

Lecture _9


LINUX essentials
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Viewing Processes

Viewing Processes

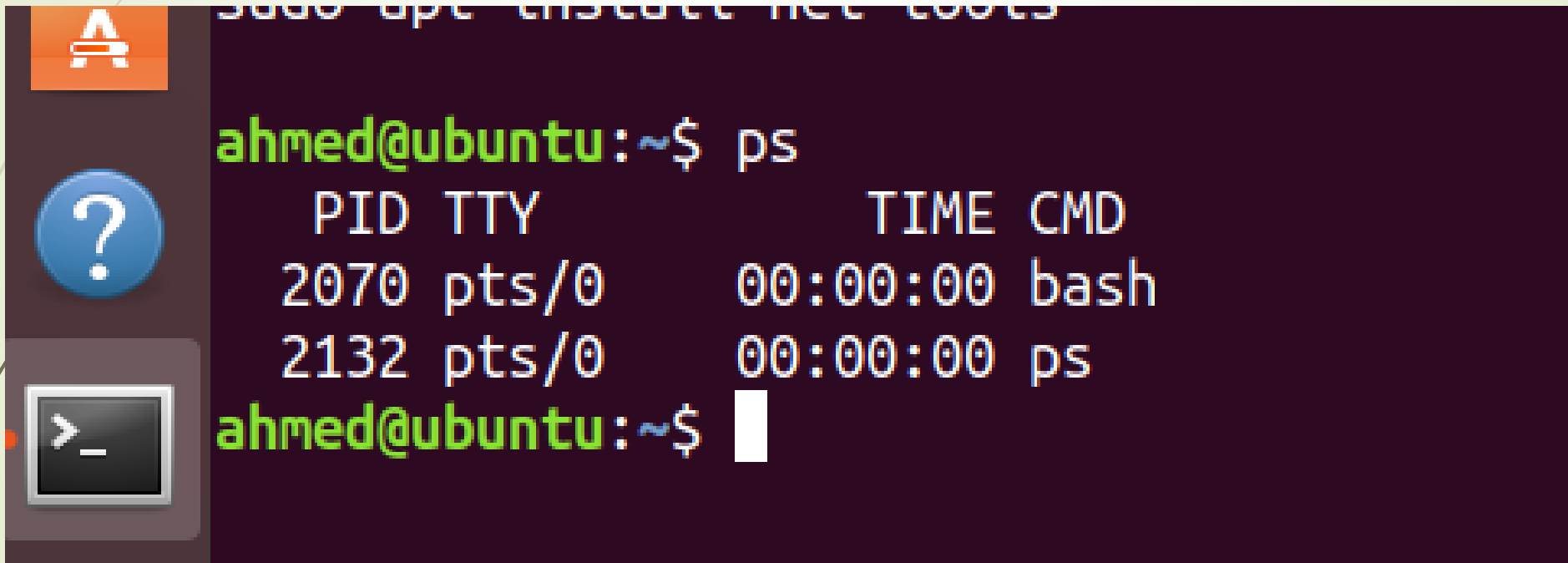
- Running a command results in something called a process. In the Linux operating system, processes are executed with the privileges of the user who executes the command. This allows for processes to be limited to certain capabilities based upon the user identity.
- Although there are exceptions, generally the operating system will differentiate users based upon whether they are the administrator. Typically, regular users, like the sysadmin user, cannot control another user's processes. Users who have administrative privileges, like the root account, can control any user processes, including stopping any user process.



The `ps` Command to List Running Processes in Linux

- Linux provides commands to view active processes and their details like PID, CPU, and memory usage.
- The most common command is `ps`, which shows currently running processes.
- Listing running processes in Linux helps you monitor and manage all active programs and system tasks.
- The `ps` command in Linux is used to display information about the currently running processes on the system.

The ps command can be used to list processes.




A terminal window with a dark purple background. The prompt is 'ahmed@ubuntu:~\$'. The command 'ps' has been entered, and the output is displayed in a table format. The table has four columns: PID, TTY, TIME, and CMD. The first row shows PID 2070, TTY pts/0, TIME 00:00:00, and CMD bash. The second row shows PID 2132, TTY pts/0, TIME 00:00:00, and CMD ps. The prompt 'ahmed@ubuntu:~\$' is followed by a white cursor bar.

```
ahmed@ubuntu:~$ ps
  PID TTY          TIME CMD
 2070 pts/0    00:00:00 bash
 2132 pts/0    00:00:00 ps
ahmed@ubuntu:~$
```



The ps command can be used to list processes.

- ps stands for **process status**.
- It shows details like PID, user, CPU, memory usage, and the command that started the process.
- By default, it displays processes running in the current shell.
- Use options to view more detailed or system-wide process information.



```
administrator@GFG19566-LAPTOP:~/practice$ ps
  PID TTY          TIME CMD
 3028492 pts/0    00:00:02 bash
 3118421 pts/0    00:00:00 ps
administrator@GFG19566-LAPTOP:~/practice$
```

Result contains four columns of information. ,

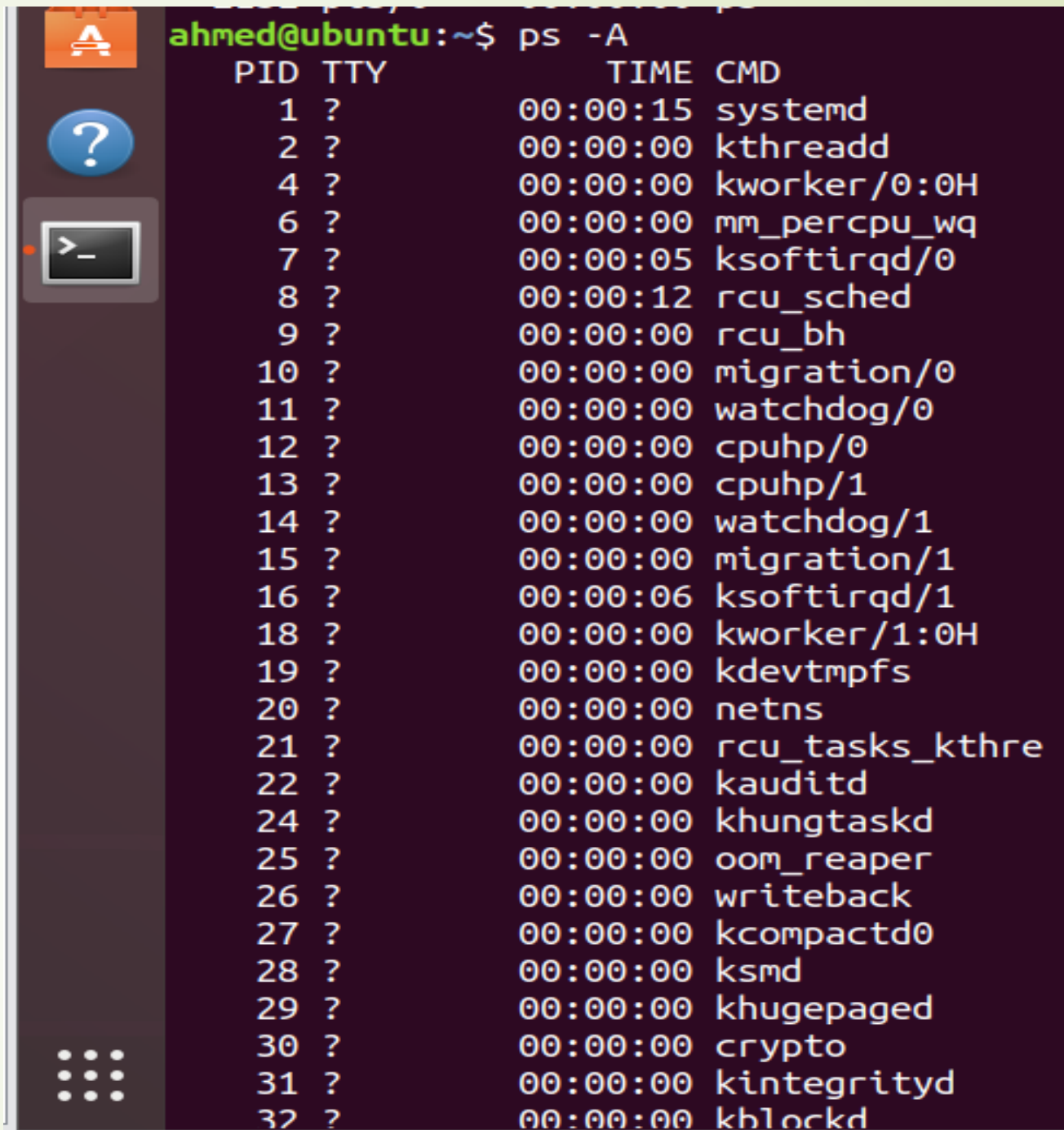
- **PID** - the unique process ID
- **TTY** - terminal type that the user is logged into
- **TIME** - amount of CPU in minutes and seconds that the process has been running
- **CMD** - name of the command that launched the process.

