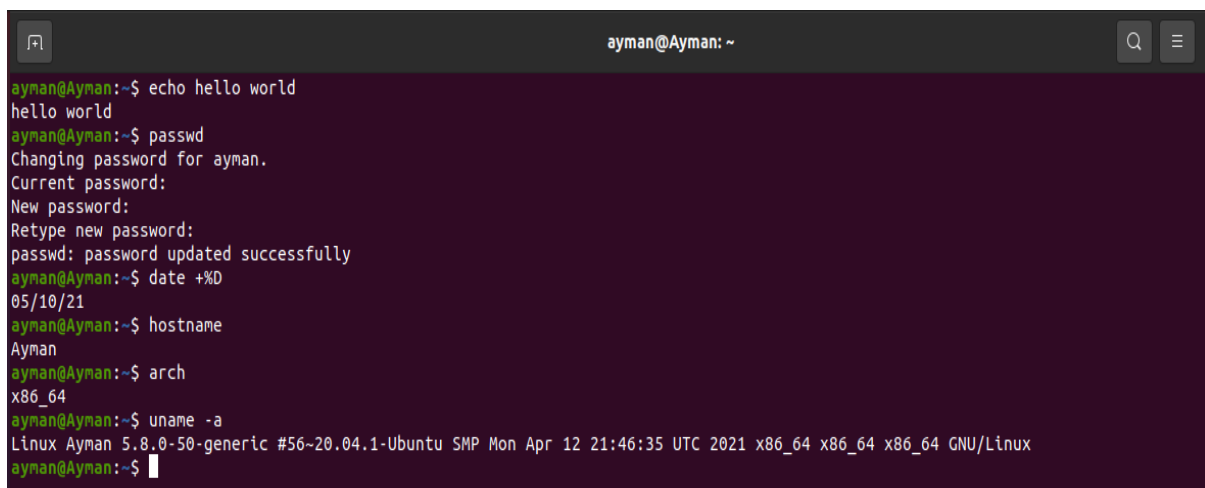


NAME : AYMAN SHAKIL

USN : 1BM19IS192

SECTION : 4-D

## PRACTICE 1



```
ayman@Ayman: ~  
ayman@Ayman:~$ echo hello world  
hello world  
ayman@Ayman:~$ passwd  
Changing password for ayman.  
Current password:  
New password:  
Retype new password:  
passwd: password updated successfully  
ayman@Ayman:~$ date +%D  
05/10/21  
ayman@Ayman:~$ hostname  
Ayman  
ayman@Ayman:~$ arch  
x86_64  
ayman@Ayman:~$ uname -a  
Linux Ayman 5.8.0-50-generic #56~20.04.1-Ubuntu SMP Mon Apr 12 21:46:35 UTC 2021 x86_64 x86_64 x86_64 GNU/Linux  
ayman@Ayman:~$
```

- `echo hello world` - prints hello world
- `passwd` - changes the password
- `date +%D` - displays date in DD/MM/YY format
- `hostname` - returns computer name
- `arch` - returns computer architecture type
- `uname -a` - prints the name, version and other details about the current machine and the operating system running on it

```

ayman@Ayman:~$ dmesg | more
[ 0.000000] Linux version 5.8.0-50-generic (build@lgw01-amd64-030) (gcc (Ubuntu 9.3.0-17ubuntu1-20.04) 9.3.0, GNU ld (GNU Binutils for Ubuntu) 2.34) #56-20.04.1-Ubuntu SMP Mon Apr 12 21:46:35 UTC 2021 (Ubuntu 5.8.0-50.56-20.04.1-generic 5.8.18)
[ 0.000000] Command line: BOOT_IMAGE=/boot/vmlinuz-5.8.0-50-generic root=UUID=7a939b44-e894-4dd7-85a0-e7ed2f3addcd ro quiet splash
[ 0.000000] KERNEL supported cpus:
[ 0.000000] Intel GenuineIntel
[ 0.000000] AMD AuthenticAMD
[ 0.000000] Hygon HygonGenuine
[ 0.000000] Centaur CentaurHauls
[ 0.000000] Zhaoxin Shanghai
[ 0.000000] x86/fpu: Supporting XSAVE feature 0x001: 'x87 floating point registers'
[ 0.000000] x86/fpu: Supporting XSAVE feature 0x002: 'SSE registers'
[ 0.000000] x86/fpu: Supporting XSAVE feature 0x004: 'AVX registers'
[ 0.000000] x86/fpu: xstate_offset[2]: 576, xstate_sizes[2]: 256
[ 0.000000] x86/fpu: Enabled xstate features 0x7, context size is 832 bytes, using 'standard' format.
[ 0.000000] BIOS-provided physical RAM map:
[ 0.000000] BIOS-e820: [mem 0x0000000000000000-0x000000000009fbff] usable
[ 0.000000] BIOS-e820: [mem 0x000000000009fc00-0x000000000009ffff] reserved
[ 0.000000] BIOS-e820: [mem 0x00000000000f0000-0x00000000000fffff] reserved
[ 0.000000] BIOS-e820: [mem 0x0000000000100000-0x00000000000dffff] usable
[ 0.000000] BIOS-e820: [mem 0x00000000000dffff0000-0x00000000000dffff] ACPI data
[ 0.000000] BIOS-e820: [mem 0x00000000fec00000-0x00000000fec00fff] reserved
[ 0.000000] BIOS-e820: [mem 0x00000000fee00000-0x00000000fee00fff] reserved
[ 0.000000] BIOS-e820: [mem 0x00000000fffc0000-0x00000000ffffff] reserved
[ 0.000000] BIOS-e820: [mem 0x0000000100000000-0x000000002342ffff] usable
[ 0.000000] NX (Execute Disable) protection: active
[ 0.000000] SMBIOS 2.5 present.
[ 0.000000] DMI: innotek GmbH VirtualBox/VirtualBox, BIOS VirtualBox 12/01/2006
[ 0.000000] Hypervisor detected: KVM
[ 0.000000] kvm-clock: Using msrs 4b564d01 and 4b564d00
[ 0.000001] kvm-clock: cpu 0, msr 116c01001, primary cpu clock

