

Lecture _9

LINUX essentials
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Viewing Processes



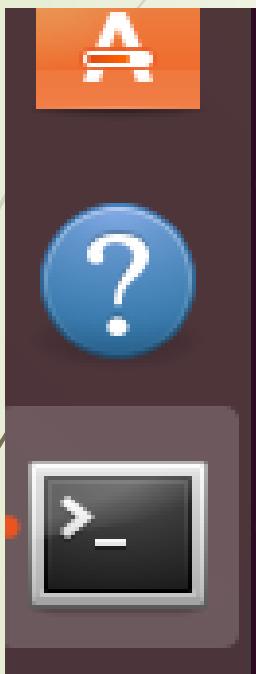
Viewing Processes

- ▶ 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.



```
ps aux www-data 1000 0.0 0.0 0:00 /usr/bin/python3.6 /var/www/html/index.py
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. ,

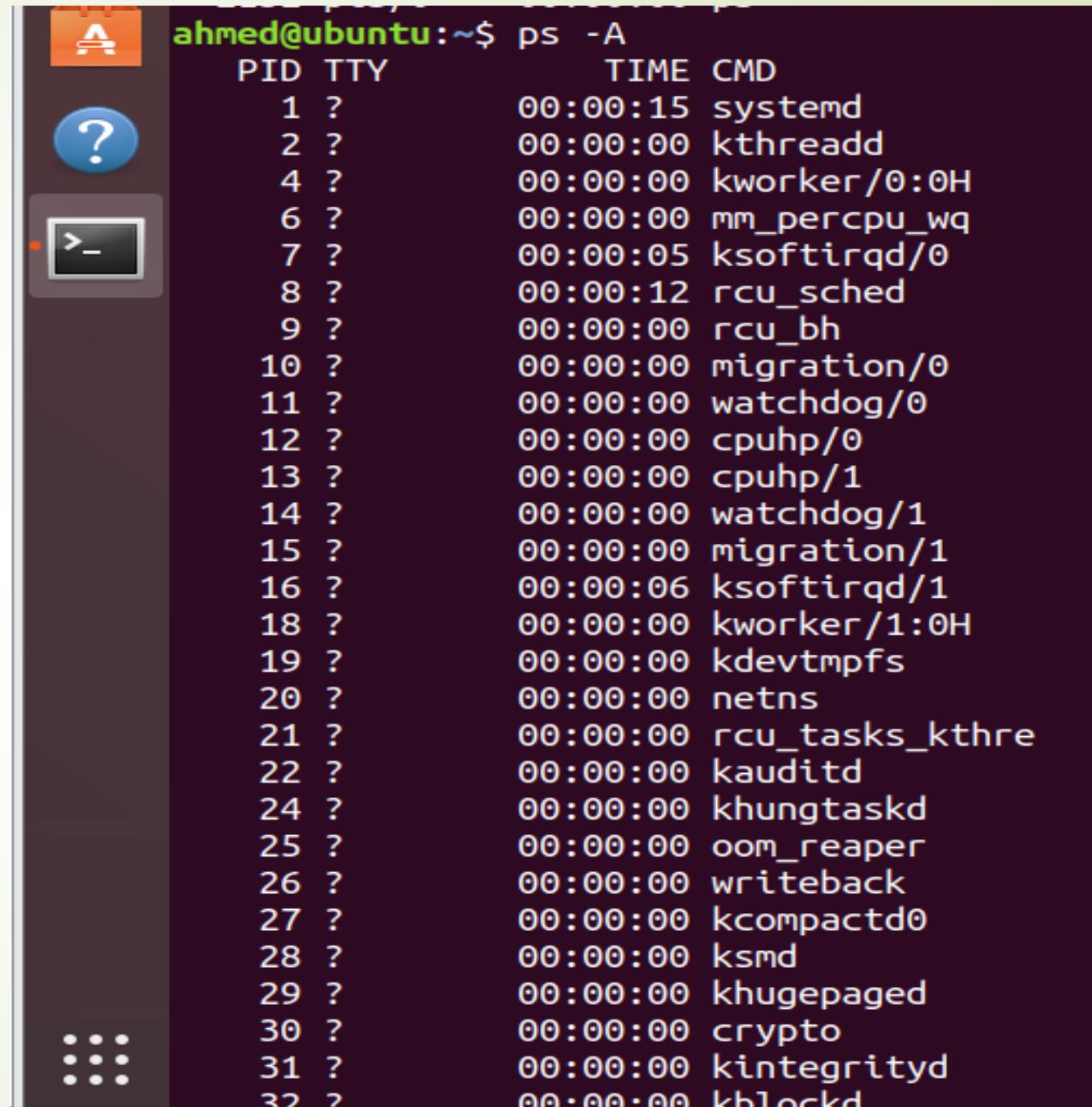
- **PID** - the unique process ID
- **TTY** - terminal type that the user is logged into
- **TIME** - amount of CPU in minutes and seconds that the process has been running
- **CMD** - name of the command that launched the process.

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]
```

