

Lab 5 Tasks

1. Compress a file by compress, gzip, zip commands and decompress it again.

=> compress test.txt → not working on my distro

=> uncompress test.txt.Z

```
mabotalb@ubuntu22: ~  
mabotalb@ubuntu22:~$ compress test.txt  
mabotalb@ubuntu22:~$ ls  
Desktop Downloads mqtttx-cli-linux-x64 myfile newfile Pictures snap test.txt  
docs javasharedresources Music myteam oldpasswd Projects sorted_file Videos  
Documents lorem.txt mycv newdir package-lock.json Public Templates  
mabotalb@ubuntu22:~$
```

=> gzip test.txt

=> gzip -d test.txt.gz

```
mabotalb@ubuntu22: ~  
mabotalb@ubuntu22:~$ gzip test.txt  
mabotalb@ubuntu22:~$  
mabotalb@ubuntu22:~$  
mabotalb@ubuntu22:~$ ls  
Desktop Downloads mqtttx-cli-linux-x64 myfile newfile Pictures snap test.txt.gz  
docs javasharedresources Music myteam oldpasswd Projects sorted_file Videos  
Documents lorem.txt mycv newdir package-lock.json Public Templates  
mabotalb@ubuntu22:~$  
mabotalb@ubuntu22:~$  
mabotalb@ubuntu22:~$ gzip -d test.txt.gz  
mabotalb@ubuntu22:~$  
mabotalb@ubuntu22:~$ ls  
Desktop Downloads mqtttx-cli-linux-x64 myfile newfile Pictures snap test.txt  
docs javasharedresources Music myteam oldpasswd Projects sorted_file Videos  
Documents lorem.txt mycv newdir package-lock.json Public Templates  
mabotalb@ubuntu22:~$
```

=> zip test.zip test.txt

=> unzip test.zip

```
mabotalb@ubuntu22: ~  
mabotalb@ubuntu22:~$ zip test.zip test.txt  
  adding: test.txt (stored 0%)  
mabotalb@ubuntu22:~$ ls  
Desktop  Downloads      mqtttx-cli-linux-x64  myfile  newfile  Pictures  snap  test.txt  
docs     javasharedresources  Music              myteam  oldpasswd  Projects  sorted_file  test.zip  
Documents  lorem.txt        mycv              newdir   package-lock.json  Public  Templates  Videos  
mabotalb@ubuntu22:~$ unzip test.zip  
Archive: test.zip  
replace test.txt? [y]es, [n]o, [A]ll, [N]one, [r]ename: y  
extracting: test.txt  
mabotalb@ubuntu22:~$ ls  
Desktop  Downloads      mqtttx-cli-linux-x64  myfile  newfile  Pictures  snap  test.txt  
docs     javasharedresources  Music              myteam  oldpasswd  Projects  sorted_file  test.zip  
Documents  lorem.txt        mycv              newdir   package-lock.json  Public  Templates  Videos  
mabotalb@ubuntu22:~$ rm test.zip  
mabotalb@ubuntu22:~$ ls  
Desktop  Downloads      mqtttx-cli-linux-x64  myfile  newfile  Pictures  snap  test.txt  
docs     javasharedresources  Music              myteam  oldpasswd  Projects  sorted_file  Videos  
Documents  lorem.txt        mycv              newdir   package-lock.json  Public  Templates  
mabotalb@ubuntu22:~$
```

State the differences between compress and gzip commands.

- Algorithm: compress uses the LZW algorithm, while gzip uses the Deflate algorithm.
- gzip provides compression ratio better than compress
- Compressed files using compress have the .Z extension, while those using gzip have the .gz extension.

2. What is the command used to view the content of a compressed file.

=> zcat test.txt.gz

```
mabotalb@ubuntu22: ~  
mabotalb@ubuntu22:~$ gzip test.txt  
mabotalb@ubuntu22:~$ ls  
Desktop  Downloads      mqtttx-cli-linux-x64  myfile  newfile  Pictures  snap  test.txt.gz  
docs     javasharedresources  Music              myteam  oldpasswd  Projects  sorted_file  Videos  
Documents  lorem.txt        mycv              newdir   package-lock.json  Public  Templates  
mabotalb@ubuntu22:~$ zcat test.txt.gz  
Test file for the compression  
mabotalb@ubuntu22:~$  
mabotalb@ubuntu22:~$  
mabotalb@ubuntu22:~$ zless test.txt.gz  
mabotalb@ubuntu22:~$
```

