Concepts of Operating System

Assignment 2

Part A

What will the following commands do?

- echo "Hello, World!"

Ans: Print text to the terminal.

In this case it will print : Hello, World!

- name="Productive"

Ans: This command Assigns String productive to the name variable.

- touch file.txt

Ans: Creates an empty file named file.txt

- ls -a

Ans: list all files and directories with hidden ones

- rm file.txt

Ans: Deletes the file named file.txt

- cp file1.txt file2.txt

Ans: Copies file1.txt content to file2.txt

- mv file.txt /path/to/directory/

Ans: Mv is a move command

File.txt is the file being moved here

/path/to/direction is the destination directory

- chmod 755 script.sh

Ans: This command changes the permission of the script.sh to allow the owner to read, write, and execute the file , while others can only read and execute it.

- grep "pattern" file.txt

Ans: Grep command searches for the string “pattern” in file.txt and then displays the matching specific word or lines in that file

- kill PID

Ans: This command Terminates the process with the specific Process ID (PID)

- mkdir mydir && cd mydir && touch file.txt && echo "Hello, World!" > file.txt && cat file.txt

Ans: mkdir Creates a directory named mydir

by using cd we enters in that directory

By touch file.txt command we create file.txt

echo write Hello,World! Into file

and later cat command display all the contents of file

- ls -l | grep ".txt"

Ans: ls -l command list all files and directories in detailed format and grep command filters those containing .txt

- cat file1.txt file2.txt | sort | uniq

Ans: concatenates file1.txt and file2.txt , sorts the combined content and removes the duplicate ones

- ls -l | grep "^d"

Ans: list all the files and directories in detailed format and grep “^d” command searches for only directories

- grep -r "pattern" /path/to/directory/

Ans: This command will search for pattern word in all directory and subdirectoy given as destination path.

- cat file1.txt file2.txt | sort | uniq –d

Ans: concatenates file1.txt and file2.txt , sorts them and displays only duplicate lines as it is written -d

- chmod 644 file.txt

Ans: set file.txt permission so that the owner can read and write while others can only read it

- cp -r source_directory destination_directory

Ans: Recursivley copies the source_directory contents to destination_directory

- find /path/to/search -name "*.txt"

Ans: searches for files with .txt extension within the path given

- chmod u+x file.txt

Ans: This command is used for to give permission to owner to execute file.txt

- echo $PATH

Ans: This command Displays the system PATH environment variable, which list directories searched for executable files. It give list of directories separated by (:)

Part B

Identify True or False:

1. ls is used to list files and directories in a directory. - True

2. mv is used to move files and directories. - True

3. cd is used to copy files and directories. - False

4. pwd stands for "print working directory" and displays the current directory. - true

5. grep is used to search for patterns in files. -True

6. chmod 755 file.txt gives read, write, and execute permissions to the owner, and read and execute permissions to group and others. - True

7. mkdir -p directory1/directory2 creates nested directories, creating directory2 inside directory1 if directory1 does not exist. - True

8. rm -rf file.txt deletes a file forcefully without confirmation. - true

Identify the Incorrect Commands:

