Part A

What will the following commands do?

- **echo "Hello, World!"**

Prints Hello, World! to the terminal.

- **name="Productive"**

Creates a variable name and assigns it the value Productive

- **touch file.txt**

Creates an empty file named file.txt or updates its timestamp if it already exists

- **ls -a**

Lists all files and directories in the current directory, including hidden ones (those starting with .)

- **rm file.txt**

Removes the file file.txt permanently.

- **cp file1.txt file2.txt**

Copies file1.txt to file2.txt . If file2.txt exists, it will be overwritten.

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

Moves file.txt to the specified directory.

- **chmod 755 script.sh**

Grants the owner full permissions (read, write, execute) and gives others read and execute permissions on script.sh

- **grep "pattern" file.txt**

Searches for occurrences of "pattern" in file.txt and prints matching lines.

- **kill PID**

Terminates the process with the specified Process ID (PID)

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

Creates a directory mydir

Changes into mydir Creates an empty file file.txt

Writes "Hello, World!" into file.txt

Displays the contents of file.txt

- **ls -l | grep ".txt"**

Lists files in long format and filters only those containing ". Txt" in their names

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

Concatenates file1.txt and file2.txt , sorts them, and removes duplicate lines

- **ls -l | grep "^d"**

Lists directories (entries starting with d in long format output).

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

Searches for "pattern" recursively in all files under /path/to/directory/ .

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

Concatenates file1.txt and file2.txt , sorts them, and displays only duplicate lines

- chmod 644 file.txt

Grants the owner read and write permissions, while others get read-only access to file.txt .

- **cp -r source_directory destination_directory**

Recursively copies source_directory to destination_directory , preserving contents.

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

Finds all .txt files in /path/to/search and its subdirectories.

- **chmod u+x file.txt**

Gives the owner (u) execute permission on file.txt

- **echo $PATH**

Displays the system's PATH environment variable, listing directories where executable files are searched for.

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 wit

True

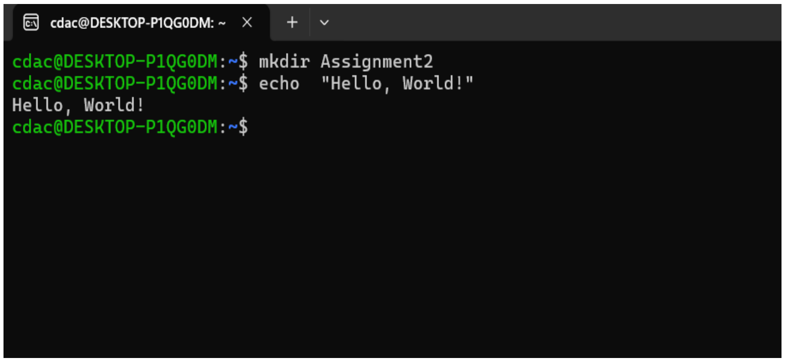
Identify the Incorrect Commands:

1. **chmodx is used to change file permissions.**
   Incorrect - chmodx is not a valid command. The correct command to change file permissions is chmod .
2. **cpy is used to copy files and directories.**
   Incorrect - cpy is not a valid command. The correct command to copy files and directories is cp .
3. **mkfile is used to create a new file.**
   Incorrect - mkfile is not a standard Linux command. To create a new file, use filename **.**
4. **catx is used to concatenate files.**
   Incorrect - touch catx is not a valid command. The correct command to concatenate files is cat .

5. **rn is used to rename files.**
   Incorrect - rn is not a valid command. To rename files, use the mv command (oldname newname)

