



Linux Basic Commands By TESR

ROS2

Linux Basic Commands

- **pwd** – command to terminal to display the **p**ath of the current **w**orking **d**irectory.

```
rengy@tesr-9939:~$ pwd
/home/rengy
```

- **ls** – command to display the **l**ist of content in current working directory.

```
rengy@tesr-9939:~$ ls
arduino          build-test1-Desktop-Debug  Documents  influxDB2          Music      PyCharm      test1      Videos
Arduino          cartographer_ws           Downloads  ironx_customer_data_backup  NodeRed    sketchbook   ui          ws_moveit
build-new-Desktop-Debug  catkin_ws                foxy_ws    kobuki_ws          Pictures   snap         untitled
build-TESR_Nav_gui-Desktop-Debug  Desktop                  grafana    model_editor_models  Public     Templates   untitled1
```

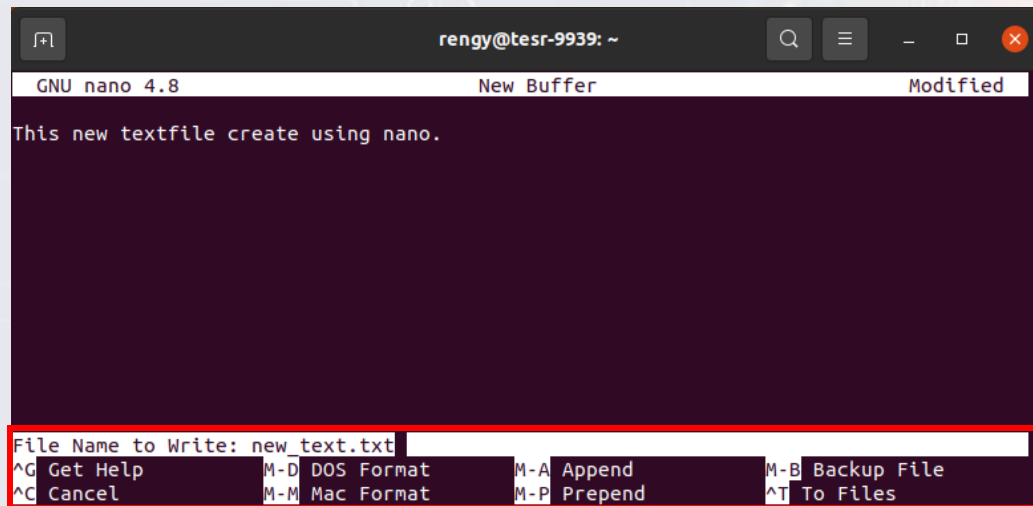
- **mkdir** – command to **m**ake a new **d**irectory folder.
 - Argument require: "mkdir <folder_name>" such as "mkdir new_content"

```
rengy@tesr-9939:~$ mkdir new_content
rengy@tesr-9939:~$ ls
arduino          build-test1-Desktop-Debug  Documents  influxDB2          Music      Public      Templates  untitled1
Arduino          cartographer_ws           Downloads  ironx_customer_data_backup  new_content  PyCharm     test1      Videos
build-new-Desktop-Debug  catkin_ws                foxy_ws    kobuki_ws          NodeRed    sketchbook   ui          ws_moveit
build-TESR_Nav_gui-Desktop-Debug  Desktop                  grafana    model_editor_models  Pictures   snap         untitled
```

Linux Basic Commands

- **nano** – command use to create or open document file in current directory.
 - **Argument require:** "**nano <file_name.txt>**" for create new or open document file.
 - Can also create file by type "nano" but when Save or Write Out document file name **must** be set to complete creation.

```
rengy@tesr-9939:~$ nano
```