1. chmodx is used to change file permissions. – Incorrect…

2. cpy is used to copy files and directories. - Incorrect

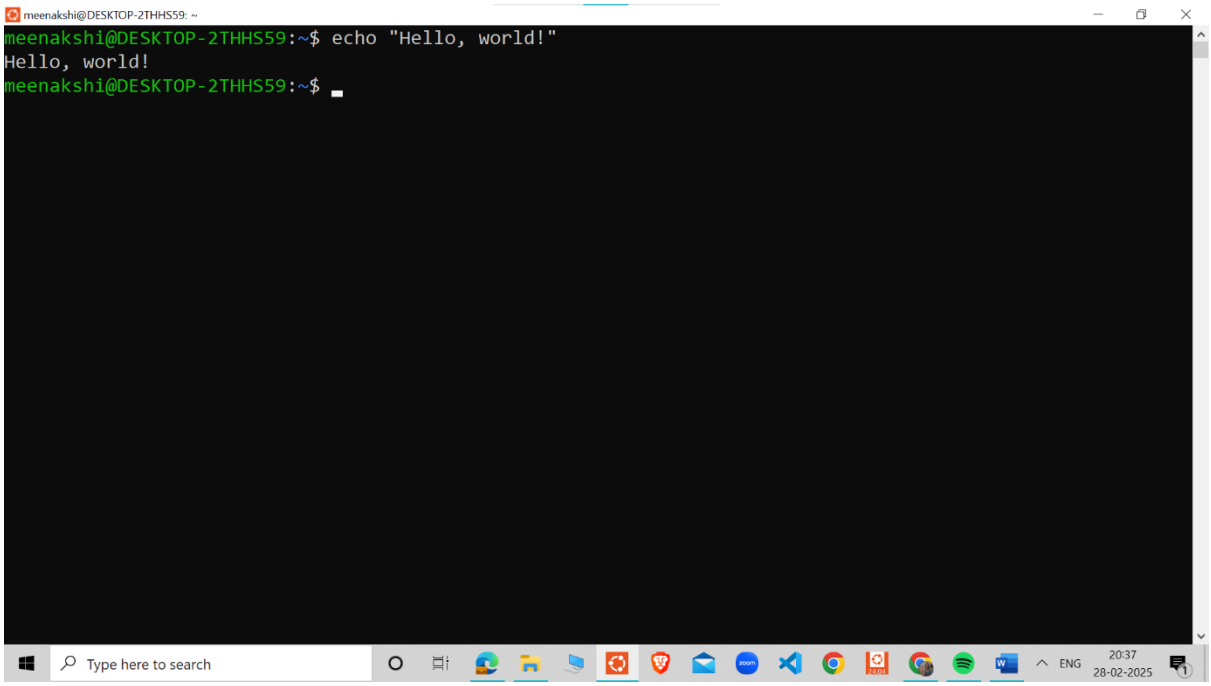
3. mkfile is used to create a new file. - Incorrect

4. catx is used to concatenate files. - Incorrect

5. rn is used to rename files. - Incorrect

Part C

Question 1: Write a shell script that prints "Hello, World!" to the terminal.



Question 2: Declare a variable named "name" and assign the value "CDAC Mumbai" to it. Print the value of the variable.

```
meenakshi@DESKTOP-2THHS59: ~
meenakshi@DESKTOP-2THHS59:~$ name="CDAC Mumbai"
meenakshi@DESKTOP-2THHS59:~$ echo "$name"
CDAC Mumbai
meenakshi@DESKTOP-2THHS59:~$
```

Question 3: Write a shell script that takes a number as input from the user and prints it.

```
meenakshi@DESKTOP-2THHS59: ~
meenakshi@DESKTOP-2THHS59:~$ touch code_3
meenakshi@DESKTOP-2THHS59:~$ nano code_3
meenakshi@DESKTOP-2THHS59:~$ cat code_3
echo "Enter a number"
read num
echo $num
meenakshi@DESKTOP-2THHS59:~$ bash code_3
Enter a number
3
3
meenakshi@DESKTOP-2THHS59:~$
```

Question 4: Write a shell script that performs addition of two numbers (e.g., 5 and 3) and prints the result.

```
meenakshi@DESKTOP-2THHS59: ~
meenakshi@DESKTOP-2THHS59:~$ nano code_4
meenakshi@DESKTOP-2THHS59:~$ bash code_4
Enter num1
2
Enter num2
2
The addition is: 4
meenakshi@DESKTOP-2THHS59:~$ cat code_4

echo "Enter num1"
read num1
echo "Enter num2"
read num2
result=$((num1 + num2))
echo "The addition is: $result"
meenakshi@DESKTOP-2THHS59:~$
```

Question 5: Write a shell script that takes a number as input and prints "Even" if it is even, otherwise prints "Odd".

```
meenakshi@DESKTOP-2THHS59: ~
meenakshi@DESKTOP-2THHS59:~$ nano code_5
meenakshi@DESKTOP-2THHS59:~$ bash code_5
Enter a number
4
Even
meenakshi@DESKTOP-2THHS59:~$ bash code_5
Enter a number
5
odd
meenakshi@DESKTOP-2THHS59:~$ cat code_5
echo "Enter a number"
read num
if(( $num % 2 == 0));
then
  echo "Even"
else
echo "odd"
fi
meenakshi@DESKTOP-2THHS59:~$
```