Syntax of `ps` Command in Linux

- ➡ The `ps` command provides a snapshot of the current processes on your system. The basic syntax is as follows:

```
ps [options]
```

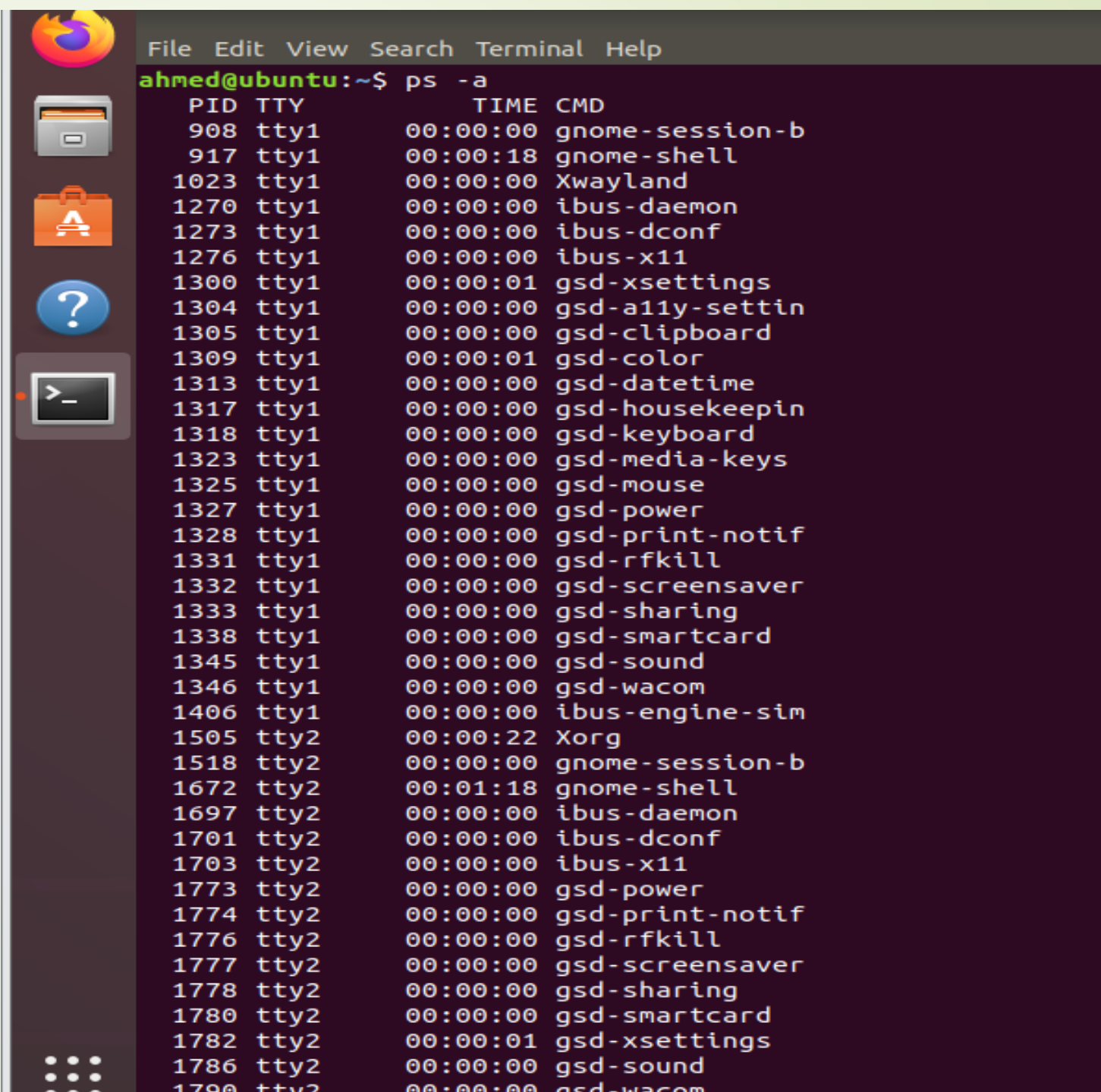
View All Running Processes in Linux.



```
ahmed@ubuntu:~$ ps -A
```

PID	TTY	TIME	CMD
1	?	00:00:15	systemd
2	?	00:00:00	kthreadd
4	?	00:00:00	kworker/0:0H
6	?	00:00:00	mm_percpu_wq
7	?	00:00:05	ksoftirqd/0
8	?	00:00:12	rcu_sched
9	?	00:00:00	rcu_bh
10	?	00:00:00	migration/0
11	?	00:00:00	watchdog/0
12	?	00:00:00	cpuhp/0
13	?	00:00:00	cpuhp/1
14	?	00:00:00	watchdog/1
15	?	00:00:00	migration/1
16	?	00:00:06	ksoftirqd/1
18	?	00:00:00	kworker/1:0H
19	?	00:00:00	kdevtmpfs
20	?	00:00:00	netns
21	?	00:00:00	rcu_tasks_kthre
22	?	00:00:00	kauditd
24	?	00:00:00	khungtaskd
25	?	00:00:00	oom_reaper
26	?	00:00:00	writeback
27	?	00:00:00	kcompactd0
28	?	00:00:00	ksmd
29	?	00:00:00	khugepaged
30	?	00:00:00	crypto
31	?	00:00:00	kintegrityd
32	?	00:00:00	kblockd

