Using memtester to test all information about system's memory

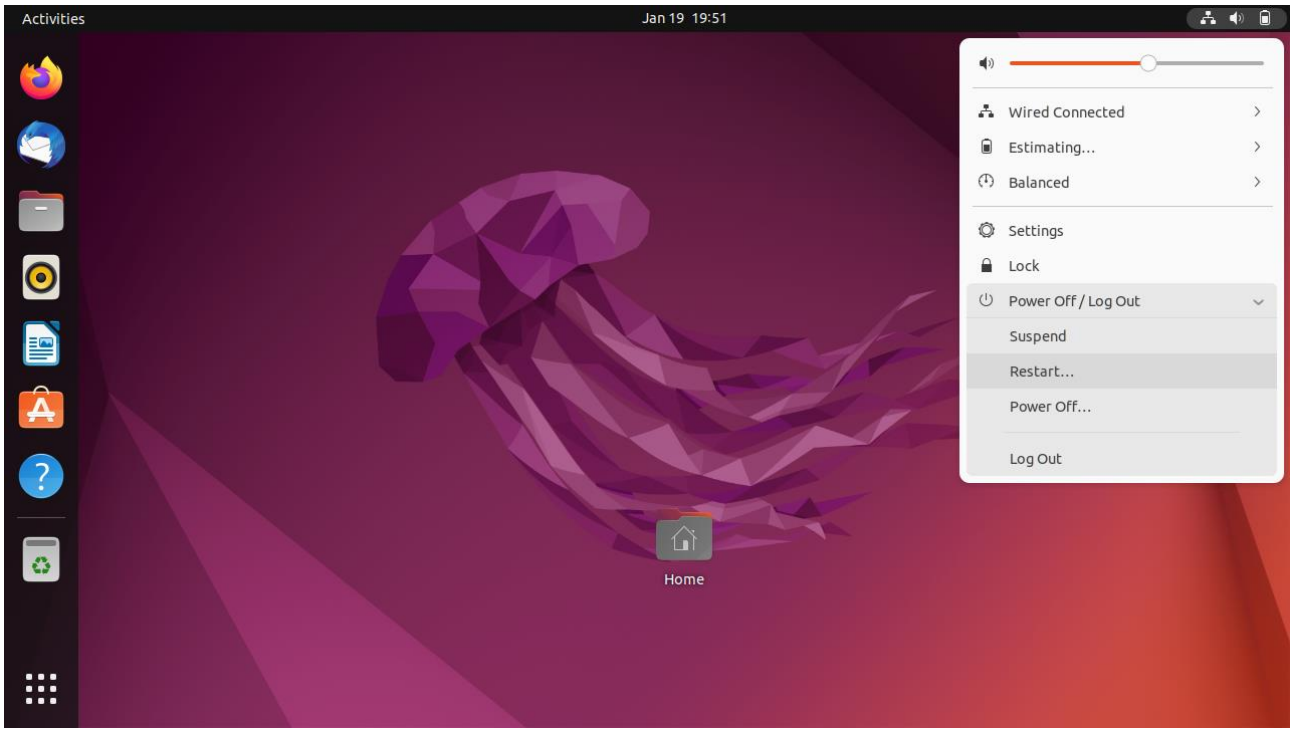
And to check **CMOS(COMPLEMENTARY METAL OXIDE SEMICONDUCTOR)** battery powers laptop's BIOS firmware(Firmware is **software that provides basic machine instructions that allow the hardware to function and communicate with other software running on a device)**,which is responsible for booting the system.(**BIOS** is firmware used to start the system after it starts).

