Raspberry Pi for Beginners

LESSON 4

MAKERHOUSE
EMPOWERING MAKERS

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MASTERING COMMAND LINE

1 INTRODUCTION

As you are going through Lesson 1 – 3, Raspbian OS offers both GUI (Graphical User Interface) and Terminal – opening a software or programs. Undeniable, GUI's provided a friendly visual in exploring the Raspbian desktop – mouse-click on files and folders in the file manager, etc. -- however somehow it loose power and expressiveness. On the other side, Terminal – vice-versa -- you get full control, and it is a fast way to do everything – opening software, managing files and folders, updating and installing software; almost anything with privilege.

A good example, and if you still remember, in Lesson 3; Turtle module, we have been introduced with the power of Terminal – finding the help instruction (method) for controlling our Turtle.

Can GUI do that?

Sadly, can't but even if GUI can give us, it's a long journey – click here and there, open this and that file – tedious.

1.1 TERMINAL

Bash, Shell, or Terminal and whatever its name, referring to the command line – a black television screen looks likes. For windows user – beginners -- you might feel obscured. It's normal.

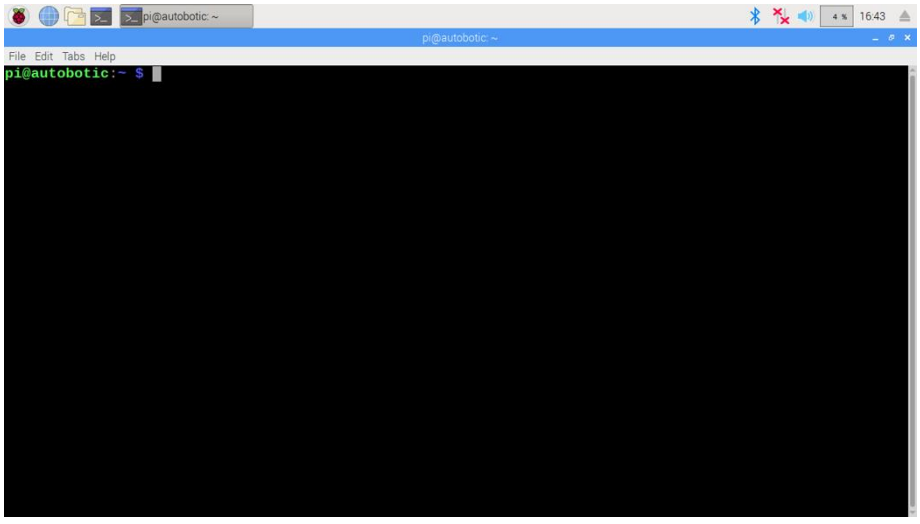


Figure 1: You may familiar with this -- Terminal

Command line often the best way (Thanks! Raspbian; Unix System) – the user only needs to type in the instruction where the computer will respond to it. It's clear, quick and unambiguous – simplify complex tasks, or instantly carry out simple ones.

Did you agree?

1.1.1 GETTING STARTED

From the beginning, we have been configured our Raspbian to boot up straight to the Desktop mode. So, we have a beautiful and sleek look of Raspbian Desktop.

How to open the Terminal?

You shall be an expert in doing that now.