=> zless test.txt.gz

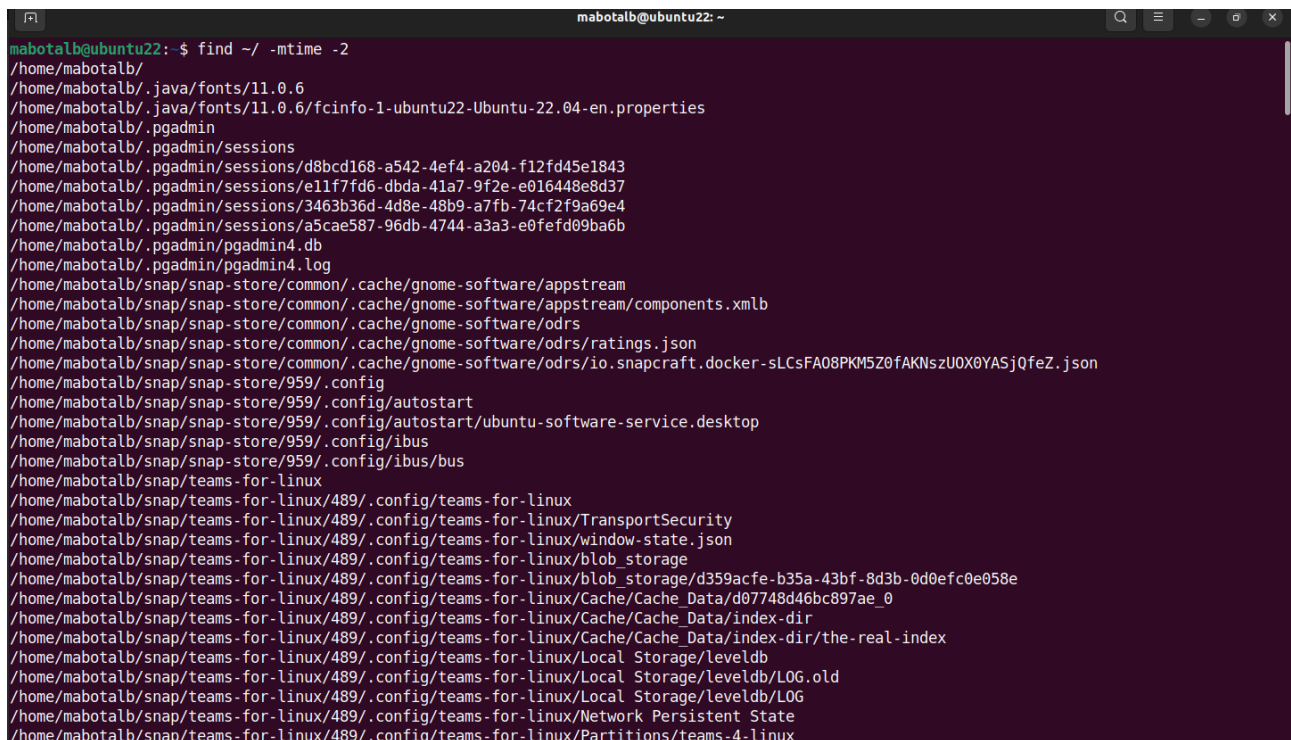
```
mabotalb@ubuntu22: ~  
Test file for the compression  
test.txt.gz (END)
```

