SECSR2043 OPERATING SYSTEMS
[20 Marks]

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Section	: Section 03	

Instruction: Please answer all of the following questions. Whenever the ✋ symbol appears, please raise your hand to call your instructor, he/she will verify your results by putting his / her initial next to the symbol.

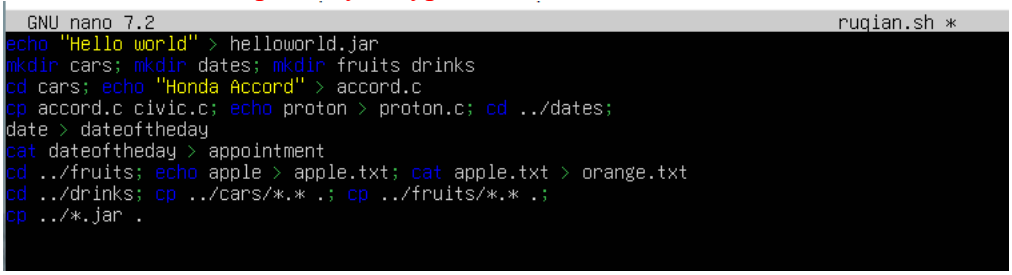
1. Type the following commands using a text editor and save it as a *yourname*.sh (Example: `ahmad.sh`).

```
echo "Hello world" > helloworld.jar
mkdir cars; mkdir dates; mkdir fruits drinks
cd cars; echo "Honda Accord" > accord.c
cp accord.c civic.c; echo proton > proton.c; cd ../dates;
date > dateoftheday
cat dateoftheday > appointment
cd ../fruits; echo apple > apple.txt; cat apple.txt >
orange.txt
cd drinks; cp ../cars/*.* .; cp ../fruits/*.* .;
cp ../*.jar .
```

a) Execute the script and draw a tree structure that contains created directories and files. The parent node of the directory begin with **$HOME** directory.

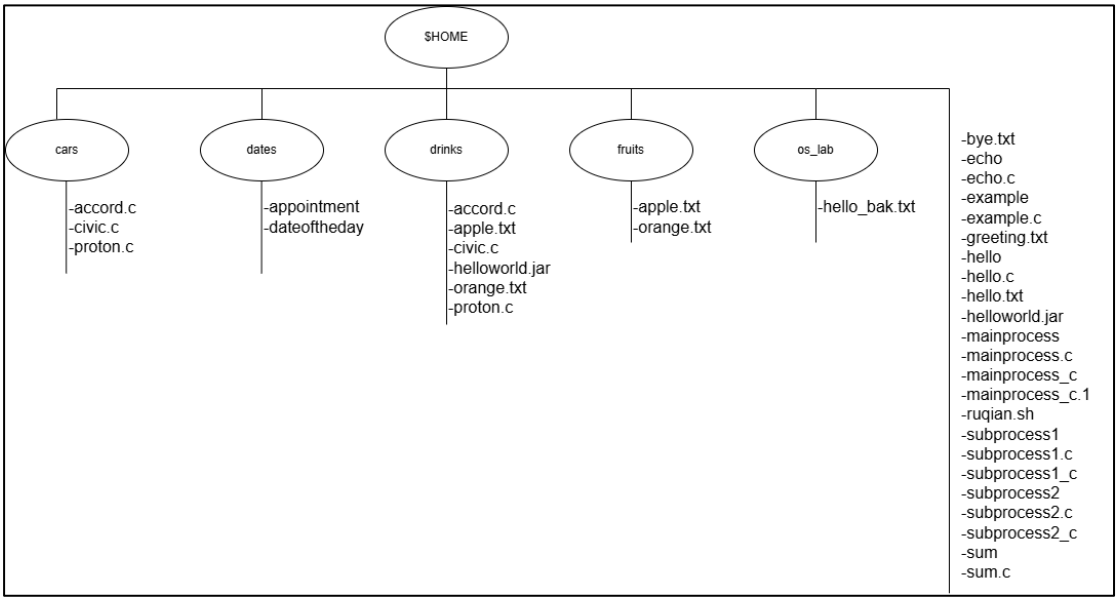
[4 marks]

Print screen the script that you type;