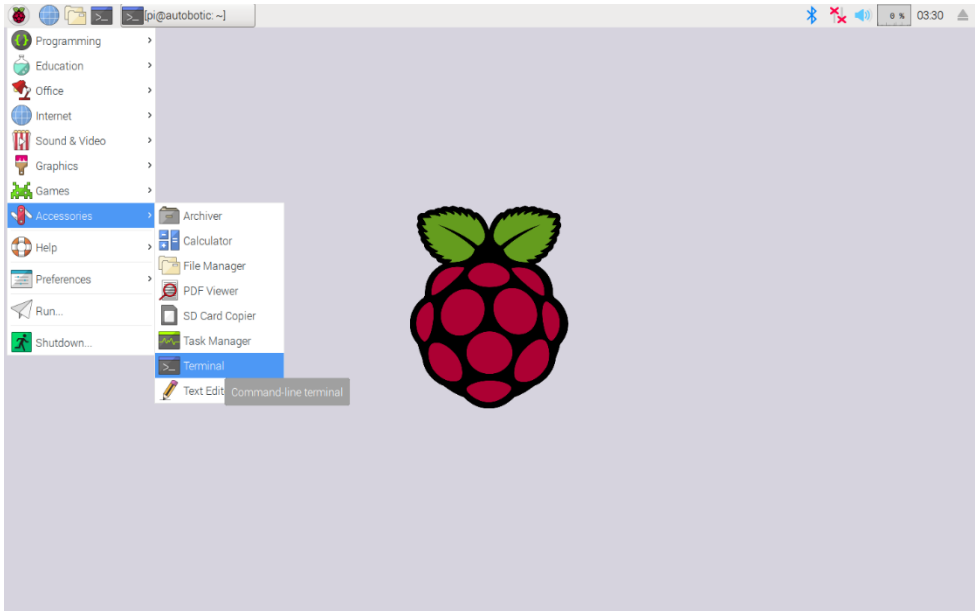


Figure 2: **Main menu** > **Accessories** > **Terminal**

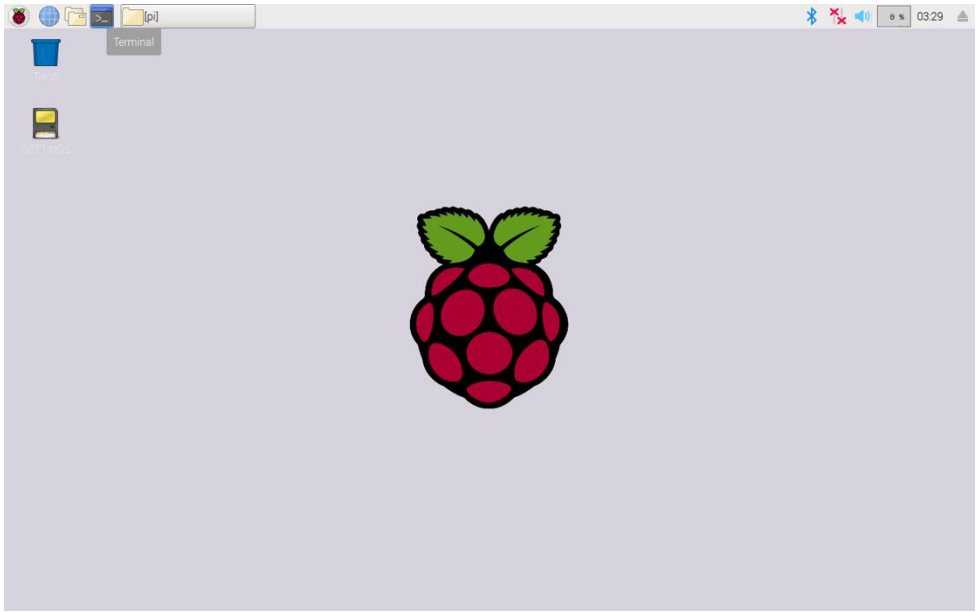


Figure 3: Terminal Icon (short-cuts)

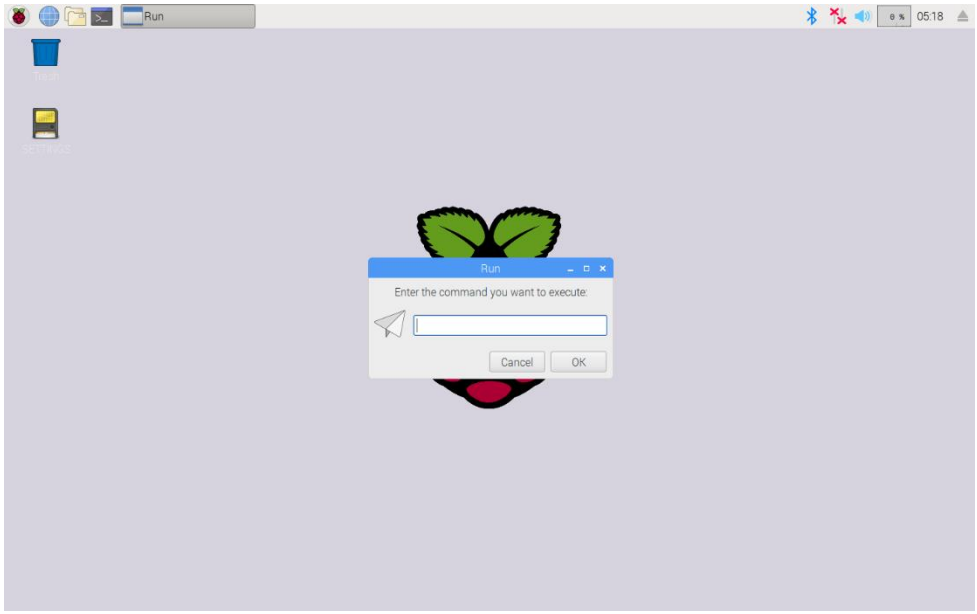


Figure 4: Hit **alt + F7** -- **ltxterminal**

Interestingly, you can try other methods. Try – a combination of ctrl+ alt + [F1 until F6] – you manageably to switch between Terminal and GUI in full-screen mode.

No	Instruction	Description
1	Ctrl + Alt + F1	Terminal
2	Ctrl + Alt + F2	Further Terminal ; password required
3	Ctrl + Alt + F3	Further Terminal ; password required
4	Ctrl + Alt + F4	Further Terminal ; password required
5	Ctrl + Alt + F5	Further Terminal ; password required
6	Ctrl + Alt + F6	GUI

Table 1: Switch between Terminal and GUI.

2 TERMINAL EXPLORATION

For the beginners, you may face with $ prompt most of the time in the terminal. But don't panic! This lesson will guide you to find your way around the terminal on the Raspberry Pi. Now prepare, pen and or paper if need. Let's begin our terminal exploration.

***** These lessons only will focus on the basics***

2.1 NAVIGATE FOLDERS AND LIST FILES

You might say that using the GUI to navigate folders and list file through the file manager is much intuitive. Yes, it is true, but give a try and feel how the command line give you much more power compare to the GUI.

