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TU DUBLIN

TECHNOLOGICAL
UNIVERSITY DUBLIN

Operating Systems 1: Assignment 1

Question 1

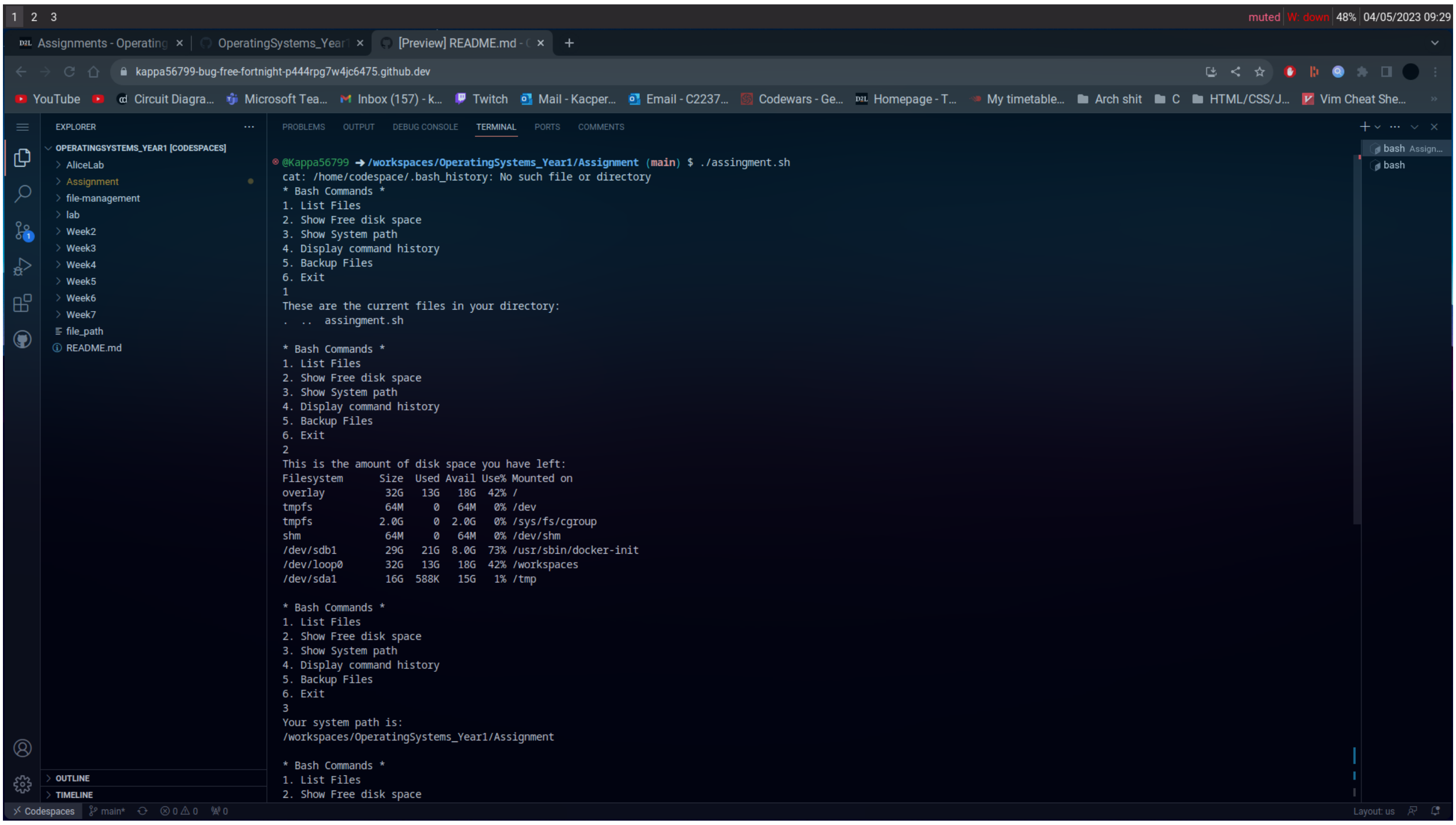
Fill the following sections when applicable.