Installing memtester:

```
hepzi@ubuntu:~$ sudo apt-get install memtester
[sudo] password for hepzi:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  memtester

Setting up memtester (4.5.1-1) ...
Processing triggers for man-db (2.10.2-1) ...
```

TO OPEN GRUB MENU :

- Turn on restart the system
- Repeatedly pressing esc key or shift key to bring up the GRUB menu
- From the grum menu, to select memtest86+
- Press enter
- The test will run
- To exit, press esc key



To run a memtester for memory size 300M for 1 iteration :

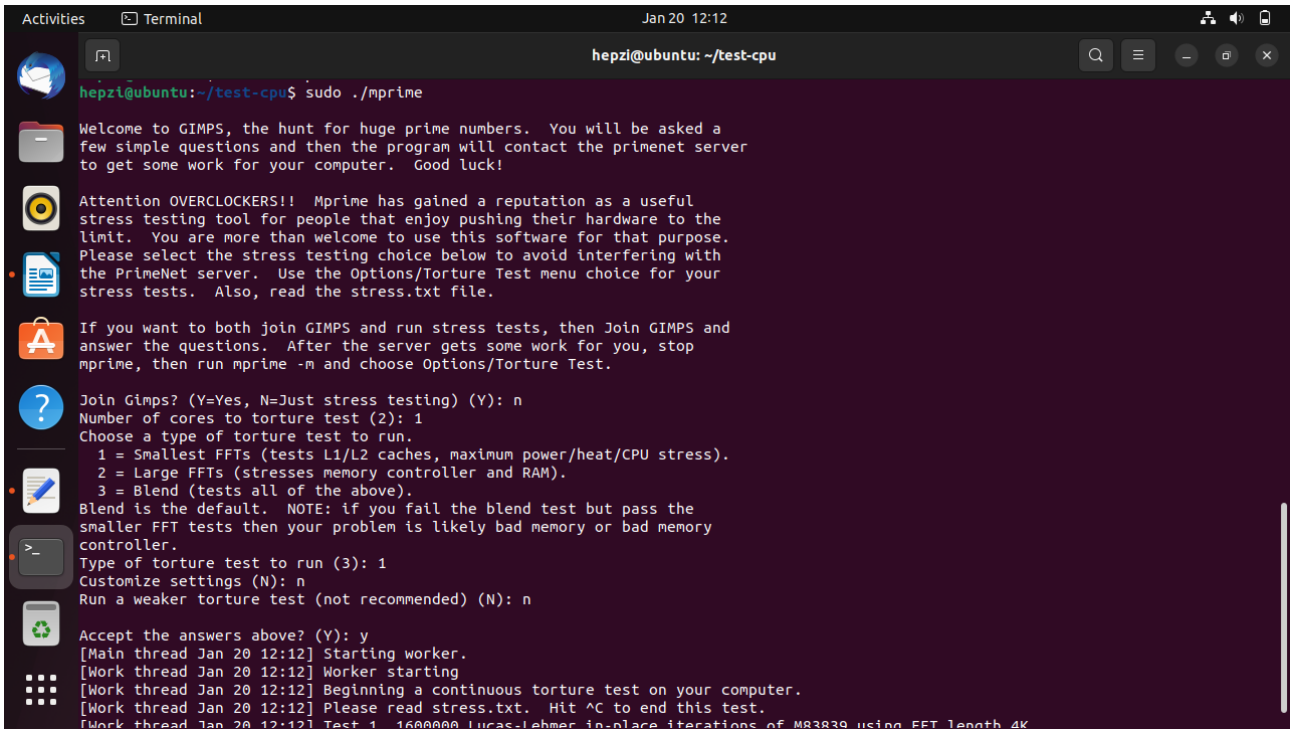
```
hepzi@ubuntu:~$ sudo memtester 300M 1
[sudo] password for hepzi:
memtester version 4.5.1 (64-bit)
Copyright (C) 2001-2020 Charles Cazabon.
Licensed under the GNU General Public License version 2 (only).

pagesize is 4096
pagesizemask is 0xfffffffffffff000
want 300MB (314572800 bytes)
got  300MB (314572800 bytes), trying mlock ...locked.
Loop 1/1:
  Stuck Address       : ok
  Random Value        : ok
  Compare XOR         : ok
  Compare SUB         : ok
  Compare MUL         : ok
  Compare DIV         : ok
  Compare OR          : ok
  Compare AND         : ok
  Sequential Increment: ok
  Solid Bits          : testing  61^C
```

