

## Lab 5

1. Compress a file by compress, gzip, zip commands and decompress it again. State the differences between compress and gzip commands.

```
[alaa@Alaa-khaled ~]$ gzip file2
[alaa@Alaa-khaled ~]$ ls
Alaa.html  dir1      file1      index.html  myteam     Pictures  Videos
backup     Documents file2.gz    j           oldpasswd  Public
d          Downloads file_research Music       page1.html result
Desktop    error     folder     mycv        page2.html Templates
[alaa@Alaa-khaled ~]$ bzip2 file2
bzip2: Can't open input file file2: No such file or directory.
[alaa@Alaa-khaled ~]$ bzip2 j
[alaa@Alaa-khaled ~]$ ls
Alaa.html  dir1      file1      index.html  myteam     Pictures  Videos
backup     Documents file2.gz    j.bz2       oldpasswd  Public
d          Downloads file_research Music       page1.html result
Desktop    error     folder     mycv        page2.html Templates
[alaa@Alaa-khaled ~]$
```

GZIP is a free application used to compress files; BZIP2 is an open source lossless data compression algorithm that makes it possible to retrieve the original data of a compressed file.

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

```
[alaa@Alaa-khaled ~]$
[alaa@Alaa-khaled ~]$ zcat file2.gz
[alaa@Alaa-khaled ~]$
```

3. Backup /etc directory using tar utility.

```
/home/alaa/backup/
[alaa@Alaa-khaled ~]$ sudo tar -cvf /etc.tar /home/alaa/backup
```

```
[alaa@Alaa-khaled ~]$ ls -li /
total 524328
 159 lrwxrwxrwx.  1 root root      7 Jun 22  2021 bin -> usr/bin
 147 dr-xr-xr-x.  5 root root 4096 Apr 12 17:23 boot
   2 drwxr-xr-x.  3 root root 4096 Feb 24  2021 data
   3 drwxr-xr-x. 19 root root 3260 Apr 12 20:01 dev
8388737 drwxr-xr-x. 143 root root 8192 Apr 12 20:01 etc
415656 -rw-r--r--.  1 root root 10240 Apr 12 20:50 etc.tar
 128 drwxr-xr-x. 13 root root  187 Jun 22  2021 home
338980 lrwxrwxrwx.  1 root root    7 Jun 22  2021 lib -> usr/lib
338983 lrwxrwxrwx.  1 root root    9 Jun 22  2021 lib64 -> usr/lib64
 150 drwxr-xr-x.  2 root root    6 Jun 22  2021 media
8832500 drwxr-xr-x.  3 root root   18 Jun 22  2021 mnt
```

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

```
[alaa@Alaa-khaled ~]$  
[alaa@Alaa-khaled ~]$ find /home -mtime -2 -ls  
131      4 drwx----- 22 alaa alaa      4096 Apr 12 21:21 /home/alaa  
8388743  4 -rw-----  1 alaa alaa        1 Apr 12 20:07 /home/alaa/.co  
nfig/pulse/683a2b8c11dd4e10b93c0a558a468d0c-default-sink  
8388744  4 -rw-----  1 alaa alaa        1 Apr 12 20:07 /home/alaa/.co  
nfig/pulse/683a2b8c11dd4e10b93c0a558a468d0c-default-source  
8388745  0 drwx-----  2 alaa alaa       53 Apr 12 20:07 /home/alaa/.co  
nfig/ibus/bus  
8388746  4 -rw-rw-r--  1 alaa alaa      168 Apr 12 20:07 /home/alaa/.co  
nfig/ibus/bus/683a2b8c11dd4e10b93c0a558a468d0c-unix-0  
141      0 drwxr-xr-x  2 alaa alaa      18 Apr 12 20:08 /home/alaa/.co  
nfig/dconf  
1744     8 -rw-r--r--  1 alaa alaa    5572 Apr 12 20:08 /home/alaa/.co  
nfig/dconf/user  
16797843 0 drwx-----  2 alaa alaa     23 Apr 12 20:08 /home/alaa/.co
```

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

```
[alaa@Alaa-khaled etc]$ sudo find / -uid 0
```

6. Find all directories in your home directory.

```
[alaa@Alaa-khaled ~]$ find /home/  
/home/  
/home/alaa  
/home/alaa/.mozilla  
/home/alaa/.mozilla/extensions  
/home/alaa/.mozilla/plugins  
/home/alaa/.mozilla/firefox  
/home/alaa/.mozilla/firefox/9557ph6t.default-default  
/home/alaa/.mozilla/firefox/9557ph6t.default-default  
/home/alaa/.mozilla/firefox/9557ph6t.default-default  
/home/alaa/.mozilla/firefox/9557ph6t.default-default  
/home/alaa/.mozilla/firefox/9557ph6t.default-default  
/home/alaa/.mozilla/firefox/9557ph6t.default-default  
/home/alaa/.mozilla/firefox/9557ph6t.default-default  
mozilla.org.xpi  
/home/alaa/.mozilla/firefox/9557ph6t.default-default  
zilla.org.xpi  
/home/alaa/.mozilla/firefox/9557ph6t.default-default
```

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

```
^C  
[alaa@Alaa-khaled ~]$ find / -name .profile
```

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

```
[alaa@Alaa-khaled ~]$ tty
/dev/pts/0
[alaa@Alaa-khaled ~]$
```

The `/dev/pts` is a special virtual temporary file directory unique to the Linux system while running the programs through pseudoterminals

the `/etc/passwd` file is used to keep track of every registered user that has access to a system

The `/etc` directory is contained in the root directory.