Script

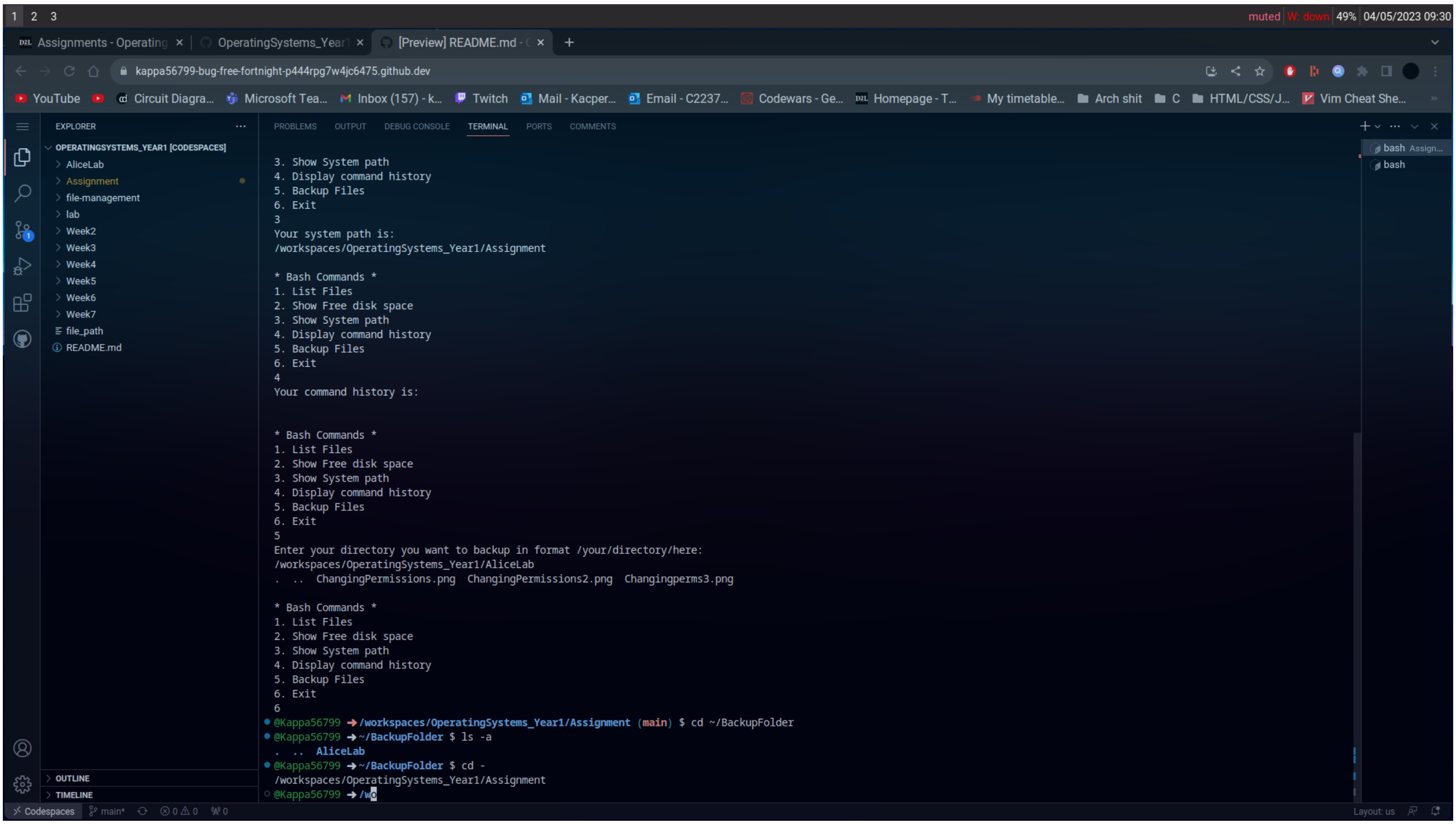
```
#!/bin/bash
#assigns bash history to a variable
history=$(cat ~/.bash_history)
while true;
do
  #menu display
  echo "* Bash Commands *"
  echo "1. List Files"
  echo "2. Show Free disk space"
  echo "3. Show System path"
  echo "4. Display command history"
  echo "5. Backup Files"
  echo "6. Exit"

  #reads in input from the user
  read input

  #case statment to process user input
  case $input in
    1) echo "These are the current files in your directory:"; ls -a; echo;;
    2) echo "This is the amount of disk space you have left:"; df -h; echo;;
    3) echo "Your system path is:"; pwd; echo;;
    4) echo "Your command history is:"; echo $history ;echo ;;
    5) echo "Enter your directory you want to backup in format /your/directory/here: "; read directory; mkdir ~/BackupFolder;cd $directory; cp -r $directory ~/BackupFolder; ls -a ;echo;;
    6) exit 1;;
    *) echo "Invalid Input Try Again"; echo;;
  esac
done
```

Screengrab

Directory 1

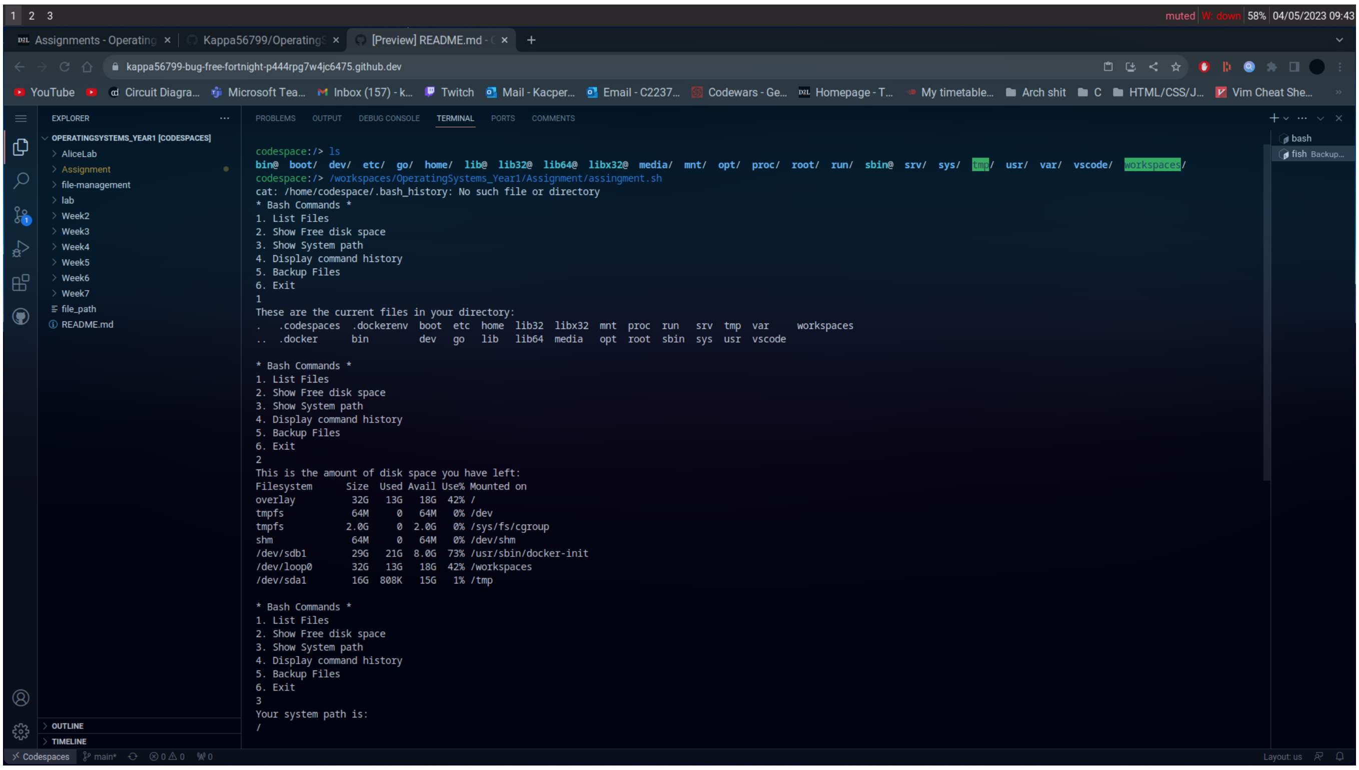


```
@Kappa56799 → /workspaces/OperatingSystems_Year1/Assignment (main) $ ./assingment.sh
cat: /home/codespace/.bash_history: No such file or directory
* Bash Commands *
1. List Files
2. Show Free disk space
3. Show System path
4. Display command history
5. Backup Files
6. Exit
1
These are the current files in your directory:
.  ..  assingment.sh

* Bash Commands *
1. List Files
2. Show Free disk space
3. Show System path
4. Display command history
5. Backup Files
6. Exit
2
This is the amount of disk space you have left:
Filesystem      Size  Used Avail Use% Mounted on
overlay          32G   13G   18G  42% /
tmpfs            64M     0   64M   0% /dev
tmpfs           2.0G     0  2.0G   0% /sys/fs/cgroup
shm              64M     0   64M   0% /dev/shm
/dev/sdb1        29G   21G  8.0G  73% /usr/sbin/docker-init
/dev/loop0       32G   13G   18G  42% /workspaces
/dev/sda1        16G  588K   15G   1% /tmp

* Bash Commands *
1. List Files
2. Show Free disk space
3. Show System path
4. Display command history
5. Backup Files
6. Exit
3
Your system path is:
/workspaces/OperatingSystems_Year1/Assignment

* Bash Commands *
1. List Files
2. Show Free disk space
```