2.1.1 LIST (**LS**)

ls – list directory content

ls [option] [file …] – list directory content

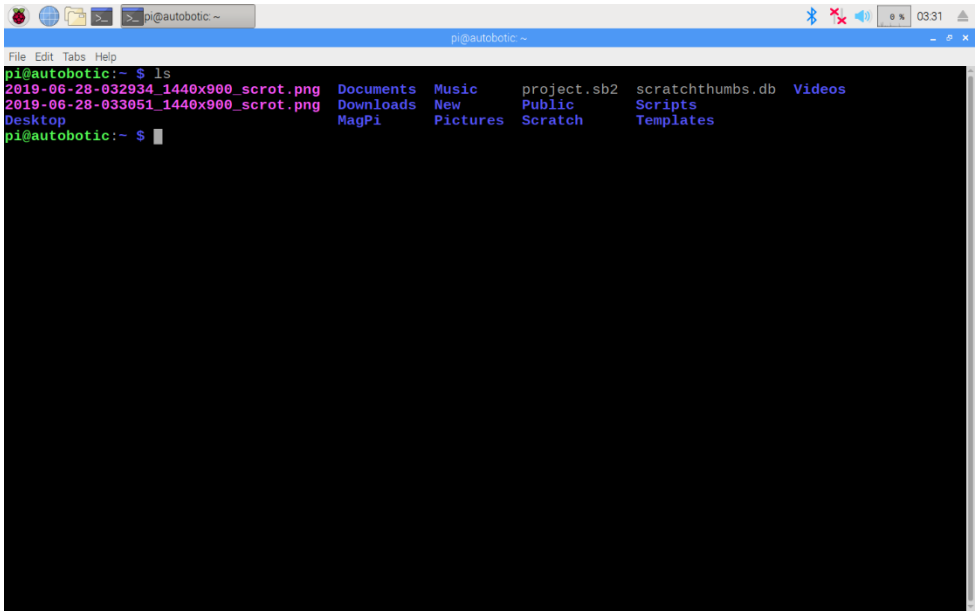


Figure 5: Using **ls** in "home" pi directory

2.1.2 CHANGE DIRECTORY (**CD**)

cd [file …] – change working directory

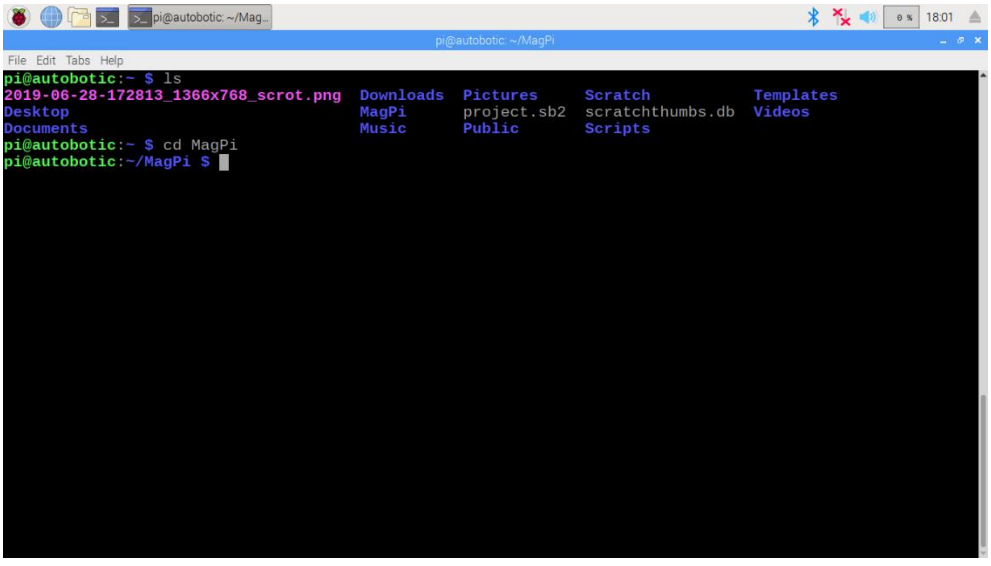


Figure 6: Using **cd** from "home" pi into "MagPi" directory

You can type "pwd" to confirm you have successfully move from home pi to MagPi directory (see 2.1.3).

2.1.2.1 HOME DIRECTORY (~)

Home directory is abbreviated as "**~**".

cd ~ – change to "home" working directory

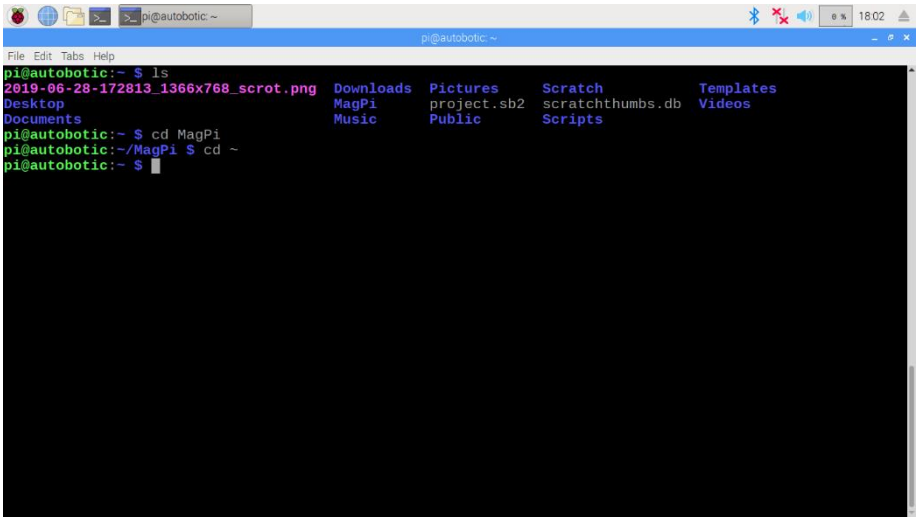


Figure 7: Using **cd** from "MagPi" pi into "home" directory

You can type "pwd" to confirm you have successfully move from MagPi to home pi directory (see 2.1.3).

2.1.2.2 LAST/PREVIOUS WORKING DIRECTORY (-)

"**-**" is a shortcut for "wherever I was before I came here" – last previous working directory.

cd - – change to last previous working directory

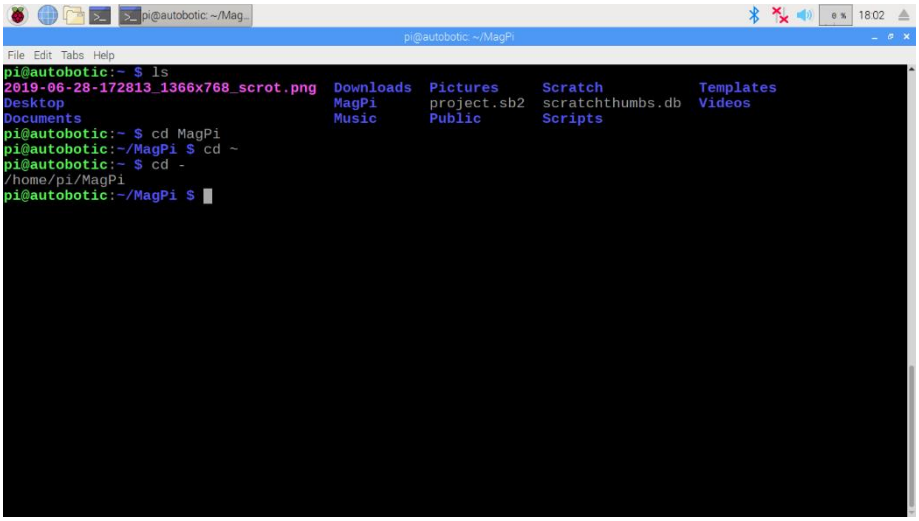


Figure 8: Using **cd** from "home" pi into "MagPi" directory – "MagPI" is last previous working directory

You can type "pwd" to confirm you have successfully move from home pi to MagPi directory (see 2.1.3).

