

## Process Status

**To display the currently running process :**

```
hepzi@ubuntu:~$ ps
  PID TTY          TIME CMD
 2351 pts/0    00:00:00  bash
 4223 pts/0    00:00:00  ps
```

The output consists of four columns :

**PID** - Process ID

**TTY** - Terminal associated with process

**TIME** - Time in minutes and seconds (CPU utilization time for process)

**CMD** - Executable command

**To view all running process except session leaders(where the process id as same as the session id and skip any processes which do not have a controlling terminal) :**

```
hepzi@ubuntu:~$ ps -a
  PID TTY          TIME CMD
 1630 tty2    00:00:00  gnome-session-b
 4224 pts/0    00:00:00  ps
```

**To view all process associated with the terminal :**

```
hepzi@ubuntu:~$ ps -T
  PID  SPID TTY          TIME CMD
 2351  2351 pts/0    00:00:00  bash
 4230  4230 pts/0    00:00:00  ps
```

**To view process without TTY : (S means interruptible sleep waiting for some event)**

```
hepzi@ubuntu:~$ ps -x
  PID TTY   STAT  TIME COMMAND
 1585 ?     Ss    0:03 /lib/systemd/systemd --user
 1586 ?     S      0:00 (sd-pam)
 1592 ?     S<sl  0:00 /usr/bin/pipewire
 1593 ?     Ssl   0:00 /usr/bin/pipewire-media-session

5134 pts/0  R+    0:00 ps -x
```

**To only list running process : (STAT R actively running, + foreground process)**

```
hepzi@ubuntu:~$ ps -r
  PID TTY   STAT  TIME COMMAND
 3492 pts/0  R+    0:00  ps -r
```

**To display most amount of information a user to understand current state of the system running process :**

**a-** running process from all users

**u-** shows user

**x-** process those have not been executed

hepzi@ubuntu:~\$ ps aux

USER	PID	%CPU	%MEM	VSZ	RSS	TTY	STAT	START	TIME	COMMAND
root	1	0.2	0.3	166664	8008	?	Ss	19:17	0:04	/sbin/init sp
root	2	0.0	0.0	0	0	?	S	19:17	0:00	[kthreadd]
root	3	0.0	0.0	0	0	?	I<	19:17	0:00	[rcu_gp]
root	4	0.0	0.0	0	0	?	I<	19:17	0:00	[rcu_par_gp]
root	5	0.0	0.0	0	0	?	I<	19:17	0:00	[slub_flushwq]
hepzi	3737	0.0	0.0	21324	1600	pts/0	R+	19:49	19:49	0:00 ps aux

- **USER:** Name of the user
- **%CPU:** CPU usage percentage
- **%MEM:** Memory usage percentage
- **VSZ:** Total virtual memory used by the process, in kb
- **RSS:** RAM occupied by the process
- **STAT:** Current process state
- **START:** Time the process was started.

**To view the process that use the most CPU power :**

hepzi@ubuntu:~\$ ps aux --sort=-pcpu

USER	PID	%CPU	%MEM	VSZ	RSS	TTY	STAT	START	TIME	COMMAND
hepzi	1753	20.4	11.3	4241904	230164	?	Ssl	19:19	14:42	/usr/bin/gnom
hepzi	2340	7.1	9.5	1114028	192496	?	Sl	19:20	5:02	/usr/lib/libr
hepzi	2493	4.5	14.8	3292212	301172	?	Sl	19:24	3:05	/snap/firefox
hepzi	3394	2.7	7.2	2482792	146496	?	Sl	19:25	1:50	/snap/firefox
mysql	1134	2.4	7.7	1790896	156408	?	Ssl	19:18	1:45	/usr/sbin/mys
systemd+	621	0.8	0.1	14824	2624	?	Ss	19:18	0:36	/lib/systemd/
hepzi	1967	0.7	0.3	249748	7476	?	Sl	19:19	0:32	/usr/bin/ibus
hepzi	4031	0.0	0.1	21660	3804	pts/0	R+	20:31	0:00	ps aux --sort

