

Part1.A:

```
Joe@DESKTOP-IIDN4IA:~/EdgesProjPart1$ nano createUser_Group
Joe@DESKTOP-IIDN4IA:~/EdgesProjPart1$ sudo ./createUser_Group Youssef 1234 GroupForYoussef
Username: Youssef, Password: 1234, Group Name: GroupForYoussef
First time running id command, only user created with default ID, no groups
uid=1001(Youssef) gid=100(users) groups=100(users)
Second time running id command, user still default ID, added to the newly created group
uid=1001(Youssef) gid=100(users) groups=100(users),200(GroupForYoussef)
Last time running id command, user new ID and new primary group
uid=1600(Youssef) gid=200(GroupForYoussef) groups=200(GroupForYoussef)
```

Part1.B:

Giving execution permission

```
Joe@DESKTOP-IIDN4IA:~/EdgesProjPart1$ chmod +x CreateDirectory
```

Running the directory, displaying output

```
Joe@DESKTOP-IIDN4IA:~/EdgesProjPart1$ nano CreateDirectory
Joe@DESKTOP-IIDN4IA:~/EdgesProjPart1$ ./CreateDirectory YoussefDir
Removing existing files.tar.gz
Directory exists, removing it and creating a new one with same name
YoussefDir/
YoussefDir/main.h
YoussefDir/hello.c
YoussefDir/hello.h
YoussefDir/main.c
gzip: files.tar already exists; do you wish to overwrite (y or n)? n
not overwritten
Joe@DESKTOP-IIDN4IA:~/EdgesProjPart1$ ./CreateDirectory YoussefDir
Removing existing files.tar.gz
Directory exists, removing it and creating a new one with same name
YoussefDir/
YoussefDir/main.h
YoussefDir/hello.c
YoussefDir/hello.h
YoussefDir/main.c
gzip: files.tar already exists; do you wish to overwrite (y or n)? y
YoussefDir/
YoussefDir/main.h
YoussefDir/hello.c
YoussefDir/hello.h
YoussefDir/main.c
```

```
Joe@DESKTOP-IIDN4IA:~/EdgesProjPart1$ ls
CreateDirectory  YoussefDir  createUser_Group  files.tar.gz
```

- g) Switch to the newly created user
- h) Display all the files inside the extracted folder recursively and with long listing format
- i) Change to owner of this directory recursively to be the new user
- j) Again, display all the files inside the extracted folder recursively and with long listing format
- k) Search for the word “file” in the extracted directory recursively
- l) Remove all the files ending with “.c”

```

Joe@DESKTOP-IIDN4IA:~/EdgesProjPart1$ su Youssef
Password:
Youssef@DESKTOP-IIDN4IA:/home/Joe/EdgesProjPart1$ ls -lR /home/Youssef/YoussefDir
/home/Youssef/YoussefDir:
total 16
-rw-rw-r-- 1 Joe Joe 27 Aug  4 14:47 hello.c
-rw-rw-r-- 1 Joe Joe 27 Aug  4 14:47 hello.h
-rw-rw-r-- 1 Joe Joe 26 Aug  4 14:47 main.c
-rw-rw-r-- 1 Joe Joe 26 Aug  4 14:47 main.h
Youssef@DESKTOP-IIDN4IA:/home/Joe/EdgesProjPart1$ chown -h
chown: missing operand
Try 'chown --help' for more information.
Youssef@DESKTOP-IIDN4IA:/home/Joe/EdgesProjPart1$ chown --help
Usage: chown [OPTION]... [OWNER]][:[GROUP]] FILE...
       or: chown [OPTION]... --reference=RFILE FILE...
Change the owner and/or group of each FILE to OWNER and/or GROUP.
With --reference, change the owner and group of each FILE to those of RFILE.

-c, --changes          like verbose but report only when a change is made

Youssef@DESKTOP-IIDN4IA:/home/Joe/EdgesProjPart1$ sudo chown -R Youssef:GroupForYoussef /home/Youssef/YoussefDir
[sudo] password for Youssef:
Youssef is not in the sudoers file.
Youssef@DESKTOP-IIDN4IA:/home/Joe/EdgesProjPart1$ sudo usermod -aG sudo Youssef
[sudo] password for Youssef:
Youssef is not in the sudoers file.
Youssef@DESKTOP-IIDN4IA:/home/Joe/EdgesProjPart1$ su -i
su: invalid option -- 'i'
Try 'su --help' for more information.
Youssef@DESKTOP-IIDN4IA:/home/Joe/EdgesProjPart1$ su Joe
Password:
Joe@DESKTOP-IIDN4IA:~/EdgesProjPart1$ sudo rm -r YoussefDir
Joe@DESKTOP-IIDN4IA:~/EdgesProjPart1$ sudo usermod -aG sudo Youssef
Joe@DESKTOP-IIDN4IA:~/EdgesProjPart1$ ls
CreateDirectory  createUser_Group  files.tar.gz
Joe@DESKTOP-IIDN4IA:~/EdgesProjPart1$ ./CreateDirectory YoussefDir
Removing existing files.tar.gz
YoussefDir/
YoussefDir/main.h
YoussefDir/hello.c
YoussefDir/hello.h
YoussefDir/main.c
gzip: files.tar already exists; do you wish to overwrite (y or n)? y
YoussefDir/