```

- **dmesg | more** - used to examine the kernel ring buffer and print the message buffer of kernel.

```

ayman@Ayman:~$ uptime
13:48:41 up 11 min, 1 user, load average: 0.11, 0.21, 0.21
ayman@Ayman:~$ whoami
ayman
ayman@Ayman:~$ who
ayman    :0                2021-05-10 13:37 (:0)
ayman@Ayman:~$ id
uid=1000(ayman) gid=1000(ayman) groups=1000(ayman),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),120(lpadmin),131(lxd),132(sambashare)
ayman@Ayman:~$ last
ayman    :0                Mon May 10 13:37    still logged in
reboot   system boot    5.8.0-50-generic Mon May 10 13:37    still running
ayman    :0                Mon May 10 12:45 - down (00:51)
reboot   system boot    5.8.0-50-generic Mon May 10 12:43 - 13:37 (00:53)
ayman    :0                Sun May 9 23:47 - crash (12:56)
reboot   system boot    5.8.0-50-generic Sun May 9 23:46 - 13:37 (13:50)
ayman    :0                Sun May 9 20:57 - down (00:02)
reboot   system boot    5.8.0-50-generic Sun May 9 20:56 - 21:00 (00:03)
ayman    :0                Sun May 9 20:34 - down (00:01)
reboot   system boot    5.8.0-50-generic Sun May 9 20:33 - 20:35 (00:01)
ayman    :0                Sun May 9 20:31 - down (00:01)
reboot   system boot    5.8.0-50-generic Sun May 9 20:30 - 20:33 (00:02)
ayman    :0                Sun May 9 20:21 - down (00:08)
reboot   system boot    5.8.0-50-generic Sun May 9 20:21 - 20:30 (00:09)
ayman    :0                Sun May 9 20:00 - down (00:20)
reboot   system boot    5.8.0-50-generic Sun May 9 19:59 - 20:20 (00:20)

wtmp begins Sun May 9 19:59:35 2021
ayman@Ayman:~$ finger
Login      Name      Tty      Idle  Login Time   Office   Office Phone
ayman      Ayman     *:0              May 10 13:37 (:0)

```

- **uptime** - gives how long system has been running
- **whoami** - prints the effective username of the current user when invoked.
- **Who** - prints a list of all currently logged in users.

```

ayman@Ayman:~$ w
13:49:07 up 11 min, 1 user, load average: 0.07, 0.19, 0.20
USER      TTY      FROM      LOGIN@   IDLE   JCPU   PCPU WHAT
ayman     :0       :0         13:37    ?xdm?  1:49   0.01s /usr/lib/gdm3/gdm-x-session --run-script env GNOME_SHELL_SESSION_MODE=ubuntu

```

```
ayman@Ayman:~$ top

top - 13:49:12 up 11 min, 1 user, load average: 0.06, 0.19, 0.20
Tasks: 207 total, 1 running, 206 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.4 us, 0.2 sy, 0.0 ni, 99.4 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 8266.2 total, 6024.3 free, 918.8 used, 1323.1 buff/cache
MiB Swap: 2048.0 total, 2048.0 free, 0.0 used. 7068.2 avail Mem

  PID USER      PR  NI   VIRT   RES   SHR  S  %CPU  %MEM    TIME+  COMMAND
 1665 ayman    20   0 4958012 337888 124808 S   1.7   4.0   0:36.61 gnome-shell
 1420 ayman    20   0 1203332  75156  46896 S   0.3   0.9   0:11.81 Xorg
 3038 ayman    20   0  20508   3960   3296 R   0.3   0.0   0:00.02 top
    1 root      20   0 167660   11512   8360 S   0.0   0.1   0:02.19 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
    6 root       0 -20         0         0         0 I   0.0   0.0   0:00.00 kworker/0:0H-kblockd
    8 root      20   0         0         0         0 I   0.0   0.0   0:00.19 kworker/u8:0-ext4-rsv-conversion
    9 root       0 -20         0         0         0 I   0.0   0.0   0:00.00 mm_percpu_wq
   10 root      20   0         0         0         0 S   0.0   0.0   0:00.06 ksoftirqd/0
   11 root      20   0         0         0         0 I   0.0   0.0   0:00.38 rcu_sched
   12 root      rt    0         0         0         0 S   0.0   0.0   0:00.01 migration/0
   13 root     -51   0         0         0         0 S   0.0   0.0   0:00.00 idle_inject/0
   14 root      20   0         0         0         0 S   0.0   0.0   0:00.00 cpuhp/0
   15 root      20   0         0         0         0 S   0.0   0.0   0:00.00 cpuhp/1
   16 root     -51   0         0         0         0 S   0.0   0.0   0:00.00 idle_inject/1
   17 root      rt    0         0         0         0 S   0.0   0.0   0:00.40 migration/1
   18 root      20   0         0         0         0 S   0.0   0.0   0:00.03 ksoftirqd/1
   20 root       0 -20         0         0         0 I   0.0   0.0   0:00.00 kworker/1:0H-kblockd
   21 root      20   0         0         0         0 S   0.0   0.0   0:00.00 cpuhp/2
   22 root     -51   0         0         0         0 S   0.0   0.0   0:00.00 idle_inject/2
   23 root      rt    0         0         0         0 S   0.0   0.0   0:00.40 migration/2
   24 root      20   0         0         0         0 S   0.0   0.0   0:00.03 ksoftirqd/2
   24 root      20   0         0         0         0 S   0.0   0.0   0:00.03 ksoftirqd/2
   26 root       0 -20         0         0         0 I   0.0   0.0   0:00.00 kworker/2:0H-kblockd
ayman@Ayman:~$ echo

ayman@Ayman:~$ man "automatic door"
No manual entry for automatic door
ayman@Ayman:~$ clear
```

