2022

LAB MANUAL

SUBMITTED BY:

RAIFA KHALID (024)

TOOBA KHALIQUE (031)

LAIBA KANWAL (014)

LAB 02

Task # 1

Verify that you are in your home directory.

```
laiba014@ubuntu:~$ pwd
/home/laiba014
```

Make the directory FIRST using the following command. List the files in the current directory to verify that the directory FIRST has been made correctly.

```
laiba014@ubuntu:~$ mkdir First
laiba014@ubuntu:~$ ls
Desktop  Documents  Downloads  examples.desktop  First  Music  Pictures  Public  Templates  Videos
```

Change directories to LABS. Create the file named file1

```
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

laiba014@ubuntu:~$ pwd
/home/laiba014
laiba014@ubuntu:~$ mkdir First
laiba014@ubuntu:~$ ls
Desktop  Documents  Downloads  examples.desktop  First  Music  Pictures  Public  Templates  Videos
laiba014@ubuntu:~$ mkdir labs
laiba014@ubuntu:~$ cd labs
laiba014@ubuntu:~/labs$ cat >file1
hellow
laiba014@ubuntu:~/labs$
laiba014@ubuntu:~/labs$ cat file1
hellow
laiba014@ubuntu:~/labs$
```

List the contents of the file file1 to the screen.

```
laiba014@ubuntu:~/labs$ cat file1
hellow
laiba014@ubuntu:~/labs$ ls
file1
laiba014@ubuntu:~/labs$
```

Make a copy of the file file1 under the name file2.Verify that the files file1 and file2 both exist.

```
aiba014@ubuntu:~/labs$ cp /home/laiba014/labs/file1 /home/laiba014/labs/file2
aiba014@ubuntu:~/labs$ ls
file1  file2
aiba014@ubuntu:~/labs$
```

List the contents of both file1 and file2 to the monitor screen.

```
laiba014@ubuntu:~/labs$ ls -al
total 16
drwxrwxr-x  2 laiba014 laiba014 4096 Oct  9 07:54 .
drwxr-xr-x 17 laiba014 laiba014 4096 Oct  9 07:42 ..
-rw-rw-r--  1 laiba014 laiba014   13 Oct  9 07:42 file1
-rw-rw-r--  1 laiba014 laiba014   13 Oct  9 07:54 file2
laiba014@ubuntu:~/labs$
```

Then delete the file file1.Clear the window.

```
laiba014@ubuntu:~/labs$ rm file1
laiba014@ubuntu:~/labs$ clear
```

Rename file2 to thefile.

```
laiba014@ubuntu:~/labs$ mv file2 thefile
laiba014@ubuntu:~/labs$
```

Copy thefile to your home directory. Remove thefile from the current directory.

```
laiba014@ubuntu:~/labs$ cp /home/laiba014/labs/thefile /home/laiba014/
laiba014@ubuntu:~/labs$ rm thefile
laiba014@ubuntu:~/labs$
```

Copy thefile from your home directory to the current directory. Change directories to your home directory. Remove thefile from your home directory and from directory LABS. Verify thefile is removed from the directory LABS. Remove the directory LABS from your home directory with the following command. Verify that thefile and LABS are gone from your home directory.

```
laiba014@ubuntu:~/labs$ mv file2 thefile
laiba014@ubuntu:~/labs$ cp /home/laiba014/labs/thefile /home/laiba014/
laiba014@ubuntu:~/labs$ rm thefile
laiba014@ubuntu:~/labs$ cp /home/laiba014/thefile /home/laiba014/labs
laiba014@ubuntu:~/labs$ cd
laiba014@ubuntu:~$ rm thefile
laiba014@ubuntu:~$ cd
laiba014@ubuntu:~$ rm -r labs
```

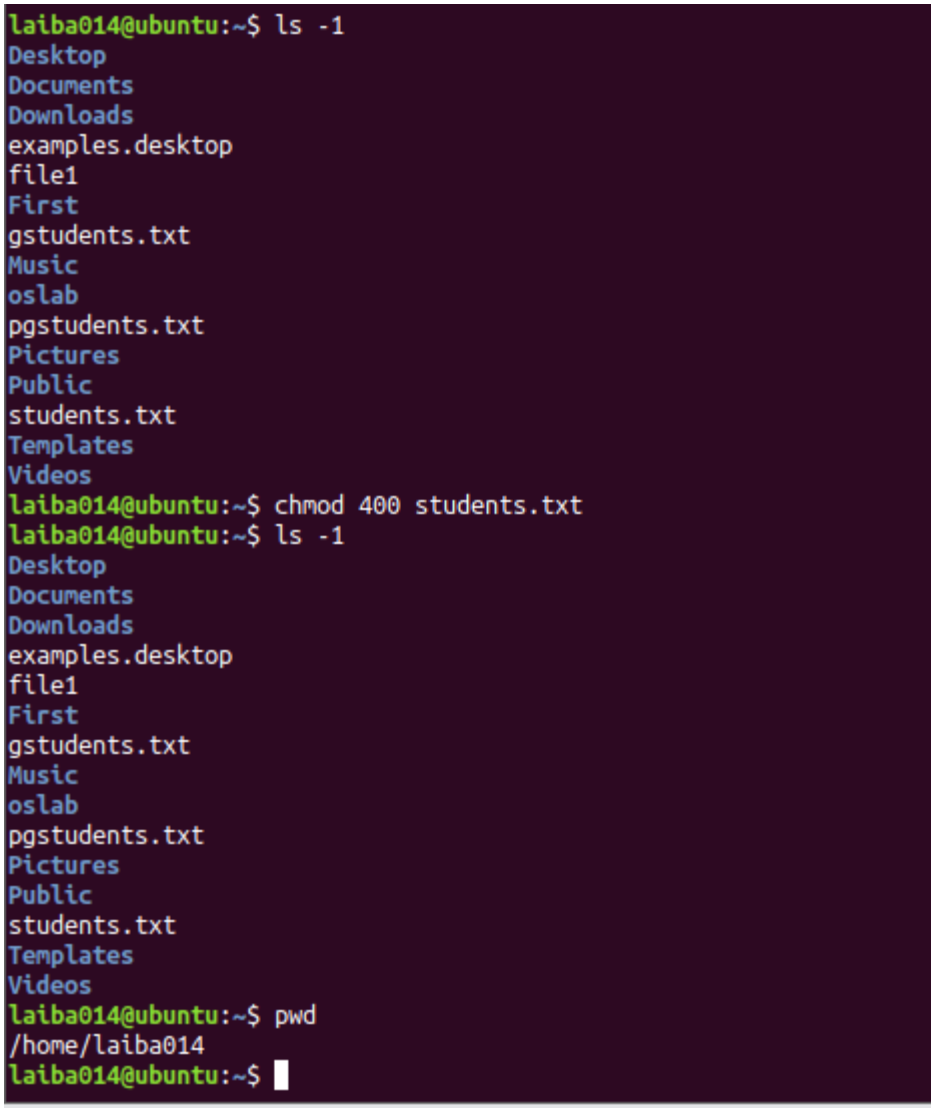
LAB 03

Task # 1

Create file name students.txt, gstudent.txt, pgstudents. Enter students' names in gstudent.txt and pgstudent.txt. Now create directory having name OSLAB and copy all files to this directory. Now append the file students.txt with first five sorted names from pstudent.txt and last five sorted names from gstudent.txt. Then show the contents of sorted names from file students.txt. Change the permissions of file students.txt read only and both other files read and execute only.

```
laiba014@ubuntu:~$ pwd
/home/laiba014
laiba014@ubuntu:~$ cat >students.txt
laiba014@ubuntu:~$ cat >gstudents.txt
halima
arfa
hiba
amna
faiza
sawera
mahnoor
rubab
raifa
iqra
ayesha
laiba014@ubuntu:~$ cat >pgstudents.txt
saad
ahad
moaz
ammar
faiq
hazik
wasay
muneeb
wajeeh
zain
dua
laiba014@ubuntu:~$ mkdir oslab
mkdir: cannot create directory ‘oslab’: File exists
laiba014@ubuntu:~$ mkdir oslab
laiba014@ubuntu:~$ cp
cp: missing file operand
Try 'cp --help' for more information.
laiba014@ubuntu:~$ cp /home/laiba014/students.txt /home/laiba014/oslab
laiba014@ubuntu:~$ cp /home/laiba014/gstudents.txt /home/laiba014/oslab
laiba014@ubuntu:~$ cp /home/laiba014/pgstudents.txt /home/laiba014/oslab
```

```
laiba014@ubuntu:~$ mkdir oslab
laiba014@ubuntu:~$ cp
cp: missing file operand
Try 'cp --help' for more information.
laiba014@ubuntu:~$ cp /home/laiba014/students.txt /home/laiba014/oslab
laiba014@ubuntu:~$ cp /home/laiba014/gstudents.txt /home/laiba014/oslab
laiba014@ubuntu:~$ cp /home/laiba014/pgstudents.txt /home/laiba014/oslab
laiba014@ubuntu:~$ head -n5 pgstudents.txt >> students.txt
laiba014@ubuntu:~$ tail -n5 gstudents.txt >> students.txt
laiba014@ubuntu:~$ sort students.txt
ahad
ammar
ayesha
faiq
iqra
mahnoor
moaz
raifa
rubab
saad
laiba014@ubuntu:~$ ls -1
Desktop
Documents
Downloads
examples.desktop
file1
First
gstudents.txt
Music
oslab
pgstudents.txt
Pictures
Public
students.txt
Templates
Videos
```


laiba014@ubuntu:~$ ls -1
Desktop
Documents
Downloads
examples.desktop
file1
First
gstudents.txt
Music
oslab
pgstudents.txt
Pictures
Public
students.txt
Templates
Videos
laiba014@ubuntu:~$ chmod 400 students.txt
laiba014@ubuntu:~$ ls -1
Desktop
Documents
Downloads
examples.desktop
file1
First
gstudents.txt
Music
oslab
pgstudents.txt
Pictures
Public
students.txt
Templates
Videos
laiba014@ubuntu:~$ pwd
/home/laiba014
laiba014@ubuntu:~$

LAB 04

Task # 1

Write shell script as follows:

```
cat > trmif
#
# Script to test rm command and exist status
# if rm $1 then echo
"$1 file deleted" fi
Press Ctrl + d to save
$ chmod 755 trmif
```

```
raifa@ubuntu:~$ cat >foo
this file exist
raifa@ubuntu:~$ cat >trmif
if rm $1
then
echo "$1 file deleted"
fi
raifa@ubuntu:~$ chmod 755 trmif
```

Answer the following question in reference to above script:

1. foo file exists on your disk and you give command, $ ./trmfi foo what will be output?

```
raifa@ubuntu:~$ ./trmif foo
foo file deleted
```

2. If bar file not present on your disk and you give command, $ ./trmfi bar what will be output?

```
raifa@ubuntu:~$ ./trmif bar
rm: cannot remove 'bar': No such file or directory
```

3. And if you type $ ./trmfi What will be output?

```
raifa@ubuntu:~$ ./trmif
rm: missing operand
Try 'rm --help' for more information.
```

Task # 2

Write a shell script that computes the gross salary of an employee according to the following:

1) **if basic salary is <1500 then HRA=10% of the basic salary.**

2) **if basic salary is >1500 then HRA=20% of the basic salary.**

```
raifa@ubuntu:~$ vi gsalary.sh
raifa@ubuntu:~$ cat gsalary.sh
echo "Enter the basic salary:"
read bs
if [ $bs -lt 1500 ]
then
gs=$((bs+(bs/100)*10))
echo "gross salary: $gs"
fi
if [ $bs -gt 1500 ]
then
gs=$((bs+(bs/100)*20))
echo "gross salary: $gs"
fi
raifa@ubuntu:~$ chmod 777 gsalary.sh
raifa@ubuntu:~$ ./gsalary.sh
Enter the basic salary:
25000
gross salary: 30000
```

Task # 3

Write a shell script to ADD two numbers taken from argument?

Note: show error if no argument or more than 2 arguments are passed

$ ./ADD 5 6

Output : Sum of 5 and 6 = 5+6 = 11

```
raifa@ubuntu:~$ vi ADD
raifa@ubuntu:~$ chmod 755 ADD
raifa@ubuntu:~$ cat ADD
Addition of 2 numbers
sum=$(($1+$2))
echo "sum of 2 numbers : ($1+$2) = $sum"
raifa@ubuntu:~$ ./ADD
./ADD: line 1: Addition: command not found
./ADD: line 2: +: syntax error: operand expected (error token is "+")
sum of 2 numbers : (+) =
raifa@ubuntu:~$ ./ADD 6 2
./ADD: line 1: Addition: command not found
sum of 2 numbers : (6+2) = 8
raifa@ubuntu:~$ ./ADD 4 2 8
./ADD: line 1: Addition: command not found
sum of 2 numbers : (4+2) = 6
```

LAB 05

Task # 1

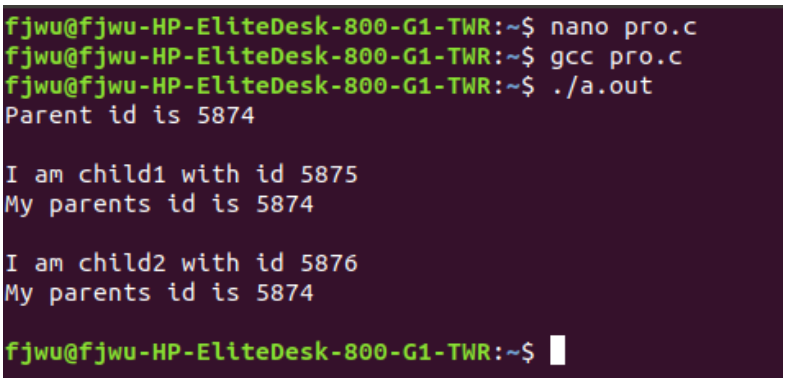
Write a program using fork () system call to create two child of the same process i.e., Parent P having child process P1 and P2.

CODE:

```
#include<stdio.h>
#include<unistd.h>
#include<sys/types.h> int main()
{
pid_t p1, p2;

printf("Parent id is %d\n",getpid());
printf("\n"); p1= fork(); if (p1 == 0)
{
printf("I am child1 with id %d\n",getpid()); printf("My
parents id is %d\n",getppid()); printf("\n");
}
else
{
```

```
p2 = fork(); if (p2 ==
0)
{
printf("I am child2 with id %d\n",getpid()); printf("My
parents id is %d\n",getppid()); printf("\n");
}
else
{
sleep(1);
}
}
}
```

OUTPUT:



Task # 2

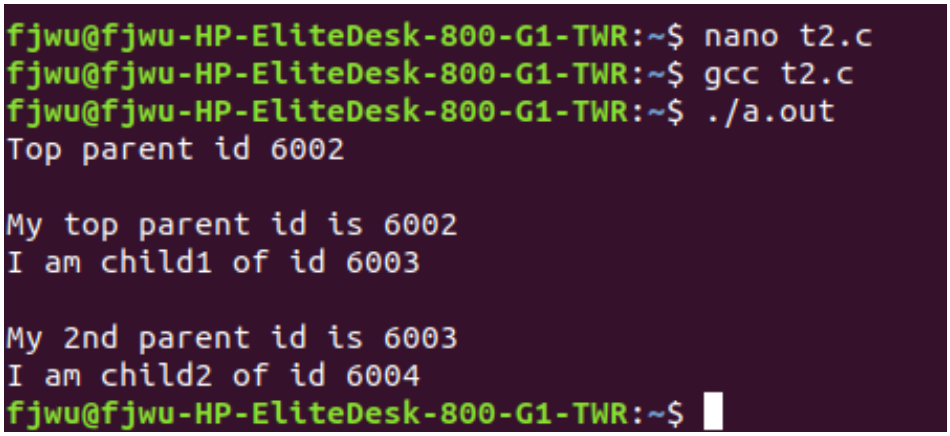
Write a program using fork() system call to create a hierarchy of 3 process such that P2 is the child of P1 and P1 is the child of P.