**To view memory usage for each running process :**

hepzi@ubuntu:~\$ ps aux --sort=+pmem

USER	PID	%CPU	%MEM	VSZ	RSS	TTY	STAT	START	TIME	COMMAND
root	2	0.0	0.0	0	0	?	S	19:17	0:00	[kthreadd]
root	3	0.0	0.0	0	0	?	I<	19:17	0:00	[rcu_gp]
root	4	0.0	0.0	0	0	?	I<	19:17	0:00	[rcu_par_gp]
root	5	0.0	0.0	0	0	?	I<	19:17	0:00	[slub_flushwq]

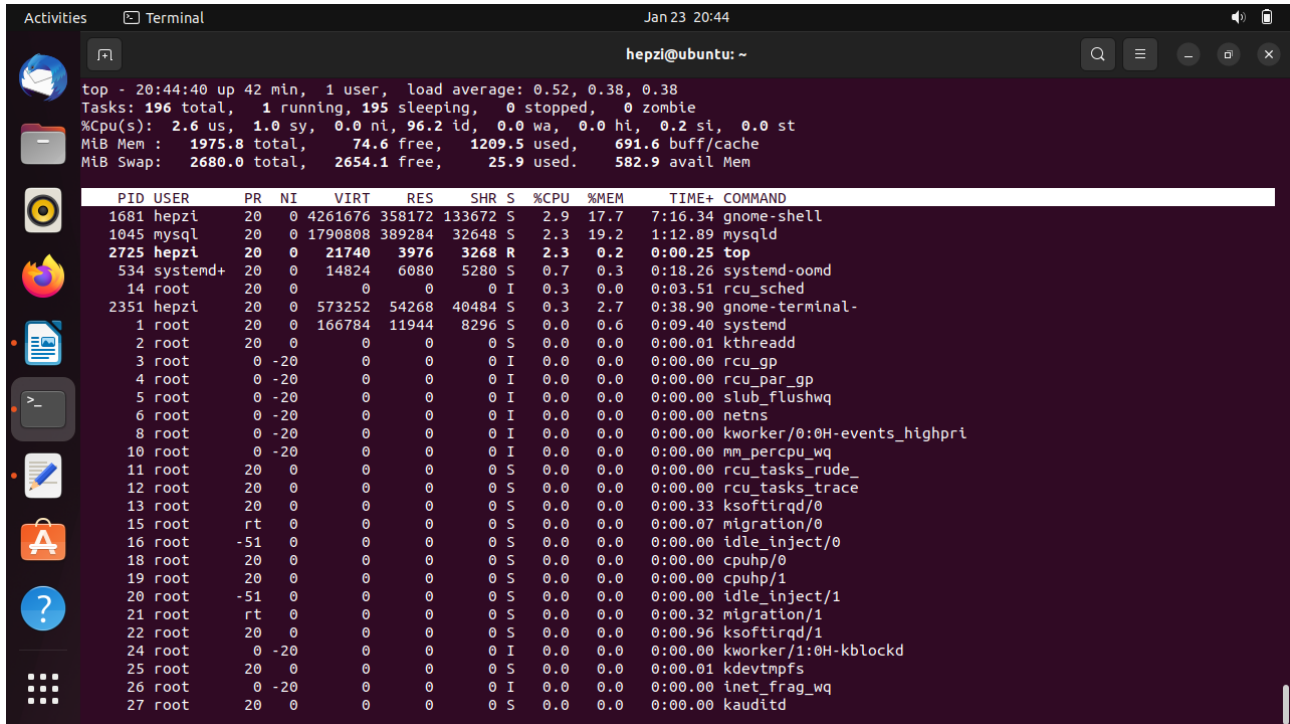
hepzi 2493 4.4 14.0 3290148 284616 ? Sl 19:24 3:09