List Processes Not associated with a Terminal in Linux



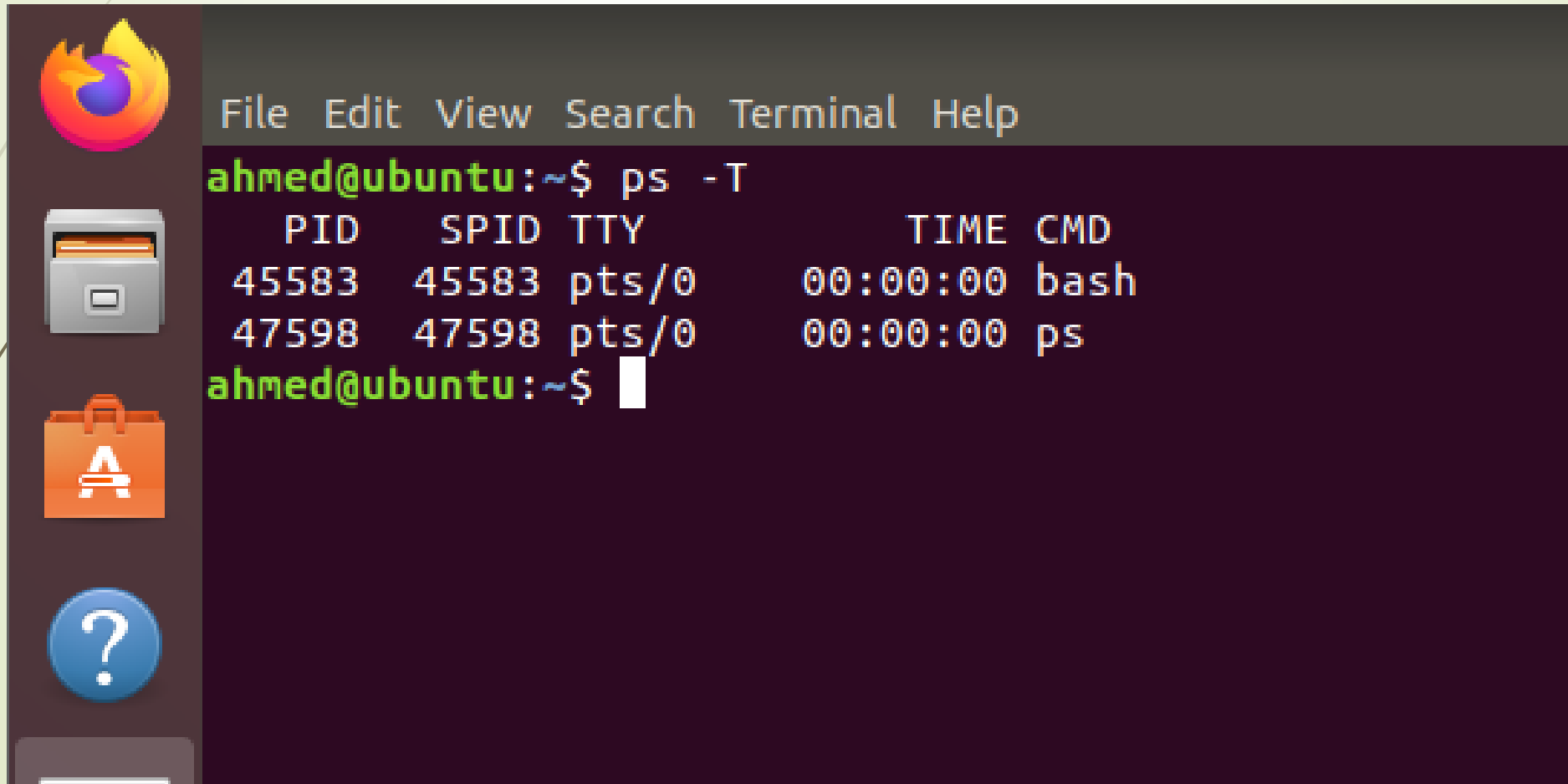
```
File Edit View Search Terminal Help
ahmed@ubuntu:~$ ps -a
  PID TTY          TIME CMD
   908 tty1        00:00:00 gnome-session-b
   917 tty1        00:00:18 gnome-shell
  1023 tty1        00:00:00 Xwayland
  1270 tty1        00:00:00 ibus-daemon
  1273 tty1        00:00:00 ibus-dconf
  1276 tty1        00:00:00 ibus-x11
  1300 tty1        00:00:01 gsd-xsettings
  1304 tty1        00:00:00 gsd-a11y-settin
  1305 tty1        00:00:00 gsd-clipboard
  1309 tty1        00:00:01 gsd-color
  1313 tty1        00:00:00 gsd-datetime
  1317 tty1        00:00:00 gsd-housekeepin
  1318 tty1        00:00:00 gsd-keyboard
  1323 tty1        00:00:00 gsd-media-keys
  1325 tty1        00:00:00 gsd-mouse
  1327 tty1        00:00:00 gsd-power
  1328 tty1        00:00:00 gsd-print-notif
  1331 tty1        00:00:00 gsd-rfkill
  1332 tty1        00:00:00 gsd-screensaver
  1333 tty1        00:00:00 gsd-sharing
  1338 tty1        00:00:00 gsd-smartcard
  1345 tty1        00:00:00 gsd-sound
  1346 tty1        00:00:00 gsd-wacom
  1406 tty1        00:00:00 ibus-engine-sim
  1505 tty2        00:00:22 Xorg
  1518 tty2        00:00:00 gnome-session-b
  1672 tty2        00:01:18 gnome-shell
  1697 tty2        00:00:00 ibus-daemon
  1701 tty2        00:00:00 ibus-dconf
  1703 tty2        00:00:00 ibus-x11
  1773 tty2        00:00:00 gsd-power
  1774 tty2        00:00:00 gsd-print-notif
  1776 tty2        00:00:00 gsd-rfkill
  1777 tty2        00:00:00 gsd-screensaver
  1778 tty2        00:00:00 gsd-sharing
  1780 tty2        00:00:00 gsd-smartcard
  1782 tty2        00:00:01 gsd-xsettings
  1786 tty2        00:00:00 gsd-sound
  1790 tty2        00:00:00 gsd-wacom
```

displays a detailed snapshot of all running processes in the system including system, background, and user processes.

```
2002 ttyL 00:00:02 update-notifier
45727 pts/0 00:00:00 ps
ahmed@ubuntu:~$ ps aux
```

USER	PID	%CPU	%MEM	VSZ	RSS	TTY	STAT	START	TIME	COMMAND
root	1	0.5	0.4	225600	8508	?	Ss	06:30	0:15	/sbin/init auto noprompt
root	2	0.0	0.0	0	0	?	S	06:30	0:00	[kthreadd]
root	4	0.0	0.0	0	0	?	I<	06:30	0:00	[kworker/0:0H]
root	6	0.0	0.0	0	0	?	I<	06:30	0:00	[mm_percpu_wq]
root	7	0.1	0.0	0	0	?	S	06:30	0:05	[ksoftirqd/0]
root	8	0.4	0.0	0	0	?	I	06:30	0:13	[rcu_sched]
root	9	0.0	0.0	0	0	?	I	06:30	0:00	[rcu_bh]
root	10	0.0	0.0	0	0	?	S	06:30	0:00	[migration/0]
root	11	0.0	0.0	0	0	?	S	06:30	0:00	[watchdog/0]
root	12	0.0	0.0	0	0	?	S	06:30	0:00	[cpuhp/0]
root	13	0.0	0.0	0	0	?	S	06:30	0:00	[cpuhp/1]
root	14	0.0	0.0	0	0	?	S	06:30	0:00	[watchdog/1]
root	15	0.0	0.0	0	0	?	S	06:30	0:00	[migration/1]
root	16	0.2	0.0	0	0	?	S	06:30	0:06	[ksoftirqd/1]
root	18	0.0	0.0	0	0	?	I<	06:30	0:00	[kworker/1:0H]
root	19	0.0	0.0	0	0	?	S	06:30	0:00	[kdevtmpfs]
root	20	0.0	0.0	0	0	?	I<	06:30	0:00	[netns]
root	21	0.0	0.0	0	0	?	S	06:30	0:00	[rcu_tasks_kthre]
root	22	0.0	0.0	0	0	?	S	06:30	0:00	[kauditd]
root	24	0.0	0.0	0	0	?	S	06:30	0:00	[khungtaskd]
root	25	0.0	0.0	0	0	?	S	06:30	0:00	[oom_reaper]