CPU Stress Testing Using mprime

To analyzes the performance capabilities of the system, it helps to evaluate how much our hardware can handle.

```
hepzi@ubuntu:~$ mkdir test-cpu

hepzi@ubuntu:~$ cd test-cpu

hepzi@ubuntu:~/test-cpu$ wget
https://www.mersenne.org/download/software/v30/30.8/p95v308b17.linux64.tar.gz
--2023-01-20 11:57:56--
https://www.mersenne.org/download/software/v30/30.8/p95v308b17.linux64.tar.gz
Resolving www.mersenne.org (www.mersenne.org)... 162.212.57.131
Connecting to www.mersenne.org (www.mersenne.org)|162.212.57.131|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 7222132 (6.9M) [application/x-gzip]
Saving to: ‘p95v308b17.linux64.tar.gz’

p95v308b17.linux64.tar.gz
100%[=====================================================>]   6.89M
108KB/s    in 50s

2023-01-20 11:58:47 (140 KB/s) - ‘p95v308b17.linux64.tar.gz’ saved [7222132/7222132]

hepzi@ubuntu:~/test-cpu$ ls
p95v308b17.linux64.tar.gz

hepzi@ubuntu:~/test-cpu$ tar -xzvf p95v308b17.linux64.tar.gz
```

libgmp.so
libgmp.so.10
libgmp.so.10.4.1
license.txt
mprime
readme.txt
stress.txt
undoc.txt
whatsnew.txt



A proxy server is a system or router that provides a gateway between users and the internet

Testing Power Supply Unit

```
hepzi@ubuntu:~$ upower -i /org/freedesktop/UPower/devices/battery_BAT0
  native-path:          BAT0
  vendor:               innotek
  model:                1
  serial:               0
  power supply:         yes
  updated:              Friday 20 January 2023 12:28:20 PM (14 seconds ago)
  has history:          yes
  has statistics:       yes
  battery
    present:            yes
    rechargeable:       yes
    state:              discharging
    warning-level:      none
    energy:             20 Wh
    energy-empty:       0 Wh
    energy-full:        50 Wh
    energy-full-design: 50 Wh
    energy-rate:        8.33333 W
```

```
  voltage:              10 V
  charge-cycles:        N/A
  time to empty:        2.4 hours
  percentage:           40%
  capacity:             100%
  icon-name:            'battery-good-symbolic'
History (charge):
  1674197900            40.000 discharging
History (rate):
  1674197900            8.333  discharging
```

Using fsck to check and repair filesystem errors(preventive maintenance)

To checking the consistency of file system and repair inconsistent file systems.

To list out different partitions:

```
hepzi@ubuntu:~$ sudo fsck -l
fsck from util-linux 2.37.2
e2fsck 1.46.5 (30-Dec-2021)
/dev/sda3 is mounted.
e2fsck: Cannot continue, aborting.
```

Parted allows to add,extend and remove partitions from storage disk:

```
hepzi@ubuntu:~$ sudo parted -l
Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sda: 26.8GB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start   End     Size    File system  Name                  Flags
 1      1049kB  2097kB  1049kB                                     bios_grub
 2      2097kB  540MB   538MB   fat32        EFI System Partition  boot, esp
 3      540MB   26.8GB  26.3GB  ext4
```

S.M.A.R.T status of HDD (Self monitoring analysis and reporting technology)

Monitoring for hard disk drives, To check the status of hard drive and predict drive failures.

```
hepzi@ubuntu:~$ sudo apt-get install smartmontools
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Suggested packages:
  gsmartcontrol smart-notifier mailx | mailutils
The following NEW packages will be installed:
  smartmontools
0 upgraded, 1 newly installed, 0 to remove and 5 not upgraded.

Processing triggers for man-db (2.10.2-1) ...
```