/snap/firefox

## Checking system performance

To display the realtime view of running process :

hepzi@ubuntu:~\$ top



```
top - 20:44:40 up 42 min, 1 user, load average: 0.52, 0.38, 0.38
Tasks: 196 total, 1 running, 195 sleeping, 0 stopped, 0 zombie
%Cpu(s): 2.6 us, 1.0 sy, 0.0 ni, 96.2 id, 0.0 wa, 0.0 hi, 0.2 si, 0.0 st
MiB Mem : 1975.8 total, 74.6 free, 1209.5 used, 691.6 buff/cache
MiB Swap: 2680.0 total, 2654.1 free, 25.9 used, 582.9 avail Mem

  PID USER      PR  NI   VIRT   RES   SHR  S  %CPU  %MEM     TIME+ COMMAND
 1681 hepzi    20   0 4261676 358172 133672 S   2.9  17.7   7:16.34 gnome-shell
 1045 mysql     20   0 1790808 389284 32648  S   2.3  19.2   1:12.89 mysqld
 2725 hepzi    20   0 21740    3976   3268 R   2.3   0.2   0:00.25 top
 534 systemd+ 20   0 14824    6080  5280  S   0.7   0.3   0:18.26 systemd-oomd
 14 root      20   0      0      0      0  I   0.3   0.0   0:03.51 rcu_sched
2351 hepzi    20   0 573252   54268  40484 S   0.3   2.7   0:38.90 gnome-terminal-
 1 root      20   0 166784   11944  8296  S   0.0   0.6   0:09.40 systemd
 2 root      20   0      0      0      0  S   0.0   0.0   0:00.01 kthreadd
 3 root      0 -20      0      0      0  I   0.0   0.0   0:00.00 rcu_gp
 4 root      0 -20      0      0      0  I   0.0   0.0   0:00.00 rcu_par_gp
 5 root      0 -20      0      0      0  I   0.0   0.0   0:00.00 slub_flushwq
 6 root      0 -20      0      0      0  I   0.0   0.0   0:00.00 netns
 8 root      0 -20      0      0      0  I   0.0   0.0   0:00.00 kworker/0:0H-events_highpri
10 root      0 -20      0      0      0  I   0.0   0.0   0:00.00 mm_percpu_wq
11 root      20   0      0      0      0  S   0.0   0.0   0:00.00 rcu_tasks_rude_
12 root      20   0      0      0      0  S   0.0   0.0   0:00.00 rcu_tasks_trace
13 root      20   0      0      0      0  S   0.0   0.0   0:00.33 ksoftirqd/0
15 root      rt   0      0      0      0  S   0.0   0.0   0:00.07 migration/0
16 root     -51   0      0      0      0  S   0.0   0.0   0:00.00 idle_inject/0
18 root      20   0      0      0      0  S   0.0   0.0   0:00.00 cpuhp/0
19 root      20   0      0      0      0  S   0.0   0.0   0:00.00 cpuhp/1
20 root     -51   0      0      0      0  S   0.0   0.0   0:00.00 idle_inject/1
21 root      rt   0      0      0      0  S   0.0   0.0   0:00.32 migration/1
22 root      20   0      0      0      0  S   0.0   0.0   0:00.96 ksoftirqd/1
24 root      0 -20      0      0      0  I   0.0   0.0   0:00.00 kworker/1:0H-kblockd
25 root      20   0      0      0      0  S   0.0   0.0   0:00.01 kdevtmpfs
26 root      0 -20      0      0      0  I   0.0   0.0   0:00.00 inet_frag_wq
27 root      20   0      0      0      0  S   0.0   0.0   0:00.00 kauditd
```