CODE:

```
#include<stdio.h>
#include<unistd.h> #include<sys/types.h>
int main() {
pid_t parent, child;
printf("Top parent id %d\n", getpid());
printf("\n"); parent =
fork(); if (parent == 0 )
```

```
{ printf("My top parent id is %d\n", getppid());
printf("I am child1 of id %d\n", getpid());
printf("\n"); child = fork(); if(child == 0)
{ printf("My 2nd parent id is %d\n", getppid());
printf("I am child2 of id %d\n", getpid());

}
} else { sleep
(1);
}
}
}
```

OUTPUT:



LAB 06

Task # 1

Write a program to read a maximum of 15 characters from the user and print them on the screen.

```
 GNU nano 4.8
#include<unistd.h>
int main()
{
char buff[20];
read(0,buff,15);

write(1,buff,15);
}
```

OUTPUT:

```
~$ nano char.c
~$ gcc char.c
~$ ./a.out
my name is raifa
my name is raif~$ a
bash: a: command not found
~$
```

Task # 2

Write a program to print the count of characters read by the read() system call.

```
 GNU nano 4.8
#include<unistd.h>
int main()
{
int count;
count=write(1,"raifa\n",0);
printf("Total number of bytes : %d\n",count);
}
```

```
^G Get Help    ^O Write Out   ^W Where Is    ^K Cut Text
^X Exit        ^R Read File   ^\ Replace     ^U Paste Tex
```

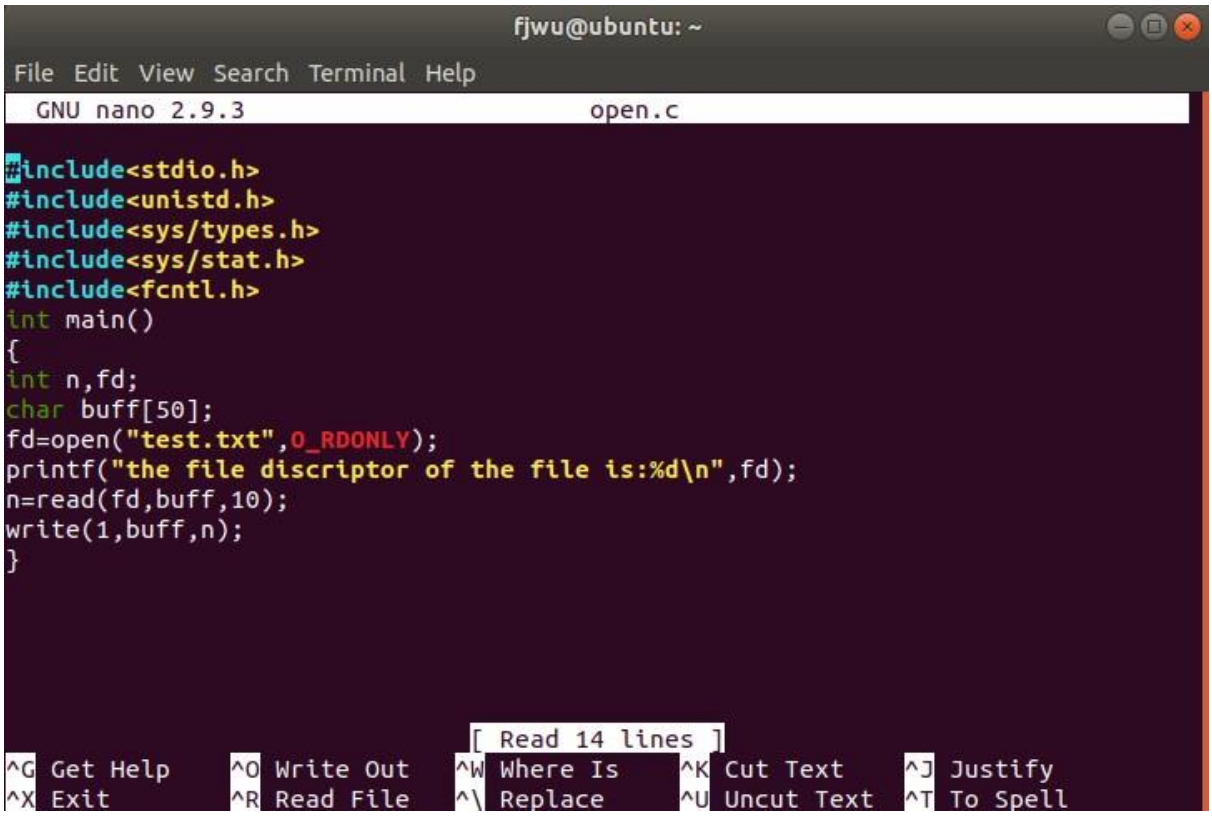
OUTPUT:

```
~$ nano w.c
~$ gcc w.c
~$ ./a.out
Total number of bytes : 0
~$
```

LAB 07

Task # 1

Write a program to read the contents of file F1 into file F2. The contents of file F2 should not get deleted or overwritten. hint: use O_APPEND flag.



Task # 2

Write a program using open() system call to copy the contents of one file into another file.

```
  GNU nano 2.9.3                          open2.c

#include<unistd.h>
#include<sys/types.h>
#include<sys/stat.h>
#include<fcntl.h>
int main()
{
int n,fd,fd1;
char buff[50];
fd=open("test.txt",O_RDONLY);
n=read(fd,buff,10);
fd1=open("towrite.txt",O_WRONLY|O_CREAT,0642);
write(fd1,buff,n);
}
```

```
fjwu@ubuntu:~$ nano open2.c
fjwu@ubuntu:~$ gcc open2.c
fjwu@ubuntu:~$ ./a.out
fjwu@ubuntu:~$ cat towrite.txt
1234567890fjwu@ubuntu:~$
```

LAB 08

Task # 1

o Compute the Factorial of a number using IPC (PIPE implementation).

o Parent creates pipe

o Forks a child

o Parent writes into pipe (the number whose factorial is to be calculated, take the number

from the user)

o Child reads from pipe and compute the Factorial of a number written by Parent

raifa.c

```c
#include<stdio.h>
#include<unistd.h>
#include<sys/types.h>
#include<sys/wait.h>
int main()
{
int fd[2],t;
int n;
  int fact=1;
pid_t p;
pipe(fd);
p=fork();
if(p>0)
{
printf("Enter the number;\n");
  scanf("%d",&n);
write(fd[1],&n,sizeof(n));
close(fd[1]);
}
else // child
{read(fd[0],&n,100);
close(fd[0]);
      for(int i=1;i<=n;++i)
      {
        fact *= i;
      }

printf("factorial %d\n;",fact);

}
}
```

```
~$ nano raifa.c
~$ gcc raifa.c
~$ ./a.out
Enter the number;
10
factorial 3628800
;~$
```

LAB 09

EXAMPLE # 1

```
fjwu@ubuntu:~$ gedit threads.c
fjwu@ubuntu:~$ gcc threads.c -lpthread
fjwu@ubuntu:~$ ./a.out
Inside Thread
0
1
2
3
4
Inside Main Program
20
21
22
23
24
fjwu@ubuntu:~$
```

Open ▾ threads.c ~/

```c
#include <unistd.h>
#include <stdlib.h>
#include <stdio.h>
#include <pthread.h>
void *thread_function(void *arg);
int i,j;
int main()
{
        pthread_t a_thread;
        pthread_create(&a_thread,NULL,thread_function,NULL);
        pthread_join(a_thread,NULL);
        printf("Inside Main Program \n");
        for(j=20;j<25;j++)
        {
                printf("%d\n",j);
                sleep(1);
        }
}
void *thread_function(void *arg)
{
        printf("Inside Thread\n");
        for(i=0;i<5;i++)
        {
                printf("%d\n",i);
                sleep(1);
        }
}
```

EXAMPLE # 2

Open ▾ threads.c ~/ Save

```
#include <unistd.h>
#include <stdlib.h>
#include <stdio.h>
#include <pthread.h>
#include <string.h>
void *thread_function(void *arg);
int i,j,n;
int main()
{
        char *m="5";
        pthread_t a_thread;
        void *result;
pthread_create(&a_thread,NULL,thread_function,m);

pthread_join(a_thread,&result);
        printf("Thread joined \n");
        for(j=20;j<25;j++)
        {
                printf("%d\n",j);
                sleep(1);
        }
        printf("thread returned %s\n",(char *)result);
}
void *thread_function(void *arg)
{
        int sum=0;
        n=atoi(arg);
        for(i=0;i<n;i++)
        {
                printf("%d\n",i);
                sleep(1);
        }
pthread_exit("Done");
}
```

```
fjwu@ubuntu:~$ gedit threads.c
fjwu@ubuntu:~$ gcc threads.c -lpthread
fjwu@ubuntu:~$ ./a.out
0
1
2
3
4
Thread joined
20
21
22
23
24
thread returned Done
fjwu@ubuntu:~$
```

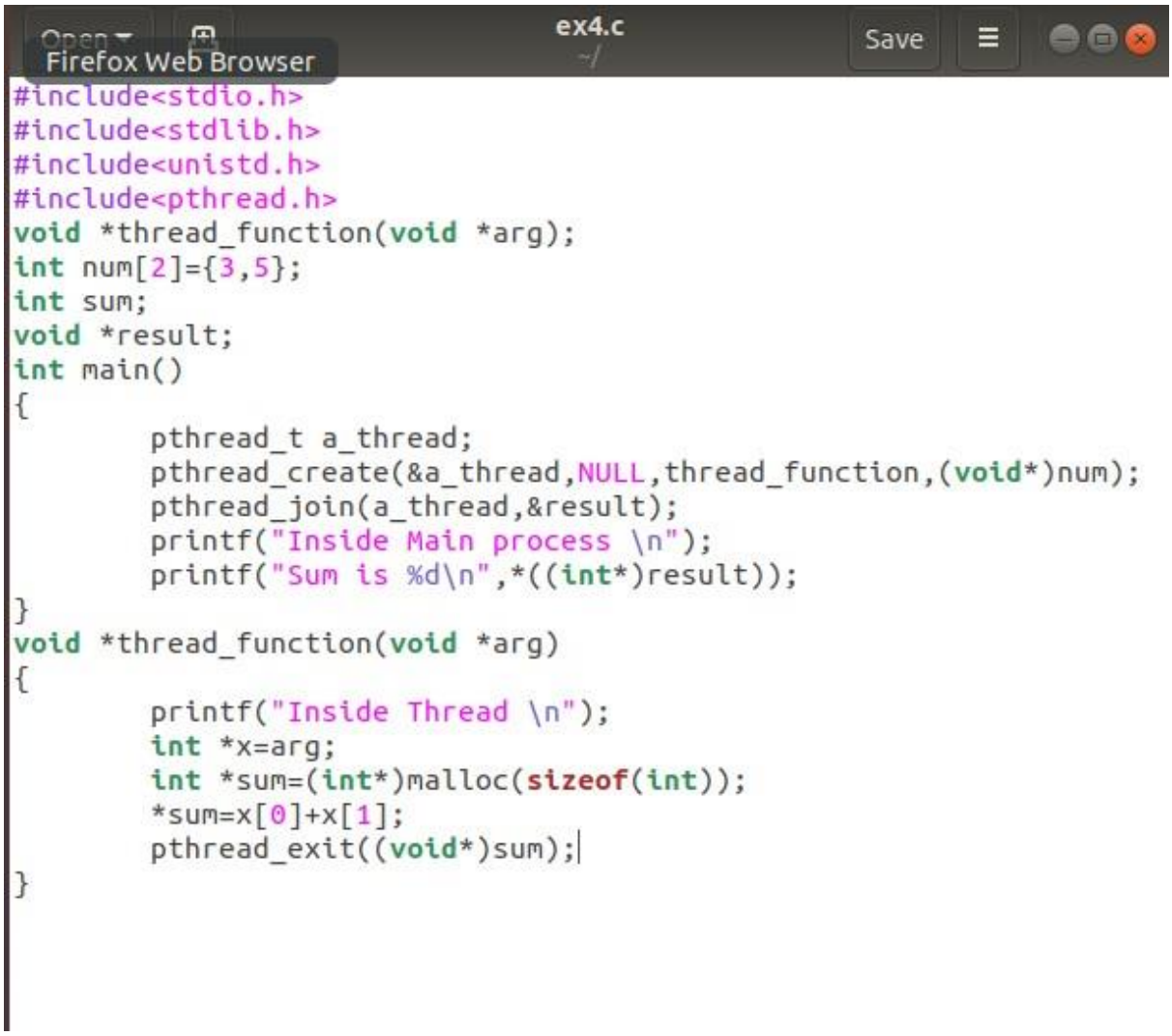
EXAMPLE # 3

Open ex3.c ~/ Save

```c
#include <stdio.h>
#include <pthread.h>
struct arg_struct
{
int arg1;
int arg2;
};
void *arguments(void *arguments)
{
        struct arg_struct*args=arguments;
        printf("%d\n",args->arg1);
        printf("%d\n",args->arg2);
        pthread_exit(NULL);
}
int main()
{
        pthread_t t;
        struct arg_struct args;
        args.arg1=5;
        args.arg2=7;
        pthread_create(&t,NULL,arguments,&args);
        pthread_join(t,NULL);
}
```

```
fjwu@ubuntu:~$ gedit ex3.c
fjwu@ubuntu:~$ gcc ex3.c -lpthread
fjwu@ubuntu:~$ ./a.out
5
7
fjwu@ubuntu:~$
```

EXAMPLE # 4


Open
ex4.c
~/
Save
Firefox Web Browser
#include<stdio.h>
#include<stdlib.h>
#include<unistd.h>
#include<pthread.h>
void *thread_function(void *arg);
int num[2]={3,5};
int sum;
void *result;
int main()
{
pthread_t a_thread;
pthread_create(&a_thread,NULL,thread_function,(void*)num);
pthread_join(a_thread,&result);
printf("Inside Main process \n");
printf("Sum is %d\n",*((int*)result));
}
void *thread_function(void *arg)
{
printf("Inside Thread \n");
int *x=arg;
int *sum=(int*)malloc(sizeof(int));
*sum=x[0]+x[1];
pthread_exit((void*)sum);
}

LAB 10

Task # 1

Write a program for first fit and best fit algorithm for memory management.