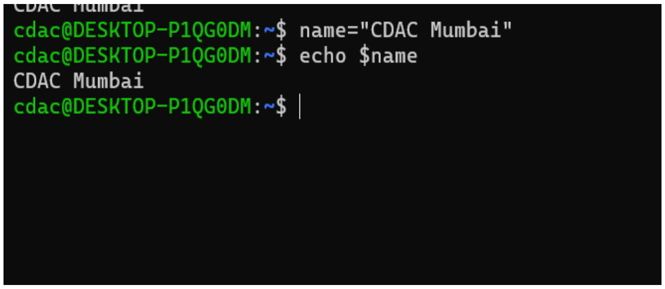
Part C

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



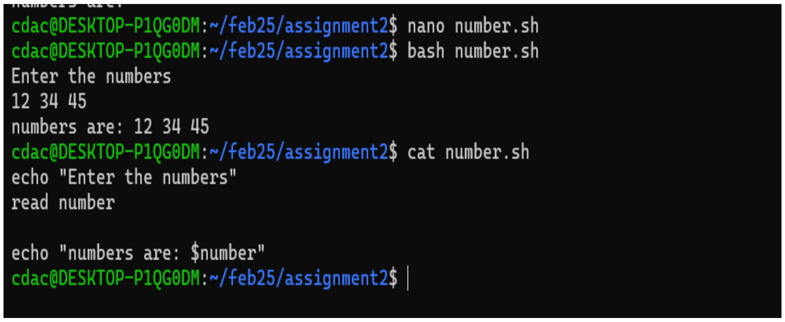
```
cdac@DESKTOP-P1QG0DM:~$ mkdir Assignment2
cdac@DESKTOP-P1QG0DM:~$ echo  "Hello, World!"
Hello, World!
cdac@DESKTOP-P1QG0DM:~$
```

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



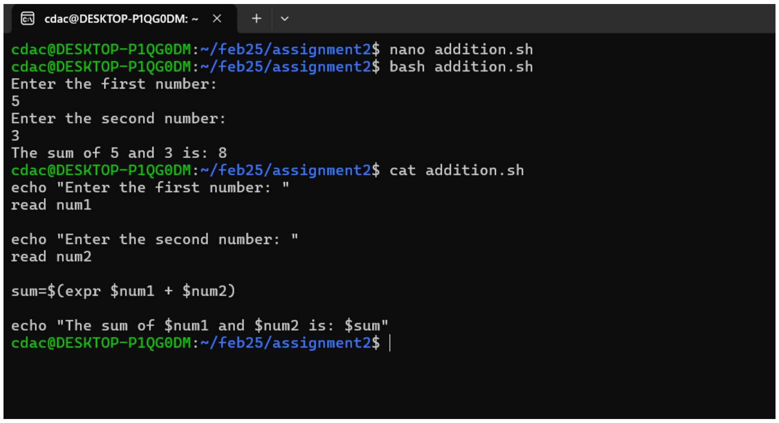
```
CDAC Mumbai
cdac@DESKTOP-P1QG0DM:~$ name="CDAC Mumbai"
cdac@DESKTOP-P1QG0DM:~$ echo $name
CDAC Mumbai
cdac@DESKTOP-P1QG0DM:~$
```

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



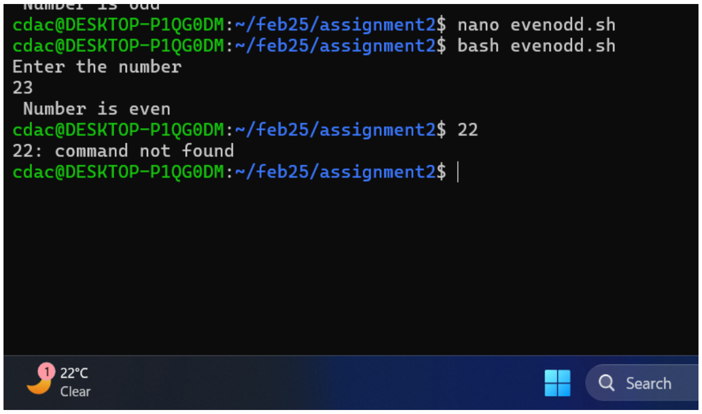
```
numbers are:
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ nano number.sh
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ bash number.sh
Enter the numbers
12 34 45
numbers are: 12 34 45
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ cat number.sh
echo "Enter the numbers"
read number

echo "numbers are: $number"
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$
```

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



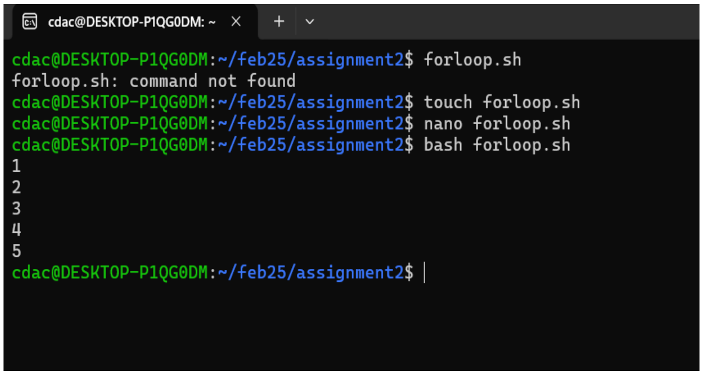
```
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ nano addition.sh
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ bash addition.sh
Enter the first number:
5
Enter the second number:
3
The sum of 5 and 3 is: 8
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ cat addition.sh
echo "Enter the first number: "
read num1

echo "Enter the second number: "
read num2

sum=$(expr $num1 + $num2)

echo "The sum of $num1 and $num2 is: $sum"
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$
```