- **w** - prints a list of all currently logged in users.
- **top** - displays processor activity of your Linux box and also displays tasks managed by kernel in real time
- **echo** - display a line of text/string on standard output or a file.

```

ayman@Ayman:~$ cal 2000
                2000
    فبراير      يناير
    ح  ن  ث  ر  خ  ج  س    ح  ن  ث  ر  خ  ج  س
    1  2  3  4  5  6  7  8    1  2  3  4  5  6  7  8
    9 10 11 12 13 14 15 16    9 10 11 12 13 14 15 16
    17 18 19 20 21 22 23 24    17 18 19 20 21 22 23 24
    25 26 27 28 29 30 31      25 26 27 28 29 30 31
    31

    مايو      أبريل
    ح  ن  ث  ر  خ  ج  س    ح  ن  ث  ر  خ  ج  س
    1  2  3  4  5  6  7  8    1  2  3  4  5  6  7  8
    9 10 11 12 13 14 15 16    9 10 11 12 13 14 15 16
    17 18 19 20 21 22 23 24    17 18 19 20 21 22 23 24
    25 26 27 28 29 30 31      25 26 27 28 29 30
    30

    أغسطس      يوليو
    ح  ن  ث  ر  خ  ج  س    ح  ن  ث  ر  خ  ج  س
    1  2  3  4  5  6  7  8    1  2  3  4  5  6  7  8
    9 10 11 12 13 14 15 16    9 10 11 12 13 14 15 16
    17 18 19 20 21 22 23 24    17 18 19 20 21 22 23
    25 26 27 28 29 30 31      24 25 26 27 28 29 30
    31
  
```

ديسمبر							نوفمبر							أكتوبر						
ح	ن	ث	ر	خ	ج	س	ح	ن	ث	ر	خ	ج	س	ح	ن	ث	ر	خ	ج	س
7	6	5	4	3	2	1	4	3	2	1				2	1					
14	13	12	11	10	9	8	11	10	9	8	7	6	5	9	8	7	6	5	4	3
21	20	19	18	17	16	15	18	17	16	15	14	13	12	16	15	14	13	12	11	10
28	27	26	25	24	23	22	25	24	23	22	21	20	19	23	22	21	20	19	18	17
														30	29	28	27	26	25	24
														31						

```

ayman@Ayman:~$ cal 9 1752
      1752 سبتمبر
ح  ن  ث  ر  خ  ج  س
      1  2 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30

ayman@Ayman:~$ echo 5+4 | bc
9
ayman@Ayman:~$ yes please

```

```

please
please
please
please
please
please
ple^C
ayman@Ayman:~$

```

- `cal 2000` - displays calendar for the year 2000
- `cal 9 1752` - displays the ninth month of the year 1752
- `echo 5+4 | bc` - prints the sum of 5+4 using the bc command line calculator
- `yes please` - outputs “please” in a constant stream until ctrl + c is pressed

```

ayman@Ayman:~$ time sleep 3

real    0m3.003s
user    0m0.002s
sys     0m0.000s
ayman@Ayman:~$ history
  1  sudo apt install build-essential dkms linux-headers-$(uname -r)
  2  sudo apt install build-essential dkms linux-headers-$(uname -r)
  3  sudo apt install build-essential dkms linux-headers-$(uname -r)
  4  echo hello world
  5  echo hello world
  6  passwd
  7  date
  8  hostname
  9  arch
 10  uname -a
 11  dmesg |more
 12  q
 13  sudo snap install q
 14  passwd

```

```

110 cal 9 1752
111 echo 5+4 | bc
112 yes please
113 cal 9 1752
114 yes please
115 cal 9 1752
116 echo 5+4 | bc
117 yes please
118 time sleep
119 history
ayman@Ayman:~$

```

- `time sleep 3` - reports how long it takes for the command `sleep 3` to execute.
- `history` - lists previously typed commands.

## PRACTICE 2

```

ayman@Ayman:~$ cd
ayman@Ayman:~$ pwd
/home/ayman
ayman@Ayman:~$ cd ..
ayman@Ayman:/home$ pwd
/home
ayman@Ayman:/home$ ls -al
total 12
drwxr-xr-x  3 root  root  4096 19:47 9 ملي .
drwxr-xr-x 20 root  root  4096 19:42 9 ملي ..
drwxr-xr-x 16 ayman ayman 4096 13:38 10 ملي ayman
ayman@Ayman:/home$ cd ..
ayman@Ayman:/$ pwd
/
ayman@Ayman:/$ cd /etc