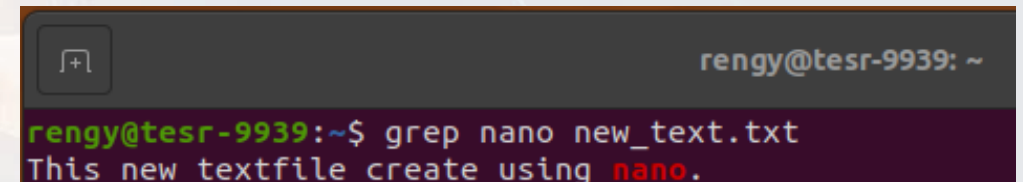
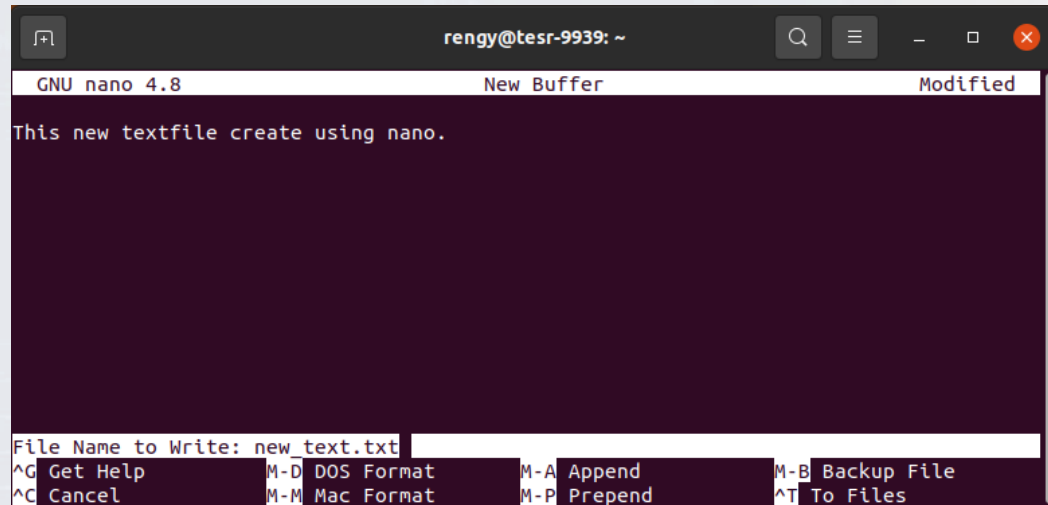


```
rengy@tesr-9939:~$ ls
arduino          grafana          sketchbook
Arduino          influxDB2        snap
build-new-Desktop-Debug  ironx_customer_data_backup  Templates
build-tesr_Nav_gui-Desktop-Debug  kobuki_ws          test1
build-test1-Desktop-Debug  model_editor_models  textfile.txt
cartographer_ws          Music              ui
catkin_ws               new_text.txt        untitled1
Desktop                 NodeRed             Videos
Documents                Pictures            ws_moveit
Downloads                Public
foxy_ws                  PyCharm
```

(type you fill after name to create file will define type of your document file. Such as text.py, file.bash or set.sh)

Linux Basic Commands

- **grep** – command use to find and display wording you given through a document.
 - **Argument require:** "**grep <word> <file_name.txt>**" to find and display word from document.



Linux Basic Commands

- **echo** – command use to display the data in declared content or write content to file.
 - Argument require: "echo <declared_variable>" or "echo <declared_variable> >> <file_name>"

```
rengy@tesr-9939: ~  
rengy@tesr-9939:~$ echo $PATH  
/home/rengy/.local/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin  
rengy@tesr-9939:~$  
rengy@tesr-9939:~$ echo $PATH >> new_text.txt  
rengy@tesr-9939:~$ nano new_text.txt
```

```
GNU nano 4.8      New Buffer      Modified  
This new textfile create using nano.
```

Before



```
GNU nano 4.8      new_text.txt  
This new textfile create using nano.  
/home/rengy/.local/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:~  
  
^G Get Help  ^O Write Out ^W Where Is  ^K Cut Text  ^J Justify  ^C Cur Pos  
^X Exit      ^R Read File ^_ Replace  ^U Paste Text ^T To Spell ^_ Go To Line
```

After

Linux Basic Commands

- **cd** – command to **c**hange current working **d**irectory.
 - Argument require: "**cd <directory_name>**" such as "**cd new_content**"

```
rengy@tesr-9939:~$ cd new_content
rengy@tesr-9939:~/new_content$
```

- Can also type "**cd ..**" to quit from current directory.

```
rengy@tesr-9939:~$ cd catkin_ws/src/r_test_navigation/
rengy@tesr-9939:~/catkin_ws/src/r_test_navigation$ cd ..
rengy@tesr-9939:~/catkin_ws/src$
```

- Can also type "**cd**" to quit from current directory to user directory.