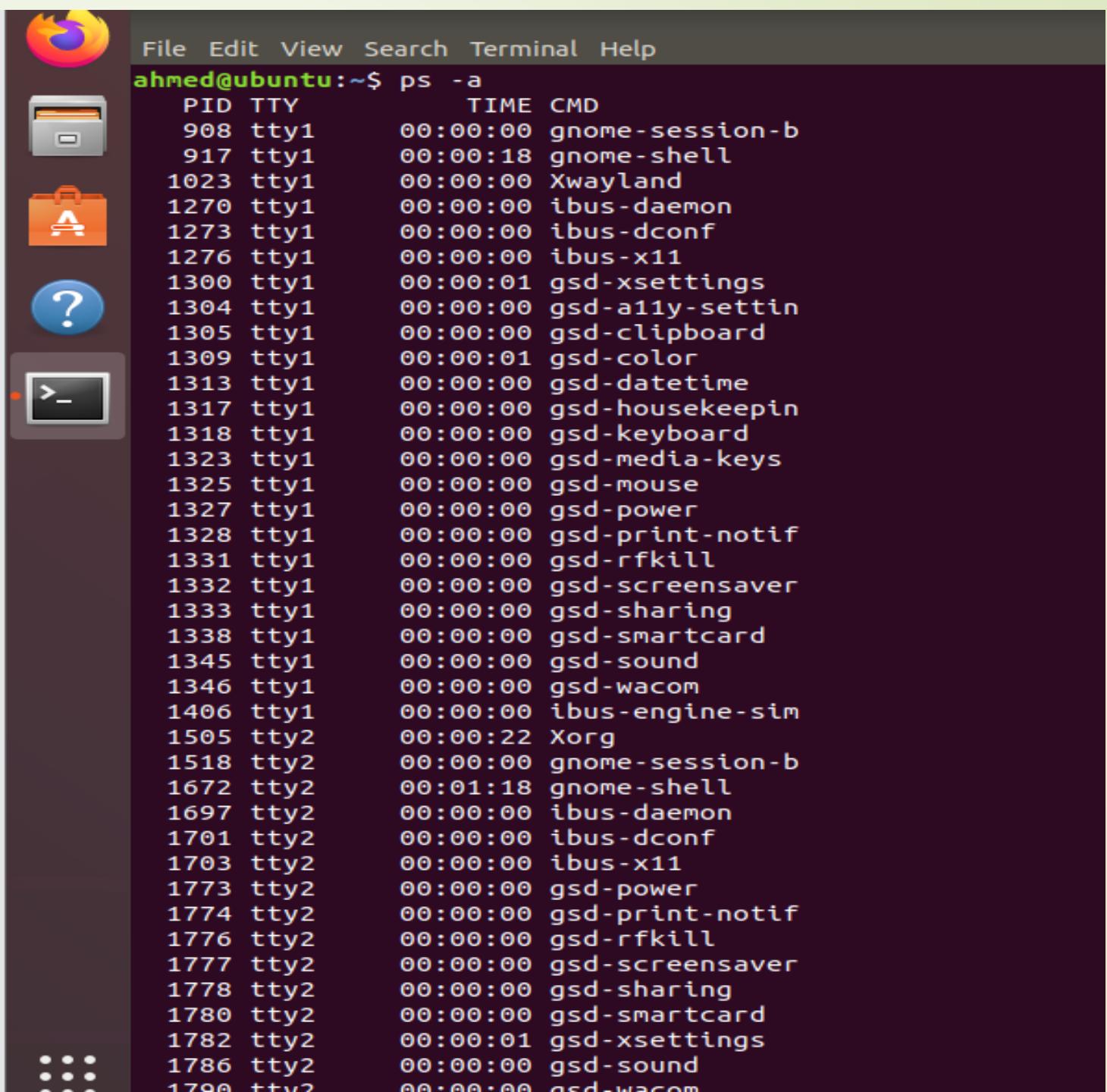
View All Running Processes in Linux.



The image shows a screenshot of the Ubuntu Unity desktop environment. A terminal window is open in the Dash, displaying the output of the command `ps -A`. The terminal title is `ahmed@ubuntu:~$`. The output lists numerous processes with their PID, TTY, time, and command name. The processes include system daemons like `systemd`, `kthreadd`, and various kernel workers and schedulers. Other processes listed include `migration`, `watchdog`, `cpuhp`, `netns`, and several kernel compacting and memory management tasks. The terminal window has a dark background with light-colored text, and the Unity interface elements like the Dash icon bar are visible at the top and bottom.