Sda drive has 3partitions, named as sda1,sda2,sda3(hard disk of the system)

```
hepzi@ubuntu:~$ sudo smartctl -i /dev/sda
smartctl 7.2 2020-12-30 r5155 [x86_64-linux-5.15.0-58-generic] (local build)
Copyright (C) 2002-20, Bruce Allen, Christian Franke, www.smartmontools.org

=== START OF INFORMATION SECTION ===
Device Model:     VBOX HARDDISK
Serial Number:    VB3e25ba82-d5ea31fd
Firmware Version: 1.0
User Capacity:    26,843,545,600 bytes [26.8 GB]
Sector Size:      512 bytes logical/physical
Device is:        Not in smartctl database [for details use: -P showall]
ATA Version is:   ATA/ATAPI-6 published, ANSI INCITS 361-2002
Local Time is:    Thu Jan 19 21:54:08 2023 IST
SMART support is: Unavailable - device lacks SMART capability.
```

To view or modify the configuration of network interface :
To display the status of currently active interfaces :

```
hepzi@ubuntu:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fe80::324e:b007:a32f:42a4  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:69:d2:c8  txqueuelen 1000  (Ethernet)
        RX packets 8834  bytes 8082652 (8.0 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 4840  bytes 586533 (586.5 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 927  bytes 120162 (120.1 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 927  bytes 120162 (120.1 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

To allows a user to test and determine how fast a data signal travels from one place to another.

To ping something first need to access, request to specified interface, ping signal sent to specified address and measure how long it takes for that system's response to reach you.

```
hepzi@ubuntu:~$ ping google.com
PING google.com (142.250.196.78) 56(84) bytes of data.
64 bytes from maa03s46-in-f14.1e100.net (142.250.196.78): icmp_seq=1 ttl=115 time=101 ms
```

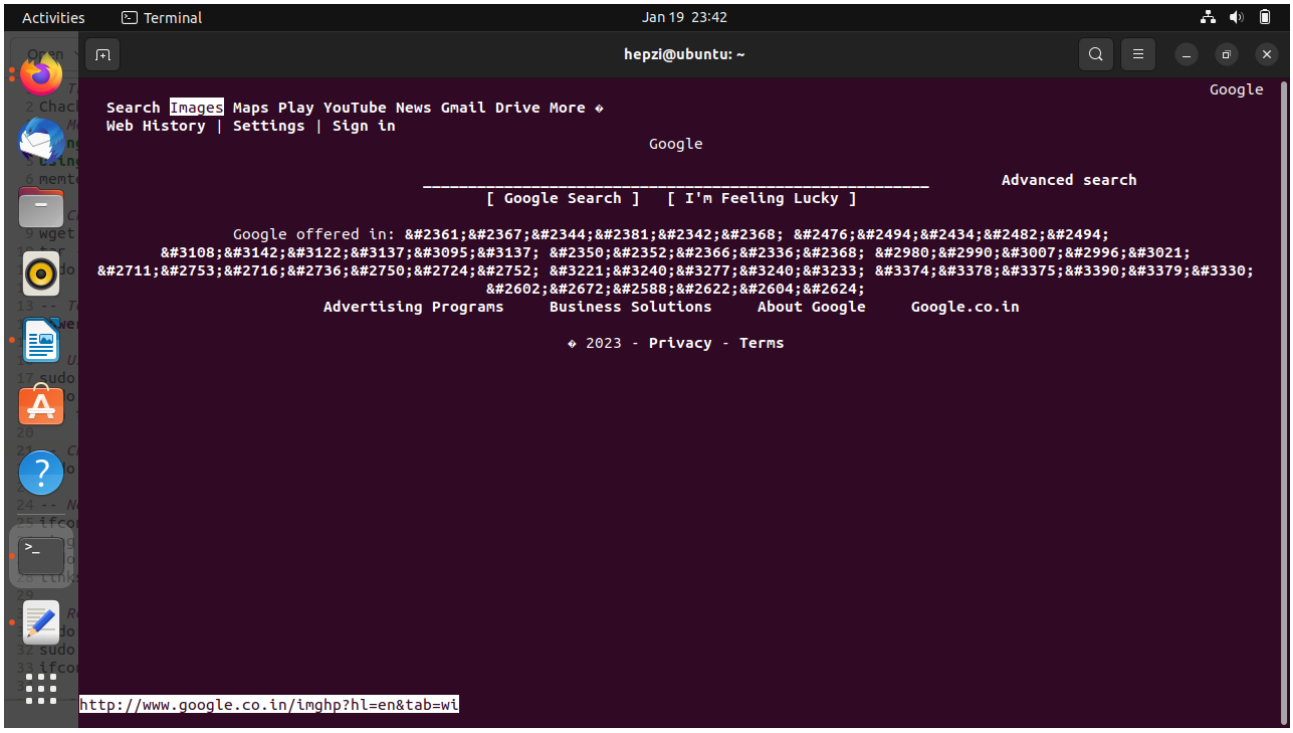
Text type web browser in command line mode