task.c

```c
#include<stdio.h>
void main()
{
    int bsize[10], psize[10], bno, pno, flags[10], allocation[10], i, j;
    for(i = 0; i < 10; i++)
    {
        flags[i] = 0;
        allocation[i] = -1;
    }
    printf("Enter no. of blocks: ");
    scanf("%d", &bno);
    printf("\nEnter size of each block: ");
    for(i = 0; i < bno; i++)
        scanf("%d", &bsize[i]);
    printf("\nEnter no. of processes: ");
    scanf("%d", &pno);
    printf("\nEnter size of each process: ");
    for(i = 0; i < pno; i++)
        scanf("%d", &psize[i]);
    for(i = 0; i < pno; i++)        //allocation as per first fit
        for(j = 0; j < bno; j++)
            if(flags[j] == 0 && bsize[j] >= psize[i])
            {
                allocation[j] = i;
                flags[j] = 1;
                break;
            }
    //display allocation details
    printf("\nBlock no.\tsize\t\tprocess no.\t\tsize");
    for(i = 0; i < bno; i++)
    {
        printf("\n%d\t\t%d\t\t", i+1, bsize[i]);
        if(flags[i] == 1)
            printf("%d\t\t\t%d",allocation[i]+1,psize[allocation[i]]);
        else
            printf("Not allocated");
    }
}
```

```
~$ nano task.c
~$ gcc task.c
~$ ./a.out
Enter no. of blocks: 3

Enter size of each block: 15
12
10

Enter no. of processes: 3

Enter size of each process: 40
15
20

Block no.       size            process no.             size
1               15              2                       15
2               12              Not allocated
3               10              Not allocated~$
```

LAB 11

Task # 1

Implement Shortest Job First (Non-Preemptive) CPU Scheduling Algorithm.

```
#include <stdio.h>
#include <unistd.h>
void main()
{
int i,j,np,at[10],bt[10],wt[10],tt[10],p[10],pos,temp,total=0;
float avgw,avgt;
printf("\tFirst Come First Serve\n");
printf("Enter the Number of Processes");
scanf("%d",&np);
for(int i=0;i<np;i++)
{
printf("\n Enter Arrival Time of Process p %d:",i+1);
scanf("%d",&at[i]);
}
```

```
for(int i=0;i<np;i++)
{
printf("\n Enter Burst Time of Process p %d:",i+1);
scanf("%d",&bt[i]);
p[i]=i+1;
}
for(i=0;i<np;i++)
{
pos=i;
for(j=i+1;j<np;j++)
{
if(bt[j]<bt[pos])
pos = j;
}
temp = bt[i];
bt[i] = bt[pos];
bt[pos] = temp;
temp = p[i];
p[i] = p[pos];
p[pos] = temp;
}
printf("\n----------After Sorting----------\n");
for(i=0;i<np;i++)
{
printf("\nProcess Name = p%d",p[i]);
printf("\nBurst Time = %d",bt[i]);
printf("\nArrival Time = %d",at[i]);
}
//Waiting
wt[0]=0;
for(i=1;i<np;i++)
{
```

```
wt[i]=0;
for(j=0;j<i;j++)
{
wt[i] += bt[j];
}
total += wt[i];
}
avgw = (float)total/np;
total = 0;
printf("\nProcess Name \t Waiting Time \t Turnaround Time\n");
//Turn Around Time
for(i=0;i<np;i++)
{
tt[i] = bt[i] + wt[i];
total += tt[i];
printf("\n p%d \t\t %d \t\t%d",p[i] , wt[i] , tt[i]);
}
avgt = (float)total/np;
printf("\n Average Waiting Time of Process: %f" , avgw);
printf("\n Average Turnaround Time of Process %f", avgt);
printf("\n----------GANT CHART----------\n");
for(i=0;i<np;i++)
{
printf("|\t p %d \t|",p[i]);
}
printf("\n");
printf("0");
for(int i=0;i<np;i++)
{
printf("\t\t%d",tt[i]);
}
```

```
printf("\n");
}
```

```
~$ nano sjf.c
~$ gcc sjf.c
~$ ./a.out
       First Come First Serve
Enter the Number of Processes 4

 Enter Arrival Time of Process p 1:0

 Enter Arrival Time of Process p 2:4

 Enter Arrival Time of Process p 3:3

 Enter Arrival Time of Process p 4:2

 Enter Burst Time of Process p 1:6

 Enter Burst Time of Process p 2:5

 Enter Burst Time of Process p 3:3

 Enter Burst Time of Process p 4:4

----------------After Sorting----------------

Process Name = p3
Burst Time = 3
Arrival Time = 0
Process Name = p4
Burst Time = 4
Arrival Time = 4
Process Name = p2
Burst Time = 5
Arrival Time = 3
Process Name = p1
Burst Time = 6
Arrival Time = 2
Process Name    Waiting Time    Turnaround Time

 p3             0              3
 p4             3              7
 p2             7              12
 p1             12             18
 Average Waiting Time of Process: 5.500000
 Average Turnaround Time of Process 10.000000
-----------------GANT CHART--------------------
|       p 3    ||      p 4    ||      p 2    ||      p 1    |
0              3              7              12             18
```

LAB 13

```
#include <stdio.h>

int main()

{

        // P0, P1, P2, P3, P4 are the Process names here


        int n, m, i, j, k;

        n = 5; // Number of processes

        m = 3; // Number of resources

        int alloc[5][3] = { { 0, 1, 0 }, // P0 // Allocation Matrix

                                                { 2, 0, 0 }, // P1

                                                { 3, 0, 2 }, // P2

                                                { 2, 1, 1 }, // P3

                                                { 0, 0, 2 } }; // P4


        int max[5][3] = { { 7, 5, 3 }, // P0 // MAX Matrix

                                        { 3, 2, 2 }, // P1

                                        { 9, 0, 2 }, // P2

                                        { 2, 2, 2 }, // P3

                                        { 4, 3, 3 } }; // P4
```

```
int avail[3] = { 3, 3, 2 }; // Available Resources


int f[n], ans[n], ind = 0;
for (k = 0; k < n; k++) {
        f[k] = 0;
}
int need[n][m];
for (i = 0; i < n; i++) {
        for (j = 0; j < m; j++)
                need[i][j] = max[i][j] - alloc[i][j];
}
int y = 0;
for (k = 0; k < 5; k++) {
        for (i = 0; i < n; i++) {
                if (f[i] == 0) {

                        int flag = 0;
                        for (j = 0; j < m; j++) {
                                if (need[i][j] > avail[j]){
                                        flag = 1;
                                        break;
                                }
                        }

                        if (flag == 0) {
                                ans[ind++] = i;
```

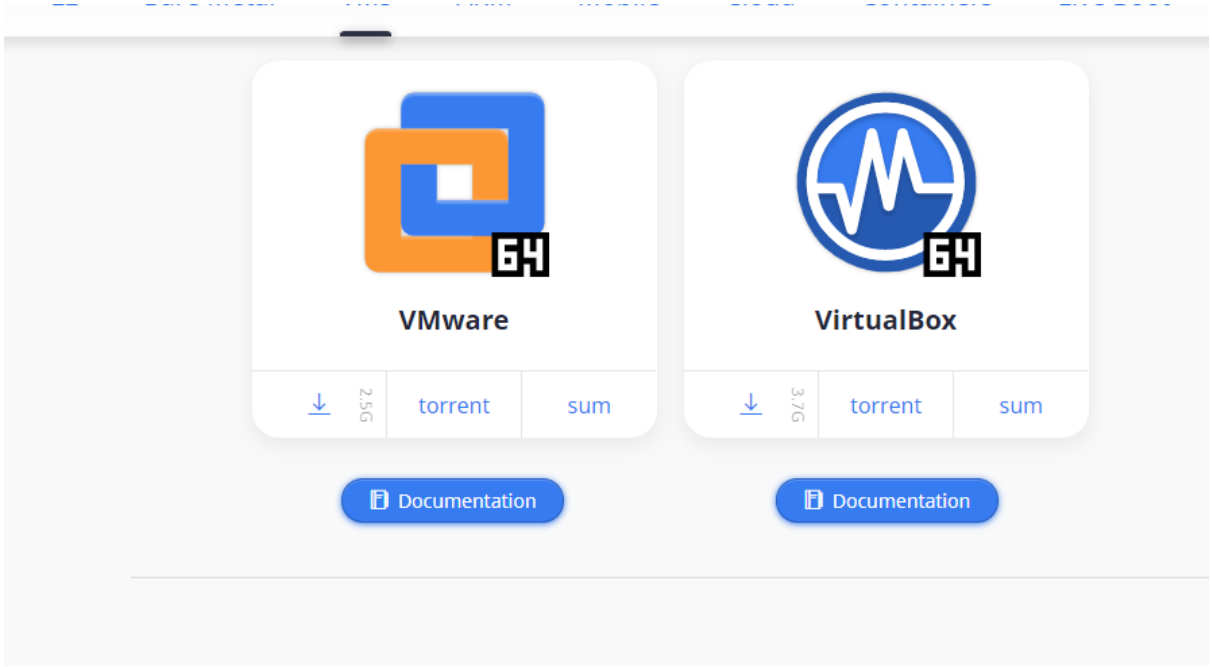
```
                                        for (y = 0; y < m; y++)
                                                avail[y] += alloc[i][y];
                                        f[i] = 1;
                                }
                        }
                }
        }

int flag = 1;

for(int i=0;i<n;i++)
{
if(f[i]==0)
{
        flag=0;
        printf("The following system is not safe");
        break;
}
}

if(flag==1)
{
printf("Following is the SAFE Sequence\n");
for (i = 0; i < n - 1; i++)
        printf(" P%d ->", ans[i]);
printf(" P%d", ans[n - 1]);
```

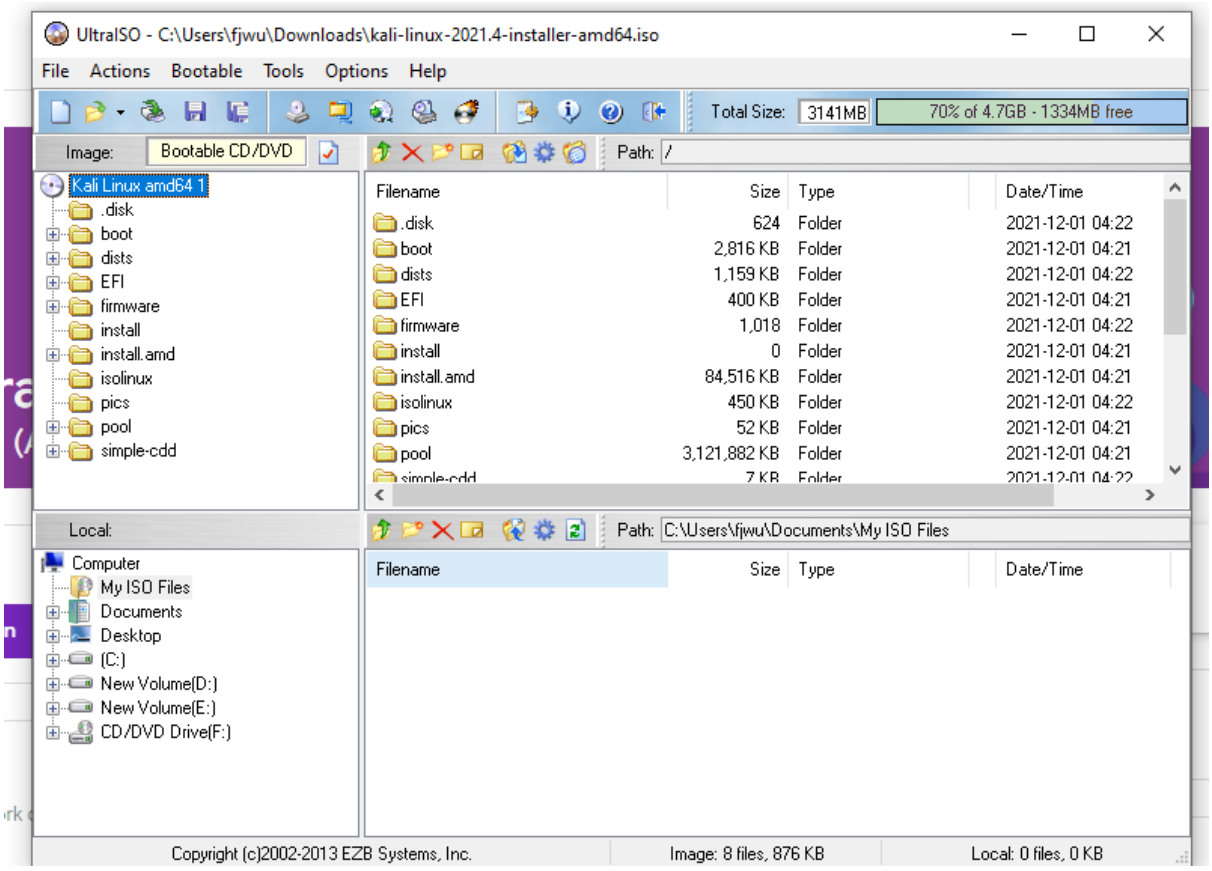
```
}

return (0);
```

OUTPUT:

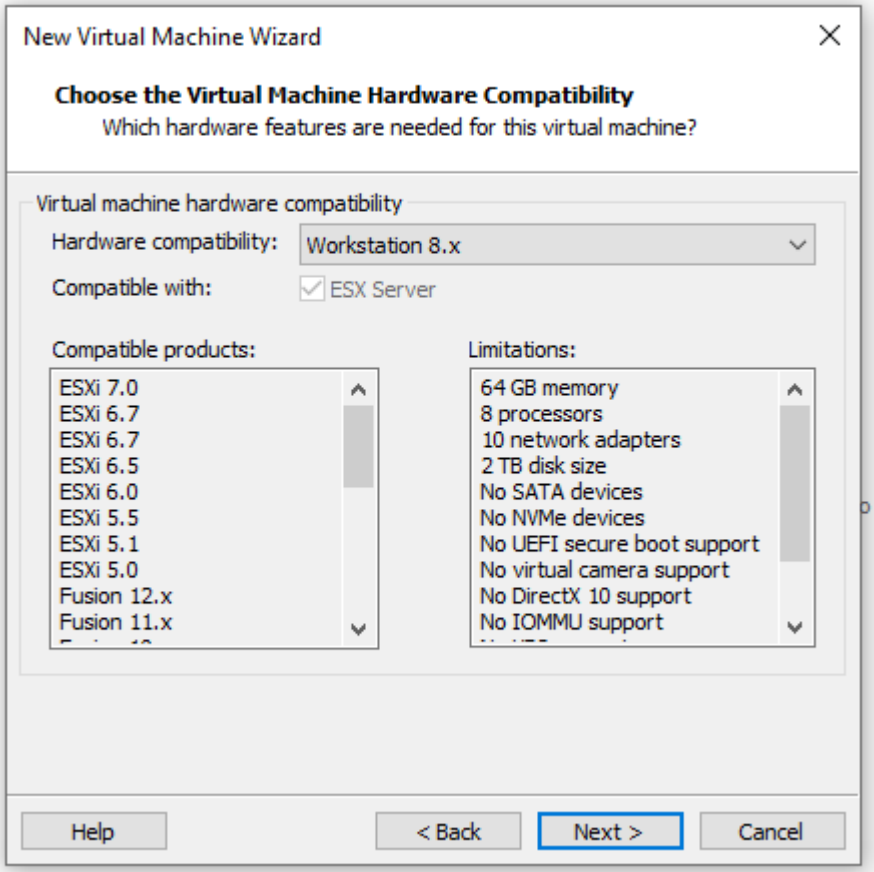
```
~$ nano file.c
~$ gcc file.c
~$ ./a.out
Following is the SAFE Sequence
 P1 -> P3 -> P4 -> P0 -> P2~$
```