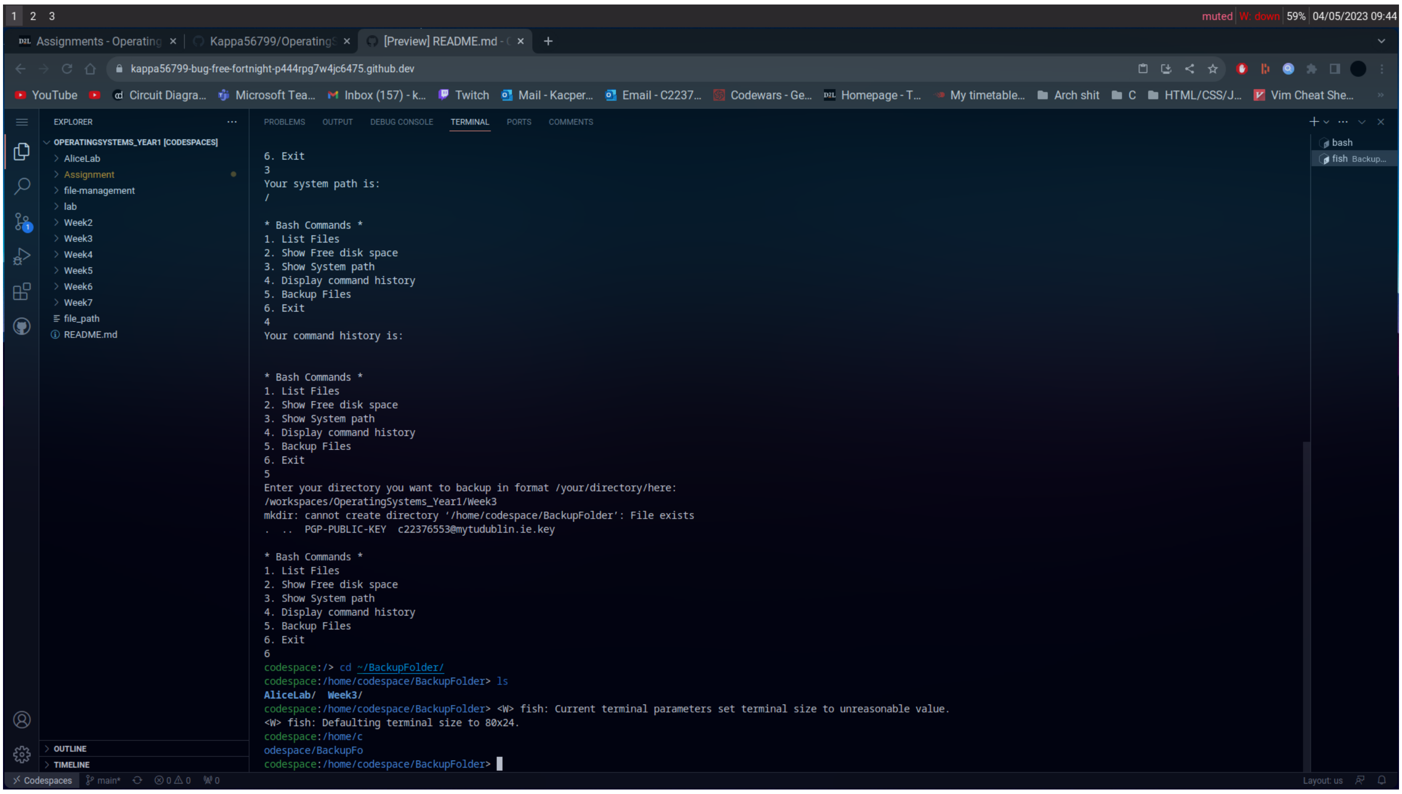


```
3. Show System path
4. Display command history
5. Backup Files
6. Exit
3
Your system path is:
/workspaces/OperatingSystems_Year1/Assignment

 * Bash Commands *
1. List Files
2. Show Free disk space
3. Show System path
4. Display command history
5. Backup Files
6. Exit
4
Your command history is:


 * Bash Commands *
1. List Files
2. Show Free disk space
3. Show System path
4. Display command history
5. Backup Files
6. Exit
5
Enter your directory you want to backup in format /your/directory/here:
/workspaces/OperatingSystems_Year1/AliceLab
.  ..  ChangingPermissions.png  ChangingPermissions2.png  Changingperms3.png

 * Bash Commands *
1. List Files
2. Show Free disk space
3. Show System path
4. Display command history
5. Backup Files
6. Exit
6
@Kappa56799 ➜ /workspaces/OperatingSystems_Year1/Assignment (main) $ cd ~/BackupFolder
@Kappa56799 ➜ ~/BackupFolder $ ls -a
.  ..  AliceLab
@Kappa56799 ➜ ~/BackupFolder $ cd -
/workspaces/OperatingSystems_Year1/Assignment
@Kappa56799 ➜ /wo
```