hepzi@ubuntu:/\$ sudo apt install htop

Reading package lists... Done

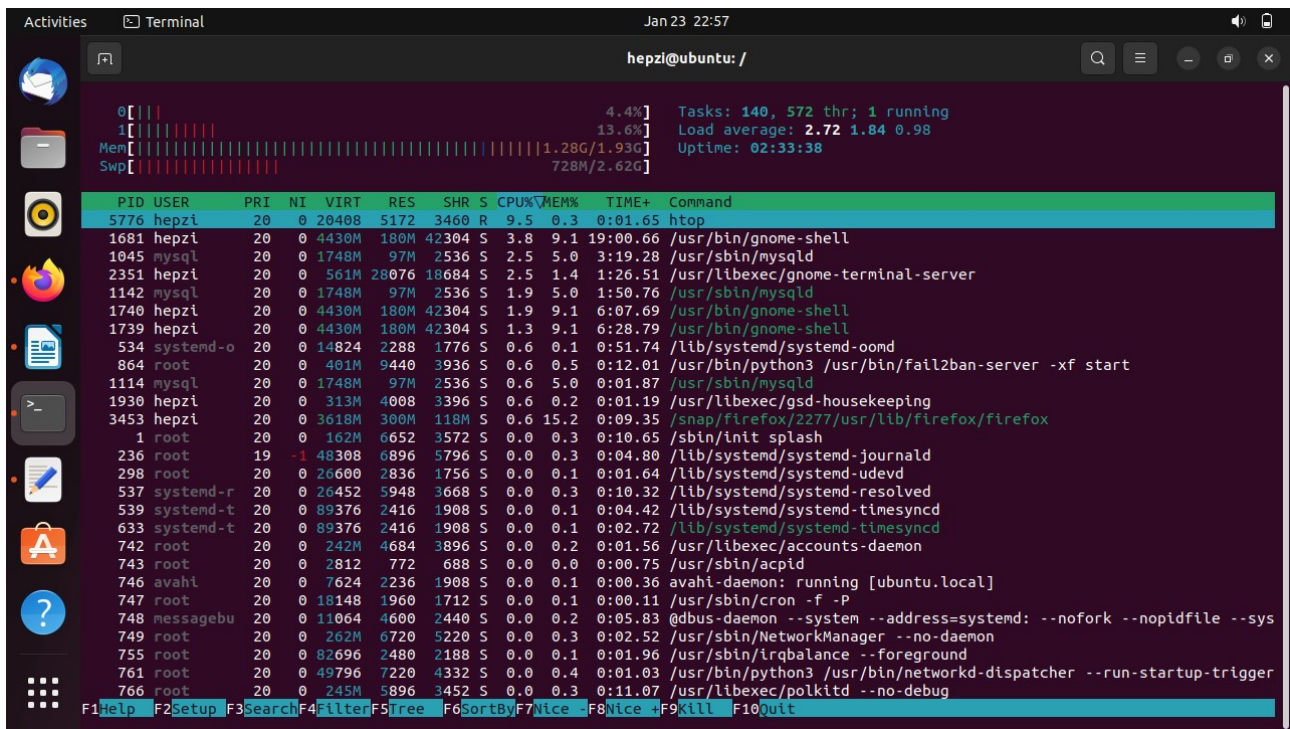
Building dependency tree... Done

Reading state information... Done

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

Allows the user to interaction on process monitoring(similar to task manager) :

hepzi@ubuntu:/\$ htop



hepzi@ubuntu:/\$ sudo apt install nmon

Reading package lists... Done

Building dependency tree... Done

Reading state information... Done

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

**System monitoring tool :**

hepzi@ubuntu:/\$ nmon

**To monitor the performance of the system such as cpu, memory usage, disk space, network and so on.**

```

Activities  Terminal  Jan 23 23:02
hepzi@ubuntu: /

nmon-16n [H for help] Hostname=ubuntu Refresh= 2secs 23:02.08

-----
          For help type H or ...
          nmon -? - hint
          nmon -h - full details

          To stop nmon type q to Quit

-----

Use these keys to toggle statistics on/off:
c = CPU          l = CPU Long-term      - = Faster screen updates
C = " WideView  U = Utilisation        + = Slower screen updates
m = Memory       V = Virtual memory    j = File Systems
d = Disks        n = Network            . = only busy disks/procs
r = Resource     N = NFS                h = more options
k = Kernel       t = Top-processes     q = Quit
  