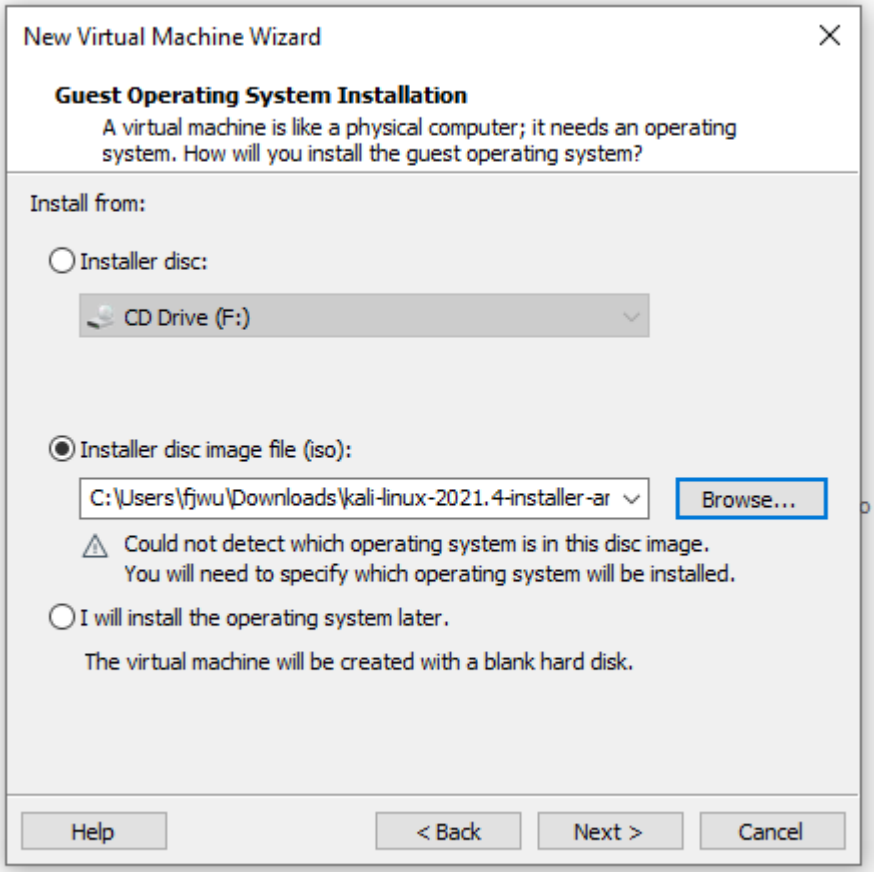
OPEN ENDED LAB

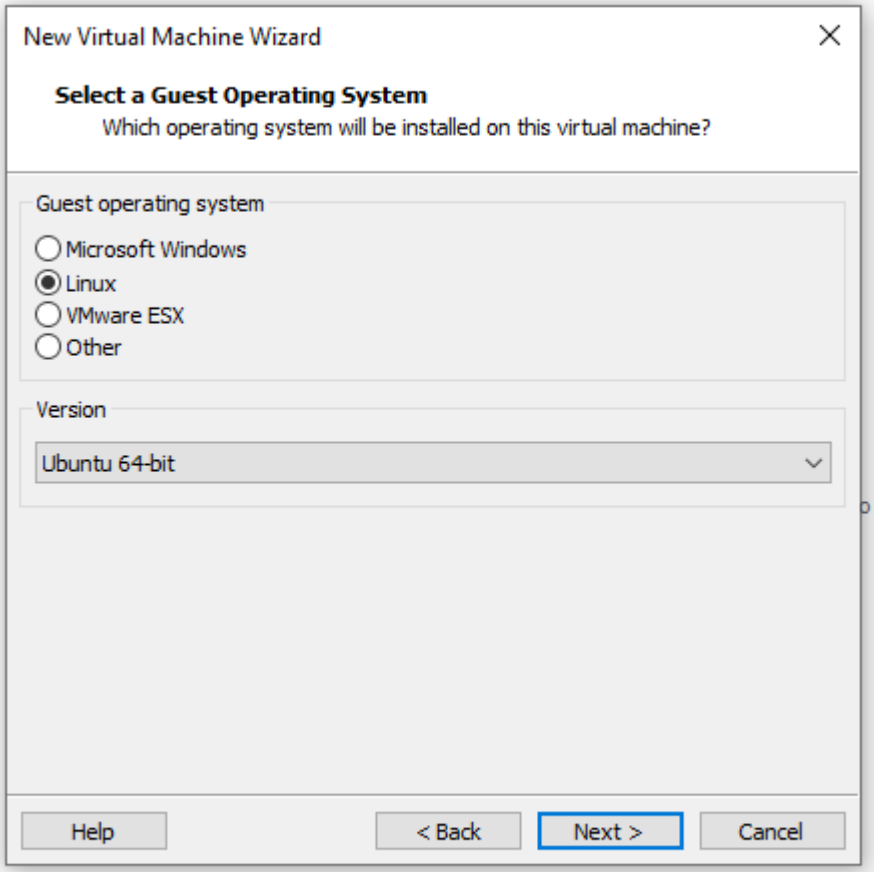


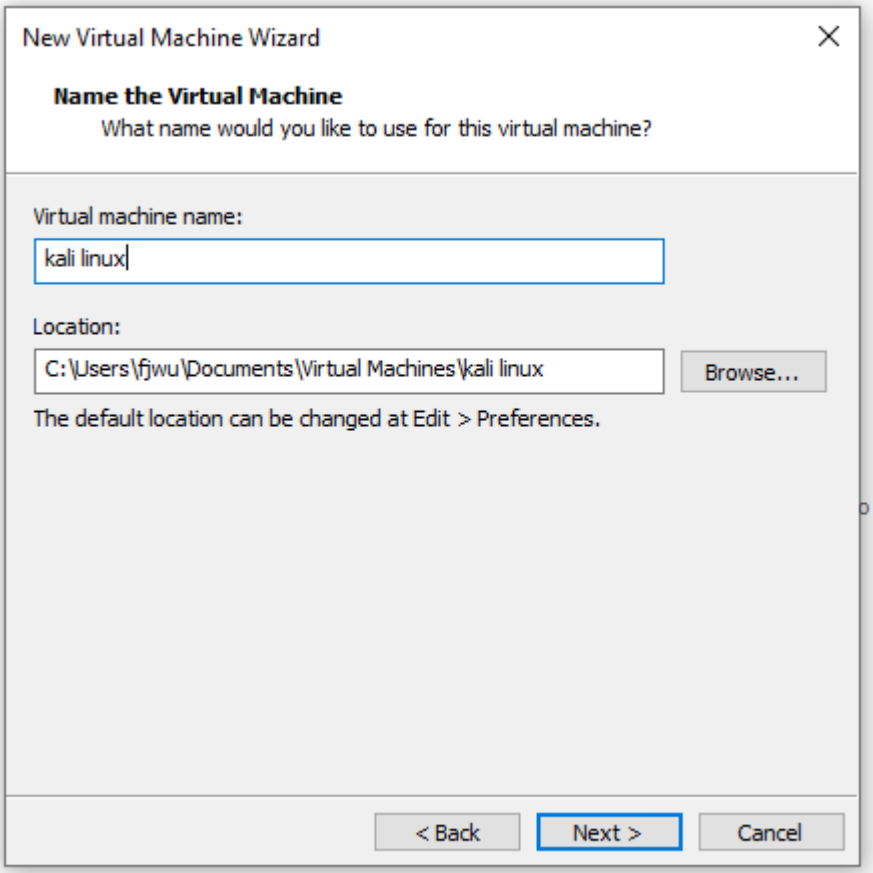

UltraISO - C:\Users\fjwu\Downloads\kali-linux-2021.4-installer-amd64.iso
File Actions Bootable Tools Options Help
Total Size: 3141MB
70% of 4.7GB - 1334MB free
Image: Bootable CD/DVD
Path: /
Kali Linux amd64 1
.disk
boot
dists
EFI
firmware
install
install.amd
isolinux
pics
pool
simple-cdd
Filename Size Type Date/Time
.disk 624 Folder 2021-12-01 04:22
boot 2,816 KB Folder 2021-12-01 04:21
dists 1,159 KB Folder 2021-12-01 04:22
EFI 400 KB Folder 2021-12-01 04:21
firmware 1,018 Folder 2021-12-01 04:22
install 0 Folder 2021-12-01 04:21
install.amd 84,516 KB Folder 2021-12-01 04:21
isolinux 450 KB Folder 2021-12-01 04:22
pics 52 KB Folder 2021-12-01 04:21
pool 3,121,882 KB Folder 2021-12-01 04:21
Local:
Path: C:\Users\fjwu\Documents\My ISO Files
Computer
My ISO Files
Documents
Desktop
(C:)
New Volume(D:)
New Volume(E:)
CD/DVD Drive(F:)
Filename Size Type Date/Time
Copyright (c)2002-2013 EZB Systems, Inc.
Image: 8 files, 876 KB
Local: 0 files, 0 KB

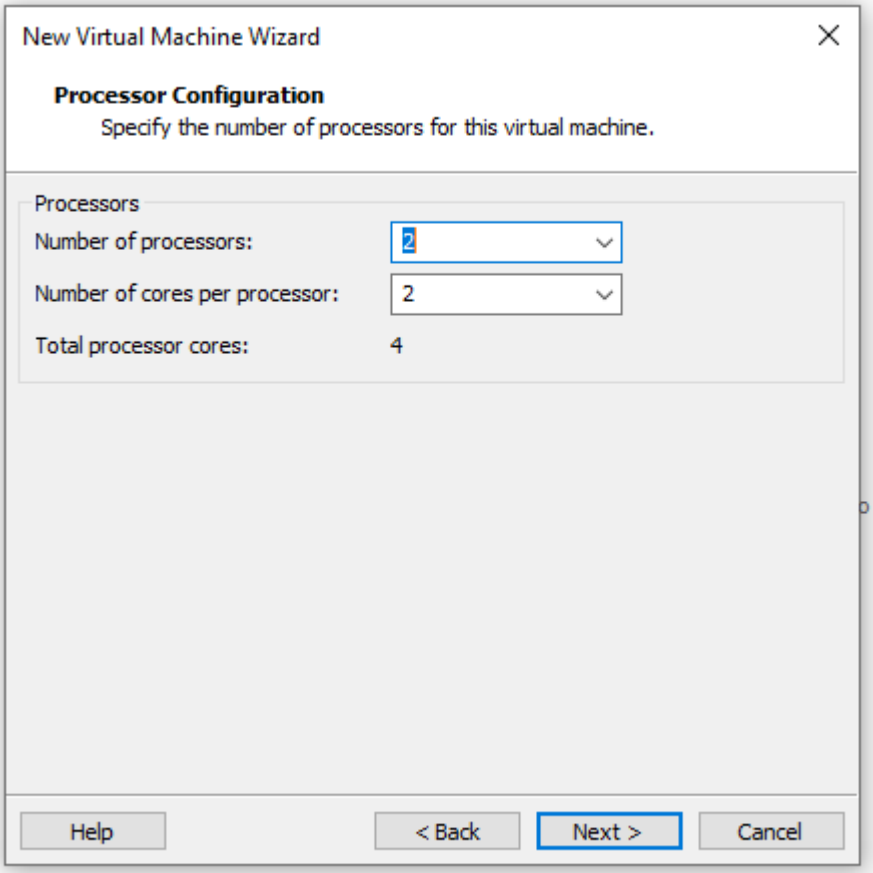
o open it in a tab.

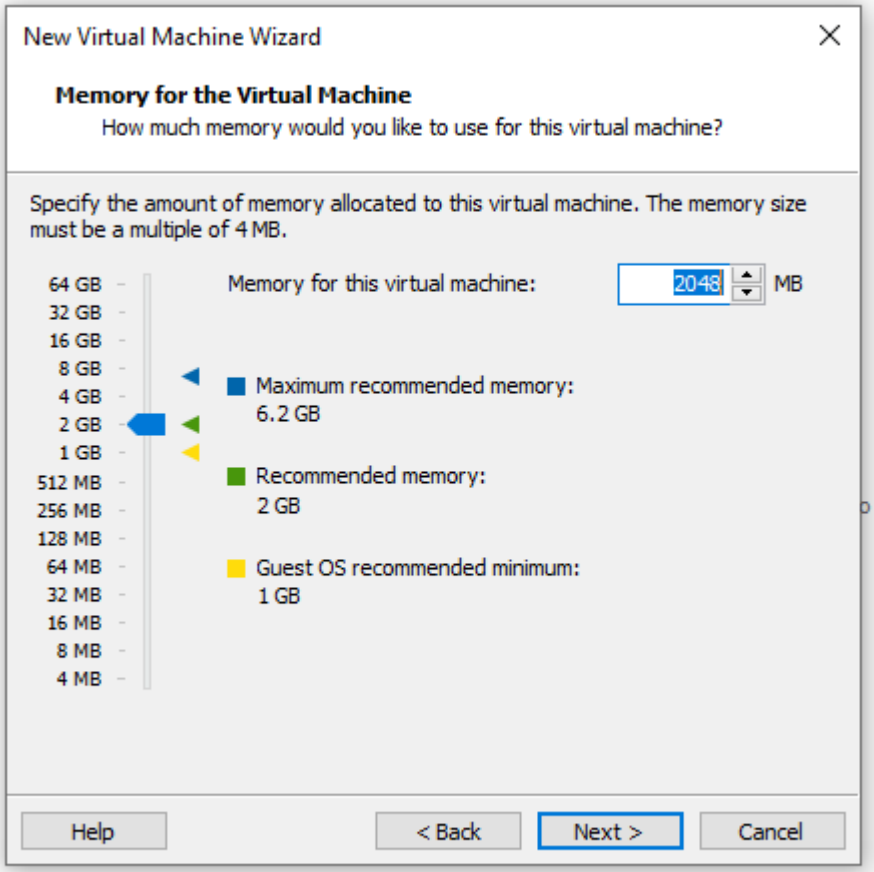

New Virtual Machine Wizard
Choose the Virtual Machine Hardware Compatibility
Which hardware features are needed for this virtual machine?
Virtual machine hardware compatibility
Hardware compatibility:
Workstation 8.x
Compatible with:
ESX Server
Compatible products:
ESXi 7.0
ESXi 6.7
ESXi 6.7
ESXi 6.5
ESXi 6.0
ESXi 5.5
ESXi 5.1
ESXi 5.0
Fusion 12.x
Fusion 11.x
Limitations:
64 GB memory
8 processors
10 network adapters
2 TB disk size
No SATA devices
No NVMe devices
No UEFI secure boot support
No virtual camera support
No DirectX 10 support
No IOMMU support
Help
< Back
Next >
Cancel