```

```

ayman@Ayman:/etc$ ls -al | more
total 1132
drwxr-xr-x 131 root root 12288 13:45 10 ملى .
drwxr-xr-x 20 root root 4096 19:42 9 ملى ..
drwxr-xr-x 3 root root 4096 22:51 9 فير acpi
-rw-r--r-- 1 root root 3028 22:47 9 فير adduser.conf
drwxr-xr-x 3 root root 4096 22:48 9 فير alsa
drwxr-xr-x 2 root root 4096 20:28 9 ملى alternatives
-rw-r--r-- 1 root root 401 2019 16 بول anacrontab
-rw-r--r-- 1 root root 433 2017 2 اك appg.conf
drwxr-xr-x 5 root root 4096 22:49 9 فير apm
drwxr-xr-x 3 root root 4096 22:51 9 فير apparmor
drwxr-xr-x 7 root root 4096 13:10 10 ملى apparmor.d
drwxr-xr-x 4 root root 4096 13:10 10 ملى apport
-rw-r--r-- 1 root root 769 2020 18 ينا appstream.conf
drwxr-xr-x 7 root root 4096 19:59 9 ملى apt
drwxr-xr-x 3 root root 4096 22:51 9 فير avahi
-rw-r--r-- 1 root root 2319 2020 25 فير bash.bashrc
-rw-r--r-- 1 root root 45 2020 26 ينا bash_completion
drwxr-xr-x 2 root root 4096 13:10 10 ملى bash_completion.d
-rw-r--r-- 1 root root 367 2020 14 أبر bindresvport.blacklist
drwxr-xr-x 2 root root 4096 2020 22 أبر binfmt.d
drwxr-xr-x 2 root root 4096 22:51 9 فير bluetooth
-rw-r----- 1 root root 33 22:51 9 فير brlapi.key
drwxr-xr-x 7 root root 4096 22:50 9 فير brltty
-rw-r--r-- 1 root root 26916 2020 4 مار brltty.conf
drwxr-xr-x 3 root root 4096 22:47 9 فير ca-certificates
-rw-r--r-- 1 root root 6569 22:48 9 فير ca-certificates.conf
-rw-r--r-- 1 root root 5713 22:47 9 فير ca-certificates.conf.dpkg-old
drwxr-xr-x 2 root root 4096 22:51 9 فير calendar
drwxr-s--- 2 root dip 4096 22:51 9 فير chatscripts
drwxr-xr-x 2 root root 4096 19:47 9 ملى console-setup

```

- **cd** - allows you to change directory
- **pwd** - will allow you to know in which directory you're located. pwd stands for print work directory.
- **cd ..** - navigate up one directory level



```
ayman@Ayman:/etc$ cat passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
messagebus:x:103:106:/:/nonexistent:/usr/sbin/nologin
syslog:x:104:110:/:/home/syslog:/usr/sbin/nologin
_apt:x:105:65534:/:/nonexistent:/usr/sbin/nologin
tss:x:106:111:TPM software stack,,,:/var/lib/tpm:/bin/false
uidd:x:107:114:/:/run/uidd:/usr/sbin/nologin
tcpdump:x:108:115:/:/nonexistent:/usr/sbin/nologin
avahi-autoipd:x:109:116:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/usr/sbin/nologin
usbmux:x:110:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin
rtkit:x:111:117:RealtimeKit,,,:/proc:/usr/sbin/nologin
dnsmasq:x:112:65534:dnsmasq,,,:/var/lib/misc:/usr/sbin/nologin
```

```
rtkit:x:111:117:RealtimeKit,,,:/proc:/usr/sbin/nologin
dnsmasq:x:112:65534:dnsmasq,,,:/var/lib/misc:/usr/sbin/nologin
cups-pk-helper:x:113:120:user for cups-pk-helper service,,,:/home/cups-pk-helper:/usr/sbin/nologin
speech-dispatcher:x:114:29:Speech Dispatcher,,,:/run/speech-dispatcher:/bin/false
avahi:x:115:121:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/usr/sbin/nologin
kernoops:x:116:65534:Kernel Oops Tracking Daemon,,,:/usr/sbin/nologin
saned:x:117:123:/:/var/lib/saned:/usr/sbin/nologin
nm-openvpn:x:118:124:NetworkManager OpenVPN,,,:/var/lib/openvpn/chroot:/usr/sbin/nologin
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false
whoopsie:x:120:125:/:/nonexistent:/bin/false
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
geoclue:x:122:127:/:/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534:/:/run/gnome-initial-setup:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
ayman:x:1000:1000:Ayman,,,:/home/ayman:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
vboxadd:x:998:1:/:/var/run/vboxadd:/bin/false
ayman@Ayman:/etc$ cd ~
ayman@Ayman:~$ pwd
/home/ayman
ayman@Ayman:~$ clear
```



```

ayman@Ayman:~$ cd
ayman@Ayman:~$ pwd
/home/ayman
ayman@Ayman:~$ mkdir work play
ayman@Ayman:~$ ls
Desktop  Downloads  Pictures  Public  Videos
Documents Music      play     Templates work
ayman@Ayman:~$ rm -r work
ayman@Ayman:~$ ls
Desktop Documents Downloads Music Pictures play Public Templates Videos
ayman@Ayman:~$ sudo cp /etc/passwd /home
[sudo] password for ayman:
ayman@Ayman:~$ sudo mv /etc/passwd play
ayman@Ayman:~$ ls -a
.          Downloads  .sudo_as_admin_successful
..         .gnupg      Templates
.bash_history .local      .vboxclient-clipboard.pid
.bash_logout Music       .vboxclient-display-svga-x11.pid
.bashrc     Pictures    .vboxclient-draganddrop.pid
.cache      play        .vboxclient-seamless.pid
.config     .profile    Videos
Desktop     Public
Documents   .ssh
ayman@Ayman:~$ clear

```

- `mkdir` command makes subdirectories work and play
- `ls` shows the list of directories
- `rm -r work` command deletes the work directory
- `sudo cp /etc/passwd /home` command copies the file into home directory
- `sudo mv /etc/passwd play` command moves the file into the play directory
- `ls -a` command lists all the files in the current directory