List All Processes Associated with this Terminal in Linux



The image shows a screenshot of an Ubuntu desktop environment. On the left side, there is a vertical dock containing four icons: the Firefox web browser, a file manager, the Dash application, and a help icon (a question mark). The main area of the screen is occupied by a terminal window. The terminal has a dark purple background and a light gray menu bar at the top with the options 'File', 'Edit', 'View', 'Search', 'Terminal', and 'Help'. The terminal prompt is 'ahmed@ubuntu:~\$'. The user has entered the command 'ps -T', which has been executed. The output of the command is displayed in a table format with the following columns: 'PID', 'SPID', 'TTY', 'TIME', and 'CMD'. The table shows two processes: one with PID 45583, SPID 45583, TTY pts/0, TIME 00:00:00, and CMD bash; and another with PID 47598, SPID 47598, TTY pts/0, TIME 00:00:00, and CMD ps. The terminal prompt is now 'ahmed@ubuntu:~\$' with a cursor.


```
File Edit View Search Terminal Help
ahmed@ubuntu:~$ ps -T
  PID   SPID TTY          TIME CMD
 45583  45583 pts/0    00:00:00 bash
 47598  47598 pts/0    00:00:00 ps
ahmed@ubuntu:~$
```

View All Processes Owned By You

```
ahmed@ubuntu: ~
File Edit View Search Terminal Help
45583 45583 pts/0 00:00:00 bash
47598 47598 pts/0 00:00:00 ps
ahmed@ubuntu:~$ ps -x
  PID TTY          STAT TIME COMMAND
 1485 ?           Ss    0:00 /lib/systemd/systemd --user
 1486 ?           S      0:00 (sd-pam)
 1499 ?           Sl    0:00 /usr/bin/gnome-keyring-daemon --daemonize --login
 1503 tty2        Ssl+  0:00 /usr/lib/gdm3/gdm-x-session --run-script env GNOME_SHELL_SESSION_MODE=ubuntu gnome-ses
 1505 tty2        Rl+   0:29 /usr/lib/xorg/Xorg vt2 -displayfd 3 -auth /run/user/1000/gdm/Xauthority -background no
 1515 ?           Ss    0:02 /usr/bin/dbus-daemon --session --address=systemd: --nofork --nopidfile --systemd-activ
 1518 tty2        Sl+   0:00 /usr/lib/gnome-session/gnome-session-binary --session=ubuntu
 1615 ?           Ss    0:00 /usr/bin/ssh-agent /usr/bin/im-launch env GNOME_SHELL_SESSION_MODE=ubuntu gnome-sessio
 1618 ?           Ssl   0:00 /usr/lib/gvfs/gvfsd
 1623 ?           Sl    0:00 /usr/lib/gvfs/gvfsd-fuse /run/user/1000/gvfs -f -o big_writes
 1636 ?           Ssl   0:00 /usr/lib/at-spi2-core/at-spi-bus-launcher
 1641 ?           S      0:00 /usr/bin/dbus-daemon --config-file=/usr/share/defaults/at-spi2/accessibility.conf --no
 1643 ?           Sl    0:00 /usr/lib/at-spi2-core/at-spi2-registryd --use-gnome-session
 1672 tty2        Rl+   1:35 /usr/bin/gnome-shell
 1686 ?           S<l   0:03 /usr/bin/pulseaudio --start --log-target=syslog
 1697 tty2        Rl    0:00 ibus-daemon --xim --panel disable
 1701 tty2        Sl    0:00 /usr/lib/ibus/ibus-dconf
 1703 tty2        Sl    0:00 /usr/lib/ibus/ibus-x11 --kill-daemon
 1705 ?           Sl    0:00 /usr/lib/ibus/ibus-portal
 1716 ?           Sl    0:00 /usr/lib/gnome-shell/gnome-shell-calendar-server
 1725 ?           Ssl   0:00 /usr/lib/evolution/evolution-source-registry
 1737 ?           Sl    0:00 /usr/lib/gnome-online-accounts/goa-daemon
 1738 ?           Ssl   0:00 /usr/lib/gvfs/gvfs-udisks2-volume-monitor
 1744 ?           Ssl   0:00 /usr/lib/gvfs/gvfs-mtp-volume-monitor
 1748 ?           Ssl   0:00 /usr/lib/gvfs/gvfs-gphoto2-volume-monitor
 1756 ?           Ssl   0:00 /usr/lib/gvfs/gvfs-afc-volume-monitor
 1763 ?           Sl    0:04 /usr/lib/gnome-online-accounts/goa-identity-service
 1765 ?           Ssl   0:00 /usr/lib/gvfs/gvfs-goa-volume-monitor
 1773 tty2        Sl+   0:00 /usr/lib/gnome-settings-daemon/gsd-power
 1774 tty2        Sl+   0:00 /usr/lib/gnome-settings-daemon/gsd-print-notifications
 1776 tty2        Sl+   0:00 /usr/lib/gnome-settings-daemon/gsd-rfkill
 1777 tty2        Sl+   0:00 /usr/lib/gnome-settings-daemon/gsd-screensaver-proxy
 1778 tty2        Sl+   0:00 /usr/lib/gnome-settings-daemon/gsd-sharing
 1780 tty2        Sl+   0:00 /usr/lib/gnome-settings-daemon/gsd-smartcard
 1782 tty2        Sl+   0:01 /usr/lib/gnome-settings-daemon/gsd-xsettings
 1786 tty2        Sl+   0:00 /usr/lib/gnome-settings-daemon/gsd-sound
 1790 tty2        Sl+   0:00 /usr/lib/gnome-settings-daemon/gsd-wacom
```



Package Management

- 
- **Package management** is a system by which software can be installed, updated, queried or removed from a filesystem. In Linux, there are many different software package management systems, but the two most popular are those from Debian and Red Hat. The virtual machines for this course use Ubuntu, a derivative of Debian.

Installing Packages

- ➡ Package files are commonly installed by downloading them directly from repositories located on Internet servers. The Debian repositories contain more than 65,000 different packages of software.