(In this case, user directory is /home/rengy)

```
rengy@tesr-9939:~$ cd catkin_ws/src/r_test_navigation/
rengy@tesr-9939:~/catkin_ws/src/r_test_navigation$ cd
rengy@tesr-9939:~$ pwd
/home/rengy
```

Linux Basic Commands

- **cp** – command to **copy** file to directory that you're prefer.
 - Argument require: "cp <file_name> <directory_full_path>"

```
rengy@tesr-9939:~$ cp new_text.txt new_content/  
rengy@tesr-9939:~$ cd new_content/  
rengy@tesr-9939:~/new_content$ ls  
new_text.txt
```


Linux Basic Commands

- **mv** – command to **move** file to directory that you're prefer.
 - Argument require: "**mv <file_name> <directory_name>**" for move a file.

```
rengy@tesr-9939:~$ ls
arduino          build-test1-Desktop-Debug  Documents  influxDB2      Music      Public      Templates  untitled1
Arduino          cartographer_ws           Downloads  ironx_customer_data_backup  new_content  PyCharm    test1      Videos
build-new-Desktop-Debug  catkin_ws                foxy_ws   kobuki_ws      NodeRed    sketchbook  ui          ws_moveit
build-TESR_Nav_gui-Desktop-Debug  Desktop                  grafana   model_editor_models  Pictures    snap        untitled
rengy@tesr-9939:~$ mv untitled new_content
rengy@tesr-9939:~$ ls
arduino          build-test1-Desktop-Debug  Documents  influxDB2      Music      Public      Templates  Videos
Arduino          cartographer_ws           Downloads  ironx_customer_data_backup  new_content  PyCharm    test1      ws_moveit
build-new-Desktop-Debug  catkin_ws                foxy_ws   kobuki_ws      NodeRed    sketchbook  ui
build-TESR_Nav_gui-Desktop-Debug  Desktop                  grafana   model_editor_models  Pictures    snap        untitled1
rengy@tesr-9939:~$ cd new_content
rengy@tesr-9939:~/new_content$ ls
untitled
```

- Can also use to rename by type "**mv <current_name> <new_name>**"

```
rengy@tesr-9939:~$ ls
arduino          build-test1-Desktop-Debug  Documents  influxDB2      Music      Public      Templates  Videos
Arduino          cartographer_ws           Downloads  ironx_customer_data_backup  new_content  PyCharm    test1      ws_moveit
build-new-Desktop-Debug  catkin_ws                foxy_ws   kobuki_ws      NodeRed    sketchbook  ui          untitled1
build-TESR_Nav_gui-Desktop-Debug  Desktop                  grafana   model_editor_models  Pictures    snap
rengy@tesr-9939:~$ mv new_content change_name
rengy@tesr-9939:~$ ls
arduino          cartographer_ws  Downloads  kobuki_ws      Public      test1
Arduino          catkin_ws       foxy_ws   model_editor_models  PyCharm    ui
build-new-Desktop-Debug  change_name     grafana   Music           sketchbook  untitled1
build-TESR_Nav_gui-Desktop-Debug  Desktop        influxDB2  NodeRed        snap        Videos
build-test1-Desktop-Debug  Documents      ironx_customer_data_backup  Pictures    Templates  ws_moveit
```


Linux Basic Commands

- **rmdir** – command to **re**move the **dir**ectory including content inside it.
 - Argument require: "rm <directory_name>" to remove the directory.

```
rengy@tesr-9939:~$ ls
arduino          cartographer_ws  Downloads        kobuki_ws        Public          test1
Arduino          catkin_ws        foxy_ws          model_editor_models PyCharm         ui
build-new-Desktop-Debug change_name      grafana          Music            sketchbook     untitled1
build-TESR_Nav_gui-Desktop-Debug Desktop         influxDB2        NodeRed          snap           Videos
build-test1-Desktop-Debug Documents       ironx_customer_data_backup Pictures         Templates      ws_moveit

rengy@tesr-9939:~$ rmdir change_name
rengy@tesr-9939:~$ ls
arduino          build-test1-Desktop-Debug Documents  influxDB2        Music  PyCharm  test1  ws_moveit
Arduino          cartographer_ws        Downloads  ironx_customer_data_backup NodeRed sketchbook ui
build-new-Desktop-Debug catkin_ws        foxy_ws  kobuki_ws        Pictures snap  untitled1
build-TESR_Nav_gui-Desktop-Debug Desktop         grafana  model_editor_models Public  Templates Videos
```

