SCSR2043 OPERATING SYSTEMS
(June 2024)
[Marks]

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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]

$HOME

```
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 .
```

```
/root
├── cars
│   ├── accord.c
│   ├── civic.c
│   └── proton.c
├── dates
│   ├── appointment
│   └── dateoftheday
├── drinks
│   ├── accord.c
│   ├── apple.txt
│   ├── civic.c
│   ├── helloworld.jar
│   ├── orange.txt
│   └── proton.c
├── fruits
│   ├── apple.txt
│   └── orange.txt
├── helloworld.jar
└── aland.sh
```

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]

```
read -p "Enter file extension (e.g., c): " extension
files=$(find . -type f -name "*.$extension")
count=$(echo "$files" | wc -l)
echo "Files with .$extension extension:"
echo "$files"
echo "Total files: $count"
```

```
Enter file extension (e.g., c): c
Files with .c extension:
./drinks/accord.c
./drinks/civic.c
./drinks/proton.c
./cars/accord.c
./cars/civic.c
./cars/proton.c
Total files: 6
```

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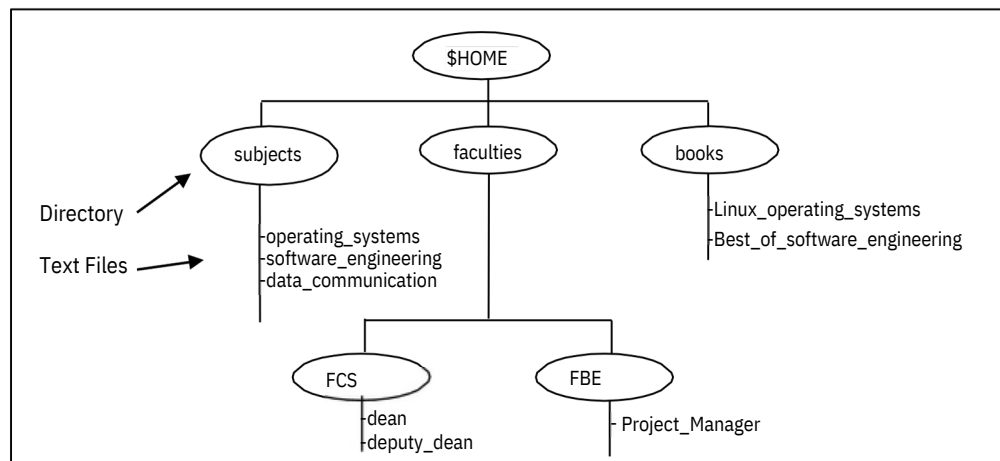
Figure 1

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]

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

create_file() {
    local filepath="$1"
    local filename=$(basename "$filepath" .txt)
    local content=${filename//_/ }
    echo "$content" > "$filepath"
}

create_file "$HOME/subjects/operating_systems.txt"
create_file "$HOME/subjects/software_engineering.txt"
create_file "$HOME/subjects/data_communication.txt"
create_file "$HOME/books/Linux_operating_systems.txt"
create_file "$HOME/books/Best_of_software_engineering.tx
create_file "$HOME/faculties/FCS/dean.txt"
create_file "$HOME/faculties/FCS/deputy_dean.txt"
create_file "$HOME/faculties/FBE/project_manager.txt"

echo "Directory structure and files created successfully
```

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	drwxr-xr-x
Best_of_software_engineering	-rw-r--r--
FCS	drwxr-xr-x
project_manager	-rw-r--r--

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	✓

```
chmod 701 $HOME/subjects
chmod 501 $HOME/books/Best_of_software_engineering.txt
chmod 711 $HOME/faculties/FCS
chmod 011 $HOME/faculties/FBE/project_manager.txt
```

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	drwx-----x
Best_of_software_engineering	-r-x-----x
FCS	drwx--x--x
project_manager	------x--x

End of Lab 3

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