```

```

Joe@DESKTOP-IIDN4IA:~/EdgesProjPart1$ su Youssef
Password:
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

Youssef@DESKTOP-IIDN4IA:/home/Joe/EdgesProjPart1$ sudo chown -R Youssef:GroupForYoussef /home/Youssef/YoussefDir
[sudo] password for Youssef:
Youssef@DESKTOP-IIDN4IA:/home/Joe/EdgesProjPart1$ ls -lR /home/Youssef/YoussefDir
/home/Youssef/YoussefDir:
total 16
-rw-rw-r-- 1 Youssef GroupForYoussef 27 Aug  4 14:54 hello.c
-rw-rw-r-- 1 Youssef GroupForYoussef 27 Aug  4 14:54 hello.h
-rw-rw-r-- 1 Youssef GroupForYoussef 26 Aug  4 14:54 main.c
-rw-rw-r-- 1 Youssef GroupForYoussef 26 Aug  4 14:54 main.h
Youssef@DESKTOP-IIDN4IA:/home/Joe/EdgesProjPart1$ grep -r "file" /home/Youssef/YoussefDir
/home/Youssef/YoussefDir/main.h:This file is named main.h
/home/Youssef/YoussefDir/hello.c:This file is named hello.c
/home/Youssef/YoussefDir/hello.h:This file is named hello.h
/home/Youssef/YoussefDir/main.c:This file is named main.c

```

l) Remove all the files ending with “.c”

```

Youssef@DESKTOP-IIDN4IA:/home/Joe/EdgesProjPart1$ rm /home/Youssef/YoussefDir/*.c
Youssef@DESKTOP-IIDN4IA:/home/Joe/EdgesProjPart1$ cd ../
bash: cd: ../: Permission denied
Youssef@DESKTOP-IIDN4IA:/home/Joe/EdgesProjPart1$ cd home
bash: cd: home: Permission denied
Youssef@DESKTOP-IIDN4IA:/home/Joe/EdgesProjPart1$ cd /home/Youssef
Youssef@DESKTOP-IIDN4IA:~$ ls
YoussefDir  files.tar
Youssef@DESKTOP-IIDN4IA:~$ cd ./YoussefDir/
Youssef@DESKTOP-IIDN4IA:~/YoussefDir$ ls
hello.h  main.h
Youssef@DESKTOP-IIDN4IA:~/YoussefDir$