Question 6: Write a shell script that uses a for loop to print numbers from 1 to 5.

```
meenakshi@DESKTOP-2THHS59: ~
meenakshi@DESKTOP-2THHS59:~$ nano code_6
meenakshi@DESKTOP-2THHS59:~$ bash code_6
1
2
3
4
5
meenakshi@DESKTOP-2THHS59:~$ cat code_6
for a in 1 2 3 4 5
do
echo $a
done
meenakshi@DESKTOP-2THHS59:~$
```

Question 7: Write a shell script that uses a while loop to print numbers from 1 to 5.

```
Select meenakshi@DESKTOP-2THHS59: ~
meenakshi@DESKTOP-2THHS59:~$ nano code_7
meenakshi@DESKTOP-2THHS59:~$ cat code_7
a=1
while [ $a -lt 6 ]
do
echo $a
a=`expr $a + 1`
done
meenakshi@DESKTOP-2THHS59:~$ bash code_7
1
2
3
4
5
meenakshi@DESKTOP-2THHS59:~$
```

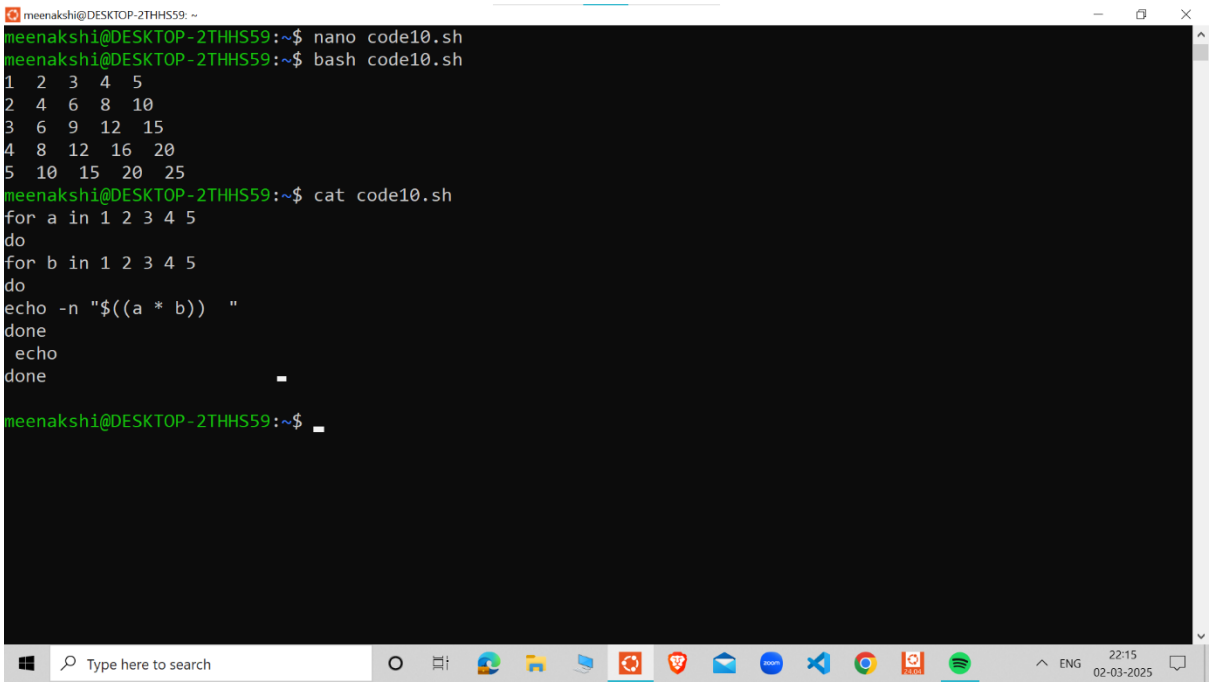
Question 8: Write a shell script that checks if a file named "file.txt" exists in the current directory. If it does, print "File exists", otherwise, print "File does not exist".

```
meenakshi@DESKTOP-2THHS59: ~
meenakshi@DESKTOP-2THHS59:~$ nano code_8
meenakshi@DESKTOP-2THHS59:~$ cat code_8
if [ -e "file.txt" ]; then
 echo "file exists"
else
 echo "file does not exist"
fi
meenakshi@DESKTOP-2THHS59:~$ bash code_8
file does not exist
meenakshi@DESKTOP-2THHS59:~$ nano code_8
meenakshi@DESKTOP-2THHS59:~$ bash code_8
\file does not exist
meenakshi@DESKTOP-2THHS59:~$
```