2.1.3 PRESENT WORKING DIRECTORY (**PWD**)

pwd – return working directory name

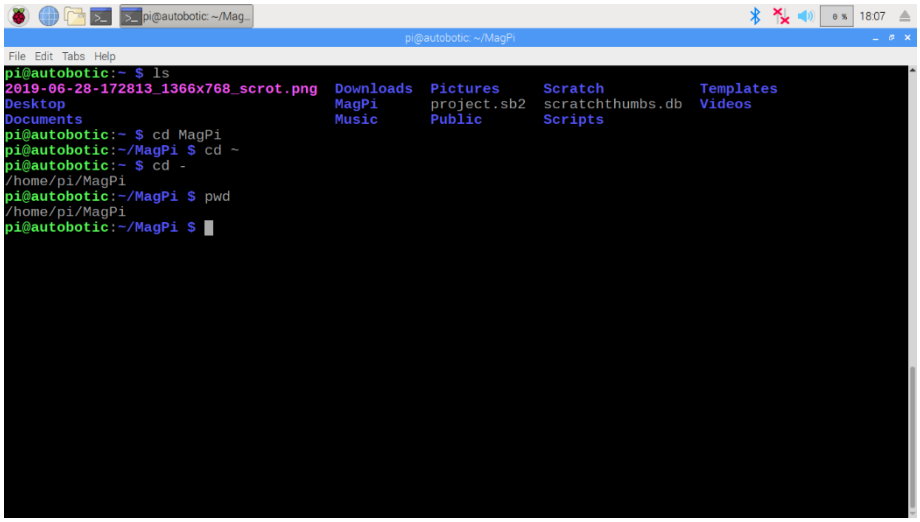


Figure 9: Ensure working in correct directory by using **pwd**

2.2 READ AND WRITE TEXT

In GUI, create-view-alter files or folders require you to mouse-click, naming, write on the dedicate text file, etc. Terminal offer more simple way – for sure fast.

2.2.1 CREATE FOLDER (**MKDIR**)

mkdir [file …] – make directories

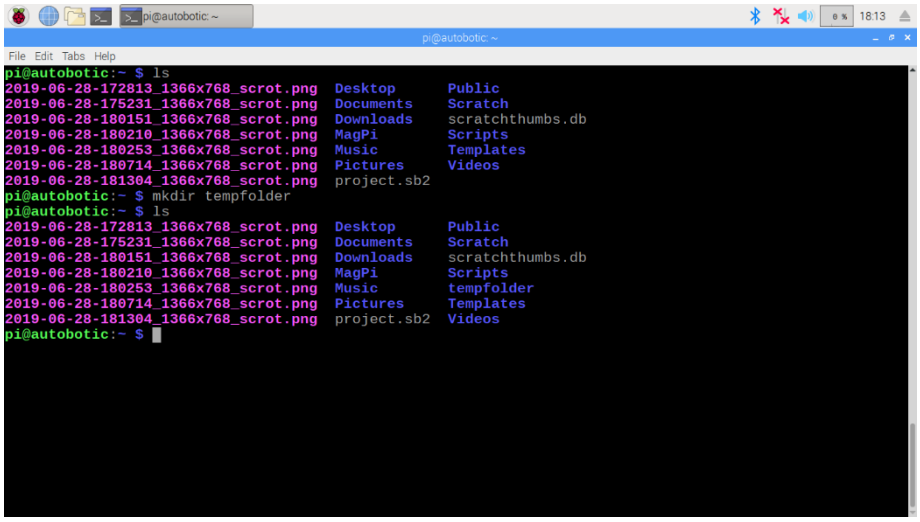
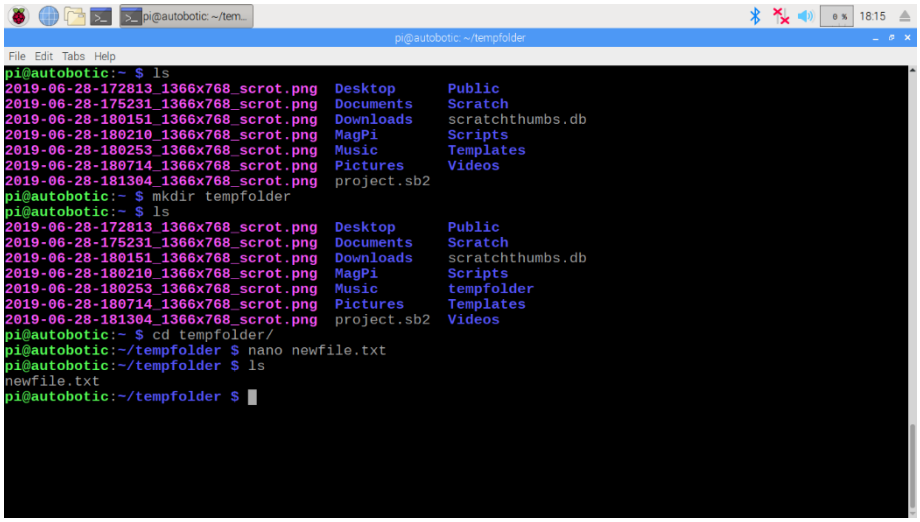


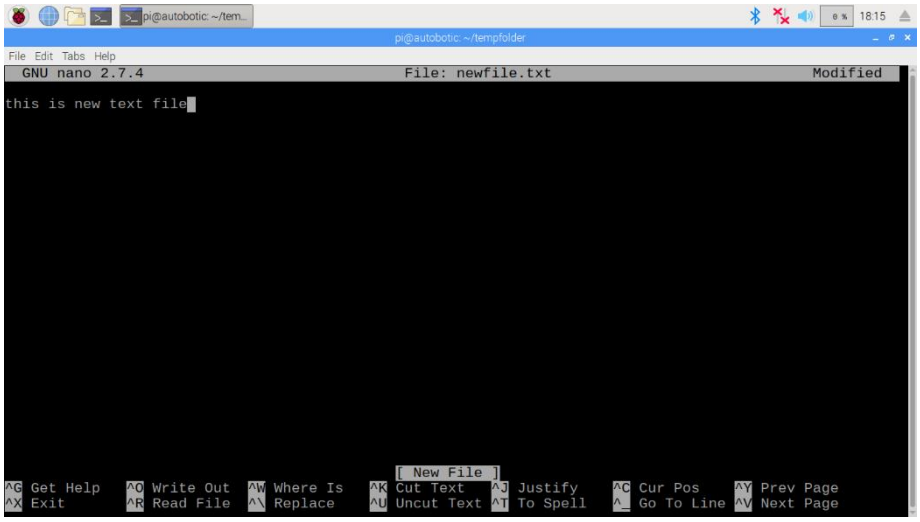
Figure 10: Create a new directory – tempfolder – in "home" pi directory

2.2.2 EDITING (**NANO**)

nano is a small, free and friendly editor – ready use in terminal.