## PRACTICE 3

```

ayman@Ayman:~$ mkdir rootdirectory
ayman@Ayman:~$ cd rootdirectory
ayman@Ayman:~/rootdirectory$ mkdir subdirectory
ayman@Ayman:~/rootdirectory$ cal
      مايو 2021
ح  ن  ث  ر  خ  ج  س
                1
 2  3  4  5  6  7  8
 9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30 31
ayman@Ayman:~/rootdirectory$ banner ayman

##      #  #  #  #      ##      #  #
#  #      #  #  ##  ##      #  #  ##  #
#  #      #  # ##  #  #      #  #  #  #
#####      #  #      #  #####  #  #  #
#  #      #  #      #  #      #  #  ##
#  #      #  #      #  #      #  #  #

```

- `mkdir` creates the directory

- **cd** enters into the directory just created
- **mkdir subdirectory** creates a subdirectory in rootdirectory
- **cal** shows the calendar for the current month
- **banner** displays the name in the form of a banner

```
ayman@Ayman:~$ ls
Desktop Documents Downloads Music Pictures Public rootdirectory Templates Videos
ayman@Ayman:~$ who
ayman      :0                2021-05-11 00:22 (:0)
ayman@Ayman:~$ tty
/dev/pts/0
ayman@Ayman:~$ cd rootdirectory
ayman@Ayman:~/rootdirectory$
```

- **ls** shows the directory listing of the parent directory
- **who** displays the number of users logged into the system
- **tty** displays the name of the device on my terminal
- **cd rootdirectory** moves into the rootdirectory

## PRACTICE 4

```
ayman@Ayman:~$ mkdir rootdirectory
ayman@Ayman:~$ mv rootdirectory exercises
ayman@Ayman:~$ cat > example1.txt
water, water everywhere and all the boards did shrink;
water, water everywhere,
No drop to drink.
ayman@Ayman:~$ ls
Desktop Downloads exercises Pictures Templates Videos
Documents example1.txt Music Public test.txt
ayman@Ayman:~$ man finger
```

- **mv rootdirectory exercises** changes the rootdirectory to exercises
- **cat > example1.txt** creates a text file called example1.txt
- on pressing enter we input the required text and then press ctrl+d to save the text in the file.
- **man finger** gives further information on the finger command.

```

FINGER(1) BSD General Commands Manual FINGER(1)

NAME
    finger - user information lookup program

SYNOPSIS
    finger [-lmsp] [user ...] [user@host ...]

DESCRIPTION
    The finger displays information about the system users.

    Options are:

    -s    Finger displays the user's login name, real name, terminal name and write status (as a '*' after the terminal name if write
           permission is denied), idle time, login time, office location and office phone number.

           Login time is displayed as month, day, hours and minutes, unless more than six months ago, in which case the year is displayed
           rather than the hours and minutes.

           Unknown devices as well as nonexistent idle and login times are displayed as single asterisks.

    -l    Produces a multi-line format displaying all of the information described for the -s option as well as the user's home direc-
           tory, home phone number, login shell, mail status, and the contents of the files ".plan", ".project", ".pgpkey" and ".forward"
           from the user's home directory.

           Phone numbers specified as eleven digits are printed as '+N-NNN-NNN-NNNN'. Numbers specified as ten or seven digits are
           printed as the appropriate subset of that string. Numbers specified as five digits are printed as 'xN-NNNN'. Numbers speci-
           fied as four digits are printed as 'xNNNN'.

           If write permission is denied to the device, the phrase '(messages off)' is appended to the line containing the device name.
           One entry per user is displayed with the -l option; if a user is logged on multiple times, terminal information is repeated

```

```

ayman@Ayman:~$ ls *.txt
example1.txt  test.txt
ayman@Ayman:~$ cp example1.txt ~/Documents/
ayman@Ayman:~$ mv example1.txt water.txt
ayman@Ayman:~$ ls *.txt
test.txt  water.txt
ayman@Ayman:~$ rm test.txt
ayman@Ayman:~$ ls *.txt
water.txt
ayman@Ayman:~$

```

- `ls *.txt` displays all the text files in the directory
- `cp example1.txt ~/Documents/` creates a copy of the text file in the documents folder.
- `mv example1.txt water.txt` renames the file example1.txt into water.txt
- test.txt was a random test file to test the creation of a file , since it is unwanted , we remove that file using the rm command.
- `Rm test.txt` removes the test.txt file

## PRACTICE 5

```

ayman@Ayman:~$ ls -l
total 52
drwxr-xr-x 2 ayman ayman 4096 00:13 11 ملى Desktop
drwxr-xr-x 2 ayman ayman 4096 01:15 11 ملى Documents
drwxr-xr-x 2 ayman ayman 4096 00:13 11 ملى Downloads
-rw-rw-r-- 1 ayman ayman 98 01:07 11 ملى example1
drwxrwxr-x 4 ayman ayman 4096 01:06 11 ملى exercises
-rw-rw-r-- 1 ayman ayman 37 04:28 11 ملى file1
-rw-rw-r-- 1 ayman ayman 31 04:28 11 ملى file2
-rw-rw-r-- 1 ayman ayman 36 04:30 11 ملى file3
-rw-rw-r-- 1 ayman ayman 0 04:30 11 ملى file4
drwxr-xr-x 2 ayman ayman 4096 00:13 11 ملى Music
drwxr-xr-x 2 ayman ayman 4096 00:13 11 ملى Pictures
drwxr-xr-x 2 ayman ayman 4096 00:13 11 ملى Public
drwxr-xr-x 2 ayman ayman 4096 00:13 11 ملى Templates
drwxr-xr-x 2 ayman ayman 4096 00:13 11 ملى Videos
ayman@Ayman:~$ chmod -x Downloads