New Virtual Machine Wizard
Guest Operating System Installation
A virtual machine is like a physical computer; it needs an operating system. How will you install the guest operating system?
Install from:
Installer disc:
CD Drive (F:)
Installer disc image file (iso):
C:\Users\fjwu\Downloads\kali-linux-2021.4-installer-ar
Browse...
Could not detect which operating system is in this disc image.
You will need to specify which operating system will be installed.
I will install the operating system later.
The virtual machine will be created with a blank hard disk.
Help
< Back
Next >
Cancel

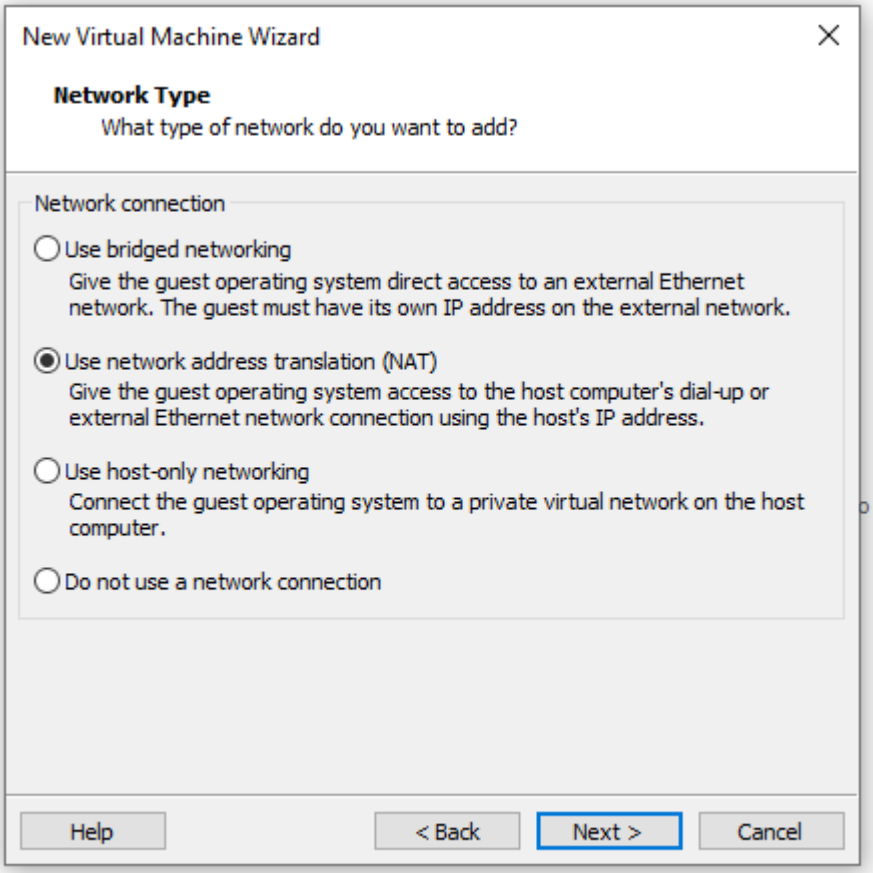

New Virtual Machine Wizard
Select a Guest Operating System
Which operating system will be installed on this virtual machine?
Guest operating system
Microsoft Windows
Linux
VMware ESX
Other
Version
Ubuntu 64-bit
Help
< Back
Next >
Cancel

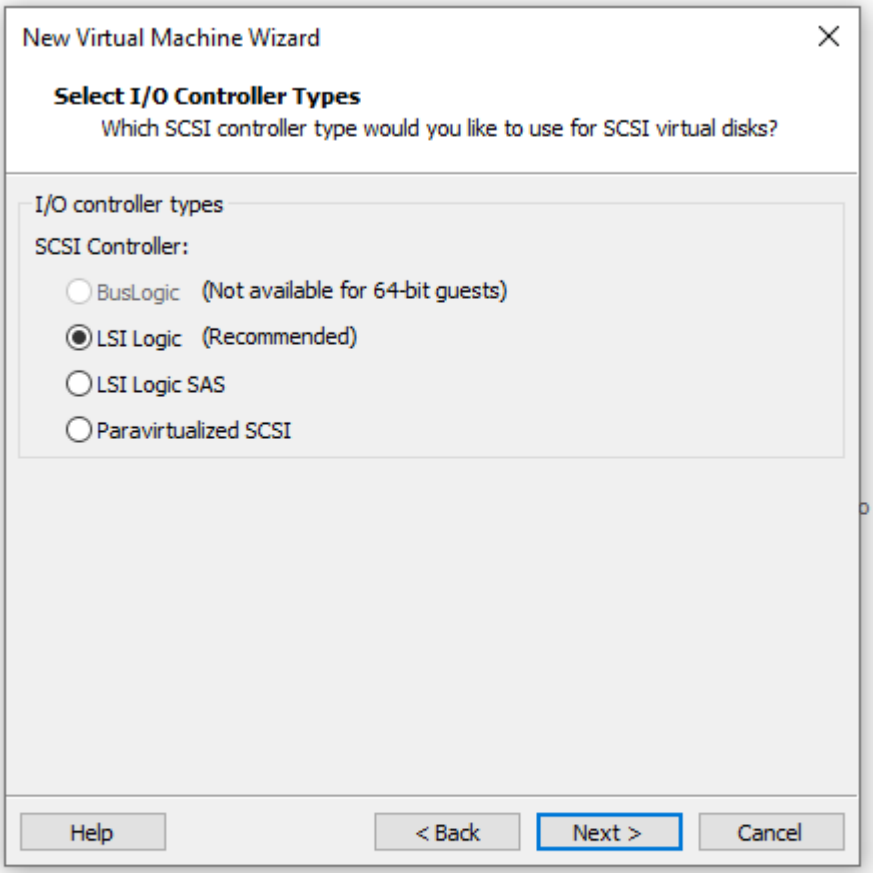

New Virtual Machine Wizard
Name the Virtual Machine
What name would you like to use for this virtual machine?
Virtual machine name:
kali linux
Location:
C:\Users\fjwu\Documents\Virtual Machines\kali linux
Browse...
The default location can be changed at Edit > Preferences.
< Back
Next >
Cancel


New Virtual Machine Wizard
Processor Configuration
Specify the number of processors for this virtual machine.
Processors
Number of processors:
2
Number of cores per processor:
2
Total processor cores:
4
Help
< Back
Next >
Cancel

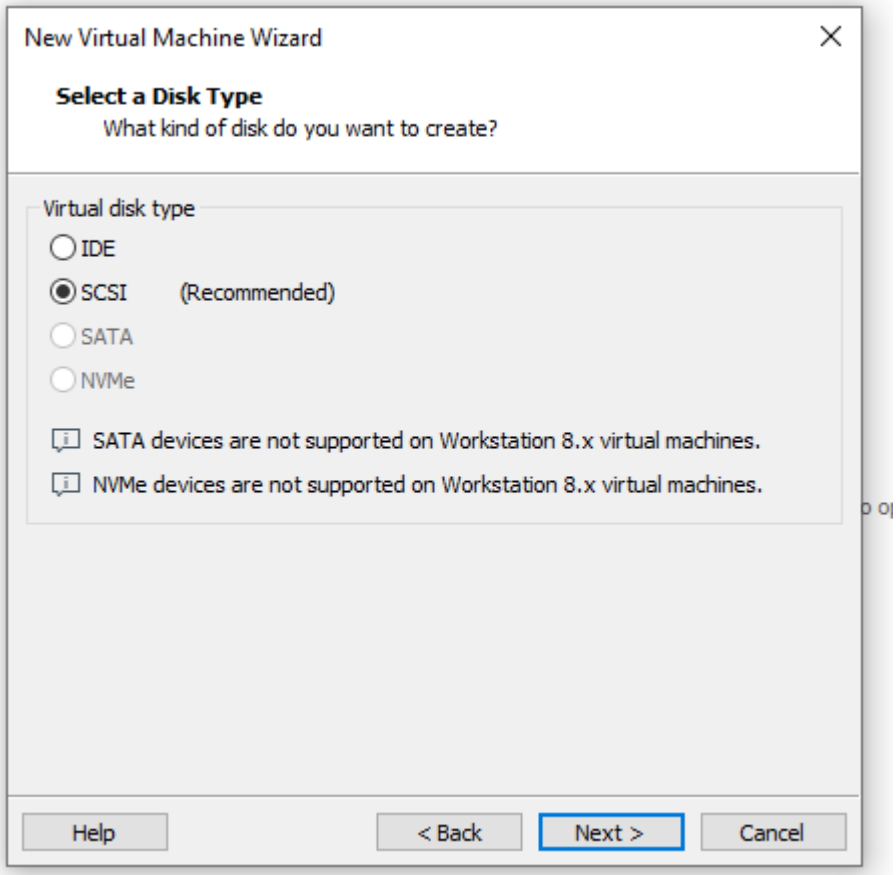

New Virtual Machine Wizard
Memory for the Virtual Machine
How much memory would you like to use for this virtual machine?
Specify the amount of memory allocated to this virtual machine. The memory size must be a multiple of 4 MB.
64 GB
32 GB
16 GB
8 GB
4 GB
2 GB
1 GB
512 MB
256 MB
128 MB
64 MB
32 MB
16 MB
8 MB
4 MB
Memory for this virtual machine:
2048
MB
Maximum recommended memory:
6.2 GB
Recommended memory:
2 GB
Guest OS recommended minimum:
1 GB
Help
< Back
Next >
Cancel

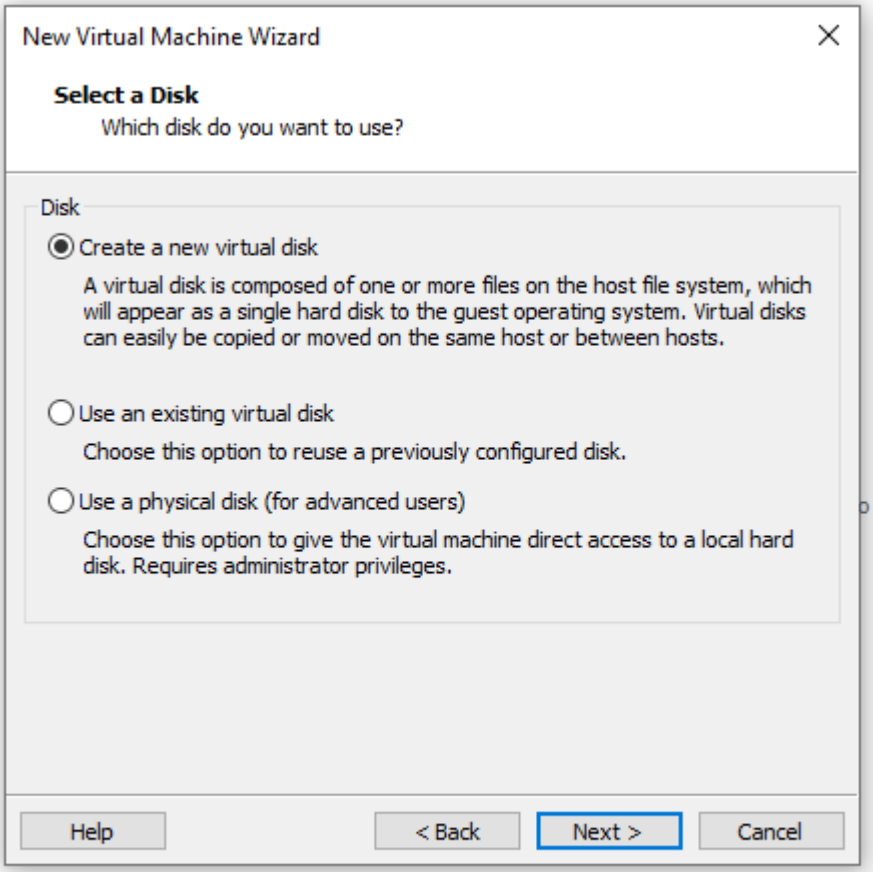
o open it in a

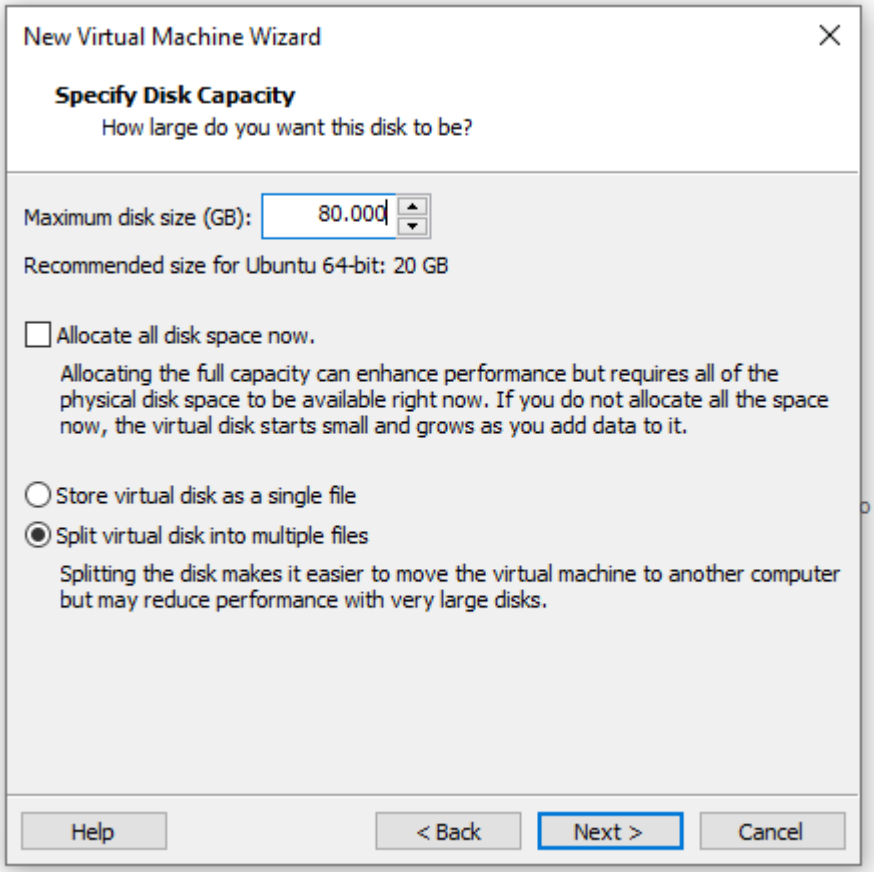

New Virtual Machine Wizard
Network Type
What type of network do you want to add?
Network connection
Use bridged networking
Give the guest operating system direct access to an external Ethernet network. The guest must have its own IP address on the external network.
Use network address translation (NAT)
Give the guest operating system access to the host computer's dial-up or external Ethernet network connection using the host's IP address.
Use host-only networking
Connect the guest operating system to a private virtual network on the host computer.
Do not use a network connection
Help
< Back
Next >
Cancel