it is good practice to use the refresh the list of available packages using the apt-get update command

```
ahmed@ubuntu:~$ sudo apt update
```

```
Hit:1 http://us.archive.ubuntu.com/ubuntu bionic InRelease
```

```
Get:2 http://us.archive.ubuntu.com/ubuntu bionic-updates InRelease [102 kB]
```

```
Get:3 http://security.ubuntu.com/ubuntu bionic-security InRelease [102 kB]
```

```
Get:4 http://us.archive.ubuntu.com/ubuntu bionic-backports InRelease [102 kB]
```

```
Get:5 http://us.archive.ubuntu.com/ubuntu bionic-updates/main amd64 DEP-11 Metadata [297 kB]
```

```
Get:6 http://security.ubuntu.com/ubuntu bionic-security/main amd64 DEP-11 Metadata [76.9 kB]
```

```
Get:7 http://us.archive.ubuntu.com/ubuntu bionic-updates/restricted amd64 DEP-11 Metadata [212 B]
```

```
Get:8 http://us.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 DEP-11 Metadata [303 kB]
```

```
Get:9 http://security.ubuntu.com/ubuntu bionic-security/restricted amd64 DEP-11 Metadata [212 B]
```

```
Get:10 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 DEP-11 Metadata [61.8 kB]
```

```
Get:11 http://us.archive.ubuntu.com/ubuntu bionic-updates/multiverse amd64 DEP-11 Metadata [2,464 B]
```

```
Get:12 http://us.archive.ubuntu.com/ubuntu bionic-backports/main amd64 DEP-11 Metadata [8,084 B]
```

```
Get:13 http://us.archive.ubuntu.com/ubuntu bionic-backports/restricted amd64 DEP-11 Metadata [216 B]
```

```
Get:14 http://us.archive.ubuntu.com/ubuntu bionic-backports/universe amd64 DEP-11 Metadata [10.1 kB]
```

```
Get:15 http://us.archive.ubuntu.com/ubuntu bionic-backports/multiverse amd64 DEP-11 Metadata [216 B]
```

```
Get:16 http://security.ubuntu.com/ubuntu bionic-security/multiverse amd64 DEP-11 Metadata [2,464 B]
```

```
Fetch 1,068 kB in 2s (486 kB/s)
```

```
Reading package lists... Done
```

```
Building dependency tree
```

```
Reading state information... Done
```

```
All packages are up to date.
```

```
ahmed@ubuntu:~$
```



```
ahmed@ubuntu:~$ cowsay -t  
bash: /usr/games/cowsay: No such file or directory
```

```
ahmed@ubuntu:~$ clear
```



```
ahmed@ubuntu:~$ sudo apt upgrade
```

```
Reading package lists... Done
```

```
Building dependency tree
```

```
Reading state information... Done
```

```
Calculating upgrade... Done
```

```
The following NEW packages will be installed:
```

```
bubblewrap distro-info fwupd-signed libbrotli1 libllvm10 libnetplan0 libwayland-egl1 libwoff1 libxmlb1 python3-click  
python3-colorama python3-dateutil python3-netifaces ubuntu-advantage-desktop-daemon ubuntu-pro-client  
ubuntu-pro-client-l10n xdg-desktop-portal xdg-desktop-portal-gtk
```


```
The following packages will be upgraded:
```


```
appstream apt apt-config-icons apt-utils apturl apturl-common base-files bolt brltty command-not-found  
command-not-found-data console-setup console-setup-linux cups-pk-helper debconf debconf-i18n desktop-file-utils dmidecode  
dmsetup fonts-beng-extra fonts-deva-extra fonts-gujr-extra fonts-guru-extra fonts-liberation fonts-noto-cjk  
fonts-noto-color-emoji fonts-orya-extra friendly-recovery fwupd fwupdate fwupdate-signed gdb gdbserver gedit gedit-common  
gir1.2-dbusmenu-glib-0.4 gir1.2-geocodeglib-1.0 gir1.2-gmenu-3.0 gir1.2-gnomebluetooth-1.0 gir1.2-gnomedesktop-3.0  
gir1.2-goa-1.0 gir1.2-gtk-3.0 gir1.2-gweather-3.0 gir1.2-javascriptcoregtk-4.0 gir1.2-json-1.0 gir1.2-mutter-2  
gir1.2-nm-1.0 gir1.2-nma-1.0 gir1.2-notify-0.7 gir1.2-snapd-1 gir1.2-upowerglib-1.0 gir1.2-vte-2.91 gir1.2-webkit2-4.0  
gjs gkbd-capplet gnome-bluetooth gnome-control-center gnome-control-center-data gnome-control-center-faces  
gnome-desktop3-data gnome-disk-utility gnome-getting-started-docs gnome-initial-setup gnome-keyring gnome-keyring-pkcs11  
gnome-menus gnome-online-accounts gnome-session-bin gnome-session-common gnome-settings-daemon  
gnome-settings-daemon-schemas gnome-shell gnome-shell-common gnome-shell-extension-ubuntu-dock gnome-software  
gnome-software-common gnome-software-plugin-snap gnome-startup-applications gnome-terminal gnome-terminal-data  
gnome-user-docs gnome-user-guide grep grub-common grub-pc grub-pc-bin grub2-common gstreamer1.0-gl
```





Quick Summary

Term	What it does	Size	Effect on Version	
Update	Fixes or improves current version	Small	Same major version	
Upgrade	Moves to a new, bigger version	Large	Major new version	



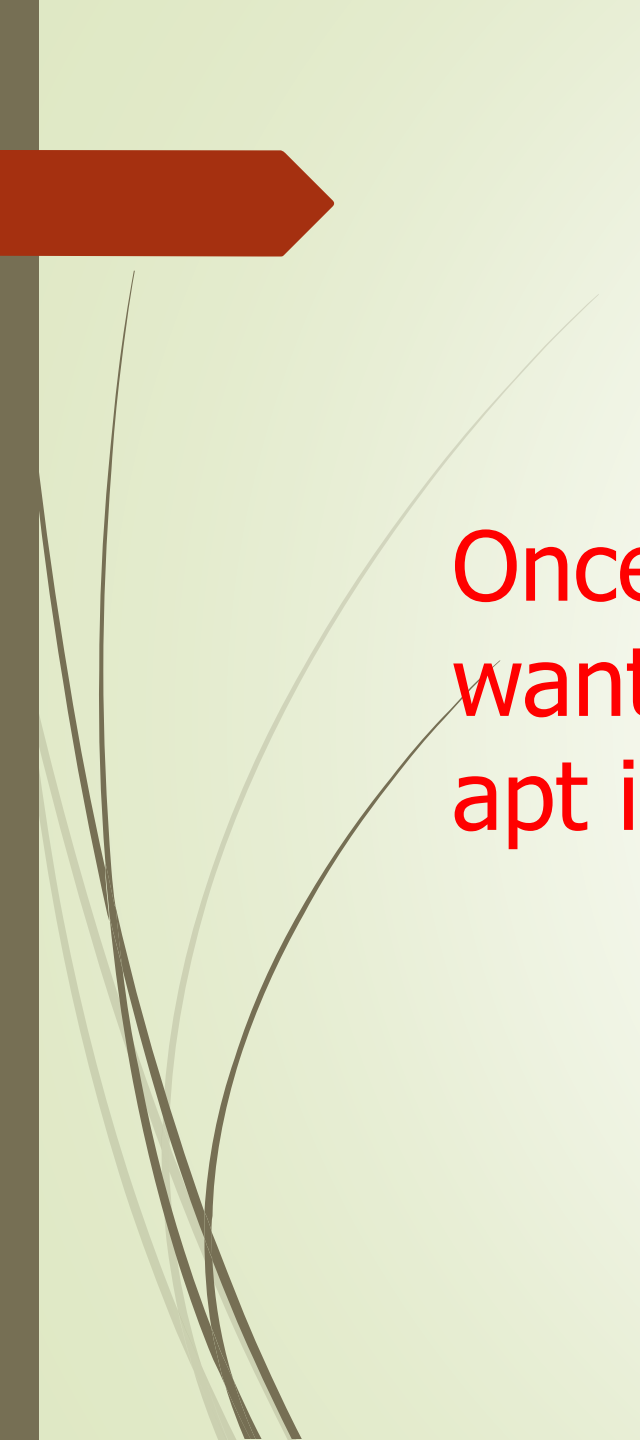
To search for keywords within these packages, you can use the **apt-cache search** command

```
apt-cache search [keyword]
```

The keyword that is used should match part of the name or description of the package that is to be located. Multiple keywords can be used to further clarify the search; for example, the search term web server would provide better results than web or server.

