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Task 1:

1: ls /bin ls/sbin

```
fawad@fawad:~$ ls /bin
'['                              nslookup
 411toppm                        nstat
 aa-enabled                      nsupdate
 aa-exec                         ntfs-3g
 aa-features-abi                 ntfs-3g.probe
 ab                             ntfscat
 aclocal                        ntfscluster
 aclocal-1.16                    ntfscmp
 aconnect                       ntfsdecrypt
 add-apt-repository             ntfsfallocate
 addpart                        ntfsfix
 addr2line                      ntfsinfo
 aircrack-ng                    ntfsls
 airdecap-ng                    ntfsmove
 airdecloak-ng                  ntfsrecover
 airolib-ng                     ntfssecaudit
 airscan-discover               ntfstruncate
```

```
nsenter
fawad@fawad:~$ ls /sbin
a2disconf          groupdel           postfix-add-filter
a2dismod           groupmems          postfix-add-policy
a2dissite          groupmod           postfix-collate
a2enconf           grpck              postkick
a2enmod            grpconv            postlock
a2ensite           grpunconv          postlog
a2query            grub-bios-setup    postmap
aa-remove-unknown  grub-install       postmulti
aa-status          grub-macbless      postqueue
aa-teardown        grub-mkconfig      postsuper
accessdb           grub-mkdevicemap   posttls-finger
addgnupghome       grub-probe         poweroff
addgroup           grub-reboot        pppd
add-shell          grub-set-default   pppdump
adduser            halt               pppoe-discovery
```

2: change dir to mydir 2
3:goto desktop

```
fawad@fawad:~/Documents$ mkdir mydir2
fawad@fawad:~/Documents$ pwd
/home/fawad/Documents
fawad@fawad:~/Documents$ cd /home/fawad/Documents/mydir2
fawad@fawad:~/Documents/mydir2$ cd ~/Desktop
```

4:writing contents from one to another file

5:combine two to create output

```
fawad@fawad:~/Desktop$ cat mynewfile > newfile
fawad@fawad:~/Desktop$ cat newfile
dgbjkfka
fdngls

gfkgl
nfgnlkgvnalkn
fawad@fawad:~/Desktop$ cat mynewfile newfile > output
fawad@fawad:~/Desktop$ cat output
dgbjkfka
fdngls

gfkgl
nfgnlkgvnalkn
dgbjkfka
fdngls

gfkgl
nfgnlkgvnalkn
```

Task 2:

1: create a pulbic dir in root

```
fawad@fawad:/$ sudo mkdir public
fawad@fawad:/$ sudo chmod 777 public
```

2. testfile and change permission

```
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task2/test$ touch testfile.txt
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task2/test$ ls -l
total 0
-rw-rw-r-- 1 fawad fawad 0 12:40 14 نومبر  testfile.txt
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task2/test$ chmod 444 testfile.txt
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task2/test$ ls -l
total 0
-r--r--r-- 1 fawad fawad 0 12:40 14 نومبر  testfile.txt
```

3. create a user usama run the shell as usama

```
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task2/test$ sudo adduser usama
Adding user `usama' ...
Adding new group `usama' (1005) ...
Adding new user `usama' (1005) with group `usama (1005)' ...
Creating home directory `/home/usama' ...
Copying files from `/etc/skel' ...
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: password updated successfully
Changing the user information for usama
Enter the new value, or press ENTER for the default
        Full Name []: Usama
        Room Number []:
        Work Phone []:
        Home Phone []:
        Other []:
Is the information correct? [Y/n] y
Adding new user `usama' to supplemental / extra groups `users' ...
Adding user `usama' to group `users' ...
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task2/test$ su -l usama
Password:
```

4. read testfile from usama
5. logout usama
6. giving all permission
7. run shell as usama
8.read file from usama

```
usama@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task2/test$ cat testfile.txt
efsjkjgiufiuegweg          jkhwefefewbh
erhgjhw\
rgwrgjbbwj
usama@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task2/test$ exit
logout
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task2/test$ chmod 777 testfile.txt
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task2/test$ ls -l
total 4
-rwxrwxrwx 1 fawad fawad 51 12:45 14 نومبر  testfile.txt
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task2/test$ su -l usama
Password:
usama@fawad:~$ cd /Practice/FA21-BSE-012/'Fall 23'/'Operating System'/OS_labmid/task2/test
usama@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task2/test$ cat testfile.txt
efsjkjgiufiuegweg          jkhwefefewbh
erhgjhw\
rgwrgjbbwj
usama@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task2/test$
```