Then draw the tree

```
tehruqian@secr2043:~$ tree
.
├── bye.txt
├── cars
│   ├── accord.c
│   ├── civic.c
│   └── proton.c
├── dates
│   ├── appointment
│   └── dateoftheday
├── drinks
│   ├── accord.c
│   ├── apple.txt
│   ├── civic.c
│   ├── helloworld.jar
│   ├── orange.txt
│   └── proton.c
├── echo
├── echo.c
├── example
├── example.c
├── fruits
│   ├── apple.txt
│   └── orange.txt
├── greeting.txt
├── hello
├── hello.c
├── hello.txt
├── helloworld.jar
├── mainprocess
├── mainprocess.c
├── mainprocess_c
├── mainprocess_c.1
├── os_lab
│   └── hello_bak.txt
├── ruqian.sh
├── subprocess1
├── subprocess1.c
├── subprocess1_c
├── subprocess2
├── subprocess2.c
├── subprocess2_c
├── sum
└── sum.c
```



b) Write an interactive bash script that will read a type of file extension, display all those files, and count the number of files. To validate your script, display c program files, and enter "c" as the input to the bash script. [4 marks]

Print screen the bash script you type and run

```
  GNU nano 7.2                                                  file_counter.sh *
#!/bin/bash

read -p "Enter file extension (without dot): " ext

echo -e "\nFiles with .$ext extension:"
files=$(find . -type f -name "*.$ext")

if [ -z "$files" ]; then
        echo "No files found with .$ext extension."
        count=0
else
        echo "$files"
        count=$(echo "$files" | wc -l)
fi

echo -e "\nTotal number of .$ext files: $count"
```

```
tehruqian@secr2043:~$ chmod +x file_counter.sh
tehruqian@secr2043:~$ ./file_counter.sh
Enter file extension (without dot): c

Files with .c extension:
./echo.c
./sum.c
./drinks/civic.c
./drinks/accord.c
./drinks/proton.c
./hello.c
./subprocess1.c
./subprocess2.c
./cars/civic.c
./cars/accord.c
./cars/proton.c
./example.c
./mainprocess.c

Total number of .c files: 13
```

2. The following Figure 1 illustrates a tree structure of some directories and files.

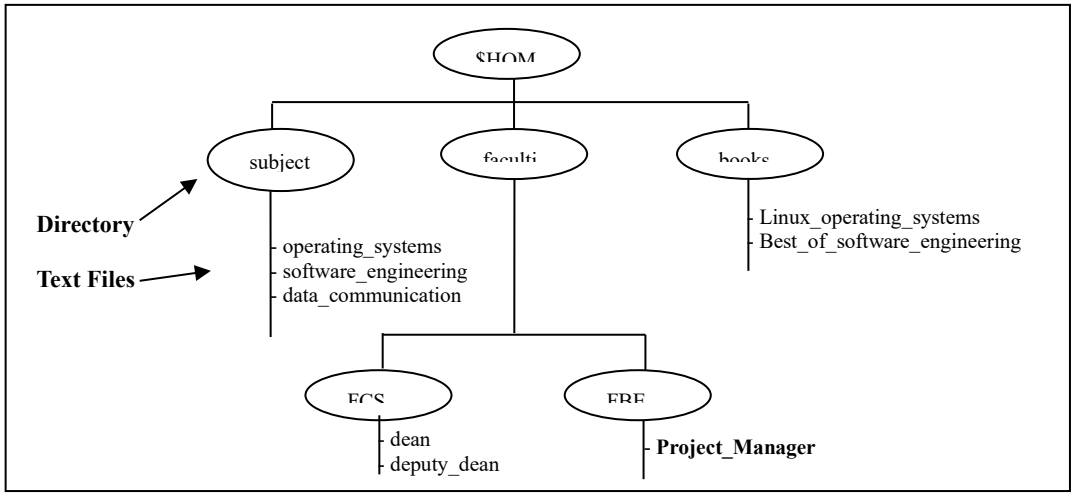


Figure 1

a) Write a bash script (called `myname2a.sh`) that will produce directories and files as in Figure 1. Each text files contain its filename without the underscore character. For example: text file `Project_Manager` contains `Project Manager`). [4 marks]