Directory 2

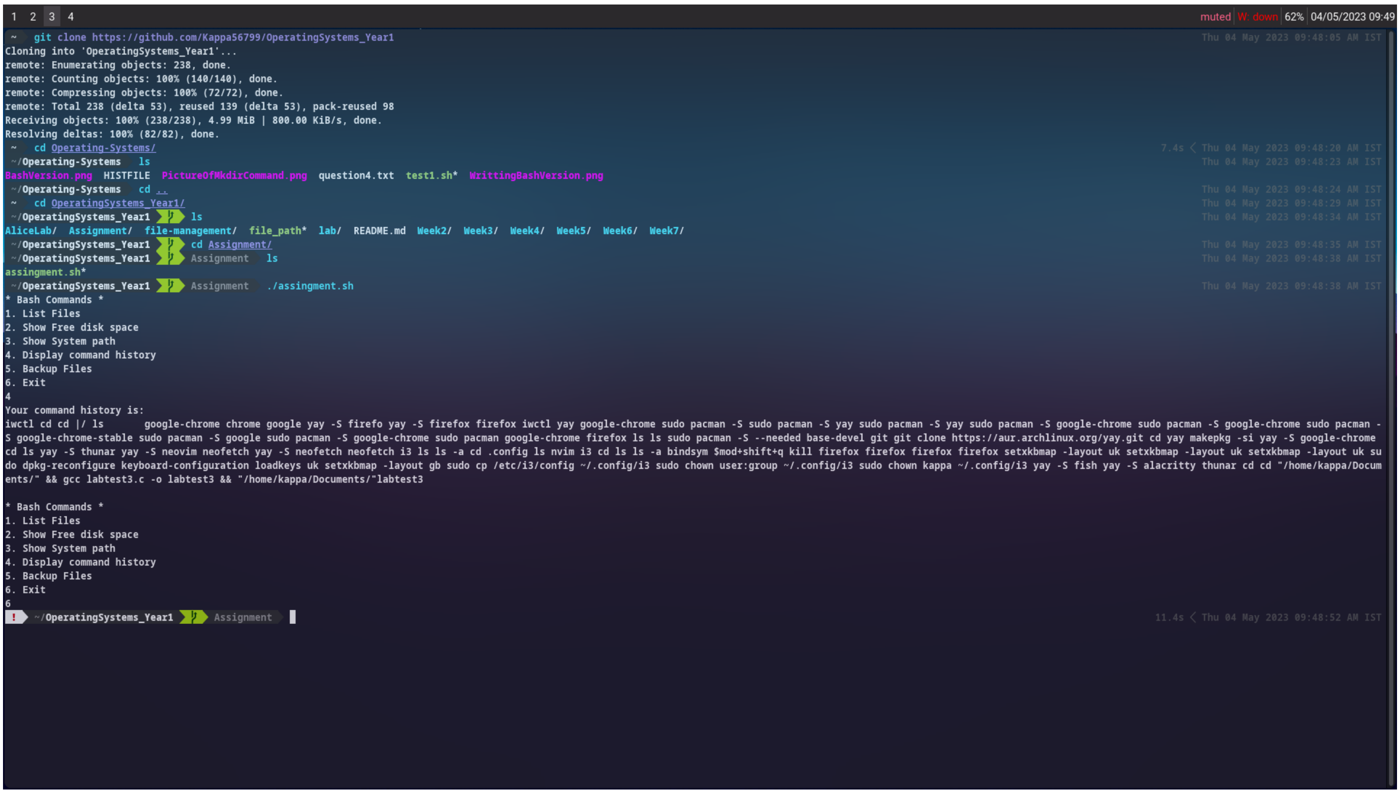


```
codespace:/> ls
bin@  boot/  dev/  etc/  go/  home/  lib@  lib32@  lib64@  libx32@  media/  mnt/  opt/  proc/  root/  run/  sbin@  srv/  sys/  tmp/  usr/  var/  vscode/  workspaces/
codespace:/> /workspaces/OperatingSystems_Year1/Assignment/assingment.sh
cat: /home/codespace/.bash_history: No such file or directory
* Bash Commands *
1. List Files
2. Show Free disk space
3. Show System path
4. Display command history
5. Backup Files
6. Exit
1
These are the current files in your directory:
.   .codespaces  .dockerenv  boot  etc  home  lib32  libx32  mnt   proc  run   srv  tmp  var     workspaces
..  .docker      bin         dev   go   lib   lib64  media   opt   root  sbin  sys  usr  vscode

* Bash Commands *
1. List Files
2. Show Free disk space
3. Show System path
4. Display command history
5. Backup Files
6. Exit
2
This is the amount of disk space you have left:
Filesystem      Size  Used Avail Use% Mounted on
overlay          32G   13G   18G  42% /
tmpfs            64M     0   64M   0% /dev
tmpfs           2.0G     0  2.0G   0% /sys/fs/cgroup
shm              64M     0   64M   0% /dev/shm
/dev/sdb1        29G   21G  8.0G  73% /usr/sbin/docker-init
/dev/loop0       32G   13G   18G  42% /workspaces
/dev/sda1        16G  808K   15G   1% /tmp

* Bash Commands *
1. List Files
2. Show Free disk space
3. Show System path
4. Display command history
5. Backup Files
6. Exit
3
Your system path is:
/
```



```
6. Exit
3
Your system path is:
/

* Bash Commands *
1. List Files
2. Show Free disk space
3. Show System path
4. Display command history
5. Backup Files
6. Exit
4
Your command history is:


* Bash Commands *
1. List Files
2. Show Free disk space
3. Show System path
4. Display command history
5. Backup Files
6. Exit
5
Enter your directory you want to backup in format /your/directory/here:
/workspaces/OperatingSystems_Year1/Week3
mkdir: cannot create directory '/home/codespace/BackupFolder': File exists
.  ..  PGP-PUBLIC-KEY  c22376553@mytudublin.ie.key

* Bash Commands *
1. List Files
2. Show Free disk space
3. Show System path
4. Display command history
5. Backup Files
6. Exit
6
codespace:/> cd ~/BackupFolder/
codespace:/home/codespace/BackupFolder> ls
AliceLab/  Week3/
codespace:/home/codespace/BackupFolder> <W> fish: Current terminal parameters set terminal size to unreasonable value.
<W> fish: Defaulting terminal size to 80x24.
codespace:/home/c
odespace/BackupFo
codespace:/home/codespace/BackupFolder>
```