- **rm** – command to **re**move a file from your working directory.
 - Argument require: "rm <file_name>" to remove a file.

```
rengy@tesr-9939:~$ ls
arduino          build-test1-Desktop-Debug Documents  influxDB2        Music  PyCharm  test1  Videos
Arduino          cartographer_ws        Downloads  ironx_customer_data_backup NodeRed sketchbook textfile.txt ws_moveit
build-new-Desktop-Debug catkin_ws        foxy_ws  kobuki_ws        Pictures snap  untitled1
build-TESR_Nav_gui-Desktop-Debug Desktop         grafana  model_editor_models Public  Templates
rengy@tesr-9939:~$ rm textfile.txt
rengy@tesr-9939:~$ ls
arduino          build-test1-Desktop-Debug Documents  influxDB2        Music  PyCharm  test1  ws_moveit
Arduino          cartographer_ws        Downloads  ironx_customer_data_backup NodeRed sketchbook ui
build-new-Desktop-Debug catkin_ws        foxy_ws  kobuki_ws        Pictures snap  untitled1
build-TESR_Nav_gui-Desktop-Debug Desktop         grafana  model_editor_models Public  Templates Videos
```

- Can also remove directory as same as rmdir by type "rm -r <directory_name>"

Linux Basic Commands

- **df** – command to show the report of system's disk space usage.

```
rengy@tesr-9939:~$ df
Filesystem      1K-blocks      Used Available Use% Mounted on
udev            7847380         0    7847380   0% /dev
tmpfs           1577004         2180    1574824   1% /run
/dev/nvme0n1p7 103417728 74808008    23310164  77% /
tmpfs           7885000        270396    7614604   4% /dev/shm
tmpfs           5120           4         5116   1% /run/lock
tmpfs           7885000         0    7885000   0% /sys/fs/cgroup
/dev/loop0       128          128           0 100% /snap/bare/5
/dev/loop2      136576      136576           0 100% /snap/chromium/2036
/dev/loop1      233600      233600           0 100% /snap/blender/2578
/dev/loop3       56960       56960           0 100% /snap/core18/2538
/dev/loop8       55552       55552           0 100% /snap/snap-store/558
/dev/loop7      370944      370944           0 100% /snap/obs-studio/1276
/dev/loop4      116736      116736           0 100% /snap/core/13308
/dev/loop5       56960       56960           0 100% /snap/core18/2409
/dev/loop9      409088      409088           0 100% /snap/obs-studio/1284
/dev/loop10     52224       52224           0 100% /snap/snap-store/547
/dev/loop12     48128       48128           0 100% /snap/snapd/16292
```

Linux Basic Commands

- **sudo** – stand for "**S**uper**U**ser **D**O" command line enables you to perform tasks that require administrative or root permission. Such as create, edit and remove file that protected by linux system.
 - Create file with sudo command will **protect** your file from edit or remove without permission.

```
rengy@tesr-9939:~$ sudo nano textfile.txt
[sudo] password for rengy:
rengy@tesr-9939:~$ ls
arduino                build-test1-Desktop-Debug  Documents  influxDB2      Music      PyCharm  test1
Arduino                cartographer_ws           Downloads  ironx_customer_data_backup  NodeRed    sketchbook textfile.txt
build-new-Desktop-Debug catkin_ws                 foxy_ws    kobuki_ws      Pictures   snap     ut
```

- Without sudo command you cannot edit or remove file that create by sudo command.

Try to edit: `rengy@tesr-9939:~$ nano textfile.txt`



```
[ Error writing textfile.txt: Permission denied ]
here Is ^K Cut Text ^J Justify ^G Cur Pos
place ^U Paste Text ^T To Spell ^_ Go To Line
```

Try remove: `rengy@tesr-9939:~$ rm textfile.txt`
`rm: remove write-protected regular empty file 'textfile.txt'?`

Linux Basic Commands

- **chmod** – command use to give permission to manage the content in working directory.
 - Argument require: "chmod +x <file_name>"

* +x = execute, +r = read, +w = write can also add as +rwx to allow all the same command.

```
rengy@tesr-9939:~$ ls
arduino          grafana          sketchbook
Arduino          influxDB2        snap
build-new-Desktop-Debug  ironx_customer_data_backup  Templates
build-TESR_Nav_gui-Desktop-Debug  kobuki_ws      test1
build-test1-Desktop-Debug  model_editor_models  textfile.txt
cartographer_ws  Music            turtlebot3
catkin_ws        new_text.txt      ui
Desktop          NodeRed          untitled1
Documents        Pictures          Videos
Downloads        Public            ws_moveit
```



```
rengy@tesr-9939:~$ chmod +x new_text.txt
rengy@tesr-9939:~$ ls
arduino          grafana          sketchbook
Arduino          influxDB2        snap
build-new-Desktop-Debug  ironx_customer_data_backup  Templates
build-TESR_Nav_gui-Desktop-Debug  kobuki_ws      test1
build-test1-Desktop-Debug  model_editor_models  textfile.txt
cartographer_ws  Music            turtlebot3
catkin_ws        new_text.txt      ui
Desktop          NodeRed          untitled1
Documents        Pictures          Videos
Downloads        Public            ws_moveit
```