Print screen the bash script you type and run

```
  GNU nano 7.2                                                  rugian2a.sh *
#!/bin/bash

mkdir -p $HOME/subjects $HOME/faculties/FCS $HOME/faculties/FBE $HOME/books

echo "operating systems" > $HOME/subjects/operating_systems
echo "software engineering" > $HOME/subjects/software_engineering
echo "data communication" > $HOME/subjects/data_communication

echo "dean" > $HOME/faculties/FCS/dean
echo "deputy dean" > $HOME/faculties/FCS/deputy_dean

echo "Project Manager" > $HOME/faculties/FBE/Project_Manager

echo "Linux operating systems" > $HOME/books/Linux_operating_systems
echo "Best of software engineering" > $HOME/books/Best_of_software_engineering_
```

```
tehrugian@secr2043:~$ tree -a | less_
```

```
.
├── .bash_history
├── .bash_logout
├── .bashrc
├── .cache
│   └── motd.legal-displayed
├── .local
│   └── share
│       └── nano
├── .profile
├── .sudo_as_admin_successful
├── .wget-hsts
├── books
│   ├── Best_of_software_engineering
│   └── Linux_operating_systems
├── bye.txt
├── cars
│   ├── accord.c
│   ├── civic.c
│   └── proton.c
├── dates
│   ├── appointment
│   └── dateoftheday
├── drinks
│   ├── accord.c
│   ├── apple.txt
│   ├── civic.c
│   ├── helloworld.jar
│   ├── orange.txt
│   └── proton.c
├── echo
├── echo.c
├── example
├── example.c
├── faculties
│   ├── FBE
│   │   └── Project_Manager
│   └── FCS
│       ├── dean
│       └── deputy_dean
├── file_counter.sh
├── fruits
│   ├── apple.txt
│   └── orange.txt
├── greeting.txt
├── hello
├── hello.c
├── hello.txt
├── helloworld.jar
:_
```

b) Complete the following table by writing the access control of directories or files that were produced. Given is the access control for directory called `book`. [2 marks]

Directory/File	Access Control
books	drwxrwxr-x
subjects	drwxrwxr-x
Best_of_software_engineering	-rw-rw-r--
FCS	drwxrwxr-x
project_manager	-rw-rw-r--

```
tehruqian@secr2043:~$ ls -ld books
drwxrwxr-x 2 tehruqian tehruqian 4096 Jun 16 14:18 books
```

```
tehruqian@secr2043:~$ ls -ld subjects
drwxrwxr-x 2 tehruqian tehruqian 4096 Jun 16 14:18 subjects
```

```
tehruqian@secr2043:~$ ls -l books/Best_of_software_engineering
-rw-rw-r-- 1 tehruqian tehruqian 29 Jun 16 14:26 books/Best_of_software_engineering
```

```
tehruqian@secr2043:~$ ls -ld faculties/FCS
drwxrwxr-x 2 tehruqian tehruqian 4096 Jun 16 14:18 faculties/FCS
```

```
tehruqian@secr2043:~$ ls -l faculties/FBE/Project_Manager
-rw-rw-r-- 1 tehruqian tehruqian 16 Jun 16 14:26 faculties/FBE/Project_Manager
```

c) Write another bash script (called `myname2c.sh`) that will change the access control of the directories and files based on the following information:

[4 marks]

Directory/File	Users								
	Owner			Group			Public		
subjects	✓	✓	✓	✓	x	x	✓	x	x
Best_of_software_engineering	✓	x	✓	x	✓	x	x	x	x
FCS	✓	✓	x	x	x	x	✓	✓	✓
project_manager	x	x	x	x	✓	✓	x	x	✓

Print screen the bash script you type and run

```
  GNU nano 7.2                                                    ruqian2c.sh
#!/bin/bash

chmod 744 $HOME/subjects

chmod 520 $HOME/books/Best_of_software_engineering

chmod 607 $HOME/faculties/FCS

chmod 031 $HOME/faculties/FBE/Project_Manager
```

```
tehruqian@secr2043:~$ ls -ld subjects
drwxr--r-- 2 tehruqian tehruqian 4096 Jun 16 14:18 subjects
```

```
tehruqian@secr2043:~$ ls -l books/Best_of_software_engineering
-r-x-w---- 1 tehruqian tehruqian 29 Jun 16 14:26 books/Best_of_software_engineering
```

```
tehruqian@secr2043:~$ ls -ld faculties/FCS
drw----rwx 2 tehruqian tehruqian 4096 Jun 16 14:18 faculties/FCS
```

```
tehruqian@secr2043:~$ ls -l faculties/FBE/Project_Manager
-----wx--x 1 tehruqian tehruqian 16 Jun 16 14:26 faculties/FBE/Project_Manager
```

d) Complete the following table by writing the access control for each directory or file after executing the bash script in question 2(c)). [2 marks]

Directory/File	Access Control
subjects	drwxr--r--
Best_of_software_engineering	-r-x-w----
FCS	drw----rwx
project_manager	-----wx--x

End of Lab 3

**** All the Best for Final Exam ****