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



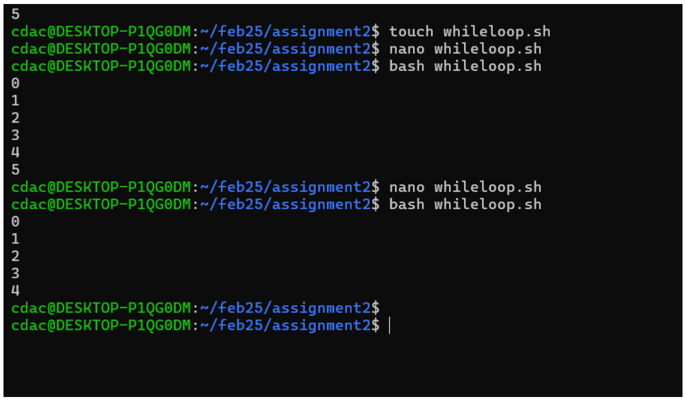
```
 Number is odd
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ nano evenodd.sh
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ bash evenodd.sh
Enter the number
23
 Number is even
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ 22
22: command not found
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$
```

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



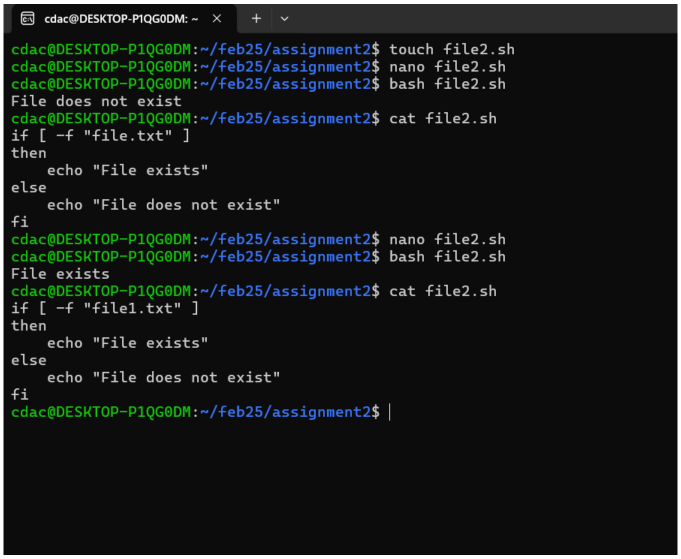
```
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ forloop.sh
forloop.sh: command not found
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ touch forloop.sh
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ nano forloop.sh
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ bash forloop.sh
1
2
3
4
5
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$
```

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



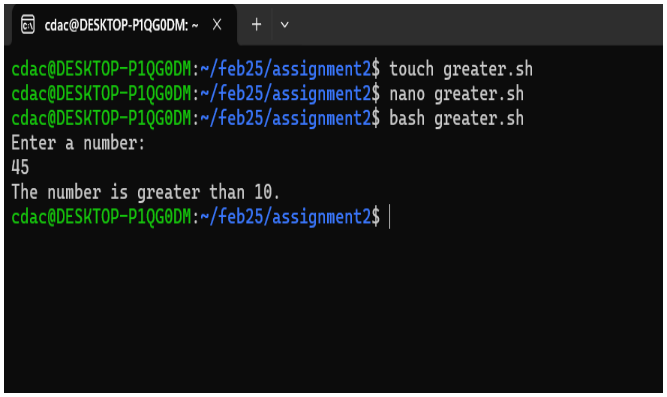
```
5
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ touch whileloop.sh
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ nano whileloop.sh
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ bash whileloop.sh
0
1
2
3
4
5
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ nano whileloop.sh
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ bash whileloop.sh
0
1
2
3
4
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$
```

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".