- For the file create by sudo you must add sudo in front of command to allow to manage that file.

```
rengy@tesr-9939:~$ ls
arduino          catkin_ws  influxDB2  NodeRed  Templates
Arduino          Desktop   ironx_customer_data_backup  Pictures  test1
build-new-Desktop-Debug  Documents  kobuki_ws  Public   textfile.txt
build-TESR_Nav_gui-Desktop-Debug  Downloads  model_editor_models  PyCharm  turtlebot3
build-test1-Desktop-Debug  foxy_ws   Music      sketchbook  ui
cartographer_ws  grafana   new_text.txt  snap        untitled1

rengy@tesr-9939:~$ chmod +x textfile.txt
chmod: changing permissions of 'textfile.txt': Operation not permitted
```



```
rengy@tesr-9939:~$ sudo chmod +x textfile.txt
[sudo] password for rengy:
rengy@tesr-9939:~$ ls
arduino          catkin_ws  influxDB2  NodeRed  Templates
Arduino          Desktop   ironx_customer_data_backup  Pictures  test1
build-new-Desktop-Debug  Documents  kobuki_ws  Public   textfile.txt
build-TESR_Nav_gui-Desktop-Debug  Downloads  model_editor_models  PyCharm  turtlebot3
build-test1-Desktop-Debug  foxy_ws   Music      sketchbook  ui
cartographer_ws  grafana   new_text.txt  snap        untitled1
```

Linux Basic Commands

- **tar** – command to unzip .tar file. For example, we will download and install Arduino using tar unzip.
- Download Link: <https://www.arduino.cc/en/software>
- Select Linux 64 bit

The image shows a sequence of three screenshots from the Arduino IDE download page, connected by red arrows indicating the flow of the process.

First Screenshot: The Arduino IDE 1.8.19 download page. Under the "DOWNLOAD OPTIONS" section, the "Linux 64 bits" option is highlighted with a red box. Other options include Windows, Windows app, Linux 32 bits, Linux ARM 32 bits, Linux ARM 64 bits, and Mac OS X.

Second Screenshot: The "Support the Arduino IDE" donation screen. It shows a list of donation amounts: \$3, \$5, \$10, \$25, \$50, and Other. The "\$10" button is highlighted with a red box, and a red arrow points down to the "JUST DOWNLOAD" button, which is also highlighted with a red box. A "CONTRIBUTE & DOWNLOAD" button is also visible.

Third Screenshot: A download progress bar for the file "arduino-1.....tar.xz". It shows the file size as "19.2/123 MB" and the time remaining as "3 mins left".

Linux Basic Commands

- After download, type "cd <download_folder" (In this case, cd Downloads)
- Type "sudo tar -xvf arduino-1.8.19-linux64.tar.xz"

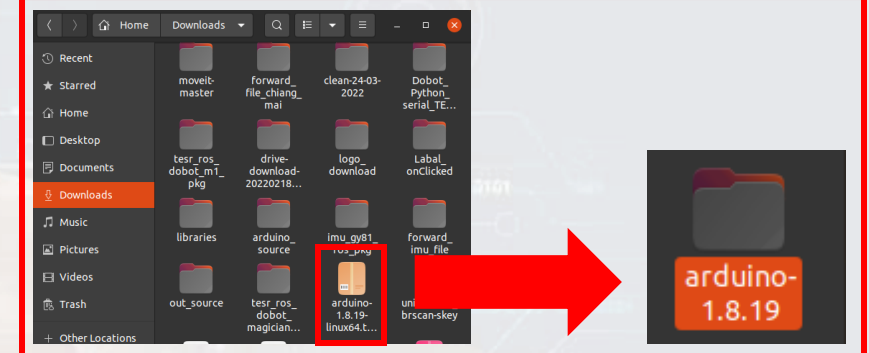
In terminal

```
rengy@tesr-9939:~/Downloads$ sudo tar -xvf arduino-1.8.19-linux64.tar.xz
[sudo] password for rengy:
arduino-1.8.19/
arduino-1.8.19/arduino-linux-setup.sh
arduino-1.8.19/lib/
arduino-1.8.19/lib/version.txt
arduino-1.8.19/lib/commons-io-2.6.jar
arduino-1.8.19/lib/public.gpg.key
arduino-1.8.19/lib/arduino-core.jar
arduino-1.8.19/lib/batik-svg-dom-1.8.jar
```