```

```

Activities  Terminal  Jan 23 23:02
hepzi@ubuntu: /

nmon-16n [H for help] Hostname=ubuntu Refresh= 2secs 23:02.47
Verbose Mode
Code Resource Stats Now Warn Danger
OK -> Top Disk sda %busy 15.8% >40% >60%

Memory and Swap
PageSize:4KB RAM-Memory Swap-Space High-Memory Low-Memory
Total (MB) 1975.8 2680.0 - not in use - not in use
Free (MB) 166.6 1929.2
Free Percent 8.4% 72.0%
Linux Kernel Internal Memory (MB)
Buffers= 15.4 Swapcached= 26.3 Inactive = 1013.3
Dirty = 0.0 Writeback = 0.0 Mapped = 229.8
Slab = 136.4 Commit_AS = 6541.2 PageTables= 26.9

Kernel and Load Average
Global-CPU-Stats----> 30.6% user Load Average CPU use since boottime
/proc/stat line 1 0.0% user_nice 1 mins 0.55 Uptime Days Hours Mins
100 ticks per second 3.0% system 5 mins 0.84 Uptime 0 2 39
100%+1 CPUcoreThread 147.5% idle 15 mins 0.78 Idle 0 2 67
1 RunQueue 8.4% iowait Uptime has overflowed
0 Blocked 0.0% irq
692.1 Context 0.0% softirq 2 CPU core threads
Switch 0.0% steal
0.0 Forks 0.0% guest Boot time 1674485605
623.1 Interrupts 0.0% guest_nice 08:23 PM 23-Jan-2023

Disk I/O /proc/diskstats mostly in KB/s Warning:contains duplicates
DiskName Busy Read WriteKB|0 |25 |50 |75 |100|
loop0 0% 0.0 0.0|>
loop1 0% 0.0 0.0|>
loop2 0% 0.0 0.0|>
loop3 0% 0.0 0.0|>
Warning: Some Statistics may not shown
  
```

## Check the drive space usage

To display usage in bytes :

```
hepzi@ubuntu:~$ df -k
```

```

Filesystem 1K-blocks Used Available Use% Mounted on
tmpfs      202324 1552 200772 1% /run
/dev/sda3  25106692 13233096 10572912 56% /
  
```

```
tmpfs      1011608    0 1011608  0% /dev/shm
tmpfs      5120      4  5116  1% /run/lock
/dev/sda2  524252    5364 518888  2% /boot/efi
tmpfs      202320    2416 199904  2% /run/user/1000
```

### To display usage in MB :

```
hepzi@ubuntu:~$ df -m
```

```
Filesystem 1M-blocks Used Available Use% Mounted on
tmpfs      198    2    197  1% /run
/dev/sda3  24519 12923  10326 56% /
tmpfs      988    0    988  0% /dev/shm
tmpfs      5    1    5  1% /run/lock
/dev/sda2  512    6    507  2% /boot/efi
tmpfs      198    3    196  2% /run/user/1000
```

### To display the file system type :

```
hepzi@ubuntu:~$ df -T
```

```
Filesystem Type 1K-blocks Used Available Use% Mounted on
tmpfs      tmpfs 202324 1552 200772 1% /run
/dev/sda3  ext4 25106692 13233100 10572908 56% /
tmpfs      tmpfs 1011608 0 1011608 0% /dev/shm
tmpfs      tmpfs 5120 4 5116 1% /run/lock
/dev/sda2  vfat 524252 5364 518888 2% /boot/efi
tmpfs      tmpfs 202320 2416 199904 2% /run/user/1000
```

### To display the temporary file systems :

```
hepzi@ubuntu:~$ df -t tmpfs
```

```
Filesystem 1K-blocks Used Available Use% Mounted on
tmpfs      202324 1552 200772 1% /run
tmpfs      1011608 0 1011608 0% /dev/shm
tmpfs      5120 4 5116 1% /run/lock
tmpfs      202320 2416 199904 2% /run/user/1000
```

**To display filesystems but without the specified type :**

```
hepzi@ubuntu:~$ df -x tmpfs
```

Filesystem	1K-blocks	Used	Available	Use%	Mounted on
/dev/sda3	25106692	13233104	10572904	56%	/
/dev/sda2	524252	5364	518888	2%	/boot/efi

**To displays information abot used and unused memory and swap usage :**

```
hepzi@ubuntu:~$ free
```

	total	used	free	shared	buff/cache	available
Mem:	2023216	1319944	115416	39288	587856	502204
Swap:	2744316	571508	2172808			