```
hepzi@ubuntu:~$ sudo apt-get install links
[sudo] password for hepzi:
Reading package lists... Done
```

Building dependency tree... Done
Reading state information... Done

Processing triggers for man-db (2.10.2-1) ...

hepzi@ubuntu:~$ links www.google.com



DHCP (Dynamic Host Configuration Protocol)
Release/Renew to solve network connectivity issues related to ip address

When a system connects to network via wifi or an Ethernet cable, it automatically picks an ip address from the router through the DHCP server.

Router - Routing is a means of sending an IP from one point to another. When you send an e-mail message to your friend in another country or even across the street, you are transmitting a series of IP, from your computer to your friend's computer.

To release :
hepzi@ubuntu:~$ sudo dhclient -r enp0s3
killed old client process

hepzi@ubuntu:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
        inet6 fe80::324e:b007:a32f:42a4 prefixlen 64 scopeid 0x20<link>
        ether 08:00:27:69:d2:c8 txqueuelen 1000 (Ethernet)
        RX packets 96 bytes 45705 (45.7 KB)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 157 bytes 22826 (22.8 KB)

TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
inet 127.0.0.1 netmask 255.0.0.0
inet6 ::1 prefixlen 128 scopeid 0x10<host>
loop txqueuelen 1000 (Local Loopback)
RX packets 122 bytes 10433 (10.4 KB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 122 bytes 10433 (10.4 KB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

To renew :
hepzi@ubuntu:~$ sudo dhclient -v enp0s3

…renewal in 40729 seconds.

hepzi@ubuntu:~$ ifconfig

Static IP configurations and adapter Resets

To configure a static IP address :
hepzi@ubuntu:~$ sudo nano /etc/network/interfaces

This file describes the network interfaces available on your system and how to activate them.
hepzi@ubuntu:~$ cd /etc/network

hepzi@ubuntu:/etc/network$ sudo nano interfaces

hepzi@ubuntu:/etc/network$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
inet6 fe80::324e:b007:a32f:42a4 prefixlen 64 scopeid 0x20<link>
ether 08:00:27:69:d2:c8 txqueuelen 1000 (Ethernet)
RX packets 6719 bytes 5610269 (5.6 MB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 4184 bytes 665988 (665.9 KB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
inet 127.0.0.1 netmask 255.0.0.0
inet6 ::1 prefixlen 128 scopeid 0x10<host>
loop txqueuelen 1000 (Local Loopback)
RX packets 1040 bytes 120806 (120.8 KB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 1040 bytes 120806 (120.8 KB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

hepzi@ubuntu:/etc/network$ sudo ifconfig enp0s3 down

hepzi@ubuntu:/etc/network$ ifconfig
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536