3. Backup /etc directory using tar utility.

=> `sudo tar -cvzf etc_backup.tar.gz /etc`

4. Starting from your home directory, find all files that were modified in the last two day.

=> `find ~/ -mtime -2`

A terminal window titled 'mabotalb@ubuntu22: ~' showing the output of the command 'find ~/ -mtime -2'. The output lists various files and directories in the user's home directory and its subdirectories, including .java fonts, .pgadmin sessions, .pgadmin4 db, .cache/gnome-software/appstream, .snap/store/common/.cache/gnome-software/appstream, .snap/store/common/.cache/gnome-software/odrs, .snap/store/common/.cache/gnome-software/odrs/io.snapcraft.docker-sLCsFA08PKM5Z0fAKNsZU0X0YASjQfeZ.json, .snap/store/959/.config, .snap/store/959/.config/autostart, .snap/store/959/.config/autostart/ubuntu-software-service.desktop, .snap/store/959/.config/ibus, .snap/store/959/.config/ibus/bus, .snap/teams-for-linux, .snap/teams-for-linux/489/.config/teams-for-linux, .snap/teams-for-linux/489/.config/teams-for-linux/TransportSecurity, .snap/teams-for-linux/489/.config/teams-for-linux/window-state.json, .snap/teams-for-linux/489/.config/teams-for-linux/blob_storage, .snap/teams-for-linux/489/.config/teams-for-linux/blob_storage/d359acfe-b35a-43bf-8d3b-0d0efc0e058e, .snap/teams-for-linux/489/.config/teams-for-linux/Cache/Cache_Data/d07748d46bc897ae_0, .snap/teams-for-linux/489/.config/teams-for-linux/Cache/Cache_Data/index-dir, .snap/teams-for-linux/489/.config/teams-for-linux/Cache/Cache_Data/index-dir/the-real-index, .snap/teams-for-linux/489/.config/teams-for-linux/Local Storage/leveldb, .snap/teams-for-linux/489/.config/teams-for-linux/Local Storage/leveldb/LOG.old, .snap/teams-for-linux/489/.config/teams-for-linux/Local Storage/leveldb/LOG, .snap/teams-for-linux/489/.config/teams-for-linux/Network Persistent State, and .snap/teams-for-linux/489/.config/teams-for-linux/Partitions/teams-4-linux.

```
mabotalb@ubuntu22:~$ find ~/ -mtime -2
/home/mabotalb/
/home/mabotalb/.java/fonts/11.0.6
/home/mabotalb/.java/fonts/11.0.6/fcinfo-1-ubuntu22-Ubuntu-22.04-en.properties
/home/mabotalb/.pgadmin
/home/mabotalb/.pgadmin/sessions
/home/mabotalb/.pgadmin/sessions/d8bcd168-a542-4ef4-a204-f12fd45e1843
/home/mabotalb/.pgadmin/sessions/e11f7fd6-dbd4-41a7-9f2e-e016448e8d37
/home/mabotalb/.pgadmin/sessions/3463b36d-4d8e-48b9-a7fb-74cf2f9a69e4
/home/mabotalb/.pgadmin/sessions/a5cae587-96db-4744-a3a3-e0fef09ba6b
/home/mabotalb/.pgadmin/pgadmin4.db
/home/mabotalb/.pgadmin/pgadmin4.log
/home/mabotalb/snap/snap-store/common/.cache/gnome-software/appstream
/home/mabotalb/snap/snap-store/common/.cache/gnome-software/appstream/components.xmlb
/home/mabotalb/snap/snap-store/common/.cache/gnome-software/odrs
/home/mabotalb/snap/snap-store/common/.cache/gnome-software/odrs/ratings.json
/home/mabotalb/snap/snap-store/common/.cache/gnome-software/odrs/io.snapcraft.docker-sLCsFA08PKM5Z0fAKNsZU0X0YASjQfeZ.json
/home/mabotalb/snap/snap-store/959/.config
/home/mabotalb/snap/snap-store/959/.config/autostart
/home/mabotalb/snap/snap-store/959/.config/autostart/ubuntu-software-service.desktop
/home/mabotalb/snap/snap-store/959/.config/ibus
/home/mabotalb/snap/snap-store/959/.config/ibus/bus
/home/mabotalb/snap/teams-for-linux
/home/mabotalb/snap/teams-for-linux/489/.config/teams-for-linux
/home/mabotalb/snap/teams-for-linux/489/.config/teams-for-linux/TransportSecurity
/home/mabotalb/snap/teams-for-linux/489/.config/teams-for-linux/window-state.json
/home/mabotalb/snap/teams-for-linux/489/.config/teams-for-linux/blob_storage
/home/mabotalb/snap/teams-for-linux/489/.config/teams-for-linux/blob_storage/d359acfe-b35a-43bf-8d3b-0d0efc0e058e
/home/mabotalb/snap/teams-for-linux/489/.config/teams-for-linux/Cache/Cache_Data/d07748d46bc897ae_0
/home/mabotalb/snap/teams-for-linux/489/.config/teams-for-linux/Cache/Cache_Data/index-dir
/home/mabotalb/snap/teams-for-linux/489/.config/teams-for-linux/Cache/Cache_Data/index-dir/the-real-index
/home/mabotalb/snap/teams-for-linux/489/.config/teams-for-linux/Local Storage/leveldb
/home/mabotalb/snap/teams-for-linux/489/.config/teams-for-linux/Local Storage/leveldb/LOG.old
/home/mabotalb/snap/teams-for-linux/489/.config/teams-for-linux/Local Storage/leveldb/LOG
/home/mabotalb/snap/teams-for-linux/489/.config/teams-for-linux/Network Persistent State
/home/mabotalb/snap/teams-for-linux/489/.config/teams-for-linux/Partitions/teams-4-linux
```