Question 9: Write a shell script that uses the if statement to check if a number is greater than 10 and prints a message accordingly.

```
meenakshi@DESKTOP-2THHS59: ~
meenakshi@DESKTOP-2THHS59:~$ bash code_9.sh
Enter a num
11
number is greater than 10
meenakshi@DESKTOP-2THHS59:~$ bash code_9.sh
Enter a num
9
number is less than than or equal to 10
meenakshi@DESKTOP-2THHS59:~$ cat code_9.sh
echo "Enter a num"
read num
if [ $num -gt 10 ]
then
 echo "number is greater than 10"
else
 echo "number is less than than or equal to 10"
fi
meenakshi@DESKTOP-2THHS59:~$
```

Question 10: Write a shell script that uses nested for loops to print a multiplication table for numbers from 1 to 5. The output should be formatted nicely, with each row representing a number and each column representing the multiplication result for that number.



Question 11: Write a shell script that uses a while loop to read numbers from the user until the user enters a negative number. For each positive number entered, print its square. Use the break statement to exit the loop when a negative number is entered.

```
meenakshi@DESKTOP-2THHS59: ~
meenakshi@DESKTOP-2THHS59:~$ bash code11.sh
Enter number: 3
Square of 3 is: 9
Enter number: 7
Square of 7 is: 49
Enter number: 9
Square of 9 is: 81
Enter number: 4
Square of 4 is: 16
Enter number: 3
Square of 3 is: 9
Enter number: -8
neg number entered exit
meenakshi@DESKTOP-2THHS59:~$ cat code11.sh
while true
do
echo -n "Enter number: "
read num
if [ $num -lt 0 ]
then
echo "neg number entered exit"
break
fi
square=$((num * num))
echo "Square of $num is: $square"
done
meenakshi@DESKTOP-2THHS59:~$
```

Part E

1 Fcfs

Q1] By FCFS scheduling algorithm.

→

Process	Arrival Time	Burst time	Completion Time	TAT	Waiting Time
P1	0	5	5	5	0
P2	1	3	8	7	4
P3	2	6	14	12	6

→

P1	P2	P3

0 5 8 14

Avg waiting time $= \frac{0+4+6}{3}$

$= \frac{10}{3} = 3.33.$

2.SJF

Q2 By SJF

Process	Arrival Time	Burst Time	Waiting Time	TAT
P1	0	3 ✓ 1	0	3
P2	1	5 4	7	12
P3	2	1 ✓ 2	1	2
P4	3	4 3	1	5

P1	P3	P4	P2

0 3 4 8 13

Avg TAT $= \frac{3+12+2+5}{4} = \frac{22}{4} = 5.5.$

3. priority Sceduling

(3) Priority sceduling :

Process	Arrival Time	Burst Time	Priority	CT	WT	TAT
P1	0	6	3	6	0	6
P2	1	4	1	10	5	9
P3	2	7	4	19	10	17
P4	3	2	2	12	7	9

P1	P2	P4	P3

0 6 10 12 19

Avg waiting time $= \frac{0+5+10+7}{4} = \frac{22}{4} = 5.5$

4 Round Robin Algorithm

Q4 Round Robin → quantum = 2 units.

Process	Arrival time	Burst Time	Waiting Time	TAT
P1	0	4	6	10
P2	1	5	8	13
P3	2	2	2	4
P4	3	3	7	10.

P1	P2	P3	P4	P1	P2	P4	P2

0 2 4 6 8 10 12 13 14

$$\text{Avg TAT} = \frac{10+13+4+10}{4} = \frac{37}{4} = 9.25$$

Q5. Consider a program that uses the fork() system call to create a child process. Initially, the parent process has a variable x with a value of 5. After forking, both the parent and child processes increment the value of x by 1. What will be the final values of x in the parent and child processes after the fork() call?

Ans:Initially the parent process has value of x=5.

Then later fork() system call create a new child process and will contain value 5 nd have separate memory space and it execute instruction x = x+1 and increments by 1

i.e 6 is final value of parent and child process and it will not affect each other as they have separate memory copies

So, the final value is 6.