```
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 1708  bytes 185237 (185.2 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 1708  bytes 185237 (185.2 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

hepzi@ubuntu:/etc/network$ cat interfaces
iface enp0s3 inet static
address 10.0.2.15
netmask 255.255.255.0
gateway 10.0.0.2
broadcast 10.0.2.255

hepzi@ubuntu:/etc/network$ sudo ifconfig enp0s3 up

hepzi@ubuntu:/etc/network$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fe80::324e:b007:a32f:42a4  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:69:d2:c8  txqueuelen 1000  (Ethernet)
        RX packets 9850  bytes 8394810 (8.3 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 5940  bytes 985514 (985.5 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 2232  bytes 233004 (233.0 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 2232  bytes 233004 (233.0 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Wireless Connection

```
hepzi@ubuntu:~$ sudo ifconfig enp0s3 up

hepzi@ubuntu:~$ ifconfig enp0s3
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fe80::324e:b007:a32f:42a4  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:69:d2:c8  txqueuelen 1000  (Ethernet)
        RX packets 3186  bytes 2213134 (2.2 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 2445  bytes 305448 (305.4 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

hepzi@ubuntu:~$ sudo ifconfig enp0s3 down
```

Verifying and changing the hostname

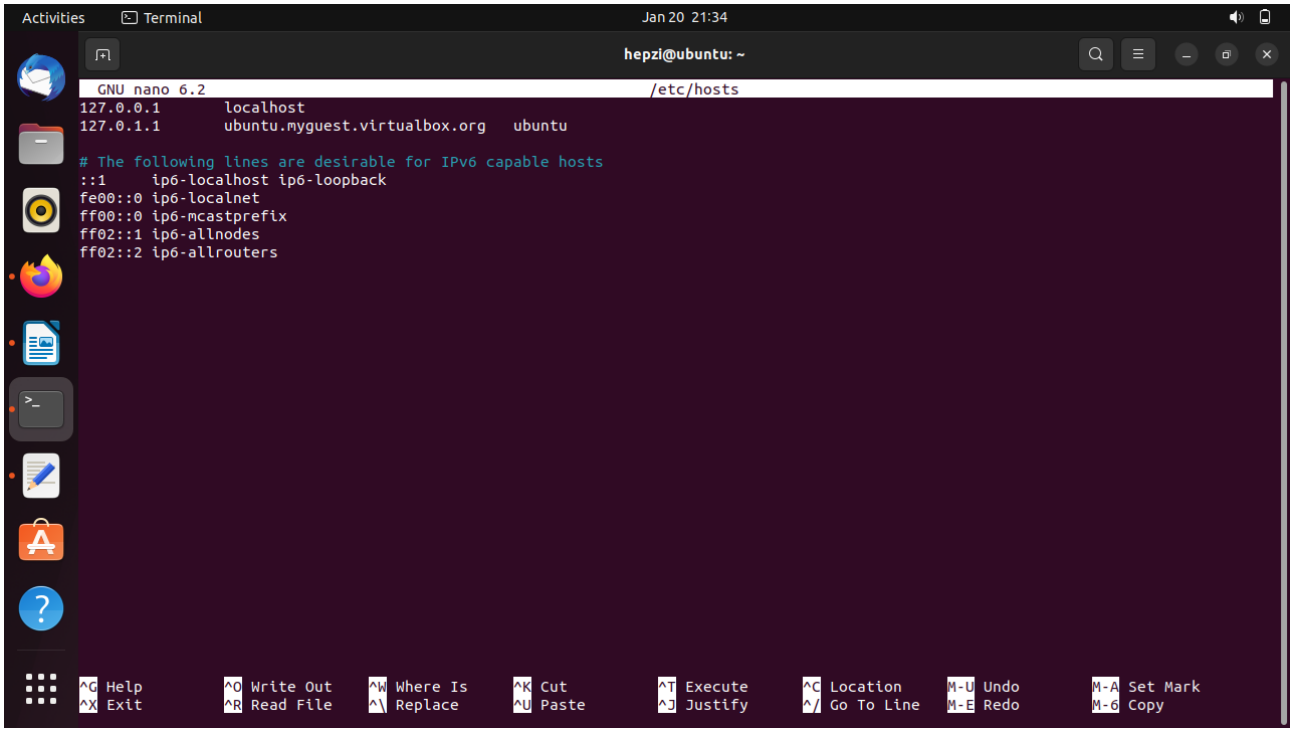
To check the hostname:
hepzi@ubuntu:~$ hostname
Ubuntu