5. Starting from /etc, find files owned by root user.

=> `sudo find /etc -user root`

```
mabotalb@ubuntu22: ~  
mabotalb@ubuntu22:~$ sudo find /etc -user root  
[sudo] password for mabotalb:  
/etc  
/etc/wgetrc  
/etc/networkd-dispatcher  
/etc/networkd-dispatcher/off.d  
/etc/networkd-dispatcher/no-carrier.d  
/etc/networkd-dispatcher/dormant.d  
/etc/networkd-dispatcher/routable.d  
/etc/networkd-dispatcher/carrier.d  
/etc/networkd-dispatcher/degraded.d  
/etc/NetworkManager  
/etc/NetworkManager/dnsmasq-shared.d  
/etc/NetworkManager/NetworkManager.conf  
/etc/NetworkManager/conf.d  
/etc/NetworkManager/conf.d/default-wifi-powersave-on.conf  
/etc/NetworkManager/dispatcher.d  
/etc/NetworkManager/dispatcher.d/01-ifupdown  
/etc/NetworkManager/dispatcher.d/pre-down.d  
/etc/NetworkManager/dispatcher.d/no-wait.d  
/etc/NetworkManager/dispatcher.d/pre-up.d  
/etc/NetworkManager/dnsmasq.d  
/etc/NetworkManager/system-connections  
/etc/NetworkManager/system-connections/GW-AC233FC03D71.nmconnection  
/etc/NetworkManager/system-connections/GatewayHotspot.nmconnection  
/etc/NetworkManager/system-connections/BLUE_DRAGON.nmconnection  
/etc/NetworkManager/system-connections/Creativa.nmconnection  
/etc/NetworkManager/system-connections/WE_C1AFA0.nmconnection  
/etc/NetworkManager/system-connections/GW-AC233FC03D33.nmconnection  
/etc/NetworkManager/system-connections/Hotspot.nmconnection  
/etc/libpaper.d  
/etc/openvpn  
/etc/openvpn/client  
/etc/openvpn/update-resolv.conf  
/etc/openvpn/server  
/etc/pam.d  
/etc/pam.d/common-password  
/etc/pam.d/common-session  
/etc/pam.d/common-session-noninteractive
```

6. Find all directories in your home directory.

=> `find ~/ -type d`

```
mabotalb@ubuntu22: ~  
mabotalb@ubuntu22:~$ find ~/ -type d  
/home/mabotalb/  
/home/mabotalb/.ssh  
/home/mabotalb/docs  
/home/mabotalb/.java  
/home/mabotalb/.java/.userPrefs  
/home/mabotalb/.java/.userPrefs/jetbrains  
/home/mabotalb/.java/.userPrefs/jetbrains/jetprofile  
/home/mabotalb/.java/.userPrefs/jetbrains/jetprofile/asset  
/home/mabotalb/.java/.userPrefs/jetbrains/_(!!cg"p!(!)"j!(!k|w"!'8!b!"p!"!e@==  
/home/mabotalb/.java/fonts  
/home/mabotalb/.java/fonts/17.0.9  
/home/mabotalb/.java/fonts/21.0.1  
/home/mabotalb/.java/fonts/11.0.6  
/home/mabotalb/.quokka  
/home/mabotalb/.quokka/interactive-examples  
/home/mabotalb/.quokka/interactive-examples/JavaScript  
/home/mabotalb/.quokka/interactive-examples/JavaScript/string  
/home/mabotalb/.quokka/interactive-examples/JavaScript/dataview  
/home/mabotalb/.quokka/interactive-examples/JavaScript/array  
/home/mabotalb/.quokka/interactive-examples/JavaScript/function
```