```

- The commands on the left show the permissions given to the files and directory by the operating system , we can change these permissions using the `chmod -<permission><filename>` or the `chmod+<permission><filename>` command depending on whether you want to remove or add permissions to a particular file.
- For example we want to remove the executable permission for the Downloads directory so we use the `chmod -x Downloads` command. This removes the executable permission for the downloads directory.
- Now if we type `ls -l` we see that the permission for the directory has been changed.

```
ayman@Ayman:~$ ls -l
total 52
drwxr-xr-x 2 ayman ayman 4096 00:13 11 ملي Desktop
drwxr-xr-x 2 ayman ayman 4096 01:15 11 ملي Documents
drw-r--r-- 2 ayman ayman 4096 00:13 11 ملي Downloads
-rw-rw-r-- 1 ayman ayman 98 01:07 11 ملي example1
drwxrwxr-x 4 ayman ayman 4096 01:06 11 ملي exercises
-rw-rw-r-- 1 ayman ayman 37 04:28 11 ملي file1
-rw-rw-r-- 1 ayman ayman 31 04:28 11 ملي file2
-rw-rw-r-- 1 ayman ayman 36 04:30 11 ملي file3
-rw-rw-r-- 1 ayman ayman 0 04:30 11 ملي file4
drwxr-xr-x 2 ayman ayman 4096 00:13 11 ملي Music
drwxr-xr-x 2 ayman ayman 4096 00:13 11 ملي Pictures
drwxr-xr-x 2 ayman ayman 4096 00:13 11 ملي Public
drwxr-xr-x 2 ayman ayman 4096 00:13 11 ملي Templates
drwxr-xr-x 2 ayman ayman 4096 00:13 11 ملي Videos
```

- Now for example let's say we want to change the permission of file1 from read write to read write execute , so we type in the following command.

```
ayman@Ayman:~$ chmod +rwx file1
ayman@Ayman:~$ ls -l
total 52
drwxr-xr-x 2 ayman ayman 4096 00:13 11 ملي Desktop
drwxr-xr-x 2 ayman ayman 4096 01:15 11 ملي Documents
drw-r--r-- 2 ayman ayman 4096 00:13 11 ملي Downloads
-rw-rw-r-- 1 ayman ayman 98 01:07 11 ملي example1
drwxrwxr-x 4 ayman ayman 4096 01:06 11 ملي exercises
-rwxrwxr-x 1 ayman ayman 37 04:28 11 ملي file1
-rw-rw-r-- 1 ayman ayman 31 04:28 11 ملي file2
-rw-rw-r-- 1 ayman ayman 36 04:30 11 ملي file3
-rw-rw-r-- 1 ayman ayman 0 04:30 11 ملي file4
drwxr-xr-x 2 ayman ayman 4096 00:13 11 ملي Music
drwxr-xr-x 2 ayman ayman 4096 00:13 11 ملي Pictures
drwxr-xr-x 2 ayman ayman 4096 00:13 11 ملي Public
drwxr-xr-x 2 ayman ayman 4096 00:13 11 ملي Templates
drwxr-xr-x 2 ayman ayman 4096 00:13 11 ملي Videos
```

- As we see the permission for file1 has been changed successfully.

**Q. Create a number of hierarchically related directories and navigate through them using a combination of absolute pathnames (starting with "/") and relative pathnames.**

To create hierarchically related directories, use the MKDIR command,

```
% mkdir /Student/Subdirectory1
```

```
% mkdir /Student/Subdirectory2
```

```
% mkdir /Student/Subdirectory3
```

To navigate through the directories using absolute pathnames:

First determine the current directory using the pwd(print working directory) command: % pwd /home/Student

**Q. Try using wildcards ("\*" and possibly "?")**

The two basic wildcard characters are ? and \*. The wildcard ? Matches any one character. The wildcard \* matches any grouping of zero or more characters.

The ? wildcard matches any one character. To restrict the matching to a particular character or range of characters, use square brackets [ ] to include a list. For example, to list files ending in "ite", and beginning with only "a", "b", "c", or "d" we would use the command: ls [abcd]ite

**Q. Put a listing of the files in your directory into a file called filelist. (Then delete it!)**

Using the CP command

```
% cp ~Student/directory1* filelist
```

```
% rm filelist
```

## **PRACTICE 6**

**Q. Type the command ls -l and examine the format of the output. Pipe the output of the command ls -l to the word count wc to obtain a count of the number of files in your directory.**

The **wc** command is used to print the number of lines, words, and characters in a file. Syntax: wc [options] filename To find the number of files in a directory, enter % ls -l | wc -l ls -l : For a long listing that shows file protections, size, and date.

**Q. Use cut to strip away the reference material and leave just the text field.**

Cut command is typically used to extract a certain range of characters from a line, usually from a file. Syntax: % cut [-b] [-c] [-f list] [-n] [-d delim] [-s] [file] -b

**Q. Use tr to strip away any tags that are actually in the text (e.g., attached to the words),so that you are left with just the words.**

The tr command (translate characters) is one of the true Unix filters. It copies its standard input to its standard output, while replacing the first character specified on the command line with the second character specified.

**Q. Set a file to be read-only with the chmod (from change mode) command. Interpret the file permissions displayed by the ls -l command.**

Consider file1 to be present, To set the file to be read-only to all, % chmod a+r file1 To see the permissions of the file, use the ls -l command. To see the permissions of the entire directory use the ls -ld command.