```

Makefile: (Part 2)

```
Joe@DESKTOP-IIDN4IA:~/makeFileProject/Project/Application$ ls
Makefile app.c
Joe@DESKTOP-IIDN4IA:~/makeFileProject/Project/Application$ make all
mkdir -p /home/Joe/makeFileProject/Project/Application/out/gen
gcc -c /home/Joe/makeFileProject/Project/Modules/caesar_cipher/src/caesar_encrypt.c -I/home/Joe/makeFileProject/Project/Modules/caesar_cipher/inc -o /home/Joe/makeFileProject/Project/Application/out/gen/caesar_encrypt.o
mkdir -p /home/Joe/makeFileProject/Project/Application/out/gen
gcc -c /home/Joe/makeFileProject/Project/Modules/caesar_cipher/src/caesar_decrypt.c -I/home/Joe/makeFileProject/Project/Modules/caesar_cipher/inc -o /home/Joe/makeFileProject/Project/Application/out/gen/caesar_decrypt.o
mkdir -p /home/Joe/makeFileProject/Project/Application/out/libs
ar rcs /home/Joe/makeFileProject/Project/Application/out/libs/libcaesar_cipher.a /home/Joe/makeFileProject/Project/Application/out/gen/caesar_encrypt.o /home/Joe/makeFileProject/Project/Application/out/gen/caesar_decrypt.o
mkdir -p /home/Joe/makeFileProject/Project/Application/out/gen
gcc -fPIC -c /home/Joe/makeFileProject/Project/Modules/xor_cipher/src/xor_encrypt.c -I/home/Joe/makeFileProject/Project/Modules/xor_cipher/inc -o /home/Joe/makeFileProject/Project/Application/out/gen/xor_encrypt.o
mkdir -p /home/Joe/makeFileProject/Project/Application/out/gen
gcc -fPIC -c /home/Joe/makeFileProject/Project/Modules/xor_cipher/src/xor_decrypt.c -I/home/Joe/makeFileProject/Project/Modules/xor_cipher/inc -o /home/Joe/makeFileProject/Project/Application/out/gen/xor_decrypt.o
mkdir -p /home/Joe/makeFileProject/Project/Application/out/libs
gcc -shared -o /home/Joe/makeFileProject/Project/Application/out/libs/libxor_cipher.so /home/Joe/makeFileProject/Project/Application/out/gen/xor_encrypt.o /home/Joe/makeFileProject/Project/Application/out/gen/xor_decrypt.o
gcc -c /home/Joe/makeFileProject/Project/Application/app.c -I/home/Joe/makeFileProject/Project/Modules/caesar_

Joe@DESKTOP-IIDN4IA:~/makeFileProject/Project/Application$ ls
Makefile app.c out output
Joe@DESKTOP-IIDN4IA:~/makeFileProject/Project/Application$ cd out
Joe@DESKTOP-IIDN4IA:~/makeFileProject/Project/Application/out$ ls
gen libs
Joe@DESKTOP-IIDN4IA:~/makeFileProject/Project/Application/out$ cd gen
Joe@DESKTOP-IIDN4IA:~/makeFileProject/Project/Application/out/gen$ ls
app.o caesar_decrypt.o caesar_encrypt.o xor_decrypt.o xor_encrypt.o
Joe@DESKTOP-IIDN4IA:~/makeFileProject/Project/Application/out/gen$ cd ..
Joe@DESKTOP-IIDN4IA:~/makeFileProject/Project/Application/out$ cd
gen/ libs/
Joe@DESKTOP-IIDN4IA:~/makeFileProject/Project/Application/out$ cd cd libs/
bash: cd: too many arguments
Joe@DESKTOP-IIDN4IA:~/makeFileProject/Project/Application/out$ cd libs
Joe@DESKTOP-IIDN4IA:~/makeFileProject/Project/Application/out/libs$ ls
libcaesar_cipher.a libxor_cipher.so
Joe@DESKTOP-IIDN4IA:~/makeFileProject/Project/Application/out/libs$ cd ..
Joe@DESKTOP-IIDN4IA:~/makeFileProject/Project/Application/out$ cd ..
Joe@DESKTOP-IIDN4IA:~/makeFileProject/Project/Application$ ls
Makefile app.c out output
Joe@DESKTOP-IIDN4IA:~/makeFileProject/Project/Application$ ./output 3 K "aaa"
./output: error while loading shared libraries: libxor_cipher.so: cannot open shared object file: No such file
or directory
Joe@DESKTOP-IIDN4IA:~/makeFileProject/Project/Application$ export LD_LIBRARY_PATH=/home/Joe/makeFileProject/Pr
oject/Application/out/libs:$LD_LIBRARY_PATH
Joe@DESKTOP-IIDN4IA:~/makeFileProject/Project/Application$ ./output 3 K "aaa"
text encrypted with caesar: ddd
text decrypted with caesar: aaa
text encrypted with xor: ***
text decrypted with xor: aaa
```

