something to work.
- ◇ From **PIXEL**, there are 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**.
- ◇ 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]**

Commands You Need Immediately

- ◆ **pwd** displays your **p**resent **w**orking **d**irectory – 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"**, **"la -l"** for format
- ◆ **sudo** gives root privileges; **su<spc><user>** switches user

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 ... **apt update** only gives you a list of packages that could be updated. You need to then call **apt upgrade** (if nothing has to be removed) or maybe **apt full-upgrade** (if pack-ages need removal) – 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**

#! - **"shebang"** or **"hashbang"** - is an initial character syntax that causes bash to initialize a specific interpreter and run the executed script.

www.wikipython.com

Working with Files and Directories

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"

dir or file		chmod permission string values								
		owner "u"			group "g"			other "o"		
character position	0	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 (-)		-	-	-	-	-	-	-	-	-

cat<spc><file> lists contents of a file, for long files try **cat | less**
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 ** 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><spc><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<enter> 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 – fun for RPi users – textual graphic diagram 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<space><aux><space><|><space><less> view all running processes
ps<space><-u><space><your user name> info on your processes, including id needed to **kill** one
stat<space><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>`

<code></proc/version></code>	 RPi version
<code>/proc/cpuinfo</code>	processor detail
<code>/proc/meminfo</code>	memory use
<code>/proc/partitions</code>	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/](https://www.raspberrypi.org/documentation/configuration/config-txt/)** **documentation/**
configuration/config-txt/
 option sections include:
Memory, Audio, Camera,
License Keys/Codecs, Boot,
Video/Display, GPIOs Ports and
Device Tree, Overclocking, Condi-
tional 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<space><install><space><a program or utility> install new package
apt<space><remove> package removed - leaves configuration file
apt<space><purge> removes all remnants that it can find
apt<space><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.

Some 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) recommended text editor is **nano**. Others include: ed, vi, **vim**, and emacs. See 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_oakev.john@yahoo.com