Proof of history command Working



```
 ~  git clone https://github.com/Kappa56799/OperatingSystems_Year1
Cloning into 'OperatingSystems_Year1'...
remote: Enumerating objects: 238, done.
remote: Counting objects: 100% (140/140), done.
remote: Compressing objects: 100% (72/72), done.
remote: Total 238 (delta 53), reused 139 (delta 53), pack-reused 98
Receiving objects: 100% (238/238), 4.99 MiB | 800.00 KiB/s, done.
Resolving deltas: 100% (82/82), done.
 ~  cd Operating-Systems/
 ~/Operating-Systems  ls
BashVersion.png  HISTFILE  PictureOfMkdirCommand.png  question4.txt  test1.sh*  WrittingBashVersion.png
 ~/Operating-Systems  cd ..
 ~  cd OperatingSystems_Year1/
 ~/OperatingSystems_Year1  ls
AliceLab/  Assignment/  file-management/  file_path*  lab/  README.md  Week2/  Week3/  Week4/  Week5/  Week6/  Week7/
 ~/OperatingSystems_Year1  cd Assignment/
 ~/OperatingSystems_Year1  Assignment  ls
assingment.sh*
 ~/OperatingSystems_Year1  Assignment  ./assingment.sh
* Bash Commands *
1. List Files
2. Show Free disk space
3. Show System path
4. Display command history
5. Backup Files
6. Exit
4
Your command history is:
iwctl cd cd |/ ls       google-chrome chrome google yay -S firefo yay -S firefox firefox iwctl yay google-chrome sudo pacman -S sudo pacman -S yay sudo pacman -S yay sudo pacman -S google-chrome sudo pacman -S google-chrome sudo pacman -
S google-chrome-stable sudo pacman -S google sudo pacman -S google-chrome sudo pacman google-chrome firefox ls ls sudo pacman -S --needed base-devel git git clone https://aur.archlinux.org/yay.git cd yay makepkg -si yay -S google-chrome
cd ls yay -S thunar yay -S neovim neofetch yay -S neofetch neofetch i3 ls ls -a cd .config ls nvim i3 cd ls ls -a bindsym $mod+shift+q kill firefox firefox firefox firefox setxkbmap -layout uk setxkbmap -layout uk setxkbmap -layout uk su
do dpkg-reconfigure keyboard-configuration loadkeys uk setxkbmap -layout gb sudo cp /etc/i3/config ~/.config/i3 sudo chown user:group ~/.config/i3 sudo chown kappa ~/.config/i3 yay -S fish yay -S alacritty thunar cd cd "/home/kappa/Docum
ents/" && gcc labtest3.c -o labtest3 && "/home/kappa/Documents/"labtest3

* Bash Commands *
1. List Files
2. Show Free disk space
3. Show System path
4. Display command history
5. Backup Files
6. Exit
6
 !  ~/OperatingSystems_Year1  Assignment
```