7. Write a command to search for all files on the system that, its name is “.profile”.

=> `sudo find / -type f -name .profile 2> /dev/null`

```
mabotalb@ubuntu22: ~  
mabotalb@ubuntu22:~$ sudo find / -type f -name .profile 2> /dev/null  
/etc/skel/.profile  
/snap/core20/2015/etc/skel/.profile  
/snap/core20/2015/root/.profile  
/snap/core20/2105/etc/skel/.profile  
/snap/core20/2105/root/.profile  
/snap/core22/1033/etc/skel/.profile  
/snap/core22/1033/root/.profile  
/snap/core22/864/etc/skel/.profile  
/snap/core22/864/root/.profile  
/snap/core18/2812/etc/skel/.profile  
/snap/core18/2812/root/.profile  
/snap/core18/2796/etc/skel/.profile  
/snap/core18/2796/root/.profile  
/root/.profile  
/home/ahmed/.profile  
/home/mabotalb/.profile  
mabotalb@ubuntu22:~$
```

8. Identify the file types of the following: /etc/passwd, /dev/pts/0, /etc, /dev/sda

=> file /etc/passwd /dev/pts/0 /etc /dev/sda

```
mabotalb@ubuntu22: ~  
mabotalb@ubuntu22:~$ file /etc/passwd /dev/pts/0 /etc /dev/sda  
/etc/passwd: ASCII text  
/dev/pts/0: character special (136/0)  
/etc: directory  
/dev/sda: cannot open `/dev/sda' (No such file or directory)  
mabotalb@ubuntu22:~$
```

9. List the inode numbers of /, /etc, /etc/hosts.

=> ls -li / /etc /etc/hosts

```
mabotalb@ubuntu22: ~  
mabotalb@ubuntu22:~$ ls -li / /etc /etc/hosts  
1966244 /etc/hosts  
  
/:  
13 bin 1 dev 12 install-script.sh 16 lib64 1179649 media 1 proc 18/sbin 1 sys 3014657 var  
4718593 boot 1966081 etc 14 lib 17 libx32 262145 mnt 5373953 root 3538945 snap 2490369 tmp  
2621441 cdrom 5505025 home 15 lib32 11 lost+found 524289 opt 1 run 3145729 srv 3670017 usr  
  
/etc:  
1966088 acpi 1966230 debian_version 1966245 hosts.allow 1966267 mailcap.order 1966171 profile.d 1966196 sudoers.d  
1966218 adduser.conf 1966116 default 1966246 hosts.deny 1966268 manpath.config 1966284 protocols 1966297 sudo_logsrvd.conf  
1966089 alsa 1966231 deluser.conf 1966137 hp 1966269 mime.types 1966172 pulse 1966299 sysctl.conf  
1966090 alternatives 1966117 depmod.d 1966138 lftpplug 1966270 mke2fs.conf 1966173 python3 1966197 sysctl.d  
1966219 anacrontab 1966118 dhcpcd 1966139 init 1966083 ModemManager 1966174 python3.10 1966293 zysstat  
1966203 apuaboot 1966119 dictionaries-common 1966140 init.d 1966156 modprobe.d 1966175 rc0.d 1966198 systemd  
1966220 app.config 1966120 dnf 1966141 initramfs-tools 1966271 modules 1966176 rc1.d 1966199 terminfo  
1966091 apt 1966232 e2scrub.conf 1966247 inputrc 1966157 modules-load.d 1966177 rc2.d 1966200 thermald  
1966092 apparmor 1966121 omers 1966142 iusserv.conf.d 1966266 mtab 1966178 rc3.d 1966201 thunderbird  
1966093 apparmor.d 1966233 environment 1966143 lpp-usb 1966273 nanorc 1966179 rc4.d 1966300 timezone  
1966094 appport 1966122 environment.d 1966144 iproute2 1966274 netconfig 1966180 rc5.d 1966202 tmpfiles.d  
1966221 appstream.conf 1966234 ethertypes 1966588 issue 1966158 netplan 1966181 rc6.d 1966203 ubuntu-advantage  
1966095 apt 1966123 firefox 1966593 issue.net 1966159 network 1966182 rcS.d 1966301 ucf.conf  
1966096 avahi 1966124 fonts 1966145 kernel 1966160 networkd-dispatcher 1966285 resolv.conf 1966204 udev  
1966222 bash.bashrc 1966235 fprintd.conf 1967403 kernel-img.conf 1966084 NetworkManager 1969464 rmt 1966205 udisks2  
1966223 bash_completion 1966097 fstab 1966251 kerneloops.conf 1966275 networks 1966287 rpc 1966206 ufw  
1966097 bash_completion.d 1966236 fuse.conf 1966148 ldap 1966161 newt 1966288 rsyslog.conf 1966184 rsyslog.d 1966207 update-manager  
1966224 bindresvport.blacklist 1966125 fwupd 1966951 ld.so.cache 1966276 nftables.conf 1966289 rygel.conf 1966208 update-notd.d  
1966098 binfmt.d 1966237 gai.conf 1966253 ld.so.conf 1966111 nsswitch.conf 1966289 rygel.conf 1966209 update-notifier  
1966099 bluetoeth 1969497 gamin 1966147 ld.so.conf.d 1969449 opamut 1966185 sane.d 1966086 UPower
```