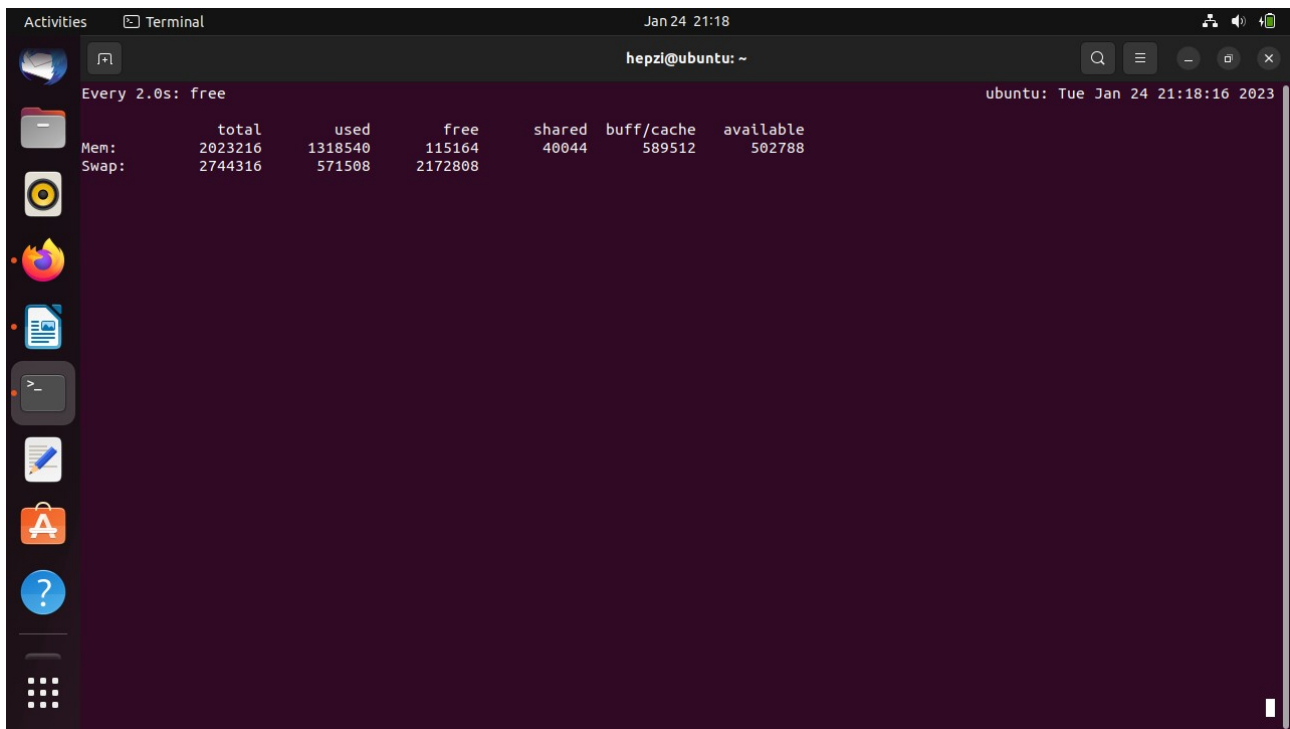
**To view Human readable output :**

```
hepzi@ubuntu:~$ free -h
```

	total	used	free	shared	buff/cache	available
Mem:	1.9Gi	1.3Gi	112Mi	38Mi	574Mi	490Mi
Swap:	2.6Gi	558Mi	2.1Gi			

**Watch will run until stopped by ctrl + c**

```
hepzi@ubuntu:~$ watch free
```



**To track the changes in output every 2secs :**

**To see what has changed (d- differences will highlight the changes) :**

```
hepzi@ubuntu:~$ watch -d free
```

**The output updated after every 5secs :**

```
hepzi@ubuntu:~$ watch -n 5 -d free
```

### **Crontab(Scheduling tasks)**

**-is a command that we want to executed on a regular schedule by the OS at a specified time.**

**To view crontab status :**

```
hepzi@ubuntu:~$ sudo systemctl status cron
```

- cron.service - Regular background program processing daemon
  - Loaded: loaded (/lib/systemd/system/cron.service; enabled; vendor preset: >
  - Active: active (running) since Tue 2023-01-24 19:18:19 IST; 2h 47min ago
  - Docs: man:cron(8)
  - Main PID: 746 (cron)
  - Tasks: 1 (limit: 2287)
  - Memory: 1.9M