- Type "cd arduino-1.8.19"
- Type ". install.sh"

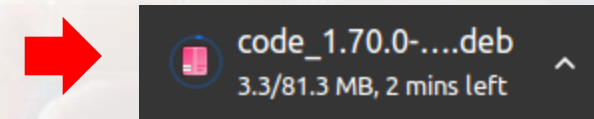
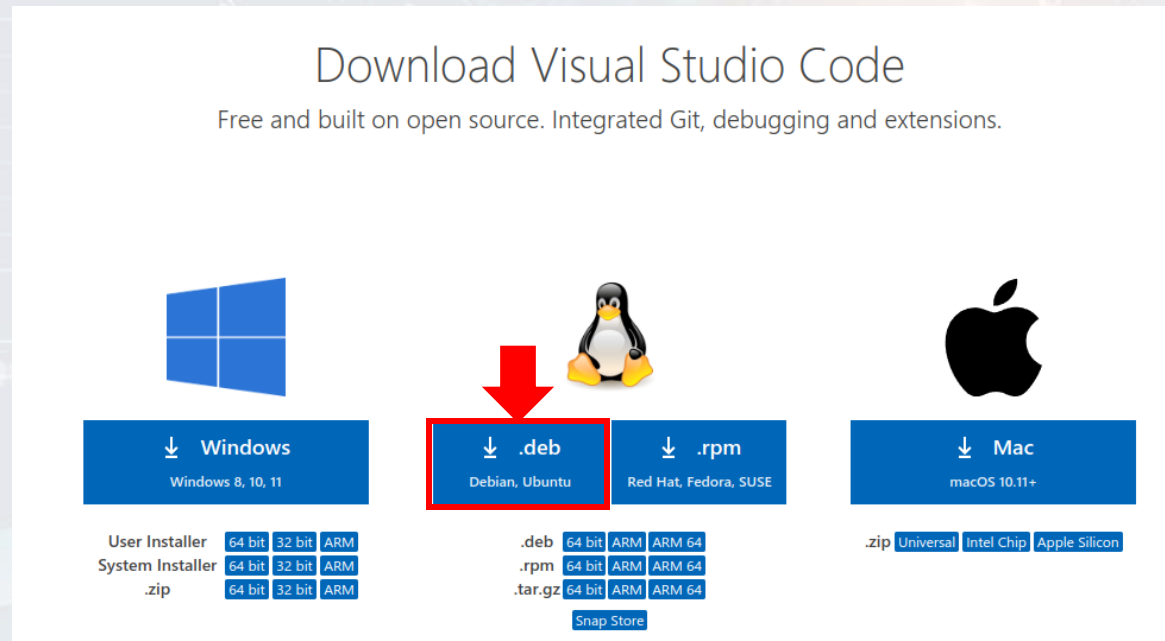
```
rengy@tesr-9939:~/Downloads$ cd arduino-1.8.19
rengy@tesr-9939:~/Downloads/arduino-1.8.19$ ls
arduino          examples        java            revisions.txt  uninstall.sh
arduino-builder  hardware       lib             tools
arduino-linux-setup.sh  install.sh    libraries      tools-builder
rengy@tesr-9939:~/Downloads/arduino-1.8.19$ . install.sh
```

In Download Folder



Linux Basic Commands

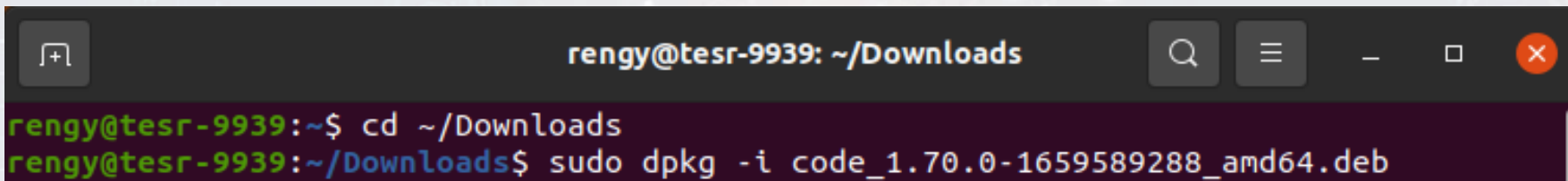
- **dpkg** – is a tools for install, build, remove and manage deb file. For example, we will download and install **Visual Studio Code** using dpkg.
 - Download Link: <https://code.visualstudio.com/download>
 - Select .deb for Debian, Ubuntu