`/dev/sda` is the hard disk of the computer we are using

```
[alaa@Alaa-khaled ~]$ lsblk
NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sda          8:0    0   40G  0 disk
├─sda1       8:1    0   16G  0 part /
├─sda2       8:2    0   10G  0 part /home
├─sda3       8:3    0    4G  0 part [SWAP]
└─sdb        8:16   0   20G  0 disk
   ├─sdb1     8:17   0    1K  0 part
   └─sdb5     8:21   0    2G  0 part /data
sr0         11:0    1   8.6G  0 rom  /run/media/alaa/CentOS-8-3-2011-x86_64-dvd
[alaa@Alaa-khaled ~]$
```

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

```
[alaa@Alaa-khaled ~]$ ls -li /
total 524328
159 lrwxrwxrwx. 1 root root 7 Jun 22 2021 bin -> usr/bin
147 dr-xr-xr-x. 5 root root 4096 Apr 12 17:23 boot
2 drwxr-xr-x. 3 root root 4096 Feb 24 2021 data
3 drwxr-xr-x. 19 root root 3260 Apr 12 20:01 dev
8388737 drwxr-xr-x. 143 root root 8192 Apr 12 20:01 etc
415656 -rw-r--r--. 1 root root 10240 Apr 12 20:50 etc.tar
128 drwxr-xr-x. 13 root root 187 Jun 22 2021 home
338980 lrwxrwxrwx. 1 root root 7 Jun 22 2021 lib -> usr/lib
338983 lrwxrwxrwx. 1 root root 9 Jun 22 2021 lib64 -> usr/lib6
150 drwxr-xr-x. 2 root root 6 Jun 22 2021 media
8832500 drwxr-xr-x. 3 root root 18 Jun 22 2021 mnt
```

```
[alaa@Alaa-khaled ~]$ ls -li /etc
total 1348
26029787 drwxr-xr-x. 3 root root 28 Apr 8 16:21 accountsservice
9024764 -rw-r--r--. 1 root root 16 Feb 5 2021 adjtime
8832473 -rw-r--r--. 1 root root 1529 May 15 2020 aliases
9082310 drwxr-xr-x. 3 root root 65 Feb 5 2021 alsa
```

```
ls: cannot access '/etc/hosts': No such file or directory
[alaa@Alaa-khaled ~]$ ls -li /etc/hosts
8832484 -rw-r--r--. 1 root root 158 Sep 10 2018 /etc/hosts
[alaa@Alaa-khaled ~]$
```

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.

```
[alaa@Alaa-khaled ~]$ cp -i /etc/passwd /home/alaa/passwords/
[alaa@Alaa-khaled ~]$ ls passwords/
passwd
[alaa@Alaa-khaled ~]$ sudo vi passwords/passwd
[sudo] password for alaa:
[alaa@Alaa-khaled ~]$ diff /etc/passwd /home/alaa/passwords/passwd
52c52
< bob:x:2112:2112::/home/bob:/bin/bash
---
> bob:x:2112:2112::/home/bob:/bin
[alaa@Alaa-khaled ~]$ cmp /etc/passwd /home/alaa/passwords/passwd
/etc/passwd /home/alaa/passwords/passwd differ: byte 2880, line 52
[alaa@Alaa-khaled ~]$
```

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

```
[alaa@Alaa-khaled ~]$ ln -s /etc/passwd /boot/
ln: failed to create symbolic link '/boot/passwd': Permission denied
[alaa@Alaa-khaled ~]$ sudo !!
sudo ln -s /etc/passwd /boot/
[sudo] password for alaa:
[alaa@Alaa-khaled ~]$
```

```
[alaa@Alaa-khaled ~]$ ls -li /etc/passwd /boot/
9000046 -rw-r--r--. 1 root root 3052 Apr  9 00:17 /etc/passwd

/boot/:
total 194528
2423961 -rw-r--r--. 1 root root      189494 Sep 25  2020 config-4.18.0-240.el8.x86_64
17247929 drwxr-xr-x. 3 root root          17 Feb  5  2021 efi
8868648 drwx-----. 4 root root          83 Apr 12 14:16 grub2
2517531 -rw-----. 1 root root 105461933 Feb  5  2021 initramfs-0-rescue-683a2b8c11dd4e10b93c0a558a468d0c.img
1119562 -rw-----. 1 root root   53041518 Feb  5  2021 initramfs-4.18.0-240.el8.x86_64.img
1950345 -rw-----. 1 root root 17431792 Feb 26  2021 initramfs-4.18.0-240.el8.x86_64kdump.img
26933759 drwxr-xr-x. 3 root root          21 Feb  5  2021 loader
415629 lrwxrwxrwx. 1 root root          11 Apr 12 17:23 passwd -> /etc/passwd
2423960 -rw-----. 1 root root   4032815 Sep 25  2020 System.map-4.18.0-240.el8.x86_64
1119552 -rwxr-xr-x. 1 root root   9514120 Feb  5  2021 vmlinuz-0-rescue-683a2b8c11dd4e10b93c0a558a468d0c
2423959 -rwxr-xr-x. 1 root root   9514120 Sep 25  2020 vmlinuz-4.18.0-240.el8.x86_64
[alaa@Alaa-khaled ~]$
```

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

it is not possible to create a hard link across different filesystems; you can create only soft (symbolic) links.