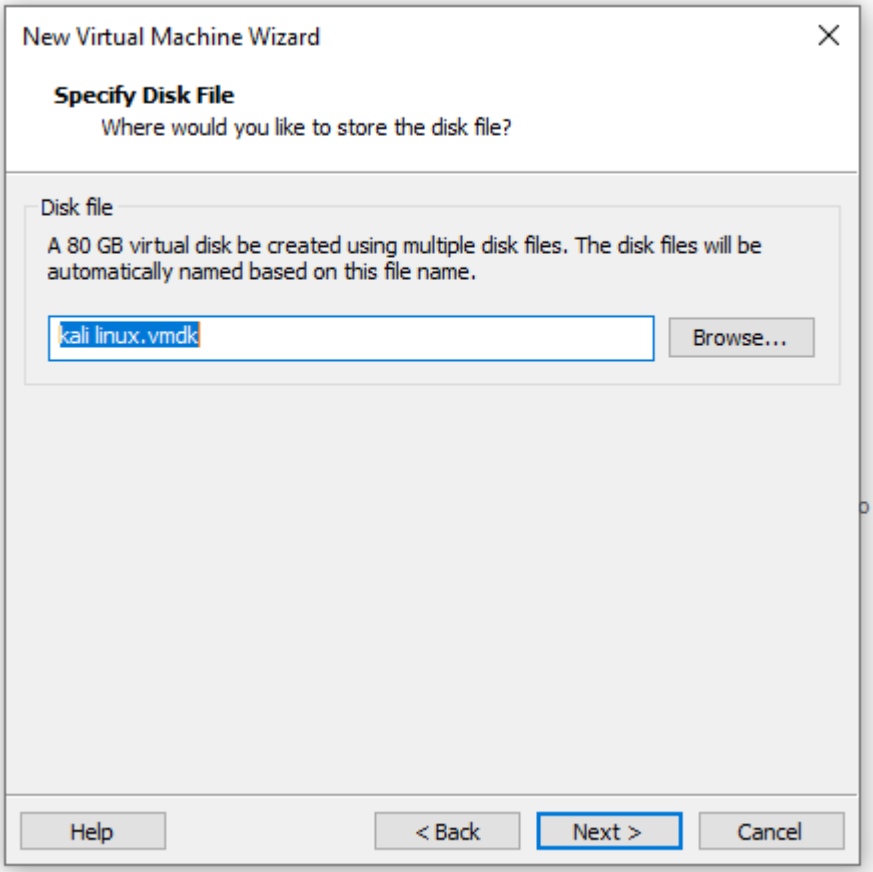

New Virtual Machine Wizard
Select I/O Controller Types
Which SCSI controller type would you like to use for SCSI virtual disks?
I/O controller types
SCSI Controller:
BusLogic (Not available for 64-bit guests)
LSI Logic (Recommended)
LSI Logic SAS
Paravirtualized SCSI
Help
< Back
Next >
Cancel

o open it

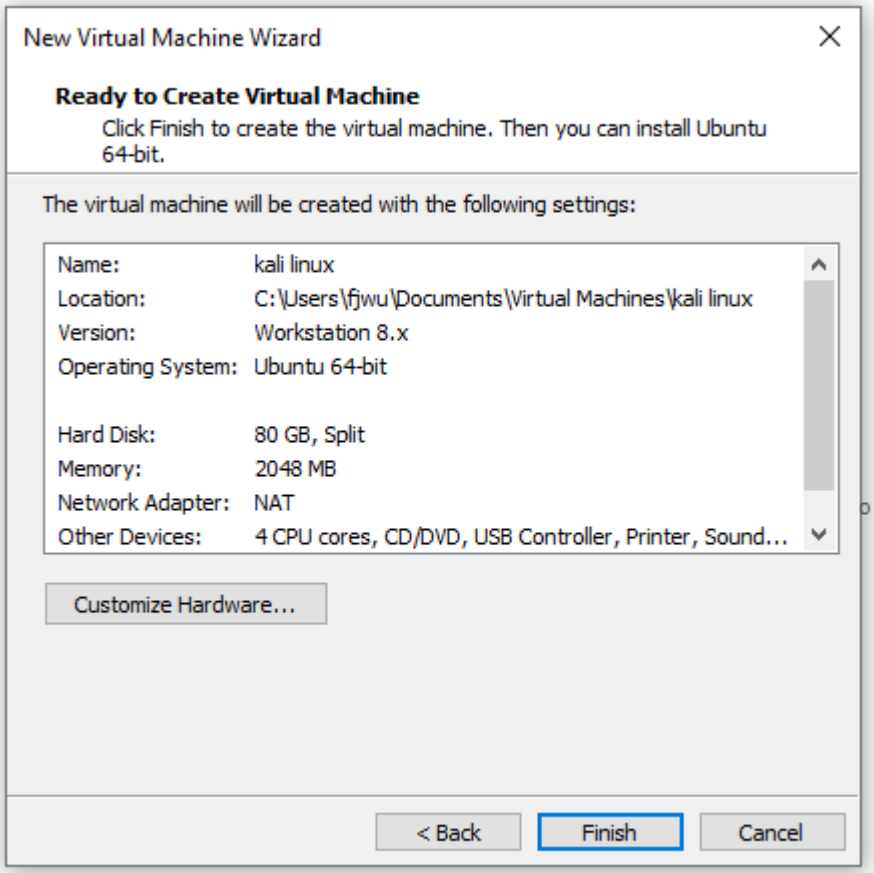

New Virtual Machine Wizard
Select a Disk Type
What kind of disk do you want to create?
Virtual disk type
IDE
SCSI (Recommended)
SATA
NVMe
SATA devices are not supported on Workstation 8.x virtual machines.
NVMe devices are not supported on Workstation 8.x virtual machines.
Help
< Back
Next >
Cancel

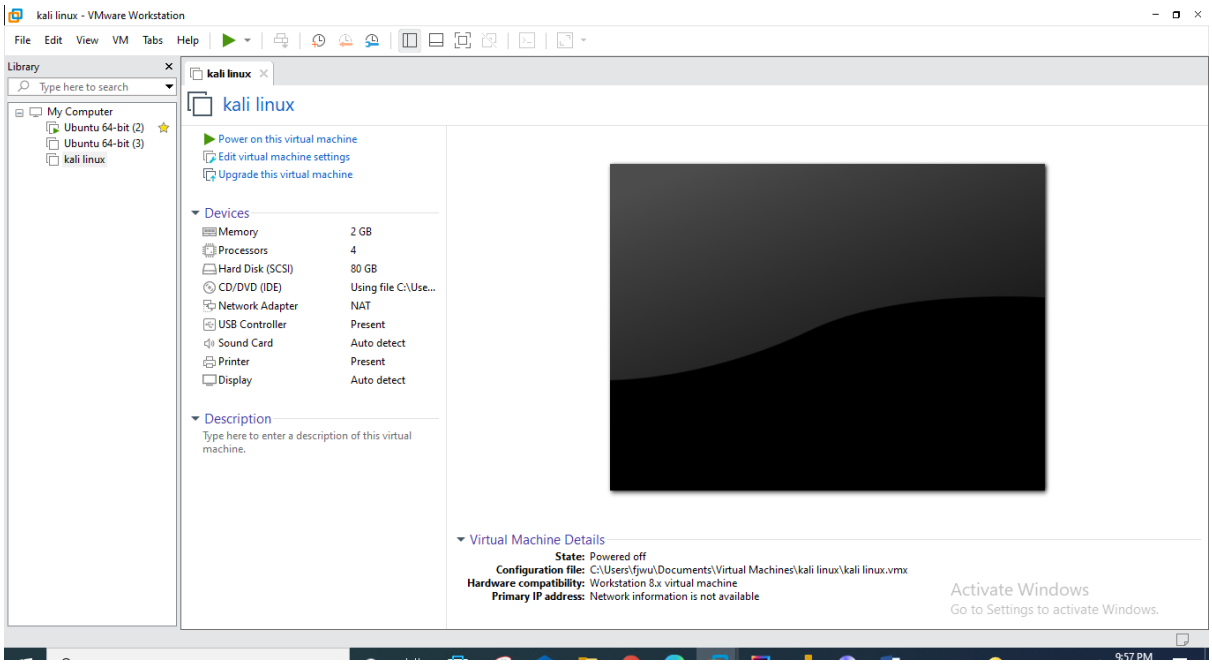

New Virtual Machine Wizard
Select a Disk
Which disk do you want to use?
Disk
Create a new virtual disk
A virtual disk is composed of one or more files on the host file system, which will appear as a single hard disk to the guest operating system. Virtual disks can easily be copied or moved on the same host or between hosts.
Use an existing virtual disk
Choose this option to reuse a previously configured disk.
Use a physical disk (for advanced users)
Choose this option to give the virtual machine direct access to a local hard disk. Requires administrator privileges.
Help
< Back
Next >
Cancel

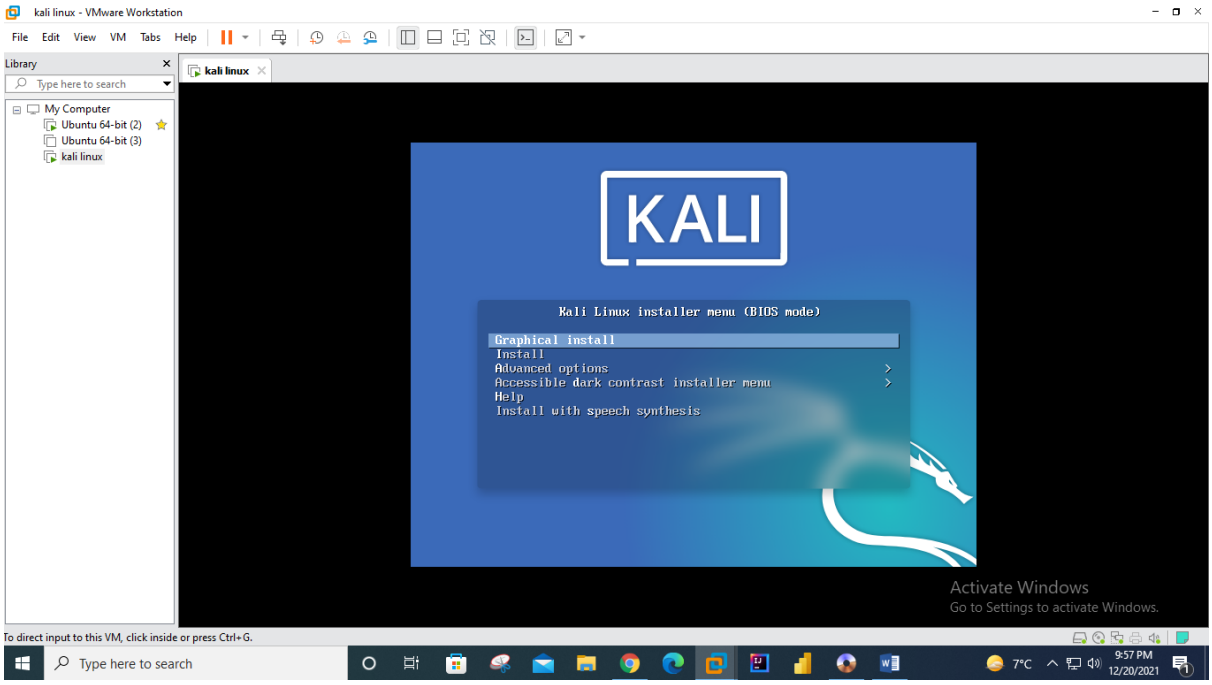

New Virtual Machine Wizard
Specify Disk Capacity
How large do you want this disk to be?
Maximum disk size (GB):
80.000
Recommended size for Ubuntu 64-bit: 20 GB
Allocate all disk space now.
Allocating the full capacity can enhance performance but requires all of the physical disk space to be available right now. If you do not allocate all the space now, the virtual disk starts small and grows as you add data to it.
Store virtual disk as a single file
Split virtual disk into multiple files
Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.
Help
< Back
Next >
Cancel

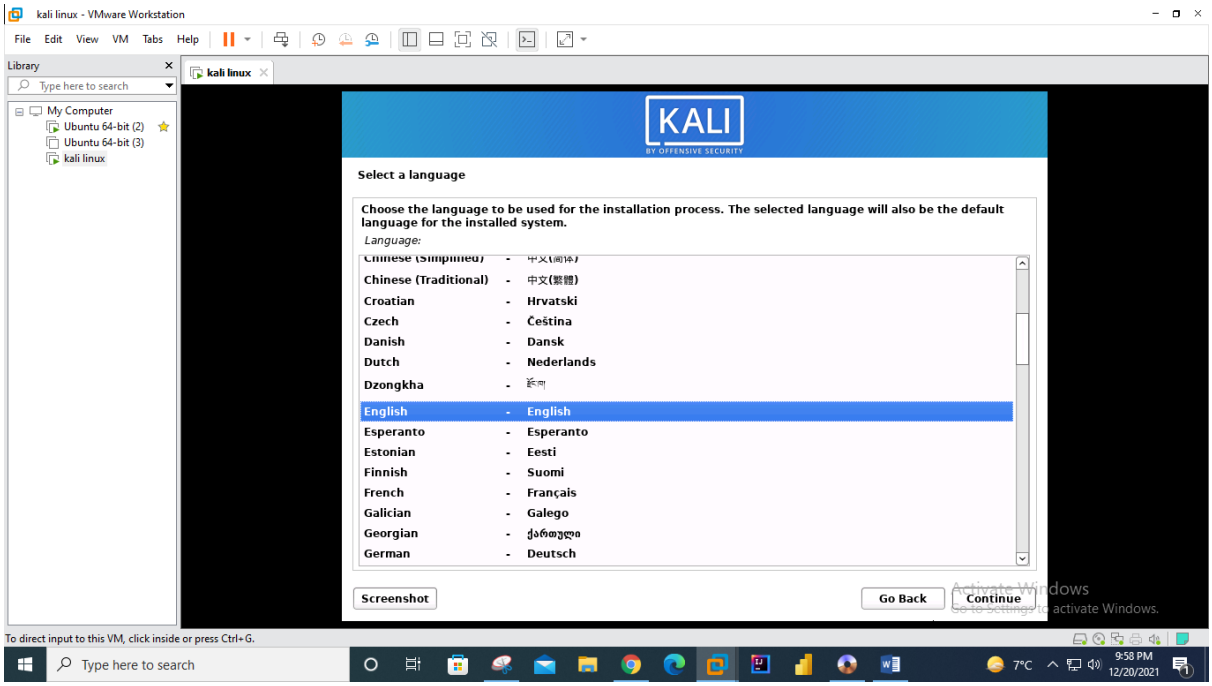

New Virtual Machine Wizard
Specify Disk File
Where would you like to store the disk file?
Disk file
A 80 GB virtual disk be created using multiple disk files. The disk files will be automatically named based on this file name.
kali linux.vmdk
Browse...
Help
< Back
Next >
Cancel