(a) Create new file in tempfolder – **cd tempfolder** > **nano newfile.txt**



(b)Edit file in nano editor; once done -- **ctrl+x** > **Enter** > **y**

Figure 11: Add and edit new file using **nano**

2.2.3 CONCATENATE (**CAT**)

cat [option] [file …] – concatenate and print files

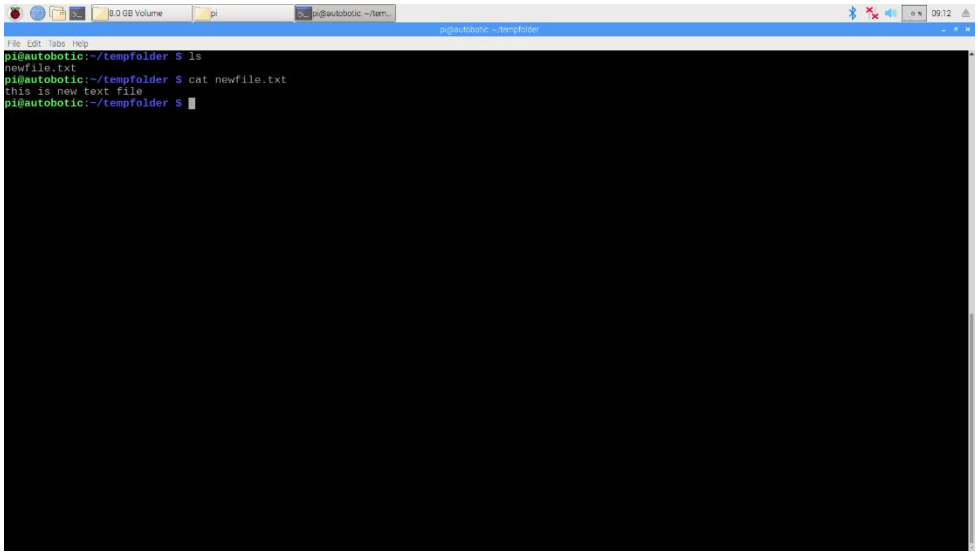


Figure 12: Review what's inside newfile.txt using **cat**

2.2.4 REMOVE FOLDER/FILES (**RM**)

rm [option] [file …] – remove directory entries