**Q. Delete one or more directories with the rmdir command. See what happens if the directory is not empty. Experiment (carefully!!) with the rm -r command to delete the directory and its content.**

First let's go to home directory of user Student: cd ~Student Let us create a directory /Student/Directory2 % mkdir /Student/Directory2 If the Directory 2 is not empty, then we get an error message: Directory2: Directory not empty. To remove the directory and all its files and contents: %rm -r Directory2

**Q. Experiment with the re-directing command output (e.g., ls -l > file1). Try ">>" instead of ">" with an existing text file as the output.**

To "redirect" output -- to take what the system would have displayed on the screen and put it in a file instead. On issuing the ls -l command, we can redirect the output to file1, as: % ls -l >file1 When you redirect output to a file that already exists, any previous contents are deleted before the command is

completed. To prevent the accidental overwriting of files, first issue the command: `set noclobber` then use `% ls -l > file1`

If file1 already exists then we will get an error: File1: file exists. However, if you are certain you want to replace the contents of an existing file with redirected output, use the emphatic form of the redirection command: `% ls >!file1` It is possible to append the redirected output onto the end of an existing file, instead of replacing the contents, by using the append symbol (`>>`). The following command adds the date to the end of the file file1, without removing its original contents: `date >> file1` If you have issued the `set noclobber` command to prevent accidental overwriting, you must use the emphatic form: `date >>! File1`

**Q. See whether upper-case versions of any of these commands will work as well as the lower-case versions.**

UNIX is **ALWAYS** case-sensitive. If you want to list your files with the `'ls'` command, if you enter `LS` you will be told "command not found".

**Q. Pipe the output of the `who` command to the `sort` command.**

UNIX sort command to sort data

- either alphabetically or numerically (`-n` option)
- in ascending or descending order (`-r` -- sort in reverse option)

By default **sort** sorts the file in ascending order using the entire line as a sorting key. The sort command can be used in pipes or have its output redirected as desired. To pipe the output of the `who` command to the input of the sort command: `%who | sort >file1`

**Q. Search for your login name in `who` file using the `grep` command.**

The `grep` command search for the pattern specified by the `Pattern` parameter and writes each matching line to standard output. The `grep` command displays the name of the file containing the matched line if you specify more than one name in the `File` parameter.



Characters with special meaning to the shell (\$, \*, [, |, ^, (,), \) must be in quotation marks when they appear in the Pattern parameter. To find a word within some text, display all lines matching "pattern1",

```
grep pattern1 file
```

```
% who | grep Student
```

## PRACTICE 7

Q. Compare two text files with the diff command.

```
ayman@Ayman:~$ cat > test1
Ayman
Shakil
David
ayman@Ayman:~$ cat > test2
Ayman
Shakil
John
ayman@Ayman:~$ cat > test3
Shakil
David
Samantha
ayman@Ayman:~$ diff test1 test2
1c1
< Ayman
---
> Ayman
3c3
< David
---
> John
ayman@Ayman:~$ clear
```

Let's create an example to explain the output produced by diff. Look at the contents of three sample files .

The diff command is used to display two files and prints the lines that are different.

When you run diff on test1 and test2, the following output is produced:

Q. Count lines, words, and characters in a file with the wc command.

```

ayman@Ayman:~$ wc /etc/passwd
 47   83 2784 /etc/passwd
ayman@Ayman:~$ wc -w example1
16 example1
ayman@Ayman:~$ wc -w test1
3 test1
ayman@Ayman:~$ wc -l example1
3 example1
ayman@Ayman:~$ █

```

The "wc" command stands for "word count". It counts the number of characters, words, and lines that are contained in a text stream.

**wc /etc/passwd** command tells the number of characters, words, and lines in the /etc/passwd file

**wc -w example1** command tells the number of words in the example1 file.

**wc -l example1** command tells the number of lines in the example1 file.

**Q. Display your current environment variables with the following command: set or env**

ENVIRONMENT variables are set using the setenv command, displayed using the printenv or env commands, and unset using the unsetenv command.

**printenv | less** displays the list of environment variables

```

SHELL=/bin/bash
SESSION_MANAGER=local/Ayman:@/tmp/.ICE-unix/1646,unix/Ayman:/tmp/.ICE-unix/1646
QT_ACCESSIBILITY=1
COLORTERM=truecolor
XDG_CONFIG_DIRS=/etc/xdg/xdg-ubuntu:/etc/xdg
XDG_MENU_PREFIX=gnome-
GNOME_DESKTOP_SESSION_ID=this-is-deprecated
LC_ADDRESS=ar_AE.UTF-8
GNOME_SHELL_SESSION_MODE=ubuntu
LC_NAME=ar_AE.UTF-8
SSH_AUTH_SOCK=/run/user/1000/keyring/ssh
XMODIFIERS=@im=ibus
DESKTOP_SESSION=ubuntu
LC_MONETARY=ar_AE.UTF-8
SSH_AGENT_PID=1571
GTK_MODULES=gail:atk-bridge
PWD=/home/ayman
LOGNAME=ayman
XDG_SESSION_DESKTOP=ubuntu
XDG_SESSION_TYPE=x11
GPG_AGENT_INFO=/run/user/1000/gnupg/S.gpg-agent:0:1
XAUTHORITY=/run/user/1000/gdm/Xauthority
GJS_DEBUG_TOPICS=JS ERROR;JS LOG
WINDOWPATH=2
HOME=/home/ayman
USERNAME=ayman
IM_CONFIG_PHASE=1
LC_PAPER=ar_AE.UTF-8
LANG=en_US.UTF-8
LS_COLORS=rs=0:di=01;34:ln=01;36:nh=00:pi=40;33:so=01;35:do=01;35:bd=40;33;01:cd=40;33;01:or=40;31;01:mi=00:su=37;41:sg=30;43:ca=30;41:tw=30;42:ow=34;42:st=37;44:ex=01;32:*.tar=01;31:*.tgz=01;31:*.arc=01;31:*.arj=01;31:*.taz=01;31:*.lha=01;31:*.lzh=01;31:*.lzma=01;31:*.tl
:█

```

**Q. Display information on yourself or another user with the finger command.**

The finger displays information about the system users. Syntax: `finger [-lmsp] -s:` Finger displays the user's login name, real name, terminal name and write status (as a "\*" after the terminal name if write per-mission is denied), idle time, login time, office location and office phone number.