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	kauditfd
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

A screenshot of a Ubuntu desktop environment. In the top left corner, there's a dock with several icons: a folder, a file manager, a help symbol, and a terminal window. The terminal window is open and displays a command-line interface. The command run is "ps -a", which lists all processes currently running on the system. The output shows numerous processes, mostly from the Gnome desktop environment, running on ttys (terminal terminals).

```
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.

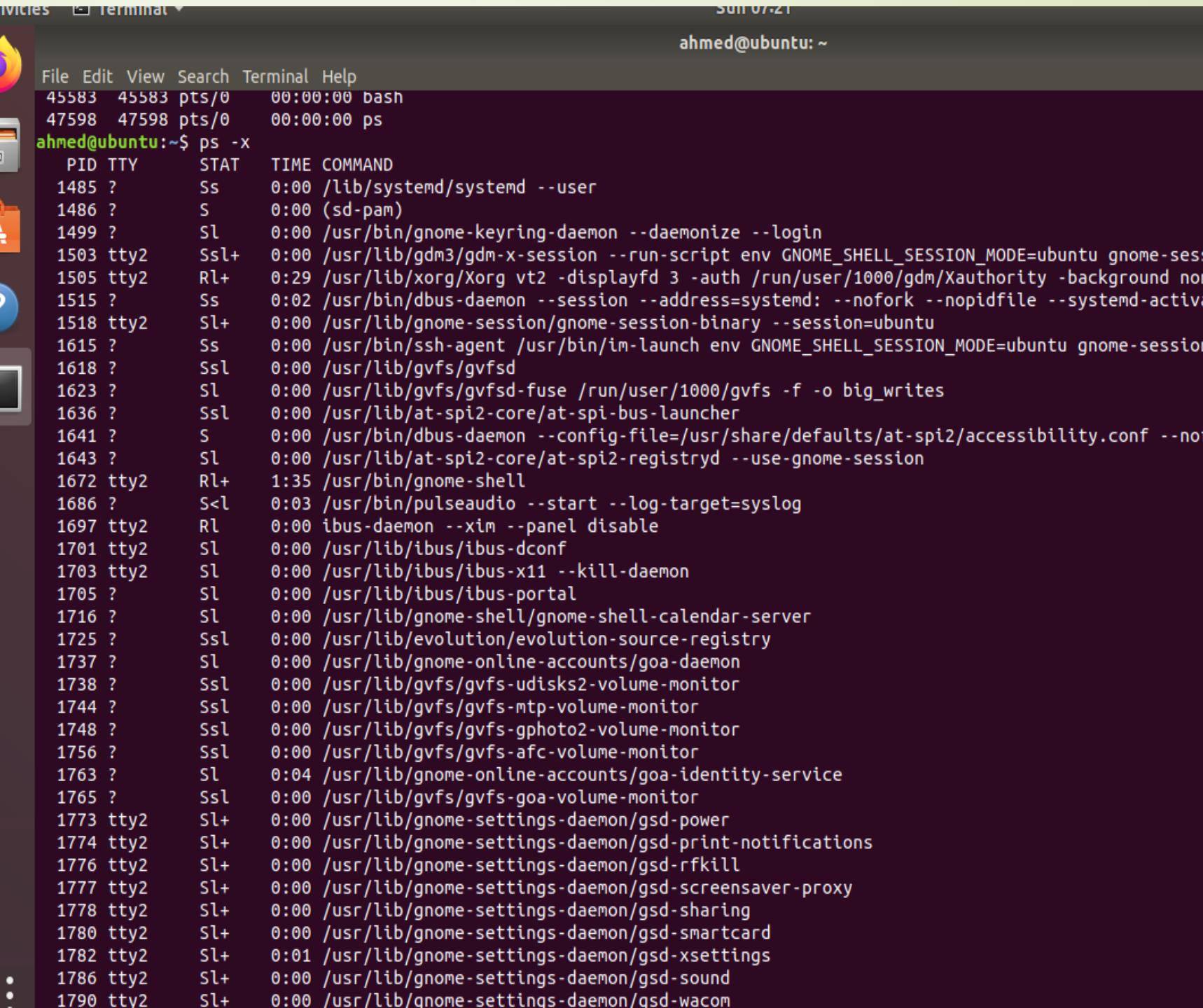
```
2002 ccyl 00:00:02 update-notifier
45727 pts/0 00:00:00 ps
ahmed@ubuntu:~$ ps aux
USER      PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root        1  0.5  0.4 225600  8508 ?        Ss  06:30   0:15 /sbin/init auto noprompt
root        2  0.0  0.0     0     0 ?        S    06:30   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 [kauditfd]
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



```
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



A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window titled "Terminal". The terminal window displays the output of the command "ps -x". The output lists various processes running on the system, including system daemons and user sessions. The terminal window has a dark background with white text. The desktop environment includes icons for the Dash, Home, and other applications like the Dash, Dash Home, and Dash Help.