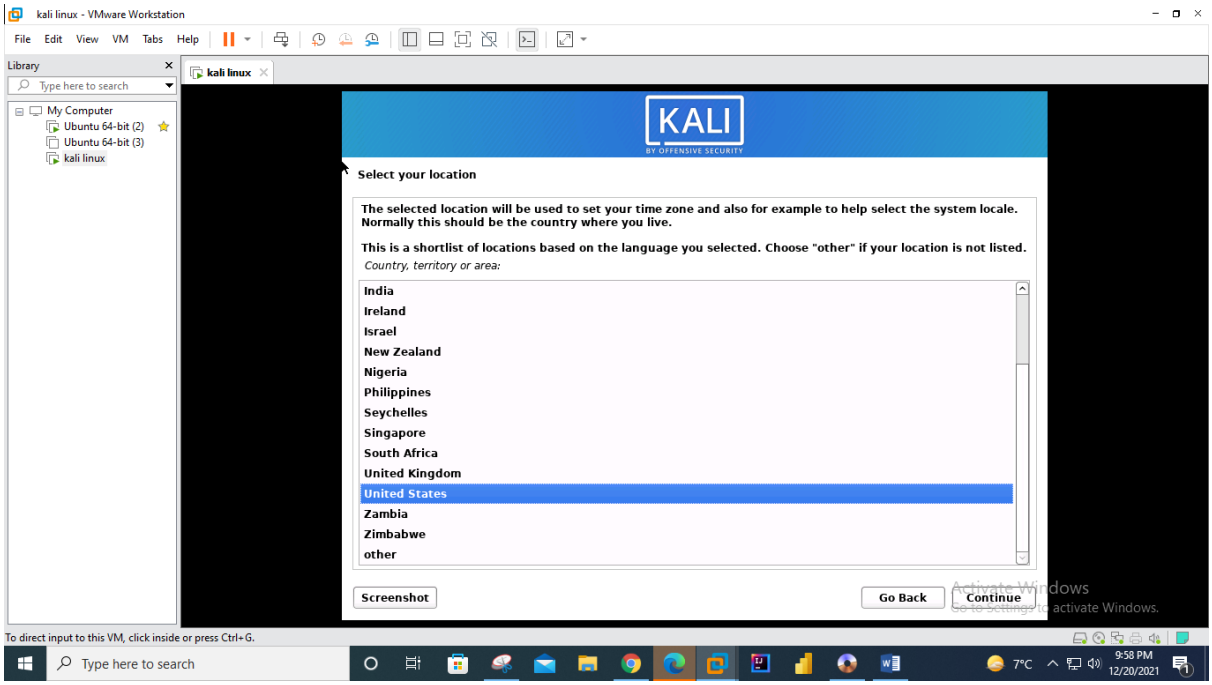
o open it

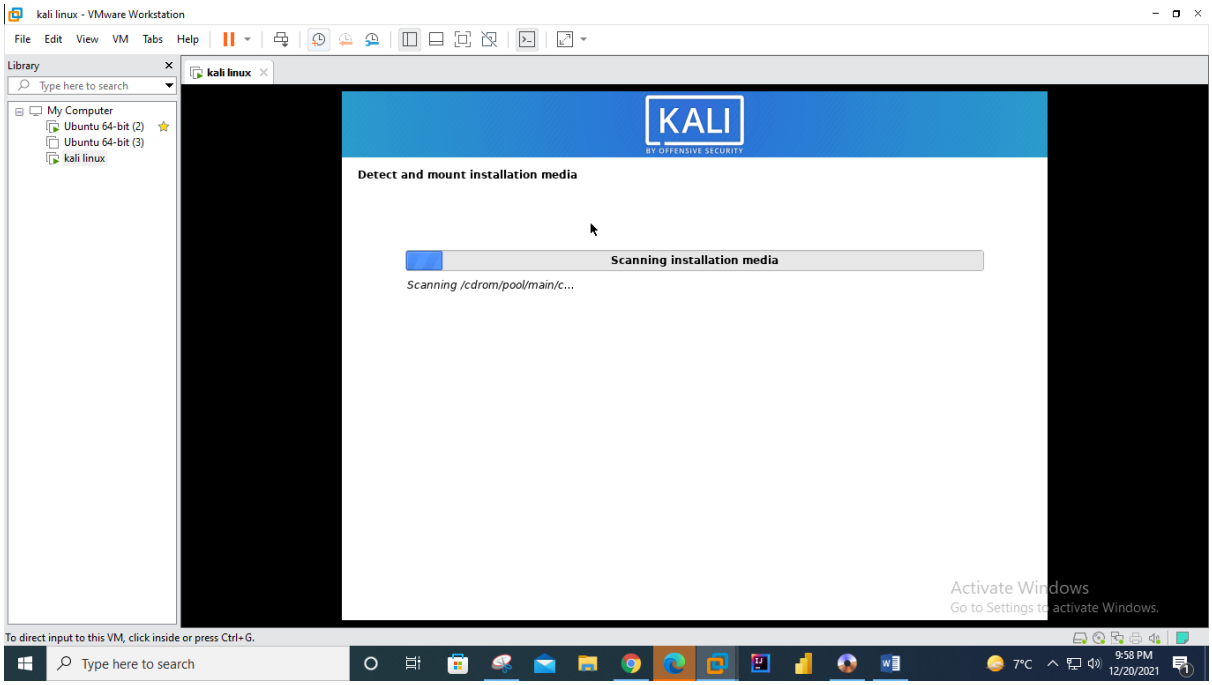

New Virtual Machine Wizard
Ready to Create Virtual Machine
Click Finish to create the virtual machine. Then you can install Ubuntu 64-bit.
The virtual machine will be created with the following settings:
Name: kali linux
Location: C:\Users\fjwu\Documents\Virtual Machines\kali linux
Version: Workstation 8.x
Operating System: Ubuntu 64-bit
Hard Disk: 80 GB, Split
Memory: 2048 MB
Network Adapter: NAT
Other Devices: 4 CPU cores, CD/DVD, USB Controller, Printer, Sound...
Customize Hardware...
< Back
Finish
Cancel

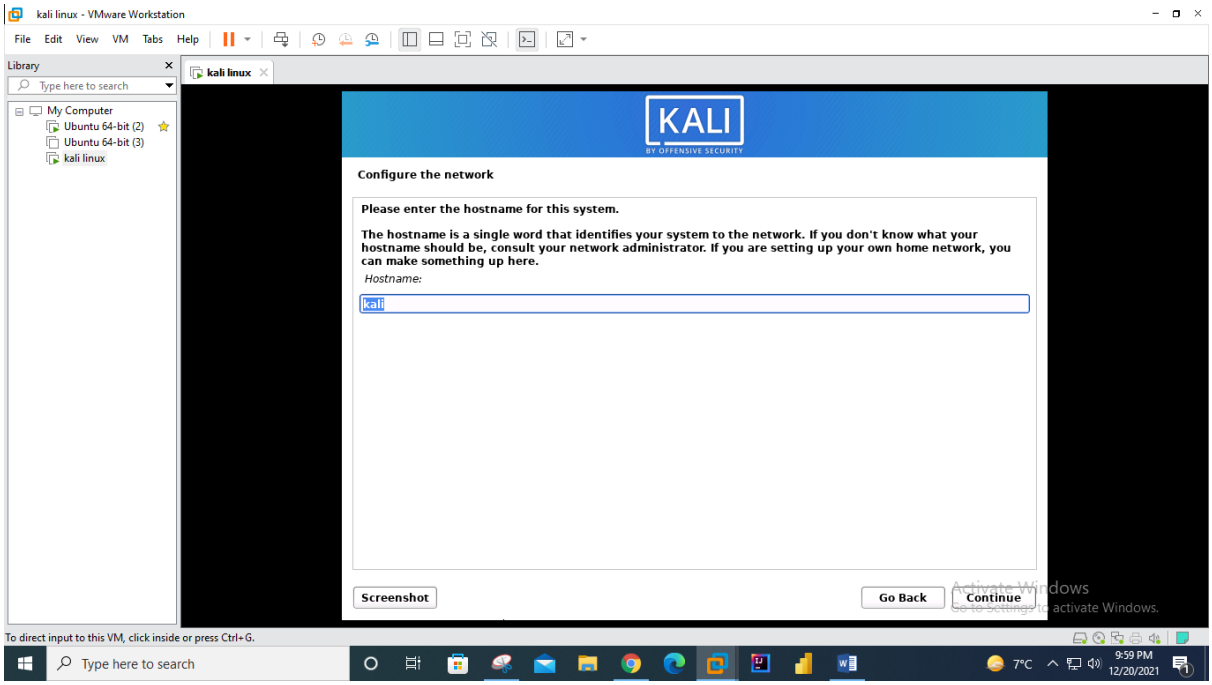

kali linux - VMware Workstation
File Edit View VM Tabs Help
Library
Type here to search
My Computer
Ubuntu 64-bit (2)
Ubuntu 64-bit (3)
kali linux
kali linux
Power on this virtual machine
Edit virtual machine settings
Upgrade this virtual machine
Devices
Memory 2 GB
Processors 4
Hard Disk (SCSI) 80 GB
CD/DVD (IDE) Using file C:\Use...
Network Adapter NAT
USB Controller Present
Sound Card Auto detect
Printer Present
Display Auto detect
Description
Type here to enter a description of this virtual machine.
Virtual Machine Details
State: Powered off
Configuration file: C:\Users\fjwu\Documents\Virtual Machines\kali linux\kali linux.vmx
Hardware compatibility: Workstation 8.x virtual machine
Primary IP address: Network information is not available
Activate Windows
Go to Settings to activate Windows.

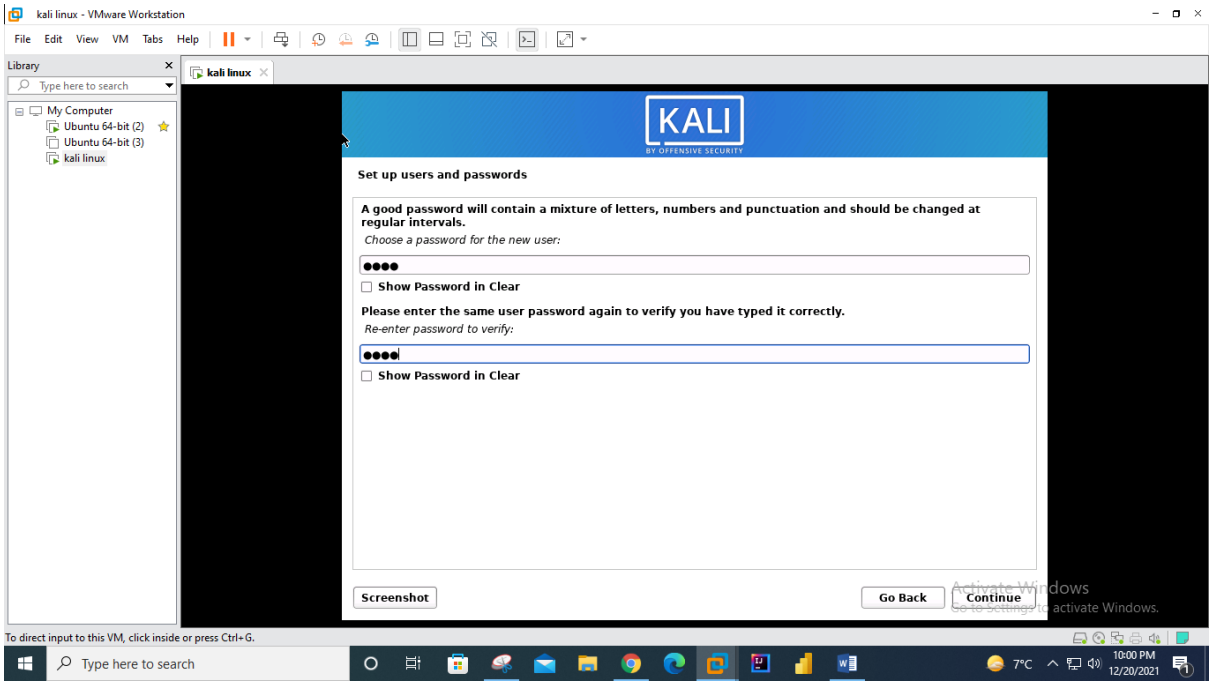

kali linux - VMware Workstation
File Edit View VM Tabs Help
Library
Type here to search
My Computer
Ubuntu 64-bit (2)
Ubuntu 64-bit (3)
kali linux
kali linux
KALI
Kali Linux installer menu (BIOS mode)
Graphical install
Install
Advanced options
Accessible dark contrast installer menu
Help
Install with speech synthesis
Activate Windows
Go to Settings to activate Windows.
To direct input to this VM, click inside or press Ctrl+G.
Type here to search
7°C
9:57 PM
12/20/2021

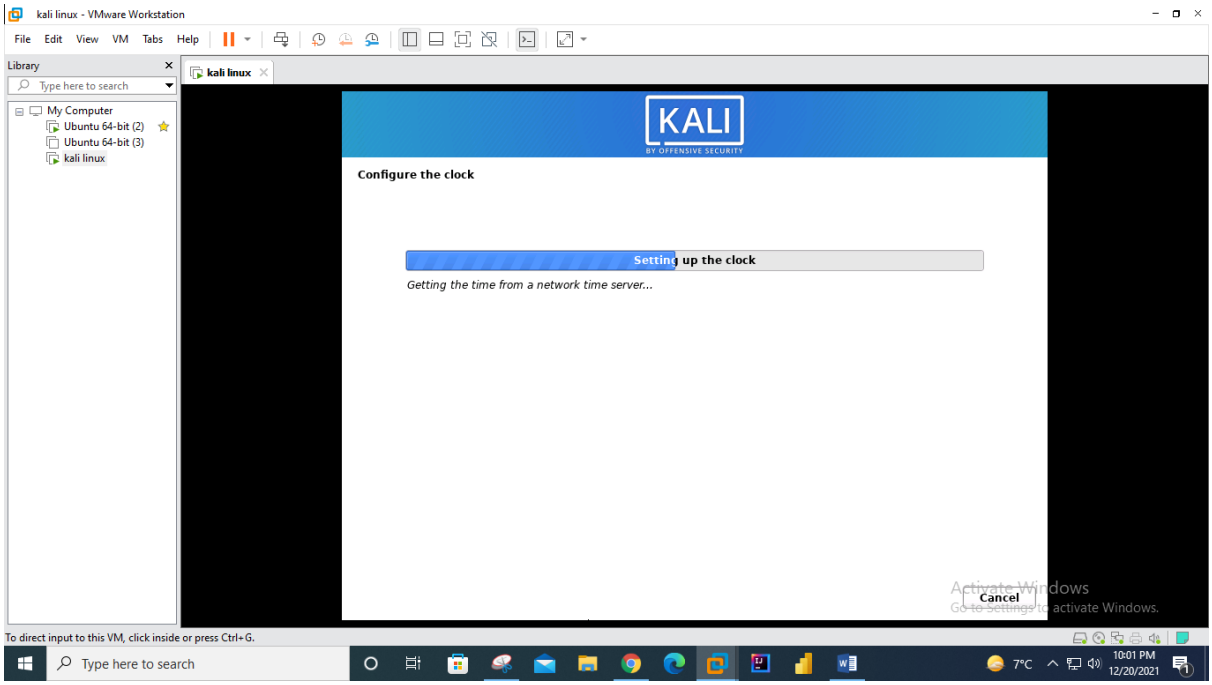

kali linux - VMware Workstation
File Edit View VM Tabs Help
Library
Type here to search
My Computer
Ubuntu 64-bit (2)
Ubuntu 64-bit (3)
kali linux
kali linux
KALI
BY OFFENSIVE SECURITY
Select a language
Choose the language to be used for the installation process. The selected language will also be the default language for the installed system.
Language:
Chinese (Simplified) - 中文(简体)
Chinese (Traditional) - 中文(繁體)
Croatian - Hrvatski
Czech - Čeština
Danish - Dansk
Dutch - Nederlands
Dzongkha - རྫོང་ཁ
English - English
Esperanto - Esperanto
Estonian - Eesti
Finnish - Suomi
French - Français
Galician - Galego
Georgian - ქართული
German - Deutsch
Screenshot
Go Back
Continue
Activate Windows
Go to Settings to activate Windows.
To direct input to this VM, click inside or press Ctrl+G.
Type here to search
7°C
9:58 PM
12/20/2021