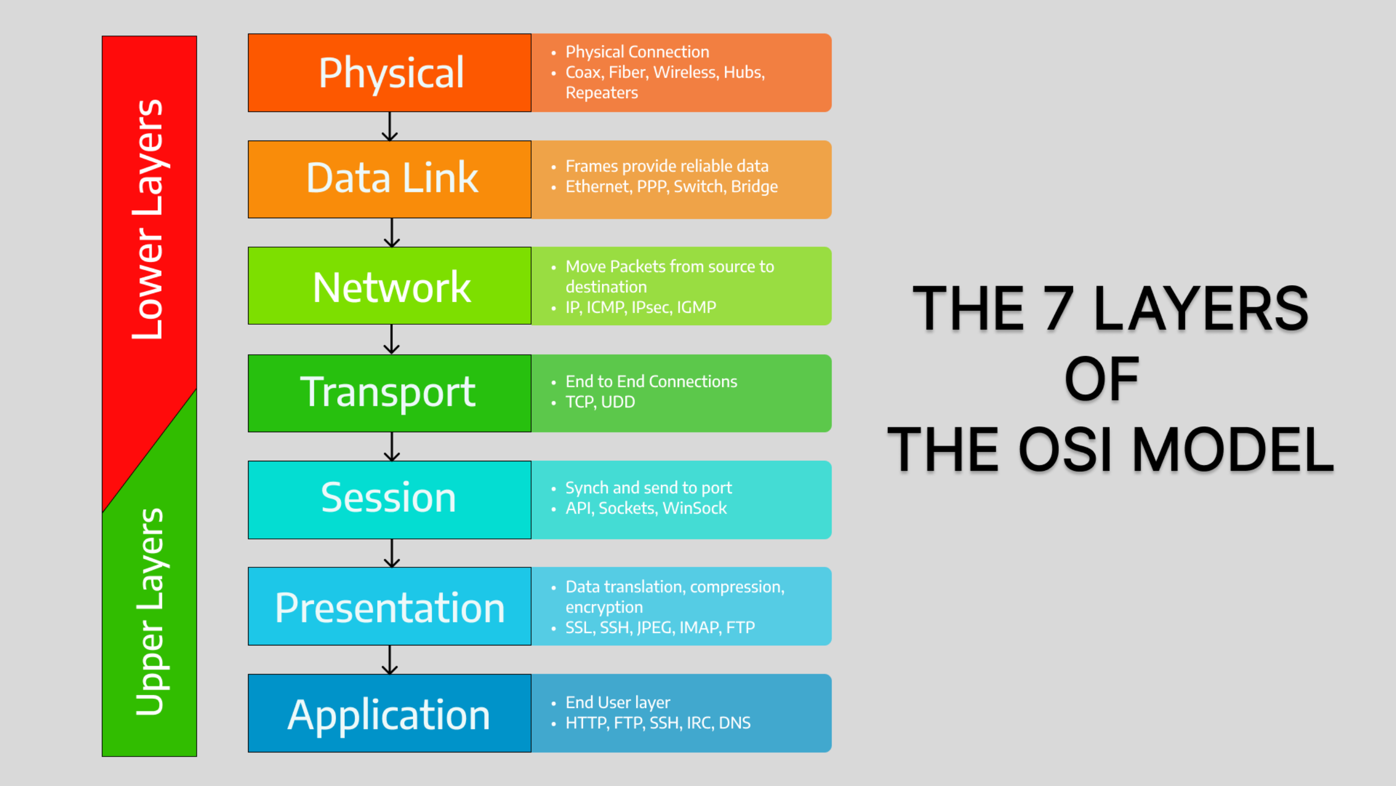
Discussion

I figured out how to make this work as I have previous experience

using many linux distros and building them from scratch. I also used man pages to figure out that df -h the h shows it in more of a human form allowing us to read it and remembered most of the commands that we had to use in the labs. The first thing I did was make a menu showing the user all the options, I used echo for this to print the menu instead of using printf as I didn’t need to use a new line character (\n) in this part of the menu and I added a shebang (#!) to allow the system to run the program by knowing where the path of bash is. Next thing I did was set-up a loop to allowing the menu to be presented until the user decides to quit. I used while True to allow the loop to run forever until the user exits by pressing 6. After creating a while loop, I added read to allow us to read in user input from the terminal which will be used in a case statement later on. Next I made a Case statement which works exactly like a switch statement in most other languages, I allowed for 6 inputs and a default case which is noted as *) to process any invalid input. We use $input for the case to tell the computer the path to our input variable that we read from before. Now we start filling out the case statement, the first option lists all files in the directory you are currently in. We put echo at the end of every case statement to print a blank line to make the menu easier to read. We use 1 semicolon(;) to allow the computer to read multiple commands and we use 2 semicolons (;;) to tell the computer the end of the case statement. The 2nd input in the case I used the man pages and found df -h prints out all the data we need anout disk space on our computer. -h allows us to have it in (human form) to make it easier to read and understand. The 3rd input shows the current directory we are in using pwd (power-working-directory). This just displays the path displaying all directories we are in up to the one we are in. The 4th input shows the command history, I did this by using cat to display the output of a file called .bash_history. This file .bash_history is found on all linux systems but for some reason it doesn’t work using the codespace. I have attached a picture from my Arch Linux OS to prove it works and that codespace dosent allow the command to run. I made read contents of the .bash_history file be assigned to a variable to allow us to use echo to print it in the 4th case statement. The 5th case statement to backup a directory I firstly read the users input of the folder they want to backup, make a new directory called BackupFolder in the home directory (I used the tilda (~/) as this allows this script to work on linux operating systems aswell as the codespace), then I enter the BackupFolder directory and copy all the contents the user wanted to backup recursively by using cp (copy) and -r (recursively) into ~/BackupFolder. I used -r as it will continue copying files over until it does every single one in the folder the user specified from before. The last thing in the 5th statement is I use ls -a in the BackupFolder to show the folder the user wanted saved works. In the 6th statement to quit the program all I used was exit 1 as this exit type quits the program. The default case or (*)) prints an error message if the user inputs anything that isnt meant to be inputted.

Question 2

OSI Model Infographic



Lower Layers

Upper Layers

Physical
- Physical Connection
- Coax, Fiber, Wireless, Hubs, Repeaters

Data Link
- Frames provide reliable data
- Ethernet, PPP, Switch, Bridge

Network
- Move Packets from source to destination
- IP, ICMP, IPsec, IGMP

Transport
- End to End Connections
- TCP, UDD

Session
- Synch and send to port
- API, Sockets, WinSock

Presentation
- Data translation, compression, encryption
- SSL, SSH, JPEG, IMAP, FTP

Application
- End User layer
- HTTP, FTP, SSH, IRC, DNS

THE 7 LAYERS
OF
THE OSI MODEL

Question 3

Fill the following sections when applicable.

Script

```
-----BEGIN PGP PUBLIC KEY BLOCK-----



mQINBGPjkaUBEADqi1MegCpWc112SJAPR9V1AFD8T0Ry6upfkqUBh
l+nmdUArkwT

66wkb+bza3u4qwyc1U7v+3QZifrMBvTToIcn4cZ1mx9OrIw557Lqn
4/f0XvIhZlU

cM0k9NWA9d/
k9YgqFk8WYLqcpJERERqXtg380WSOQqR3H3RBT350anNDI5ziSFxA

/9DC3lrfqTzP/
K8LridUavkBqnUdYUeICukokgmQOouE9TD0mgHlPZf7UKsfDBf6

PJjW6Ri7esF5ObWfCG3Bx6Z9txRTNnP/
4aSl0LX1IbdgOLFx+bcvb4Sa8WyuMd2s

yhke3KBlhGO2ehoKRHgkQdW4MUf7eQUNf8+QVrVQPMwFD36+GdhLR
5dIQ3zt2IKj

RpymeEQEnCmDadD3b1FFZ0LSXmu6kyi9MeRggW0tcCqGaEY+Nv9d2
IDnRFot8Jp1

rU83P6NOQIEzTOdYa8c3CtNxm91p+VSQxnjfd6ZACZHG/
BrxKd9xbTDjz54o8ydT

BT4YyynY2Jsfq+gqoJbHXfvNWhiJ+/
h4STk+pV65EkXidgpeZXnm0lCWONTDK5pm

TaGlzOjCD9J91/4YW8EozTnfhYrS8DGSkxHhgMTGuhnf3fXGmH2Vk
NhjU4EjY+u8

71p9KxHJbNUf00BP4sQqC/
+GgtehhZ4RcH+1jRkJqvkkm8SODpqluKca2QARAQAB

tCZLYWNwZXIgUGFsa2EgPGMyMjM3NjU1M0BteXR1ZHVibGluLmllP
okCVAQTAQgA
```

```
PhYhBFtaLzvG4PSbMD1o/
Z7d6gcFdHDvBQJj45GlAhsDBQkAJ40ABQsJCAcCBhUK

CQgLAgQWAgMBAh4BAheAAAoJEJ7d6gcFdHDvCo0P/
i9ET74RF7M4giNUzh2yQzqO

Jg9ln0XZJHTe6UhH1DKkdjEHJGdwjGJDT8eMUYCjqgsDizW3gggcu
F4SroIJVpLK

84rskB5lHk6fwKt6b4SE/
dQdqfAYI4f0ft344DVW1pDZ7MJvf+EntfDsnFW9k+Sj

66WypNJJIrKMa8UCChL81aTcGBER69J/
LPb6fxUoSW0SxBdIHprCVtljPb7D/gvU

jipOaKpWrFaQbwyigPWPRHeT0qj+9uNXYww5BTIoO3RP6LbtXiLOV
J1jl2MlM6Oc

34eI5EiF/FeYmTVOWh0lKaroONECFylll/OEyAR/
GGNIRMz1deInL8nhjyj7dVBR

bUuvXhsQfBPmXECVEw8wY4jUU/nEY1QTww7tPBbEzfPuDg+
+t2VdWDhHkIgWh0wm

NTh3h0aMfdzEzhkDHpRl8oD9R40f/
CJ6xL1y0KX1/2eyD264l6wYHaS63ZxmKxZb

SpjwQWynZQAhqoZw2XR1hA6DIHYNEdRgYxljP4l1S2eMLICnfPrNm
XDwfKy1Lbt3

R8jbibL326WXkA2p1/2qYeUmyRcpASz+imk0VKSE5WAb9aN5o6ZF0
mScSwkW4M1l

yELxXvohe18AmgynRSQxWTvbeJaK0oRjErZwoKQ+1d7KX5eFQrFwt
74XgdY/ago2

7cIz8blphMpfFaCBmy4AuQINBGPjkaUBEAC5ql8zxsuwtOwUmyN11
uiK1mGmSyRi

dpkM8aLEVnc08yXdWSo+xXfe29zp7ppn0rjKCOHuNsLxvK8iOKPyX
TfGLfqx/k/U

fOkLN7gStQfUubZP9NuwLMgkeW4CNameLIbi1muMq3H9Iz1DEiuR2
y83W9pPPt8m

UQ9h0Wn5+9a6nnl6KD49gxJzm6DuspN6zwQjhG8jcDCb40TF6ui+B
xYSl+noP8Lc
```