To change new hostname:
hepzi@ubuntu:~$ sudo hostname Ubuntu
To view hostname:
hepzi@ubuntu:~$ hostname
ubuntu

Open /etc/hostname to change the hostname using nano editor of our choice.
hepzi@ubuntu:~$ sudo nano /etc/hostname

Open /etc/hosts to change the hostname
hepzi@ubuntu:~$ sudo nano /etc/hosts

If we wish to change the hostname, replace it with new name in the same way



hepzi@ubuntu:~$ sudo ifconfig enp0s3 up

Calling Up the ARP(Address Resolution Protocol) Table
Allows users to Manipulate the system arp cache

It can add entries to the table, delete and display the current content
It shows current mappings(IP address): -n numeric form
hepzi@ubuntu:~$ arp -n

Address	HWtype	HWaddress	Flags Mask	Iface
10.0.2.2	ether	52:54:00:12:35:02	C	enp0s3

Address: The IPv4 address of the machine

- **HWtype:** The type of connection in our case is through ethernet
- **HWaddress:** The MAC address of the machine
- **Flags Mask:** Tells the address is extracted manually, user-defined, or incomplete
- **IFace:** It is the interface name

```
hepzi@ubuntu:~$ ping 10.0.2.2
PING 10.0.2.2 (10.0.2.2) 56(84) bytes of data.
64 bytes from 10.0.2.2: icmp_seq=1 ttl=64 time=1.17 ms
64 bytes from 10.0.2.2: icmp_seq=2 ttl=64 time=1.79 ms
64 bytes from 10.0.2.2: icmp_seq=3 ttl=64 time=0.612 ms
64 bytes from 10.0.2.2: icmp_seq=4 ttl=64 time=0.683 ms
64 bytes from 10.0.2.2: icmp_seq=5 ttl=64 time=0.501 ms
```

Display entries for specific address:

```
hepzi@ubuntu:~$ arp -a
_gateway (10.0.2.2) at 52:54:00:12:35:02 [ether] on enp0s3
```

It shows changes in the kernel's table:

```
hepzi@ubuntu:~$ route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         10.0.2.2        0.0.0.0         UG    100    0        0 enp0s3
10.0.2.0        0.0.0.0         255.255.255.0   U     100    0        0 enp0s3
169.254.0.0     0.0.0.0         255.255.0.0     U     1000   0        0 enp0s3
```

To test the internet connection via terminal

Use the following command to install pip:

```
hepzi@ubuntu:~$ sudo apt-get install pip
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Note, selecting 'python3-pip' instead of 'pip'

Processing triggers for man-db (2.10.2-1) ...
```

Speedtest measures the speed between our device and a test server:

```
hepzi@ubuntu:~$ sudo pip install speedtest-cli
Collecting speedtest-cli
  Downloading speedtest_cli-2.1.3-py2.py3-none-any.whl (23 kB)
Installing collected packages: speedtest-cli
Successfully installed speedtest-cli-2.1.3
WARNING: Running pip as the 'root' user can result in broken permissions and conflicting
behaviour with the system package manager. It is recommended to use a virtual environment
instead: https://pip.pypa.io/warnings/venv
```