-l: Finger displays the user's login name, real name, terminal name and write status (as a "\*" after the terminal name if write per-mission is denied), idle time, login time, office location and office phone number.

-p: Prevents the -l option of finger from displaying the contents of the ".plan", ".project" and ".pgpkey" files.

-m: Prevent matching of user names.

~/ .nofinger If finger finds this file in a user's home directory, it will, for finger requests originating outside the local host, firmly deny the existence of that user. For this to work, the finger program must be able to see the .nofinger file. This generally means that the home directory containing the file must have the other-users-execute bit set (o+x).

% `finger -s` To see other users: % `finger username@domain` To see details in less/more than one page % `finger username@domain | less/more`

Q. Delete all the files in the current directory whose name ends in ".bak".

```
ayman@Ayman:~$ ls
abc.bak  Desktop  Downloads  exercises  file2  file4  Music  Public  Templates  test2  Videos
def.bak  Documents example1  file1      file3  ghi.bak Pictures Student test1      test3
ayman@Ayman:~$ rm *.bak
ayman@Ayman:~$ ls
Desktop  Downloads  exercises  file2  file4  Pictures  Student  test1  test3
Documents example1  file1      file3  Music  Public  Templates test2  Videos
ayman@Ayman:~$ clear
```

to delete all .bak files use the rm command

`rm *.bak` deletes all the .bak files

To remove all files with the .bak extension, without asking for confirmation

`rm -f *.bak`

Q. Display lines 10 to 14 of any file which contains 25 lines.

The p command (for 'print') used to display lines in the file. The format of this command is: `: [line_range] p`. If no range is supplied the current line is displayed.

To display lines 10-14 of any file which contains 25 lines, do `% 10,14 p`

Q. Count how many lines contain the word science in a word file science.txt.

First find the word using the grep command and then pipe it using the wc command

```
% grep science science.txt | wc -l
```

Q. List the statistics of the largest file (and only the largest file) in the current directory.

One line script to find the largest file in the current directory is:

```
find . -type f -print | xargs ls -ladtr | cut -c34- | sort -n -r | head <1>
```

## PRACTICE 8

Q. Kill any process with the help of the PID and run any process at the background.

```
Tasks: 197 total, 1 running, 196 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.8 us, 0.5 sy, 0.0 ni, 98.7 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 8310.2 total, 6304.8 free, 694.7 used, 1310.7 buff/cache
MiB Swap: 424.5 total, 424.5 free, 0.0 used, 7350.8 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
1409	ayman	20	0	1130284	68816	44200	S	3.3	0.8	0:30.98	Xorg
1660	ayman	20	0	5097512	356948	124660	S	2.3	4.2	2:03.89	gnome-shell
4056	ayman	20	0	823324	51192	38680	S	2.3	0.6	0:00.61	gnome-terminal-
4070	ayman	20	0	20512	3676	3156	R	0.7	0.0	0:00.03	top
11	root	20	0	0	0	0	I	0.3	0.0	0:01.56	rcu_sched
1715	ayman	20	0	162912	6476	5816	S	0.3	0.1	0:00.11	at-spl2-registr
1	root	20	0	167860	11776	8448	S	0.0	0.1	0:03.07	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
6	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/0:0H
9	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	mm_percpu_wq
10	root	20	0	0	0	0	S	0.0	0.0	0:00.04	ksoftirqd/0
12	root	rt	0	0	0	0	S	0.0	0.0	0:00.18	migration/0
13	root	-51	0	0	0	0	S	0.0	0.0	0:00.00	idle_inject/0
14	root	20	0	0	0	0	S	0.0	0.0	0:00.00	cpuhp/0
15	root	20	0	0	0	0	S	0.0	0.0	0:00.00	cpuhp/1
16	root	-51	0	0	0	0	S	0.0	0.0	0:00.00	idle_inject/1
17	root	rt	0	0	0	0	S	0.0	0.0	0:01.00	migration/1
18	root	20	0	0	0	0	S	0.0	0.0	0:00.03	ksoftirqd/1
19	root	20	0	0	0	0	I	0.0	0.0	0:00.78	kworker/1:0-events
20	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/1:0H-kblockd
21	root	20	0	0	0	0	S	0.0	0.0	0:00.00	cpuhp/2
22	root	-51	0	0	0	0	S	0.0	0.0	0:00.00	idle_inject/2
23	root	rt	0	0	0	0	S	0.0	0.0	0:00.99	migration/2

```
ayman@ayman:~$ kill 4056
```

The above command kills the process with process ID 4056

Q. Select a text File and double Space the lines.

Use the SED command to double space the lines in a text file. `% sed filename`

Q. List all users from etc/passwd in the alphabetically sorted order.

To list all users on a Unix system, even the ones who are not logged in, look at the /etc/passwd file. To see in detail, about all the users do: `$ cat /etc/passwd` to just see the Unix user names, use the command

`"$ cat /etc/passwd | cut -d: -f1|sort`

```
ayman@Ayman:~$ cat /etc/passwd | cut -d: -f1|sort
_apt
avahi
avahi-autoipd
ayman
backup
bin
colord
cups-pk-helper
daemon
dnsmasq
games
gdm
geoclue
gnats
gnome-initial-setup
hplip
irc
kernoops
list
lp
mail
man
messagebus
news
nm-openvpn
nobody
proxy
pulse
root
rtkit
saned
```

Q. Use the grep command to search the file example1 for occurrences of the string “water”.

```
ayman@Ayman:~$ grep water example1
water, water everywhere and all the boards did shrink;
water, water everywhere,
ayman@Ayman:~$
```

Use the command `grep water example1`