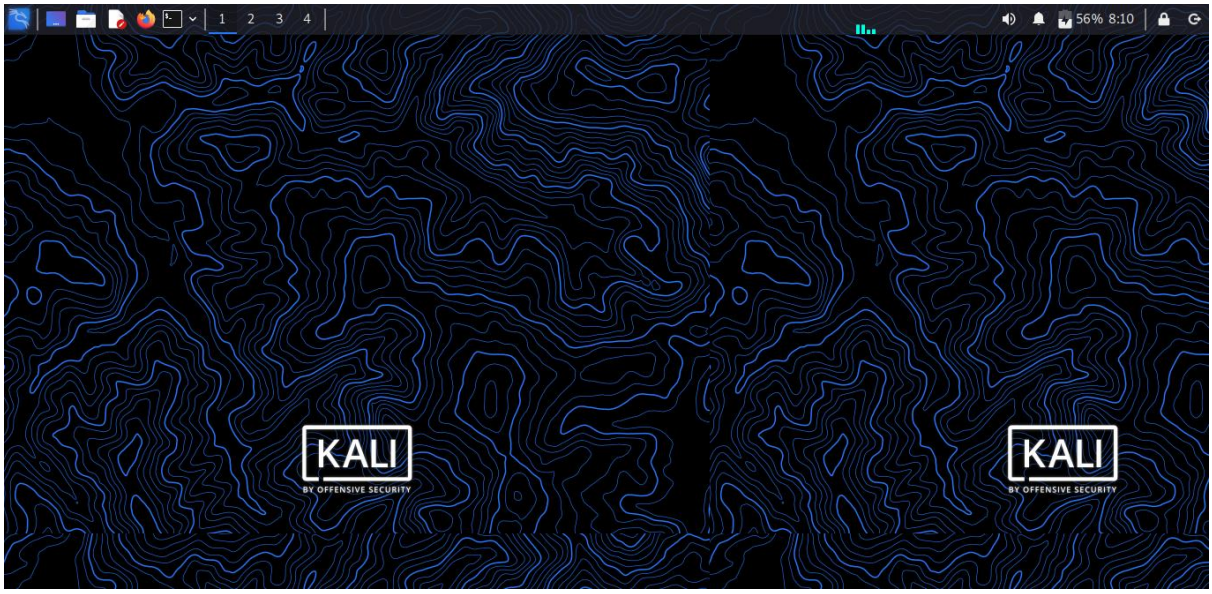

kali linux - VMware Workstation
File Edit View VM Tabs Help
Library
Type here to search
My Computer
Ubuntu 64-bit (2)
Ubuntu 64-bit (3)
kali linux
kali linux
KALI
BY OFFENSIVE SECURITY
Select your location
The selected location will be used to set your time zone and also for example to help select the system locale. Normally this should be the country where you live.
This is a shortlist of locations based on the language you selected. Choose "other" if your location is not listed.
Country, territory or area:
India
Ireland
Israel
New Zealand
Nigeria
Philippines
Seychelles
Singapore
South Africa
United Kingdom
United States
Zambia
Zimbabwe
other
Screenshot
Go Back
Continue
Activate Windows
Go to Settings to activate Windows.
To direct input to this VM, click inside or press Ctrl+G.
Type here to search
7°C
9:58 PM
12/20/2021

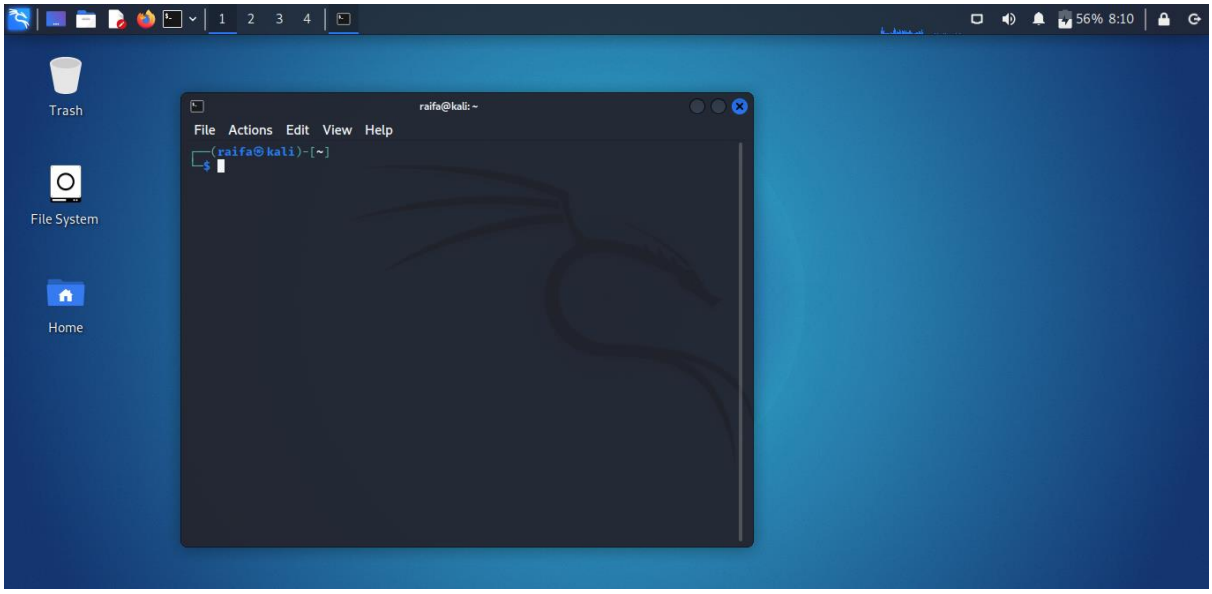

kali linux - VMware Workstation
File Edit View VM Tabs Help
Library
Type here to search
My Computer
Ubuntu 64-bit (2)
Ubuntu 64-bit (3)
kali linux
kali linux
KALI
BY OFFENSIVE SECURITY
Detect and mount installation media
Scanning installation media
Scanning /cdrom/pool/main/c...
Activate Windows
Go to Settings to activate Windows.
To direct input to this VM, click inside or press Ctrl+G.
Type here to search
7°C
9:58 PM
12/20/2021

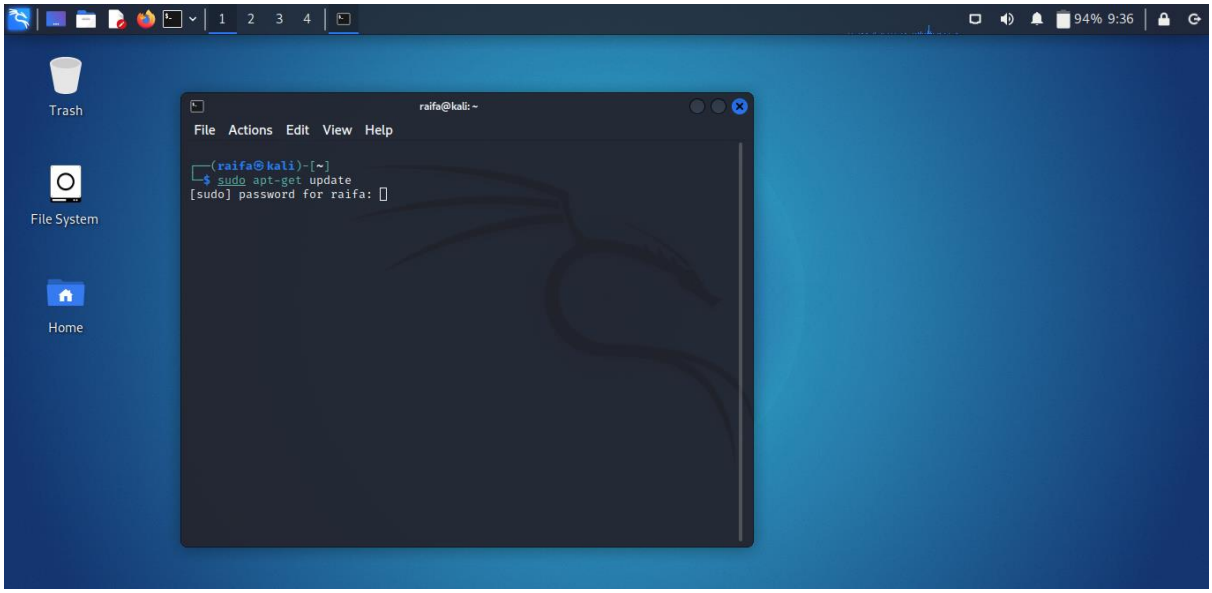

kali linux - VMware Workstation
File Edit View VM Tabs Help
Library
Type here to search
My Computer
Ubuntu 64-bit (2)
Ubuntu 64-bit (3)
kali linux
kali linux
KALI
BY OFFENSIVE SECURITY
Configure the network
Please enter the hostname for this system.
The hostname is a single word that identifies your system to the network. If you don't know what your hostname should be, consult your network administrator. If you are setting up your own home network, you can make something up here.
Hostname:
kali
Screenshot
Go Back
Continue
Activate Windows
Go to Settings to activate Windows.
To direct input to this VM, click inside or press Ctrl+G.
Type here to search
7°C
9:59 PM
12/20/2021

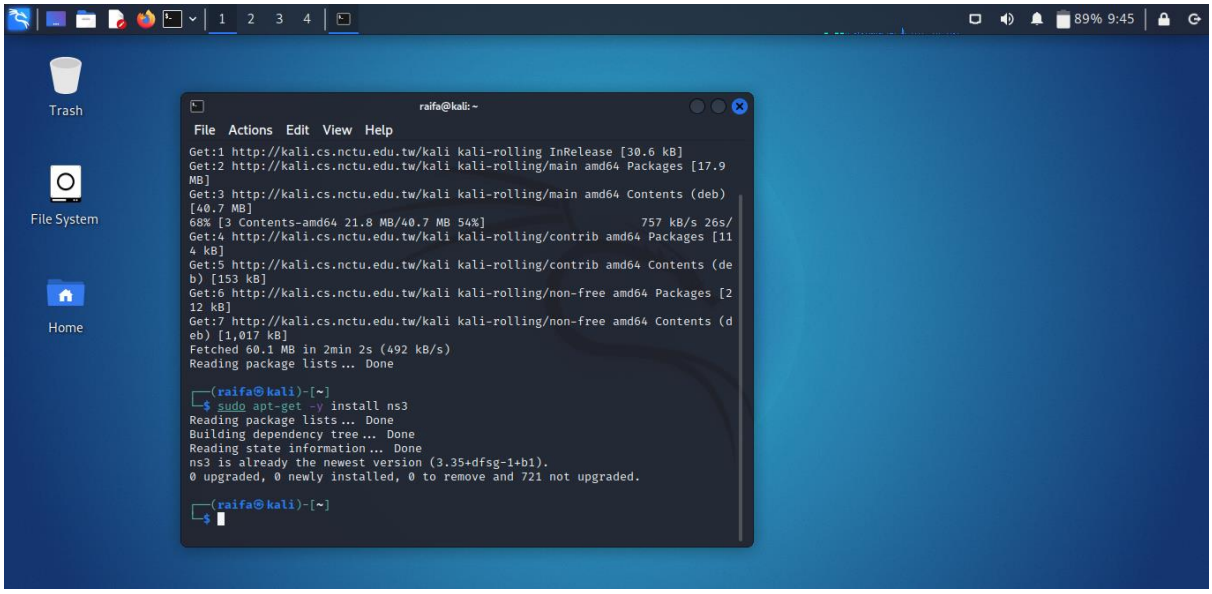

kali linux - VMware Workstation
File Edit View VM Tabs Help
Library
Type here to search
My Computer
Ubuntu 64-bit (2)
Ubuntu 64-bit (3)
kali linux
kali linux
KALI
BY OFFENSIVE SECURITY
Set up users and passwords
A good password will contain a mixture of letters, numbers and punctuation and should be changed at regular intervals.
Choose a password for the new user:
Show Password in Clear
Please enter the same user password again to verify you have typed it correctly.
Re-enter password to verify:
Show Password in Clear
Screenshot
Go Back
Continue
Activate Windows
Go to Settings to activate Windows.
To direct input to this VM, click inside or press Ctrl+G.
Type here to search
7°C
10:00 PM
12/20/2021


kali linux - VMware Workstation
File Edit View VM Tabs Help
Library
Type here to search
My Computer
Ubuntu 64-bit (2)
Ubuntu 64-bit (3)
kali linux
kali linux
KALI
BY OFFENSIVE SECURITY
Configure the clock
Setting up the clock
Getting the time from a network time server...
Cancel
Activate Windows
Go to Settings to activate Windows.
To direct input to this VM, click inside or press Ctrl+G.
Type here to search
7°C
10:01 PM
12/20/2021


1 2 3 4
56% 8:10
KALI
BY OFFENSIVE SECURITY
KALI
BY OFFENSIVE SECURITY


1 2 3 4
56% 8:10
Trash
File System
Home
raifa@kali: ~
File Actions Edit View Help
(raifa㉿kali)-[~]
$


1 2 3 4
94% 9:36
Trash
File System
Home
raifa@kali: ~
File Actions Edit View Help
(raifa㉿kali)-[~]
$ sudo apt-get update
[sudo] password for raifa:


1 2 3 4
89% 9:45
Trash
File System
Home
raifa@kali: ~
File Actions Edit View Help
Get:1 http://kali.cs.nctu.edu.tw/kali kali-rolling InRelease [30.6 kB]
Get:2 http://kali.cs.nctu.edu.tw/kali kali-rolling/main amd64 Packages [17.9 MB]
Get:3 http://kali.cs.nctu.edu.tw/kali kali-rolling/main amd64 Contents (deb) [40.7 MB]
68% [3 Contents-amd64 21.8 MB/40.7 MB 54%] 757 kB/s 26s/
Get:4 http://kali.cs.nctu.edu.tw/kali kali-rolling/contrib amd64 Packages [114 kB]
Get:5 http://kali.cs.nctu.edu.tw/kali kali-rolling/contrib amd64 Contents (deb) [153 kB]
Get:6 http://kali.cs.nctu.edu.tw/kali kali-rolling/non-free amd64 Packages [212 kB]
Get:7 http://kali.cs.nctu.edu.tw/kali kali-rolling/non-free amd64 Contents (deb) [1,017 kB]
Fetched 60.1 MB in 2min 2s (492 kB/s)
Reading package lists ... Done
(raifa㉿kali)-[~]
$ sudo apt-get -y install ns3
Reading package lists ... Done
Building dependency tree ... Done
Reading state information ... Done
ns3 is already the newest version (3.35+dfsg-1+b1).
0 upgraded, 0 newly installed, 0 to remove and 721 not upgraded.
(raifa㉿kali)-[~]
$