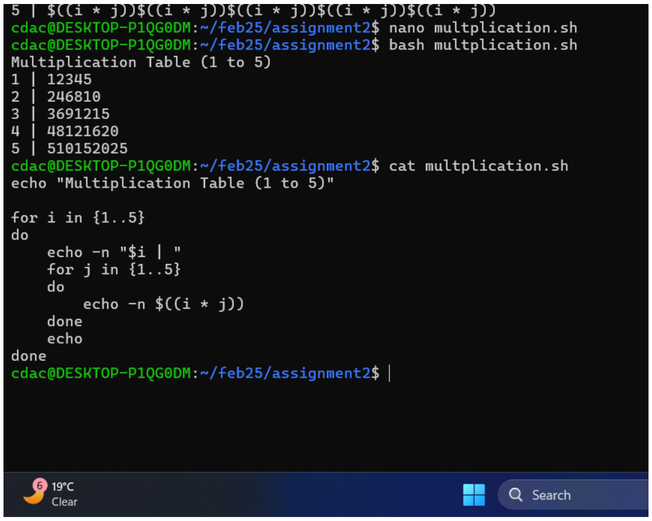
```
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ touch file2.sh
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ nano file2.sh
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ bash file2.sh
File does not exist
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ cat file2.sh
if [ -f "file.txt" ]
then
    echo "File exists"
else
    echo "File does not exist"
fi
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ nano file2.sh
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ bash file2.sh
File exists
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ cat file2.sh
if [ -f "file1.txt" ]
then
    echo "File exists"
else
    echo "File does not exist"
fi
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$
```

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.



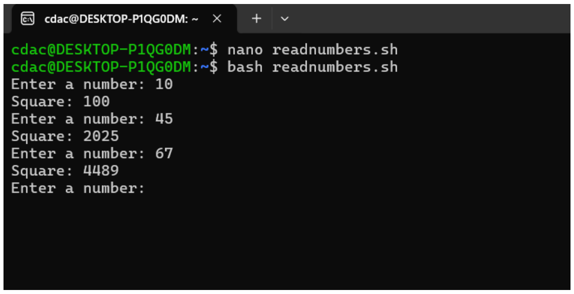
```
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ touch greater.sh
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ nano greater.sh
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ bash greater.sh
Enter a number:
45
The number is greater than 10.
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$
```

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.



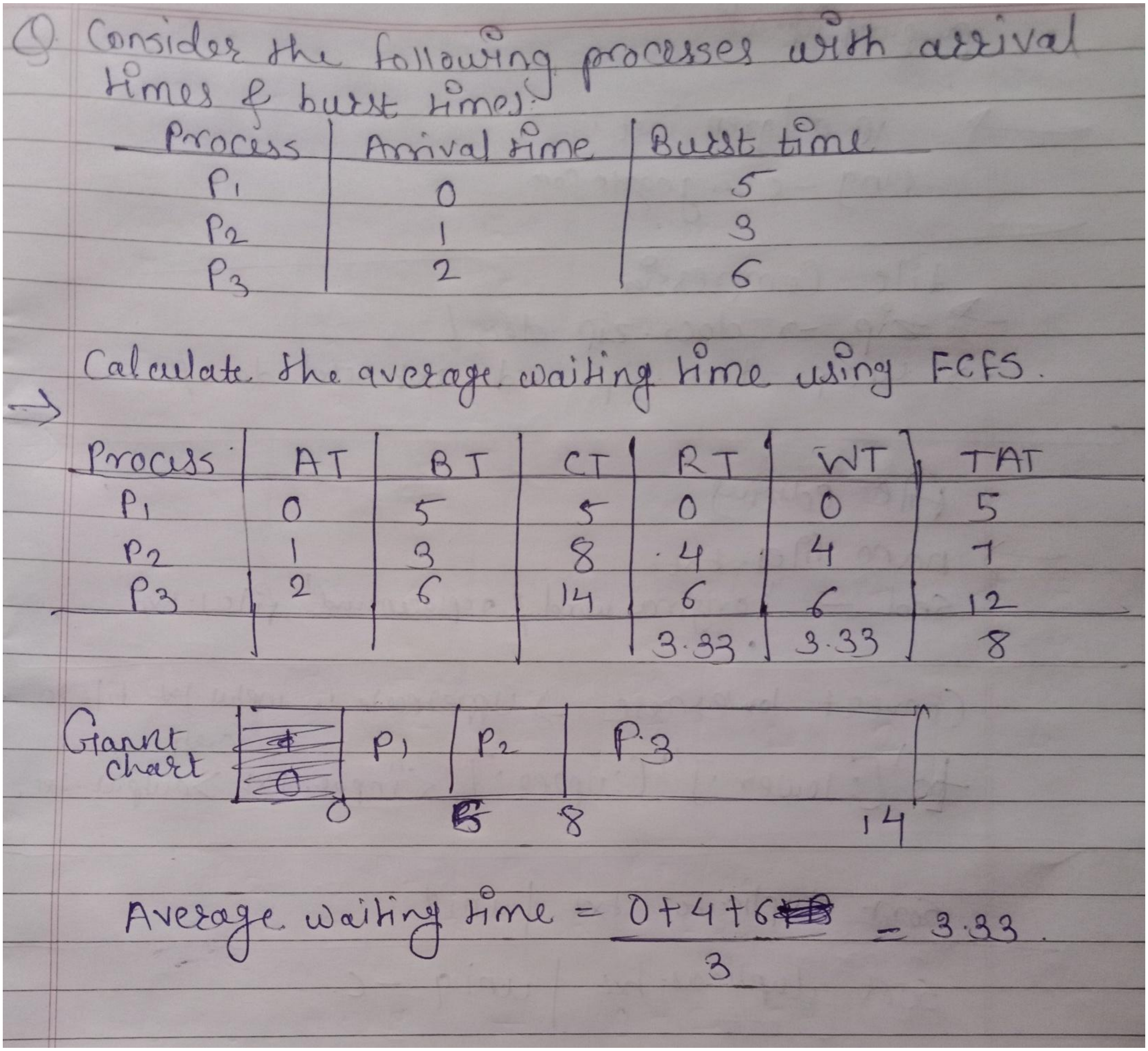
```
5 | $((i * j))$((i * j))$((i * j))$((i * j))$((i * j))
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ nano multplication.sh
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ bash multplication.sh
Multiplication Table (1 to 5)
1 | 12345
2 | 246810
3 | 3691215
4 | 48121620
5 | 510152025
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ cat multplication.sh
echo "Multiplication Table (1 to 5)"

for i in {1..5}
do
    echo -n "$i | "
    for j in {1..5}
    do
        echo -n $((i * j))
    done
    echo
done
cdac@DESKTOP-P1QG0DM:~/feb25/assignment2$ |
```