CPU: 755ms

CGroup: /system.slice/cron.service

└─746 /usr/sbin/cron -f -P

### To view the crontab file :

```
hepzi@ubuntu:~$ cat /etc/crontab
```

```
# /etc/crontab: system-wide crontab
```

```
# Unlike any other crontab you don't have to run the `crontab'
```

```
# command to install the new version when you edit this file
```

```
# and files in /etc/cron.d. These files also have username fields,
```

```
# that none of the other crontabs do.
```

```
SHELL=/bin/sh
```

```
# You can also override PATH, but by default, newer versions inherit it from the environment
```

```
#PATH=/usr/local/sbin:/usr/local/bin:/sbin:/bin:/usr/sbin:/usr/bin
```

```
# Example of job definition:
```

```
# .----- minute (0 - 59)
```

```
# | .----- hour (0 - 23)
```

```
# | | .----- day of month (1 - 31)
```

```
# | | | .----- month (1 - 12) OR jan,feb,mar,apr ...
```

```
# | | | | .---- day of week (0 - 6) (Sunday=0 or 7) OR sun,mon,tue,wed,thu,fri,sat
```

```
# | | | |
```

```
# * * * * * user-name command to be executed
```

```
17 * * * * root cd / && run-parts --report /etc/cron.hourly
```

```
25 6 * * * root test -x /usr/sbin/anacron || ( cd / && run-parts --report /etc/cron.daily )
```

```
47 6 * * 7 root test -x /usr/sbin/anacron || ( cd / && run-parts --report /etc/cron.weekly )
```

```
52 6 1 * * root test -x /usr/sbin/anacron || ( cd / && run-parts --report /etc/cron.monthly )
```

#

### **To edit system crontabs:**

```
hepzi@ubuntu:~$ crontab -e
crontab: installing new crontab
```

### **To view crontab file contents :**

```
hepzi@ubuntu:~$ crontab -l
# Edit this file to introduce tasks to be run by cron.
#
# Each task to run has to be defined through a single line
# indicating with different fields when the task will be run
# and what command to run for the task
#
# To define the time you can provide concrete values for
# minute (m), hour (h), day of month (dom), month (mon),
# and day of week (dow) or use '*' in these fields (for 'any').
#
# Notice that tasks will be started based on the cron's system
# daemon's notion of time and timezones.
#
# Output of the crontab jobs (including errors) is sent through
# email to the user the crontab file belongs to (unless redirected).
#
# For example, you can run a backup of all your user accounts
# at 5 a.m every week with:
# 0 5 * * 1 tar -zcf /var/backups/home.tgz /home/
#
# For more information see the manual pages of crontab(5) and cron(8)
* * * * * date >> date.txt
# m h dom mon dow  command
```

```
hepzi@ubuntu:~$ cat date.txt
```

```
Tuesday 24 January 2023 11:04:01 PM IST
```

```
Tuesday 24 January 2023 11:05:01 PM IST
```

```
hepzi@ubuntu:~$ crontab -l
```

```
# Edit this file to introduce tasks to be run by cron.
```

```
#
```

```
# Each task to run has to be defined through a single line
```

```
# indicating with different fields when the task will be run
```

```
# and what command to run for the task
```

```
#
```

```
# To define the time you can provide concrete values for
```

```
# minute (m), hour (h), day of month (dom), month (mon),
```

```
# and day of week (dow) or use '*' in these fields (for 'any').
```

```
#
```

```
# Notice that tasks will be started based on the cron's system
```

```
# daemon's notion of time and timezones.
```

```
#
```

```
# Output of the crontab jobs (including errors) is sent through
```

```
# email to the user the crontab file belongs to (unless redirected).
```

```
#
```

```
# For example, you can run a backup of all your user accounts
```

```
# at 5 a.m every week with:
```

```
# 0 5 * * 1 tar -zcf /var/backups/home.tgz /home/
```

```
#
```

```
# For more information see the manual pages of crontab(5) and cron(8)
```

```
* * * 1 * echo 'Hello' >> /tmp/test.txt
```

```
# m h dom mon dow  command
```

**To be executed at a specified time :**

```
hepzi@ubuntu:~$ cat /tmp/test.txt
```

```
Hello
```