To find packages associated with the cow keyword:

```
ahmed@ubuntu:~$ apt-cache search cow
devscripts - scripts to make the life of a Debian Package maintainer easier
4digits - guess-the-number game, aka Bulls and Cows
averell - incredibly stupid web server
cowbell - An easy-to-use tag editor for your music files
cowbuilder - pbuilder running on cowedancer
cowedancer - Copy-on-write directory tree utility
cowsay - configurable talking cow
cowsay-off - configurable talking cow (offensive cows)
dicoweb - RFC 2229 compliant modular dictionary server (web interface)
erlang-cowboy - Cowboy is a small, fast and modular HTTP server written in Erlang
erlang-cowboy-doc - Documentation files for erlang-cowboy
erlang-cowboy-examples - Examples for erlang-cowboy
erlang-cowlib - Erlang library for manipulating web protocols
fl-cow - copy-on-write utility
libforks-perl - Perl module to emulate threads with fork
libguestfs0 - guest disk image management system - shared library
libmoosex-struct-perl - simple lightweight record-like structures making sounds like
libnet-opensrs-perl - Perl interface for domain registration via the Tucows OpenSRS
libqcow-dev - QEMU Copy-On-Write image format access library -- development files
libqcow-utils - QEMU Copy-On-Write image format access library -- Utilities
libqcow1 - QEMU Copy-On-Write image format access library
libxml-catalog-perl - Perl module for resolving public and remapping system identifiers
libxray-absorption-perl - x-ray absorption data for the elements
minetest-mod-animals - Minetest mod providing animals
minetest-mod-mobf - Minetest mod providing a framework for creating mobs
netrek-client-cow - client for netrek online game
```



Once you've found the package that you want to install, you can install it with the apt install command



ahmed@ubuntu:~\$ sudo apt install cowsay

Reading package lists... Done

Building dependency tree

Reading state information... Done

Suggested packages:

filters cowsay-off

The following NEW packages will be installed:

cowsay

0 upgraded, 1 newly installed, 0 to remove and 337 not upgraded.

Need to get 17.7 kB of archives.

After this operation, 89.1 kB of additional disk space will be used.

Get:1 <http://us.archive.ubuntu.com/ubuntu/bionic/universe/amd64/cowsay/all> 3.03+dfsg2-4 [17.7 kB]

Fetched 17.7 kB in 0s (37.8 kB/s)

Selecting previously unselected package cowsay.

(Reading database ... 148805 files and directories currently installed.)

Preparing to unpack .../cowsay_3.03+dfsg2-4_all.deb ...

Unpacking cowsay (3.03+dfsg2-4) ...

Setting up cowsay (3.03+dfsg2-4) ...

Processing triggers for man-db (2.8.3-2) ...

ahmed@ubuntu:~\$ cowsay "hello"

< hello >

```
      ^__^
      (oo)\_______
      (_____)\\\_____)\\
              ||----w |
              ||     ||
```

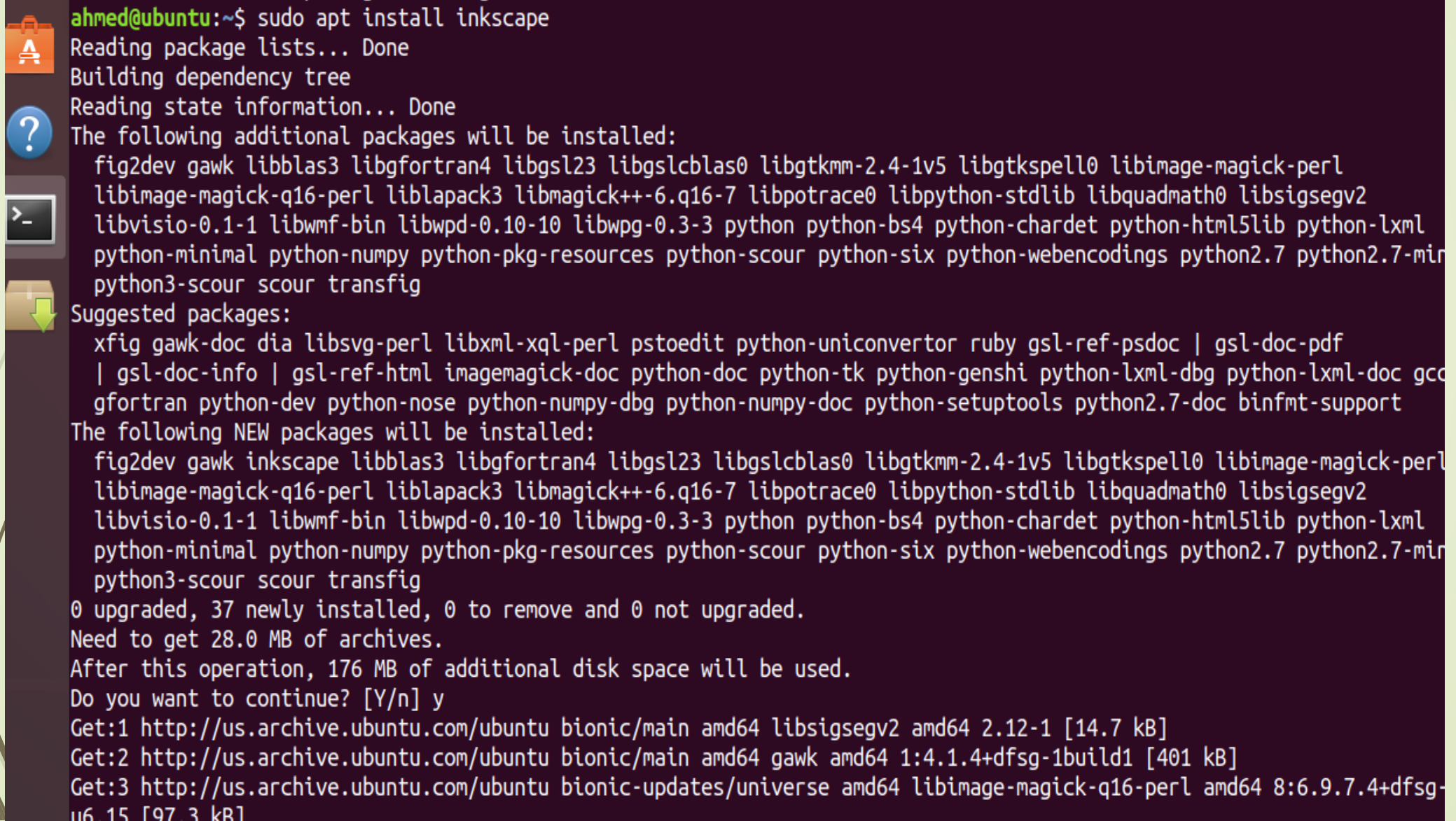
ahmed@ubuntu:~\$



```
cowsay "hello, world"
```

```
_____  
< hello, world >  
-----  
      ^ _ ^  
      (oo)\_____  
      (__)\\    )\\/  
          ||----w |  
          ||     ||
```

Example2: install inkscape program



```
ahmed@ubuntu:~$ sudo apt install inkscape
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  fig2dev gawk libblas3 libgfortran4 libgsl23 libgslcblas0 libgtkmm-2.4-1v5 libgtkspell0 libimage-magick-perl
  libimage-magick-q16-perl liblapack3 libmagick++-6.q16-7 libpotrace0 libpython-stdlib libquadmath0 libsigsegv2
  libvisio-0.1-1 libwmf-bin libwpd-0.10-10 libwpg-0.3-3 python python-bs4 python-chardet python-html5lib python-lxml
  python-minimal python-numpy python-pkg-resources python-scour python-six python-webencodings python2.7 python2.7-min
  python3-scour scour transfig
Suggested packages:
  xfig gawk-doc dia libsvg-perl libxml-xql-perl pstoeedit python-uniconvertor ruby gsl-ref-psdoc | gsl-doc-pdf
  | gsl-doc-info | gsl-ref-html imagemagick-doc python-doc python-tk python-genshi python-lxml-dbg python-lxml-doc gcc
  gfortran python-dev python-nose python-numpy-dbg python-numpy-doc python-setuptools python2.7-doc binfmt-support
The following NEW packages will be installed:
  fig2dev gawk inkscape libblas3 libgfortran4 libgsl23 libgslcblas0 libgtkmm-2.4-1v5 libgtkspell0 libimage-magick-perl
  libimage-magick-q16-perl liblapack3 libmagick++-6.q16-7 libpotrace0 libpython-stdlib libquadmath0 libsigsegv2
  libvisio-0.1-1 libwmf-bin libwpd-0.10-10 libwpg-0.3-3 python python-bs4 python-chardet python-html5lib python-lxml
  python-minimal python-numpy python-pkg-resources python-scour python-six python-webencodings python2.7 python2.7-min
  python3-scour scour transfig
0 upgraded, 37 newly installed, 0 to remove and 0 not upgraded.
Need to get 28.0 MB of archives.
After this operation, 176 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://us.archive.ubuntu.com/ubuntu bionic/main amd64 libsigsegv2 amd64 2.12-1 [14.7 kB]
Get:2 http://us.archive.ubuntu.com/ubuntu bionic/main amd64 gawk amd64 1:4.1.4+dfsg-1build1 [401 kB]
Get:3 http://us.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 libimage-magick-q16-perl amd64 8:6.9.7.4+dfsg-
u6 15 [97.3 kB]
```