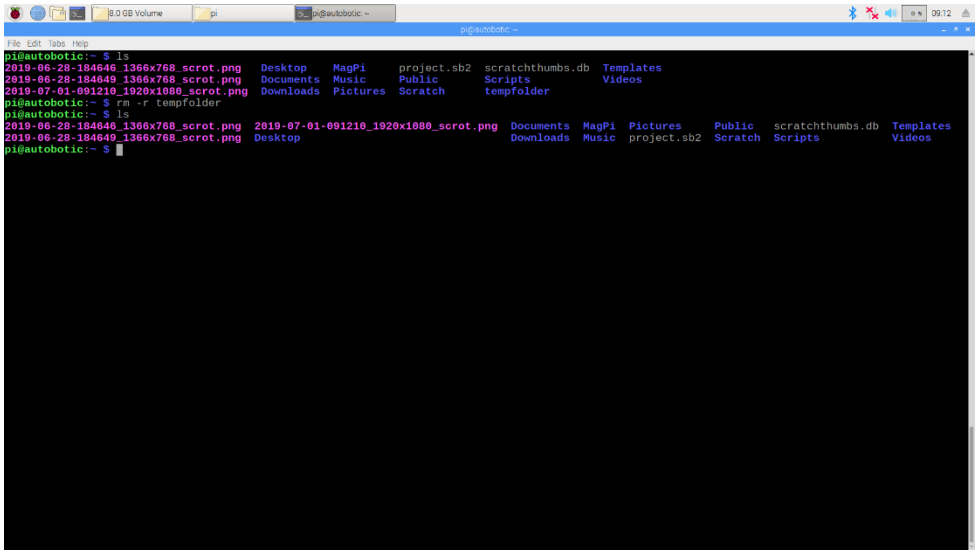


Figure 13: removing **tempfolder** using **rm -r tempfolder**

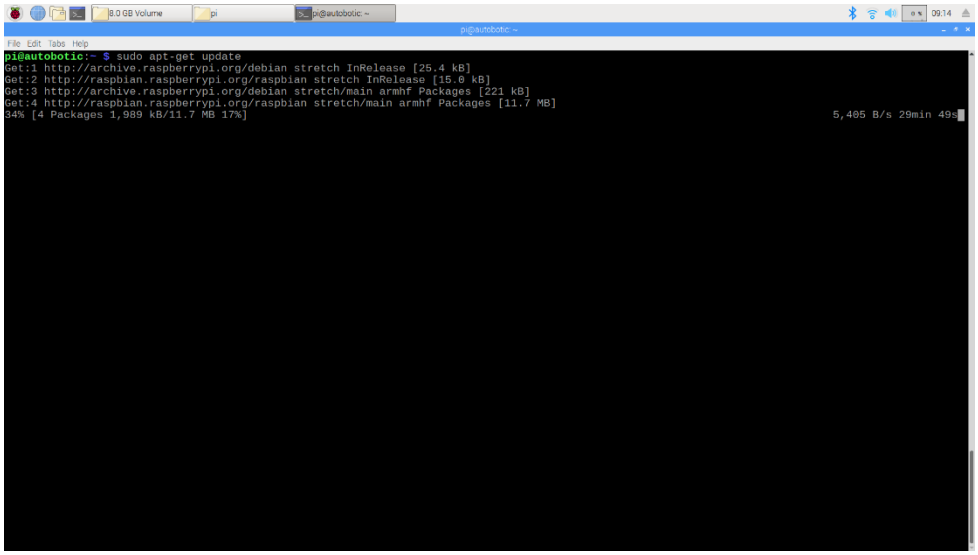
2.3 PERMISSION TO INSTALL

2.3.1 INSTALL

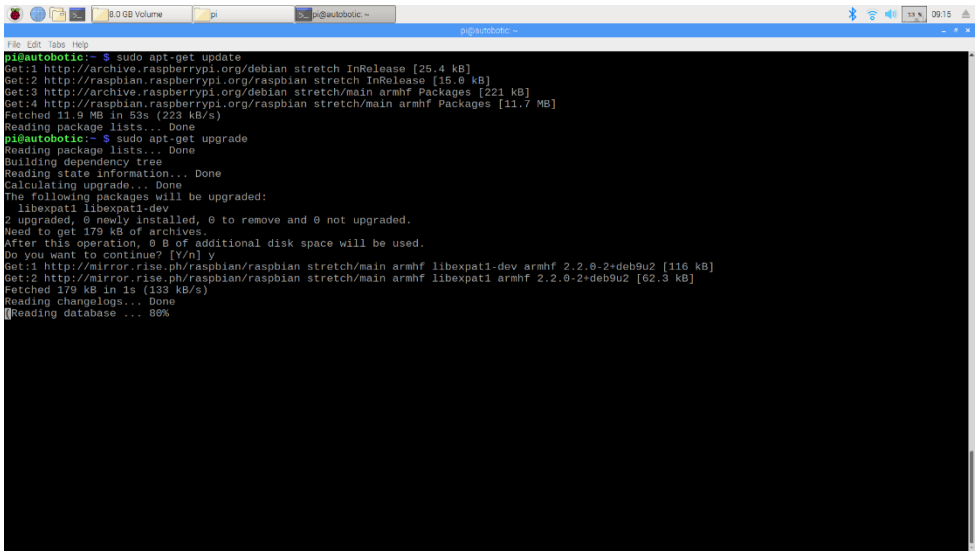
sudo apt-get update – updating Raspberry Pi software etc

sudo apt-get upgrade – upgrading Raspberry Pi system

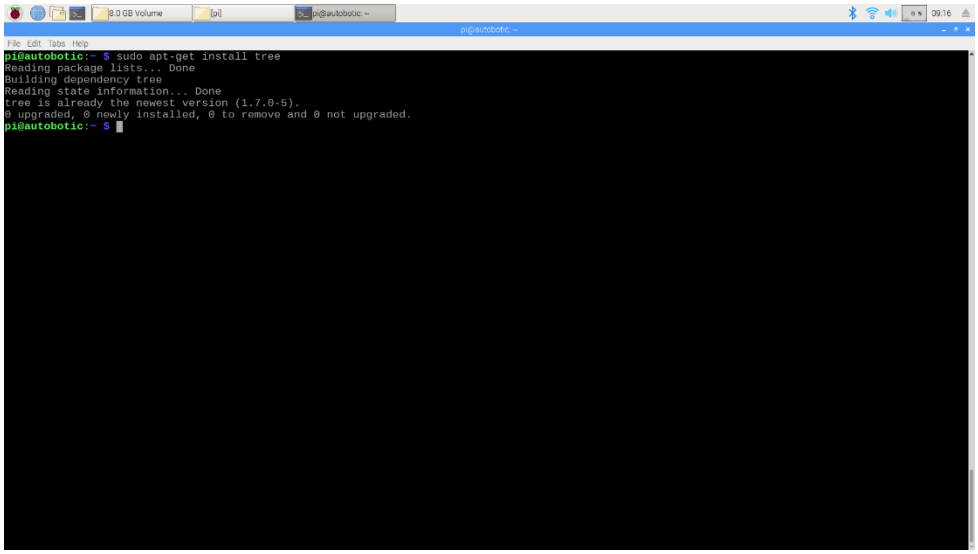
sudo apt-get install [file …] – install specific software