Task 3:
1: sort command

```
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task3$ cat| sort alphabatical.txt
ahmad
Fawad
furqan
haroon
^C
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task3$ cat alphabatical.txt
Fawad
ahmad
furqan
haroon
```

```
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task3$ cat |sort numbers.t
12
23
27
35
67
89
^C
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task3$ cat numbers.txt
23
67
35
27
12
89
```

2. head tail

```
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task3$ head index.txt
Nmap scan report for _gateway (192.168.18.1)
MAC Address: 9C:B2:E8:F4:AF:8A (Huawei Technologies)
Nmap scan report for 192.168.18.48
MAC Address: E4:B3:18:BC:28:7F (Intel Corporate)
Nmap scan report for 192.168.18.83
MAC Address: 4C:1A:3D:7D:F4:E5 (Guangdong Oppo Mobile Telecommunications)
Nmap scan report for 192.168.18.114
MAC Address: D8:BB:2C:15:76:7F (Apple)
Nmap scan report for 192.168.18.133
MAC Address: E0:13:B5:4A:43:41 (vivo Mobile Communication)
```

```
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task3$ tail index.txt
MAC Address: 00:1C:BF:C8:D0:1C (Intel Corporate)
Nmap scan report for 192.168.18.243
MAC Address: AC:2B:6E:DF:38:AB (Intel Corporate)
Nmap scan report for 192.168.18.245
MAC Address: 5C:FB:3A:AC:04:21 (Unknown)
Nmap scan report for 192.168.18.251
MAC Address: 80:4E:70:43:DB:90 (Samsung Electronics)
Nmap scan report for 192.168.18.253
MAC Address: 4E:F8:D0:9B:3B:4E (Unknown)
Nmap scan report for fawad (192.168.18.85)
```

3. Find last three lines

```
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task3$ tail -n 3 index.txt
Nmap scan report for 192.168.18.253
MAC Address: 4E:F8:D0:9B:3B:4E (Unknown)
Nmap scan report for fawad (192.168.18.85)
```

4. print lines words bytes

```
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task3$ wc  index.txt
   25  126 1084 index.txt
```

5.nice renice packettracer

```
fawad@fawad:~$ sudo nice -n -10 packettracer &
[3] 12146
fawad@fawad:~$ Starting Packet Tracer 8.2.1
^C
fawad@fawad:~$ sudo renice -n 15 12146
12146 (process ID) old priority 0, new priority 15
fawad@fawad:~$
```

Task 4:
1. Code

```c
task4.c > main()
1    #include <stdio.h>
2    #include <stdlib.h>
3    #include <time.h>
4
5    int main() {
6        srand(time(NULL));
7        // Create an array of size 20
8        int array[20];
9        int even_count = 0;
10       for (int i = 0; i < 20; ++i) {
11           array[i] = rand() % 100 + 1;
12           if (array[i] % 2 == 0) {
13               even_count++;
14           }
15       }
16       printf("Array: ");
17       for (int i = 0; i < 20; ++i) {
18           printf("%d ", array[i]);
19       }
20       printf("\nNumber of even numbers: %d\n", even_count);
21       return 0;
22   }
23
```

Output:

```
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task4$ gcc -o result task4.c
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task4$ ./result
Array: 76 47 62 65 3 62 62 78 1 59 23 3 7 46 95 72 21 20 40 55
Number of even numbers: 9
```

Task 5:
Code:

```c
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>

int main() {
    // Print something and check PID of the parent
    printf("Parent Process: %d\n", getpid());

    // Create a child process and print child PID in parent process
    int child_pid = fork();

    if (child_pid > 0) {
        // Parent process
        printf("Parent Process created a child process with PID: %d\n", child_pid);
    } else {
        // Child process
        printf("Child Process: %d\n", getpid());
    }

    return 0;
}
```

OUTPUT:

```
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task4$ gcc -o result main.c
fawad@fawad:/Practice/FA21-BSE-012/Fall 23/Operating System/OS_labmid/task4$ ./result
Parent Process: 7454
Parent Process created a child process with PID: 7455
Child Process: 7455
```