Linux Basic Commands

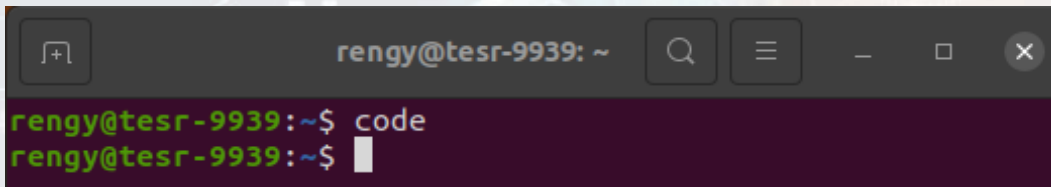
- **dpkg** – Install Visual Studio Code
 - Type "`cd ~/Downloads`"
 - Type "`sudo dpkg -i code_1.70.0-1659589288_amd64.deb`"

*`dpkg -i` = install
`dpkg --help` = see all function of dpkg

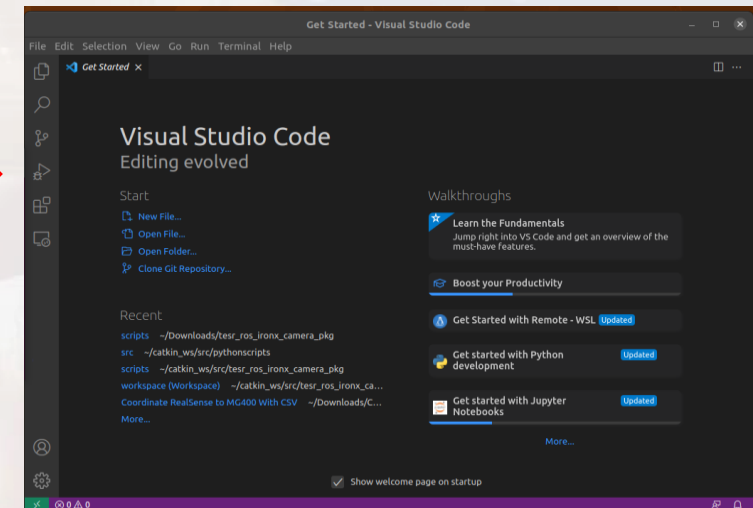
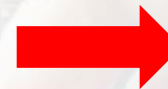


```
rengy@tesr-9939: ~/Downloads
rengy@tesr-9939:~$ cd ~/Downloads
rengy@tesr-9939:~/Downloads$ sudo dpkg -i code_1.70.0-1659589288_amd64.deb
```

- Type "`code`" to open Visual Studio Code



```
rengy@tesr-9939: ~
rengy@tesr-9939:~$ code
rengy@tesr-9939:~$
```



Linux Basic Commands

- **git clone** – command that help you to download folder from github HTTPS link address.
 - Argument require: "git clone <HTTPs_link_address>"

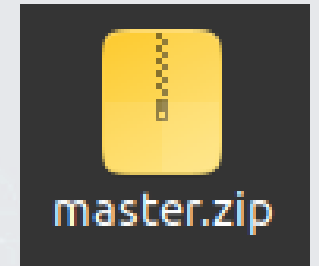
```
rengy@tesr-9939:~$ git clone https://github.com/ROBOTIS-GIT/turtlebot3.git
Cloning into 'turtlebot3'...
remote: Enumerating objects: 6344, done.
remote: Counting objects: 100% (184/184), done.
remote: Compressing objects: 100% (72/72), done.
remote: Total 6344 (delta 94), reused 177 (delta 93), pack-reused 6160
Receiving objects: 100% (6344/6344), 119.92 MiB | 1.35 MiB/s, done.
Resolving deltas: 100% (3936/3936), done.
```