CMake (Part2):

```
Joe@DESKTOP-IIDN4IA:~/cmakeProject/Project/Modules/xor_cipher$ cd ..
Joe@DESKTOP-IIDN4IA:~/cmakeProject/Project/Modules$ cd ..
Joe@DESKTOP-IIDN4IA:~/cmakeProject/Project$ mkdir build && cd build
Joe@DESKTOP-IIDN4IA:~/cmakeProject/Project/build$ cmake ..
-- The C compiler identification is GNU 13.3.0
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
-- Check for working C compiler: /usr/bin/cc - skipped
-- Detecting C compile features
-- Detecting C compile features - done
-- Configuring done (14.5s)
-- Generating done (0.4s)
-- Build files have been written to: /home/Joe/cmakeProject/Project/build
Joe@DESKTOP-IIDN4IA:~/cmakeProject/Project/build$ make
[ 12%] Building C object Modules/caesar_cipher/CMakeFiles/caesar_cipher.dir/src/caesar_encrypt.c.o
[ 25%] Building C object Modules/caesar_cipher/CMakeFiles/caesar_cipher.dir/src/caesar_decrypt.c.o
[ 37%] Linking C static library ../../out/libs/libcaesar_cipher.a
[ 37%] Built target caesar_cipher
[ 50%] Building C object Modules/xor_cipher/CMakeFiles/xor_cipher.dir/src/xor_encrypt.c.o
[ 50%] Building C object Modules/xor_cipher/CMakeFiles/xor_cipher.dir/src/xor_decrypt.c.o
[ 62%] Building C object Modules/xor_cipher/CMakeFiles/xor_cipher.dir/src/xor_decrypt.c.o
[ 75%] Linking C shared library ../../out/libs/libxor_cipher.so
[ 75%] Built target xor_cipher
[ 87%] Building C object Application/CMakeFiles/output.dir/app.c.o
[100%] Linking C executable ../out/output
[100%] Built target output
Joe@DESKTOP-IIDN4IA:~/cmakeProject/Project/build$ ls
Application  CMakeCache.txt  CMakeFiles  Makefile  Modules  cmake_install.cmake  out
Joe@DESKTOP-IIDN4IA:~/cmakeProject/Project/build$ export LD_LIBRARY_PATH=../out/libs:$LD_LIBRARY_PATH
Joe@DESKTOP-IIDN4IA:~/cmakeProject/Project/build$ ./out/output 3 K "aaa"
text encrypted with caesar: ddd
text decrypted with caesar: aaa
text encrypted with xor: ***
text decrypted with xor: aaa
Joe@DESKTOP-IIDN4IA:~/cmakeProject/Project/build$
```