(a) Updating apps and dependencies using **sudo apt-get update**



(b) Updating apps and dependencies using **sudo apt-get upgrade**



(c) Add and edit new file using **nano**

Figure 15: Updating apps, dependencies, and install an apps

2.3.2 SEARCH

sudo apt-cache search [file …] – find particular apps

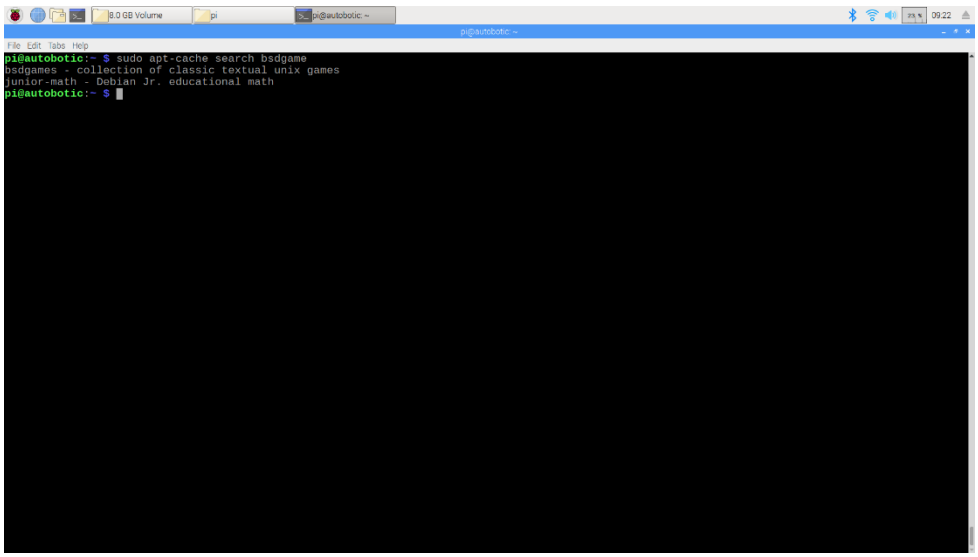


Figure 16: Using **apt-cache search** to find an apps or games etc

sudo apt-cache show [file …] – examine individual packages

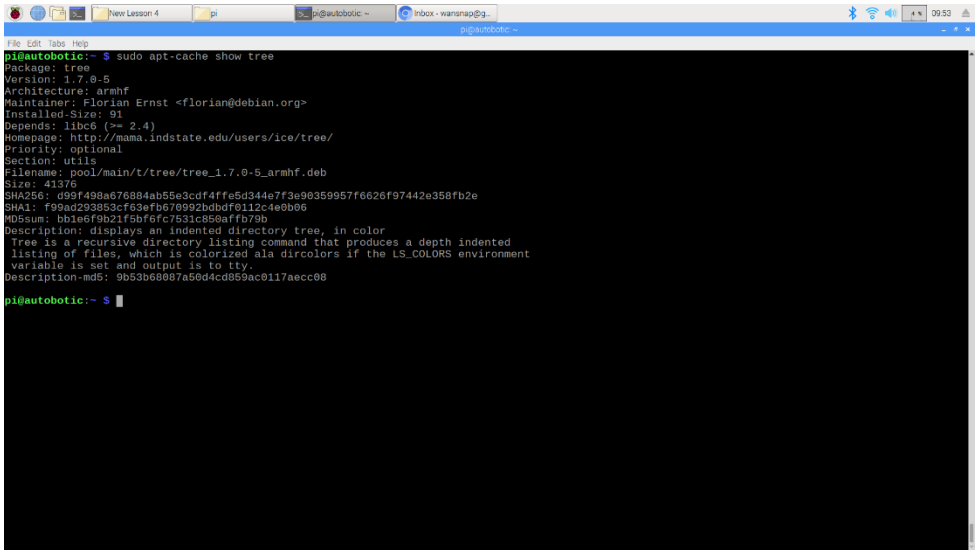


Figure 17: Using **apt-cache show** to find an specific apps or games etc

2.3.3 CLEAR / REMOVE

sudo apt-get autoclean – auto clean the removed apps and the dependencies

sudo apt-get autoremove – auto remove apps and the dependencies obsolete

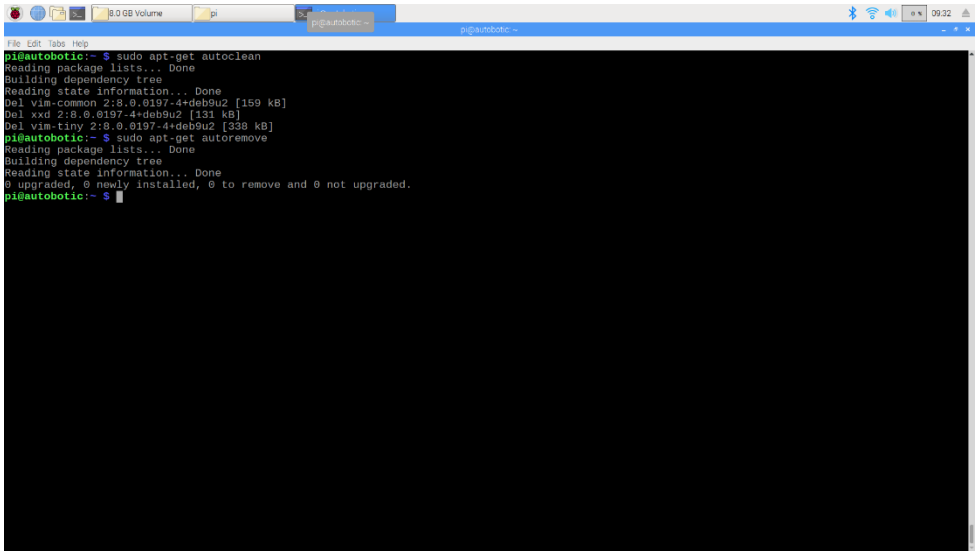


Figure 18: Auto-clean and remove – to remove obsoletes or apps and dependencies

3 MISCELLANEOUS

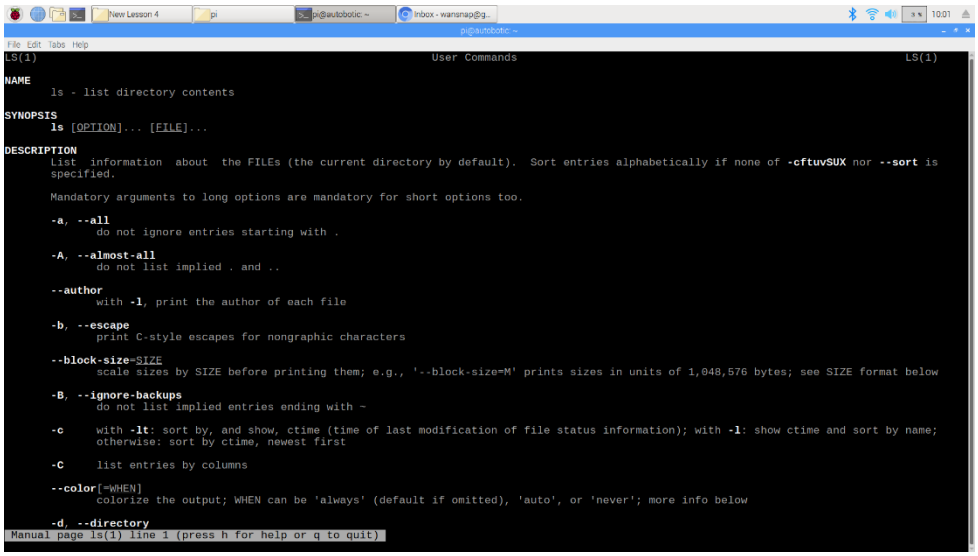
I have listed here some of tips and tricks for finding help, tab completion, wildcard*, etc. in strengthening using the command line.