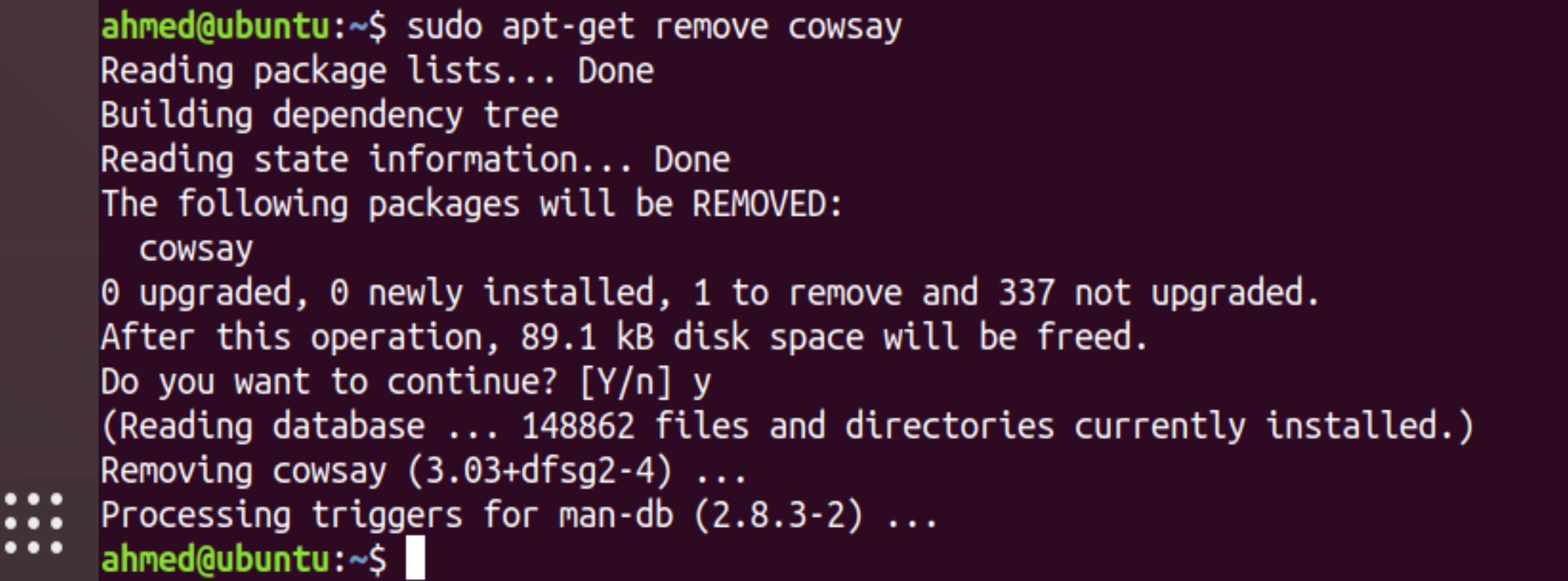
Removing Packages

- The **apt-get command** is able to either **remove or purge a** package.
- The difference between the two is that **purging** deletes all package files, while **removing** deletes all but the configuration files for the package.
- An administrator can execute the apt-get remove command to remove a package or the apt-get purge command to purge a package completely from the system.

For example, to purge cowsay completely, execute the following command.

```
apt-get remove [package]
```

```
apt-get purge [package]
```

A terminal window with a dark background. On the left side, there is a vertical bar with a series of white dots. An orange arrow points from the left towards the terminal output. The text in the terminal shows the execution of the command to remove cowsay, including dependency checks, disk space information, and confirmation prompts.

```
ahmed@ubuntu:~$ sudo apt-get remove cowsay
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages will be REMOVED:
  cowsay
0 upgraded, 0 newly installed, 1 to remove and 337 not upgraded.
After this operation, 89.1 kB disk space will be freed.
Do you want to continue? [Y/n] y
(Reading database ... 148862 files and directories currently installed.)
Removing cowsay (3.03+dfsg2-4) ...
Processing triggers for man-db (2.8.3-2) ...
ahmed@ubuntu:~$
```

Removing the inkscape

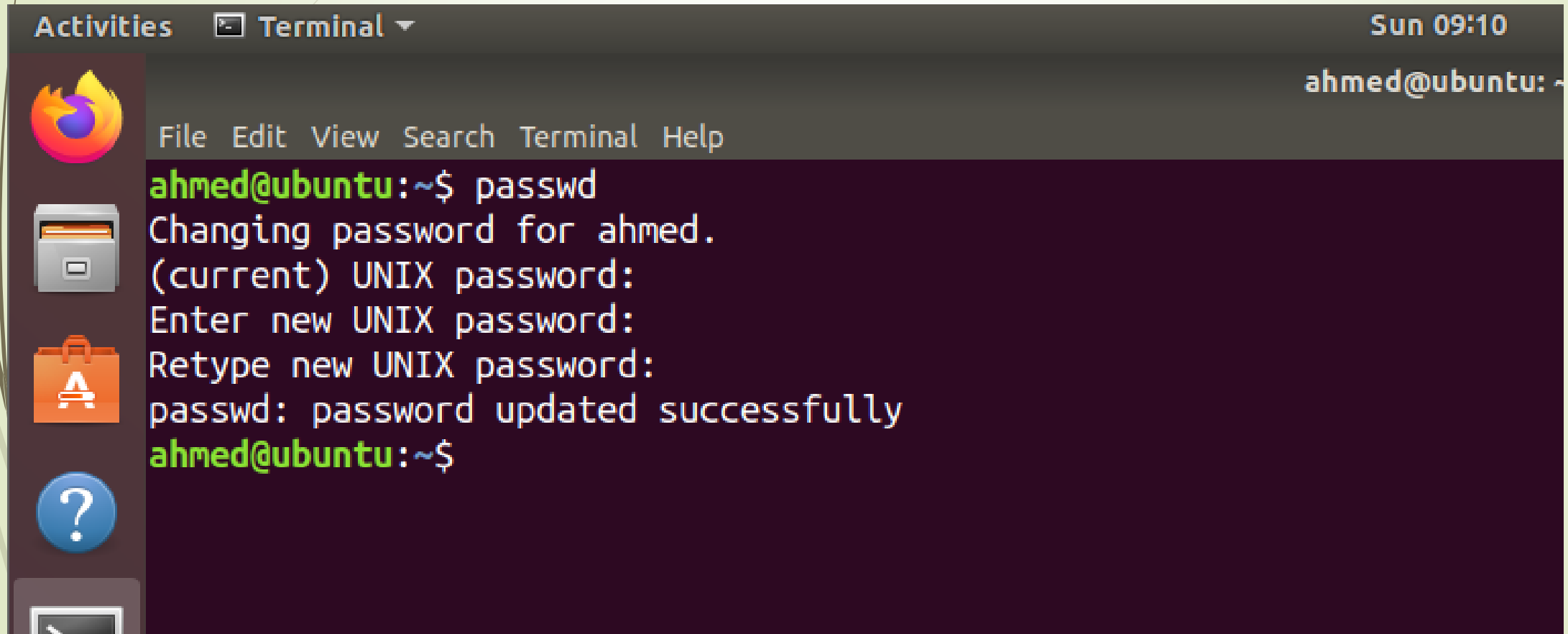
```
? Reading state information... Done
All packages are up to date.
ahmed@ubuntu:~$ sudo apt-get remove inkscape
>_ Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
libblas3 libgfortran4 libgsl23 libgslcblas0 libgtkmm-2.4-1v5 libgtkspell0 libimage-magick-perl libimage-magick
liblapack3 libmagick++-6.q16-7 libpotrace0 libpython-stdlib libquadmath0 libvisio-0.1-1 libwpd-0.10-10 libwpg-
python python-bs4 python-chardet python-html5lib python-lxml python-minimal python-numpy python-pkg-resources
python-scour python-six python-webencodings python2.7 python2.7-minimal python3-scour scour
Use 'sudo apt autoremove' to remove them.
The following packages will be REMOVED:
inkscape
0 upgraded, 0 newly installed, 1 to remove and 0 not upgraded.
After this operation, 128 MB disk space will be freed.
Do you want to continue? [Y/n] y
(Reading database ... 152209 files and directories currently installed.)
Removing inkscape (0.92.3-1) ...
Processing triggers for desktop-file-utils (0.23-1ubuntu3.18.04.2) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
Processing triggers for gnome-menus (3.13.3-11ubuntu1.1) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for mime-support (3.60ubuntu1) ...
```