Linux Basic Commands

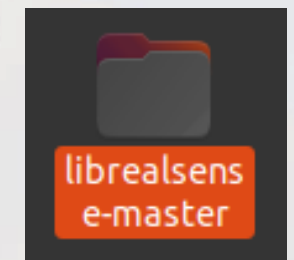
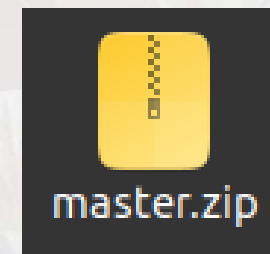
- **wget** – command tools help you to download file.
 - Argument require: "**wget <download_link>**"

```
rengy@tesr-9939:~$ wget https://github.com/IntelRealSense/librealsense/archive/master.zip
--2022-08-09 19:30:10-- https://github.com/IntelRealSense/librealsense/archive/master.zip
Resolving github.com (github.com)... 20.205.243.166
Connecting to github.com (github.com)|20.205.243.166|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://codeload.github.com/IntelRealSense/librealsense/zip/refs/heads/master [following]
--2022-08-09 19:30:10-- https://codeload.github.com/IntelRealSense/librealsense/zip/refs/heads/master
Resolving codeload.github.com (codeload.github.com)... 20.205.243.165
Connecting to codeload.github.com (codeload.github.com)|20.205.243.165|:443... connected.
```



- **zip** – command to unzip .zip file.
 - Argument require: "**unzip <file_name.zip>**"

```
rengy@tesr-9939:~$ unzip master.zip
Archive:  master.zip
c94410a420b74e5fb6a414bd12215c05ddd82b69
  creating:  librealsense-master/
  creating:  librealsense-master/.github/
```



Linux Basic Commands

- **ifconfig** – command use to check own Laptop/PC ip address and MAC address too.

```
rengy@tesr-9939: ~  
rengy@tesr-9939:~$ ifconfig  
enp2s0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500  
ether 04:42:1a:88:d7:a4 txqueuelen 1000 (Ethernet)  
RX packets 0 bytes 0 (0.0 B)  
RX errors 0 dropped 0 overruns 0 frame 0
```

```
wlp3s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
inet 192.168.1.103 netmask 255.255.255.0 broadcast 192.168.1.255  
inet6 fe80::583f:c1ff:db4:713a prefixlen 64 scopeid 0x20<link>  
ether 48:e7:da:f5:a1:9f txqueuelen 1000 (Ethernet)  
RX packets 827098 bytes 691089955 (691.0 MB)  
RX errors 0 dropped 0 overruns 0 frame 0  
TX packets 552084 bytes 361702063 (361.7 MB)
```

- **hostname -i** – another command use to show ip address

```
rengy@tesr-9939:~$ hostname -i  
192.168.1.103 fe80::583f:c1ff:db4:713a
```

Linux Basic Commands

- **ping** – command use to check the connection within network.
 - Argument require: "**ping <ip_address>**" such as "**ping 192.168.1.103**"

```
rengy@tesr-9939:~$ ping 192.168.1.103
PING 192.168.1.103 (192.168.1.103) 56(84) bytes of data.
64 bytes from 192.168.1.103: icmp_seq=1 ttl=64 time=0.046 ms
64 bytes from 192.168.1.103: icmp_seq=2 ttl=64 time=0.064 ms
64 bytes from 192.168.1.103: icmp_seq=3 ttl=64 time=0.088 ms
64 bytes from 192.168.1.103: icmp_seq=4 ttl=64 time=0.124 ms
^C
--- 192.168.1.103 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3066ms
rtt min/avg/max/mdev = 0.046/0.080/0.124/0.029 ms
```

Connection found.

```
rengy@tesr-9939:~$ ping 192.168.1.100
PING 192.168.1.100 (192.168.1.100) 56(84) bytes of data.
From 192.168.1.103 icmp_seq=1 Destination Host Unreachable
From 192.168.1.103 icmp_seq=2 Destination Host Unreachable
From 192.168.1.103 icmp_seq=3 Destination Host Unreachable
^C
--- 192.168.1.100 ping statistics ---
5 packets transmitted, 0 received, +3 errors, 100% packet loss, time 4088ms
ping 3
```

Connection not found.

Contact Us

Email: tesrshop@gmail.com

Line official Account: @ion1900z

Facebook fanpage: TESR

Tel. 082-983-7768

Scan here



TESR Co., LTD

112/296 หมู่บ้าน เพอร์เฟค มาสเตอร์พีช
หมู่ที่ 2 ตำบลไทรมา อำเภอมะนังนบุรี
จังหวัดนบุรี 11000