Part3:

```
PS C:\Users\79254> ssh Joe@10.0.2.15
Joe@10.0.2.15's password:
Welcome to Ubuntu 24.04.1 LTS (GNU/Linux 5.10.16.3-microsoft-standard-WSL2 x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Tue Aug  5 22:26:06 EEST 2025

System load:  0.41               Processes:    21

Welcome to Ubuntu 24.04.1 LTS (GNU/Linux 5.10.16.3-microsoft-standard-WSL2 x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Tue Aug  5 22:26:06 EEST 2025

System load:  0.41               Processes:    21
Usage of /:   0.7% of 250.98GB   Users logged in: 0
Memory usage: 5%                IPv4 address for eth0:
Swap usage:   0%

This message is shown once a day. To disable it please create the
/home/Joe/.hushlogin file.
Joe@DESKTOP-IIDN4IA:~$
Joe@DESKTOP-IIDN4IA:~$

This message is shown once a day. To disable it please create the
/home/Joe/.hushlogin file.
Joe@DESKTOP-IIDN4IA:~$
Joe@DESKTOP-IIDN4IA:~$ ls
EdgesProjPart1 JoeDir Project_required_files cmakeProject file makeFileProject
Joe@DESKTOP-IIDN4IA:~$

Joe@DESKTOP-IIDN4IA:~$ ls
EdgesProjPart1 JoeDir Project_required_files cmakeProject file makeFileProject
Joe@DESKTOP-IIDN4IA:~$ ls
EdgesProjPart1 JoeDir ProjectPart3 Project_required_files cmakeProject file makeFileProject
Joe@DESKTOP-IIDN4IA:~$ cd ProjectPart3/
Joe@DESKTOP-IIDN4IA:~/ProjectPart3$ ls
app
Joe@DESKTOP-IIDN4IA:~/ProjectPart3$ chmod +x app
Joe@DESKTOP-IIDN4IA:~/ProjectPart3$ ./app
./app: line 6: syntax error near unexpected token '('
./app: line 6: 'int main() {'
Joe@DESKTOP-IIDN4IA:~/ProjectPart3$ ./app
./app: line 6: syntax error near unexpected token '('
./app: line 6: 'int main() {'
Joe@DESKTOP-IIDN4IA:~/ProjectPart3$ ls
app.c application
Joe@DESKTOP-IIDN4IA:~/ProjectPart3$ ./application
Linux 5.10.16.3-microsoft-standard-WSL2 (DESKTOP-IIDN4IA)    08/05/25    _x86_64_    (8 CPU)

22:55:21    CPU    %usr    %nice    %sys    %iowait    %irq    %soft    %steal    %guest    %gnice    %idle
22:55:21    all    0.03    0.00    0.05    0.01    0.00    0.00    0.00    0.00    0.00    99.91
Child 1 (mpstat) exited with status 0
  PID TTY          TIME CMD
 3706 pts/1    00:00:01 bash
 3996 pts/1    00:00:00 application
 3998 pts/1    00:00:01 ps
Child 2 (ps) exited with status 0
Joe@DESKTOP-IIDN4IA:~/ProjectPart3$
```

```

Joe@DESKTOP-IIDN4IA:~/ProjectPart3$ mv application app.c
Joe@DESKTOP-IIDN4IA:~/ProjectPart3$ rm app
Joe@DESKTOP-IIDN4IA:~/ProjectPart3$ ls
app.c
Joe@DESKTOP-IIDN4IA:~/ProjectPart3$ gcc -o application app.c
Joe@DESKTOP-IIDN4IA:~/ProjectPart3$ ls
app.c  application

Joe@DESKTOP-IIDN4IA:~/ProjectPart3$ pstree -p
init(1)---init(7)---init(8)---bash(9)---su(24)---bash(25)---pstree(142)
          |               |               |
          |               |               |---sshd(58)---sshd(59)---sshd(97)---bash(98)
          |               |
          |               |---{init}(5)
          |               |---{init}(6)

Joe@DESKTOP-IIDN4IA:~/ProjectPart3$ pstree -p
init(1)---init(7)---init(8)---bash(9)---su(24)---bash(25)---pstree(167)
          |               |               |
          |               |               |---sshd(58)---sshd(59)---sshd(97)---bash(98)---application(164)---application(165)
          |               |               |
          |               |               |---application(166)
          |               |
          |               |---{init}(5)
          |               |---{init}(6)

Joe@DESKTOP-IIDN4IA:~/EdgesProjPart1$ nano createUser_Group
Joe@DESKTOP-IIDN4IA:~/EdgesProjPart1$ sudo ./createUser_Group Youssef 1234 GroupForYoussef
Username: Youssef, Password: 1234, Group Name: GroupForYoussef
First time running id command, only user created with default ID, no groups
uid=1001(Youssef) gid=100(users) groups=100(users)
Second time running id command, user still default ID, added to the newly created group
uid=1001(Youssef) gid=100(users) groups=100(users),200(GroupForYoussef)
Last time running id command, user new ID and new primary group
uid=1600(Youssef) gid=200(GroupForYoussef) groups=200(GroupForYoussef)

```