3SXWZ1Hqw8ojCgFtyk0khBtMeFK0mPJLEGqFqSyBk0Ew69xmaN5UX
emwmed02O9+

Lr0AYxqMT7S7Ln0ZrFZCPXCWvhKW4a2LsSCiSy/
7NBp+AuvCDXoW9afpSXaGdglf

3CuQseTd390xkH9+lZ1bv4OUXUeOwqmmITi8B761xIy3armUeBJ/
TRiWEHLilpkb

c7aT8t0gLcb/
ccKssE1O3vdF3d8Q48OObJ6AR00egHaALASYjvfSyOwWYMCQA5ph

xpUz02VNX5KypKTLNoz659lD2YDJpLTZgUrJDBEI9JsWSeQQhtG70
B7YgCbb3vqd

XhNCYoeiT8w9MFe4ZAWFvaX5xURMrKppshhMz43U8RwEs0rh9H/
x8ZQ2HgHww+n6

hR98sH69V0QcsIhX/hxPNfAr3lDYEHxi1vGgz/
BNcbE1swgmTu6OREWhs53PnGBy

1jWJhGL83oycxwARAQABiQI8BBgBCAAmFiEEW1ovO8bg9JswPWj9n
t3qBwV0cO8F

AmPjkaUCGwwFCQAnjQAACgkQnt3qBwV0cO8mrA//SV2A/
D5CUS93kXCG7gKoHPYN

IJg3EJq8oWrTrLtZdaWmOA+xMEqcG/ZHRSlet9F5Xuf2RVYBiQ/
thQEWUNArIgxK

pKyHEnFRER5gd/
eDWeZIbYAfZXXi9gXXcxBR9GTSzMsNHSJ1tTWf9P9wP/VtiP9C

QPO7p5saWpBn/FU3UNljbevEiJY7Qs2yr8OxsTKa/
3G01kHUbR6C+9IryUi2XW9B

v1JMj7D3Suw6OeN83IWE/7rQ/
3heuo7K2WLEqmSvzV2gAkW5NTCfv7R+ua8p+CP5

VuKg0LAPPIHfYVe0MRJJ5M8CUf86kolYOBJqLbd3ShEkP6cGGk2pg
D+EZ7dfuAdw

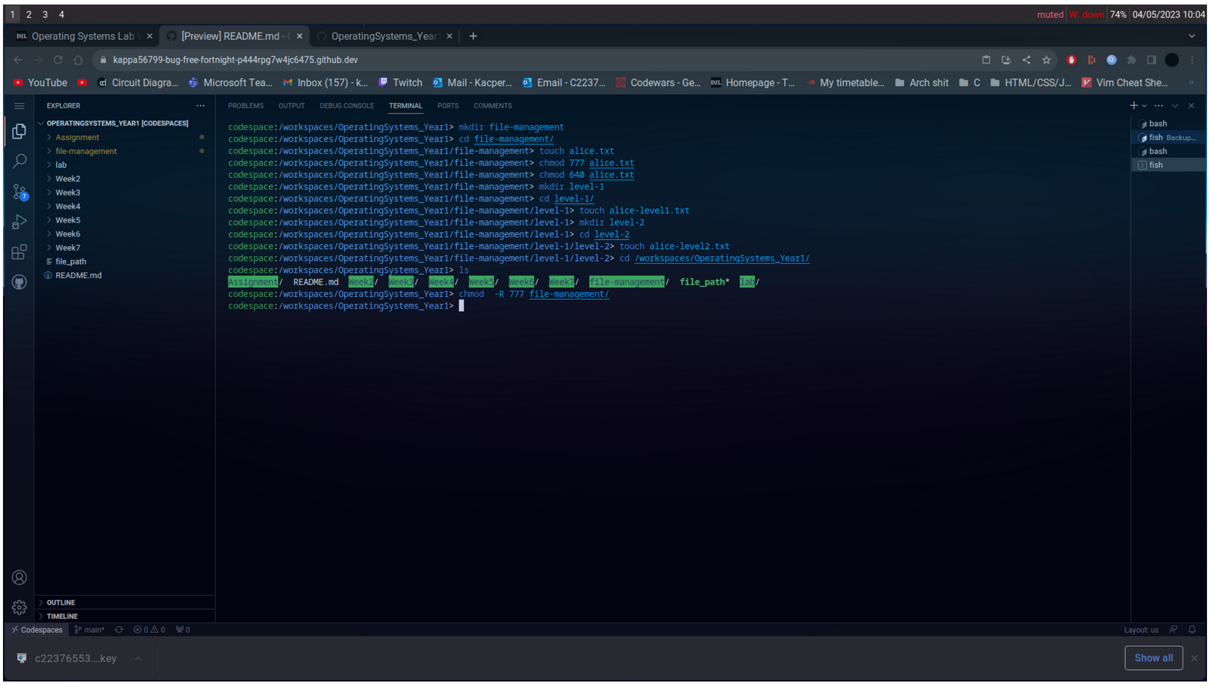
iByX410SS80iJAmCERiJGEMwiM/
Pd2WcMnfS2GW2HolOwXQ4acp17YU4hDTvjd6e

sDfo6xpn1u0El/Q81TLII8UVTjPRPBynNH09/
WMYMIdR93Dk8TDVjMkX8hasd+kW

```
Vf2wPmYrdWw2o/
bHLQqKDqC8WjBuD6AvYKz7MtqdntXThzRUzmGp5GoT0ijkksUS

Rw7LkYy07nWCTfxLURqIo9pT+CrQKCUnhU1L36TYLuNbRgUHoJY2A
gh6wqze5TMg

8KOIsYmSPAtSBkQtqSzzX425LnA7CYEB/
1hKNdgfqNxXyRS9aTh017RFYFVl/V5s

UdeZeqqKCZzMsujbtZI=

=DO+f



-----END PGP PUBLIC KEY BLOCK-----
```