10. Copy /etc/passwd to your home directory, use the commands diff and cmp, and Edit in the file you copied, and then use these commands again, and check the output.

=> cp /etc/passwd passwd

=> diff /etc/passwd passwd

=> cmp /etc/passwd passwd

```
mabotalb@ubuntu22: ~  
mabotalb@ubuntu22:~$ cp /etc/passwd passwd  
mabotalb@ubuntu22:~$ ls  
Desktop  Documents  find          lorem.txt      Music  myfile  newdir  oldpasswd  passwd  Projects  snap  Templates  Videos  
docs     Downloads  javasharedresources  mqttx-cli-linux-x64  mycv   myteam  newfile  package-lock.json  Pictures  Public  sorted_file  test.txt.gz  z  
mabotalb@ubuntu22:~$ diff /etc/passwd passwd  
mabotalb@ubuntu22:~$ cmp /etc/passwd passwd  
mabotalb@ubuntu22:~$ vi passwd  
mabotalb@ubuntu22:~$ diff /etc/passwd passwd  
50a51  
> add new passwd from mabotalb  
mabotalb@ubuntu22:~$ cmp /etc/passwd passwd  
cmp: EOF on /etc/passwd after byte 3022, line 50  
mabotalb@ubuntu22:~$
```

11. Create a symbolic link of /etc/passwd in /boot.

=> sudo ln -s /etc/passwd /boot/symbolic_passwd

```
mabotalb@ubuntu22: ~  
mabotalb@ubuntu22:~$ sudo ln -s /etc/passwd /boot/symbolic_passwd  
[sudo] password for mabotalb:  
mabotalb@ubuntu22:~$ ls /boot  
config-6.2.0-37-generic  grub          initrd.img-6.2.0-37-generic  memtest86+.elf      System.map-6.2.0-37-generic  vmlinuz-6.2.0-37-generic  
config-6.2.0-39-generic  initrd.img    initrd.img.old              memtest86+_multiboot.bin  System.map-6.2.0-39-generic  vmlinuz-6.2.0-39-generic  
efi                     initrd.img-6.2.0-37-generic  memtest86+.bin             symbolic_passwd        vmlinuz              vmlinuz.old  
mabotalb@ubuntu22:~$
```

12. Create a hard link of /etc/passwd in /boot. Could you? Why?

=> sudo ln /etc/passwd /boot/hardlink_passwd

```
mabotalb@ubuntu22: ~  
mabotalb@ubuntu22:~$ sudo ln /etc/passwd /boot/hardlink_passwd  
mabotalb@ubuntu22:~$ ls /boot  
config-6.2.0-37-generic  grub          initrd.img-6.2.0-37-generic  memtest86+.bin      symbolic_passwd      vmlinuz          vmlinuz.old  
config-6.2.0-39-generic  hardlink_passwd  initrd.img-6.2.0-39-generic  memtest86+.elf      System.map-6.2.0-37-generic  vmlinuz-6.2.0-37-generic  
efi                     initrd.img      initrd.img.old              memtest86+_multiboot.bin  System.map-6.2.0-39-generic  vmlinuz-6.2.0-39-generic  
mabotalb@ubuntu22:~$
```