```
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-sess
 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-activat
 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]
Fetched 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 -lto  
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	Definition
Update	Fixes or improves current version	Small	Same major version	A minor update to a software's codebase.
Upgrade	Moves to a new, bigger version	Large	Major new version	A significant update that changes the underlying architecture or adds major new features.



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 cowdancer
cowdancer - 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
libmoox-struct-perl - simple lightweight record-like structures making sounds like objects
libnet-opensrs-perl - Perl interface for domain registration via the Tucows OpenRSync protocol
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
openvz - Guest Compute Service for Linux Host V-Containers
```



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



sudo apt install cowsay



```
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 lib gsl23 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 pstoedit 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 lib gsl23 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]
```

```
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

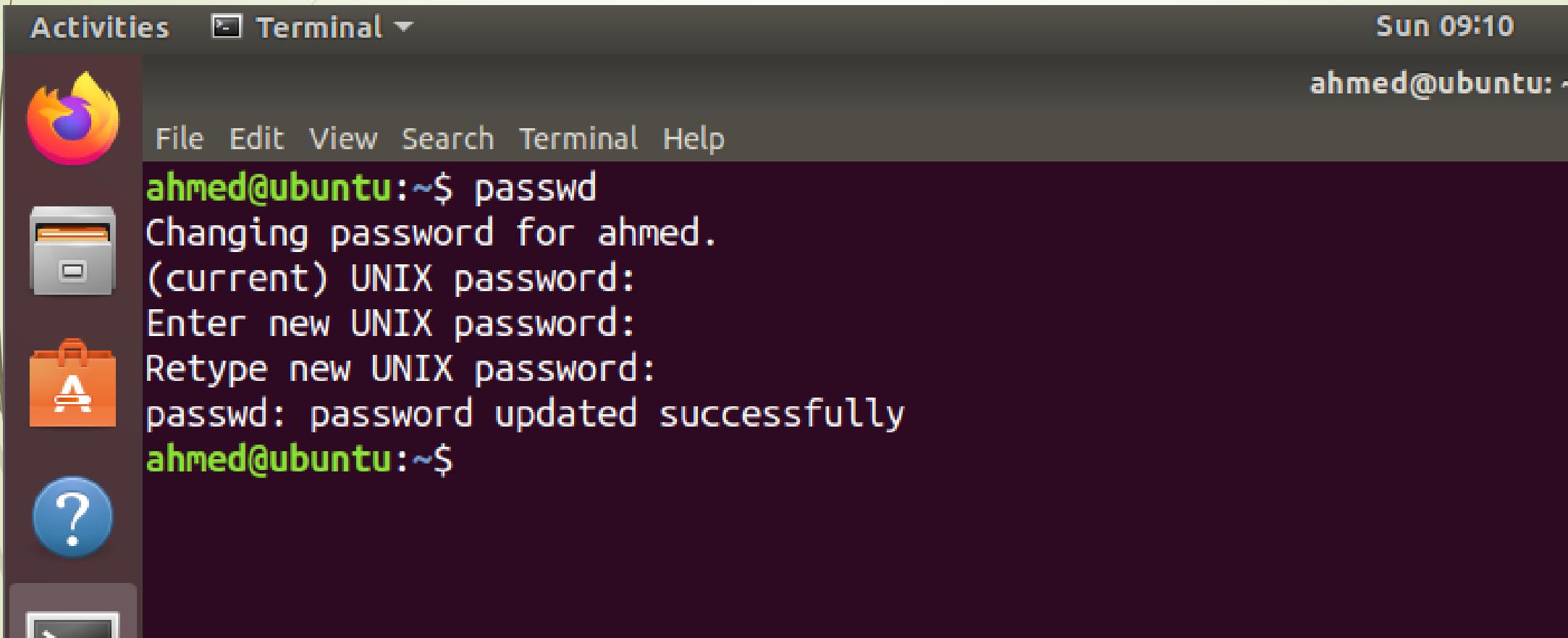
```
? Reading state information... Done
All packages are up to date.
ahmed@ubuntu:~$ sudo apt-get remove inkscape
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libblas3 libgfortran4 lib gsl23 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 an Ubuntu desktop environment. On the left is a dock with icons for the Dash, Home, Applications, and Help. A terminal window titled "Terminal" is open in the center. The terminal shows the command "passwd" being run by the user "ahmed" at "ahmed@ubuntu". The user is prompted to enter their current UNIX password, then a new password, and re-enter it. The command successfully updates the password.

```
Activities Terminal Sun 09:10
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 lib gsl23 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/>