3.1 FIND HELP

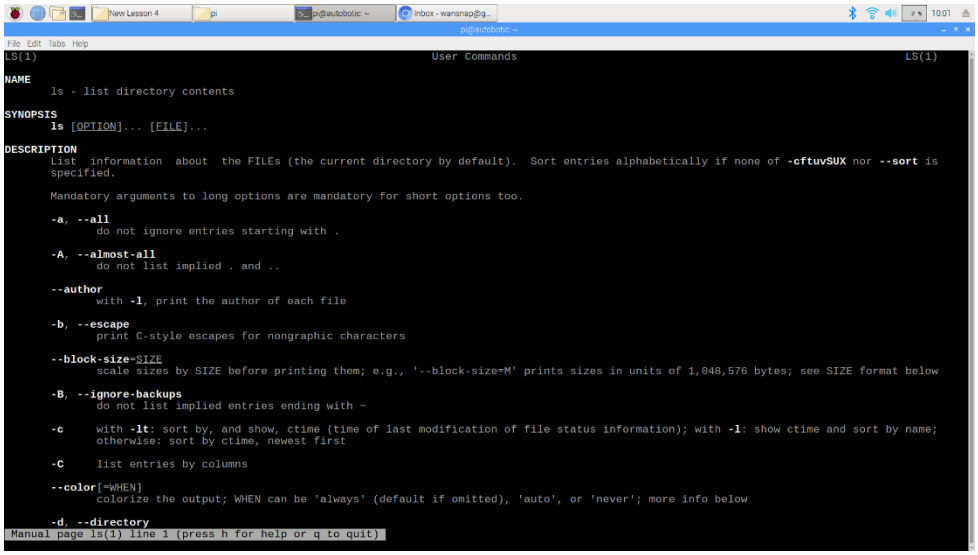
man [command] – manual for command line syntax (simple)

info [command] – manual for command line syntax (complete)

If we need to find more info on certain command line syntax, **man** (manual) and **info** is there for help.



(a) Using **man** (manual)



(b) Using **info**

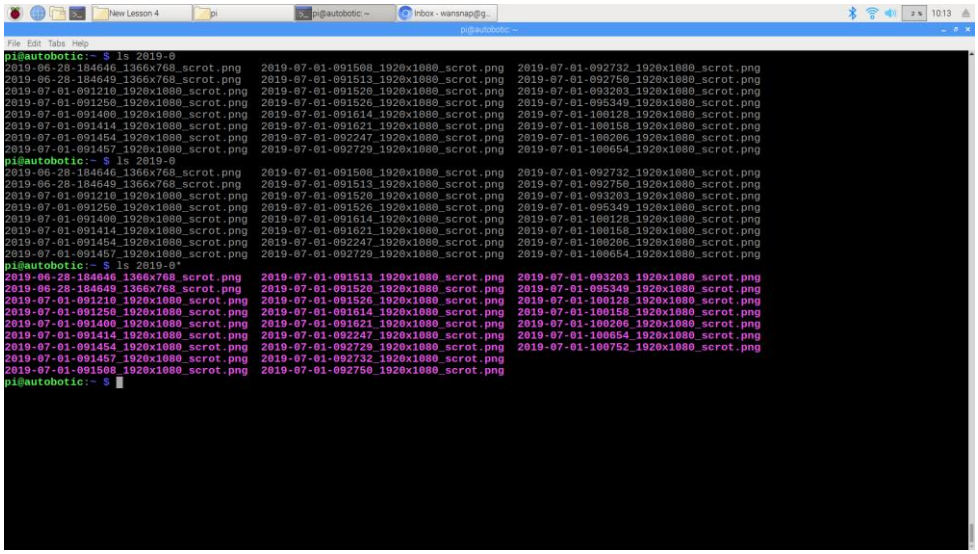
Figure 19: Finding help

3.2 TAB COMPLETION

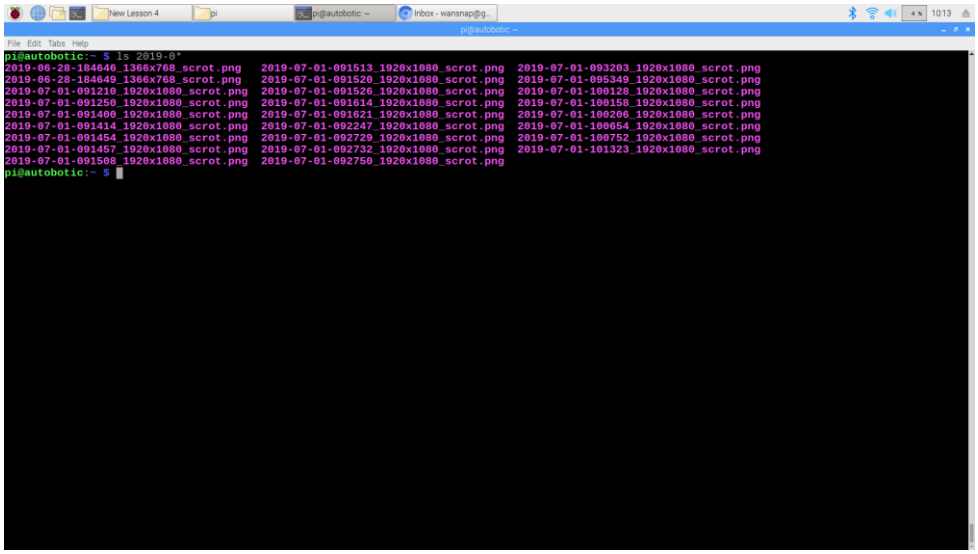
This a lazy way for typing long text name for folders. If you've more than one file beginning with p, they'll all be listed, and you can type more letters and hit Tab again.

3.3 WILDCARD

"*" or **asterisk** is known as a wildcard, and this one represents any number of characters (including none). Powerful for listing up all the files or folders has identically same as



(a)



(b)

Figure 20: List (**ls**) using the wildcard