Screengrab

Alice Lab Pictures



```
codespace:/workspaces/OperatingSystems_Year1> mkdir file-management
codespace:/workspaces/OperatingSystems_Year1> cd file-management/
codespace:/workspaces/OperatingSystems_Year1/file-management> touch alice.txt
codespace:/workspaces/OperatingSystems_Year1/file-management> chmod 777 alice.txt
codespace:/workspaces/OperatingSystems_Year1/file-management> chmod 640 alice.txt
codespace:/workspaces/OperatingSystems_Year1/file-management> mkdir level-1
codespace:/workspaces/OperatingSystems_Year1/file-management> cd level-1/
codespace:/workspaces/OperatingSystems_Year1/file-management/level-1> touch alice-level1.txt
codespace:/workspaces/OperatingSystems_Year1/file-management/level-1> mkdir level-2
codespace:/workspaces/OperatingSystems_Year1/file-management/level-1> cd level-2
codespace:/workspaces/OperatingSystems_Year1/file-management/level-1/level-2> touch alice-level2.txt
codespace:/workspaces/OperatingSystems_Year1/file-management/level-1/level-2> cd /workspaces/OperatingSystems_Year1/
codespace:/workspaces/OperatingSystems_Year1> ls
Assignment/  README.md  Week2/  Week3/  Week4/  Week5/  Week6/  Week7/  file-management/  file_path*  lab/
codespace:/workspaces/OperatingSystems_Year1> chmod  -R 777 file-management/
codespace:/workspaces/OperatingSystems_Year1> 
```

Discussion For Alice Lab

So first I made the file using touch, then I gave the alice.txt file read, write and executable permissions using chmod 777. Then to make the file read and write only to user and to group I used chmod 640 which I got the numbers from a table I found on the internet. Then the last thing I did was chmod -R 777 file-management to give every single file and folder all permissions. This works recursively (-R).

System Report

```
MemTotal:       4026548 kB
MemFree:         222968 kB
MemAvailable:    2599732 kB
Buffers:         429112 kB
Cached:          2080228 kB
SwapCached:            0 kB
Active:          1973152 kB
Inactive:        1510060 kB
Active(anon):     974644 kB
Inactive(anon):      328 kB
Active(file):     998508 kB
Inactive(file):  1509732 kB
Unevictable:        2468 kB
Mlocked:            2468 kB
SwapTotal:             0 kB
SwapFree:              0 kB
Dirty:               388 kB
Writeback:             0 kB
AnonPages:        952656 kB
```

```
Mapped:          414300 kB

Shmem:              920 kB

KReclaimable:     163408 kB

Slab:            233100 kB

SReclaimable:     163408 kB

SUnreclaim:       69692 kB

KernelStack:       7436 kB

PageTables:       16108 kB

NFS_Unstable:         0 kB

Bounce:               0 kB

WritebackTmp:         0 kB

CommitLimit:     2013272 kB

Committed_AS:    3979584 kB

VmallocTotal:   34359738367 kB

VmallocUsed:       33848 kB

VmallocChunk:         0 kB

Percpu:            1536 kB

HardwareCorrupted:     0 kB

AnonHugePages:    249856 kB

ShmemHugePages:        0 kB

ShmemPmdMapped:        0 kB

FileHugePages:         0 kB

FilePmdMapped:         0 kB

CmaTotal:              0 kB
```

```
CmaFree:               0 kB
HugePages_Total:       0
HugePages_Free:        0
HugePages_Rsvd:        0
HugePages_Surp:        0
Hugepagesize:       2048 kB
Hugetlb:               0 kB
DirectMap4k:      171968 kB
DirectMap2M:     4022272 kB
DirectMap1G:     2097152 kB
%Cpu(s):  3.2 us,  4.4 sy,  0.0 ni, 92.4 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
```

Question 4

Fill the following sections when applicable.

Script

Commands in linux

A)To make a directory in home in linux you can use the following two commands where the username is the name the user has given to themeselves while making their user login on the computer:

```
  mkdir ~/TUDOP or mkdir /home/username/TUDOP
```

B)To make a file in the directory we just created we do the following:

```
cd ~/TUDOP or cd /home/username/TUDOP to enter our directory

touch File1.txt
```

C)To check the size of a File1.txt we need to do the following:

Ensure we are in the directory of the file in this case we do:

```
  cd ~/TUDOP or cd /home/username/TUDOP

  du -h file1.txt
```

D)To change the modification time of a file we do the following in linux:

Ensure we are in the correct directory of the file which we do:

```
  cd ~/TUDOP or cd /home/username/TUDOP
```

then we can change the files modification time with:

```
  touch -t 202311241111 File1.txt
```

the time format is in YYYYMMDDHHMM where Y is years, M is months, D is days, H is hours and the last M is minutes.

E) First we need to create the file called File2.txt as follows:

```
  touch File2.txt
```

then we use the command echo -e or printf to add lines of text into the file as follows:

```
echo -e "This is line 1!\n This is line 2\nThis is line 3!" >> File2.txt
```

  or

```
printf "This is line1!\nThis is line 2\nThis is line 3!" >> File2.txt
```

F)To just print out one line in linux we can use the following commands:

```
  awk 'NR==1' File1.txt
```

you can replace the 1 with any number you like in this case it will only display line one of the file. NR stands for number of records(number of lines).

You can also use the command sed to only display 1 or any lines of text you want:

```
  sed -n 1p File1.txt for 1 line
```

for multiple lines you want you would use this below:

```
  sed -n -e 1p -e 2p File1.txt
```

G)To Append the content of a text file to another text file we do the following:

```
  cat File1.txt >> File2.txt
```

This will append everything from File1.txt to File2.txt

H)To make a directory in home in linux we can use the two following two commands where the username is the name the user has given to themselves while making their user login on the computer:

```
  mkdir ~/TUDOP_new_semester or mkdir
/home/username/TUDOP_new_semester
```

I)To copy files over from one directory to the other in linux we use the following command:

```
  cp -r ~/TUDOP/File1.txt ~/TUDOP/File2.txt
~/TUDOP_new_semester
```

  or

```
cp -r /home/username/TUDOP/File1.txt
/home/username/TUDOP/File2.txt

/home/username/TUDOP_new_semester
```

J) There is multiple ways of deleting files and folders but the easiest way is as follows:

```
  rm -rf ~/TUDOP or rm -rf /home/username/TUDOP
```

this forces the computer to remove all files and folders found inside it and the folder itself -r is a loop which keeps removing files and -f is to force the delete.