Updating User Passwords

- The `passwd` command is used to update a user's password. Users can only change their own passwords, whereas the **root** user can update the password for any user.

```
passwd [OPTIONS] [USER]
```

Example to change password

A screenshot of a Linux terminal window. The window has a title bar with 'Activities', 'Terminal', and a dropdown arrow. The top right corner shows the date and time 'Sun 09:10'. The user 'ahmed@ubuntu' is logged in from the home directory '~'. The terminal shows the command 'passwd' being executed. The output indicates the password is being changed for 'ahmed', prompts for the current and new passwords, and confirms the update was successful. The terminal interface includes a menu bar with 'File', 'Edit', 'View', 'Search', 'Terminal', and 'Help'. On the left side, there is a vertical dock with icons for Firefox, a file manager, a shopping bag, and a help icon. The terminal text is as follows:

```
ahmed@ubuntu:~$ passwd
Changing password for ahmed.
(current) UNIX password:
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
ahmed@ubuntu:~$
```



File Edit View Search Terminal Help

```
ahmed@ubuntu:~$ passwd -S  
ahmed P 12/07/2025 0 99999 7 -1  
ahmed@ubuntu:~$
```

- **Sara:** The username
- **P=**Password status:
 - **P** = Password is set
 - **L** = Account is locked
 - **NP** = No password
- **12/13/2021:** The date when the password was last changed.
- **99999: Maximum days** the password is valid.
99999 = the password practically never expires.
- **7: Warning days** before the password expires



File Edit View Search Terminal Help


```
ahmed@ubuntu:~$ passwd -S  
ahmed P 12/07/2025 0 99999 7 -1  
ahmed@ubuntu:~$
```

Summary

- User **sara** has a password.
- Last password change: **Dec 13, 2021**
- Password **never expires** (99999 days).
- User will be warned **7 days** before expiration.
- Account will **not** become inactive automatically; the user can still log in even if the password is expired..



ifconfig (interface configuration)

- ➔ ifconfig (interface configuration) is a network management tool. It is used to configure and view the status of the network interfaces in Linux operating systems. With ifconfig, you can assign IP addresses, enable or disable interfaces, routes, and more.
- 



How to Install ifconfig

ahmed@ubuntu:~\$ ifconfig

Command 'ifconfig' not found, but can be installed with:

sudo apt install net-tools

ahmed@ubuntu:~\$ sudo apt install net-tools

Reading package lists... Done

Building dependency tree

Reading state information... Done

The following packages were automatically installed and are no longer required:

libblas3 libgfortran4 libgsl23 libgslcblas0 libgtkmm-2.4-1v5 libgtkspell0 libimage-magick-perl libimage-magick-q16-perl
liblapack3 libmagick++-6.q16-7 libpotrace0 libpython-stdlib libquadmath0 libvisio-0.1-1 libwpd-0.10-10 libwpg-0.3-3
python python-bs4 python-chardet python-html5lib python-lxml python-minimal python-numpy python-pkg-resources
python-scour python-six python-webencodings python2.7 python2.7-minimal python3-scour scour

Use 'sudo apt autoremove' to remove them.

The following NEW packages will be installed:

net-tools

0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.

Need to get 194 kB of archives.

After this operation, 803 kB of additional disk space will be used.

Get:1 <http://us.archive.ubuntu.com/ubuntu/bionic/main/amd64/net-tools> amd64 1.60+git20161116.90da8a0-1ubuntu1 [194 kB]

Fetched 194 kB in 2s (98.2 kB/s)

Selecting previously unselected package net-tools.

(Reading database ... 151129 files and directories currently installed.)


Preparing to unpack .../net-tools_1.60+git20161116.90da8a0-1ubuntu1_amd64.deb ...

Unpacking net-tools (1.60+git20161116.90da8a0-1ubuntu1) ...

Setting up net-tools (1.60+git20161116.90da8a0-1ubuntu1) ...

Processing triggers for man-db (2.8.3-2ubuntu0.1) ...

ahmed@ubuntu:~\$



```
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
ahmed@ubuntu:~$ ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
    inet 192.168.153.129  netmask 255.255.255.0  broadcast 192.168.153.255
    inet6 fe80::22f7:8e22:1cd9:c0c9  prefixlen 64  scopeid 0x20<link>
    ether 00:0c:29:f7:ba:ba  txqueuelen 1000  (Ethernet)
    RX packets 149371  bytes 217080953 (217.0 MB)
    RX errors 0  dropped 0  overruns 0  frame 0
    TX packets 23748  bytes 1821900 (1.8 MB)
    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 840  bytes 82327 (82.3 KB)
    RX errors 0  dropped 0  overruns 0  frame 0
    TX packets 840  bytes 82327 (82.3 KB)
    TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

ahmed@ubuntu:~$
```

Summary

- ens33 = your main network connection, active, has IP: 192.168.153.129.
- lo = internal system network, always present, IP: 127.0.0.1.



➔  **Network Interface: ens33**

 This is your main network card.

 UP, RUNNING → The network interface is active and working.

 netmask 255.255.255.0 → Subnet mask.


 broadcast 192.168.153.255 → Broadcast address.

 ether 00:0c:29:f7:ba:ba → MAC address.

➔ **Traffic:**

 RX packets → Received packets (data coming to you).

 TX packets → Transmitted packets (data going out).

 No errors → Connection is healthy.



✓ Loopback Interface: lo

- ✓ This is the internal network of your computer.
- ✓ **inet 127.0.0.1** → Localhost (used for internal communication).IP
- ✓ Always **UP and RUNNING**.
- ✓ No errors → Works correctly.
- ✓ RX (Received data)
- ✓ TX (Transmitted)

References

- ➡ Ramses van Zon," Securing File Access Permissions on Linux ", SciNet HPC, University of Toronto ,27 October 2022.
- ➡ <https://www.geeksforgeeks.org/linux-unix/ps-command-in-linux-with-examples/>
- ➡ <https://linuxize.com/post/ifconfig-command/>