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.



```
cdac@DESKTOP-P1QG0DM:~$ nano readnumbers.sh
cdac@DESKTOP-P1QG0DM:~$ bash readnumbers.sh
Enter a number: 10
Square: 100
Enter a number: 45
Square: 2025
Enter a number: 67
Square: 4489
Enter a number:
```

Part E



Q. Consider the following processes with arrival times & burst times:

Process	Arrival time	Burst time
P1	0	5
P2	1	3
P3	2	6

Calculate the average waiting time using FCFS.

→

Process	AT	BT	CT	RT	WT	TAT
P1	0	5	5	0	0	5
P2	1	3	8	4	4	7
P3	2	6	14	6	6	12
				3.33	3.33	8

Gantt chart

P1	P2	P3

0 5 8 14

Average waiting time = $\frac{0+4+6}{3}$ = 3.33.

Q.2 Calaulate the average turnaround time using Shortest Job first (SJF) Scheduling.

Process	Arrival time	Burst time
P1	0	3
P2	1	5
P3	2	1
P4	3	4

→

Process	AT	BT	CT	RT	WT	TAT
P1	0	3	3	0	0	3
P2	1	5	13	7	7	12
P3	2	1	4	1	1	7
P4	3	4	8	1	1	5

P1, P3 P4 P2

Gantt chart

P1	P3	P4	P2

0 3 4 8 13

Avarge time $= \dfrac{3+2+5+12}{4}$

$= 5.5$

3) Consider the following process with arrival time, burst time & priorities (lower no. indicates higher priority).

Process	AT	BT	Priority
P1	0	6	3
P2	1	4	1
P3	2	7	4
P4	3	2	2

→

Process	AT	BT	Priority	CT	WT	RT	TAT.
P1	0	6	3	6	0	0	6
P2	1	4	1	10	5	5	9
P3	2	7	4	19	17	17	10
P4	3	2	2	12	10	10	17

chart

P2	P4	P1	P3

0 1 5 11 17.

$$\text{Avarage waiting time} = \frac{0+5+7+10}{4}$$

$$= 5.5$$

$$\text{Avarage TAT} = \frac{6+9+9+17}{4} = \frac{41}{4}$$

$$= 10.25.$$

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4) Consider the following process with arrival times & burst time & the time quantum for Round Robin Scheduling is 2 units:

Process	AT	BT
P1	0	4
P2	1	5
P3	2	2
P4	3	3

→ Calculate the average turnaround time using Round Robin Scheduling

→

P	AT	BT	CT	RT	WT	TAT.
P1	0	4	10	0	6	10
P2	1	5	14	1	8	13
P3	2	2	6	2	2	4
P4	3	3	13	3	7	10

Chart

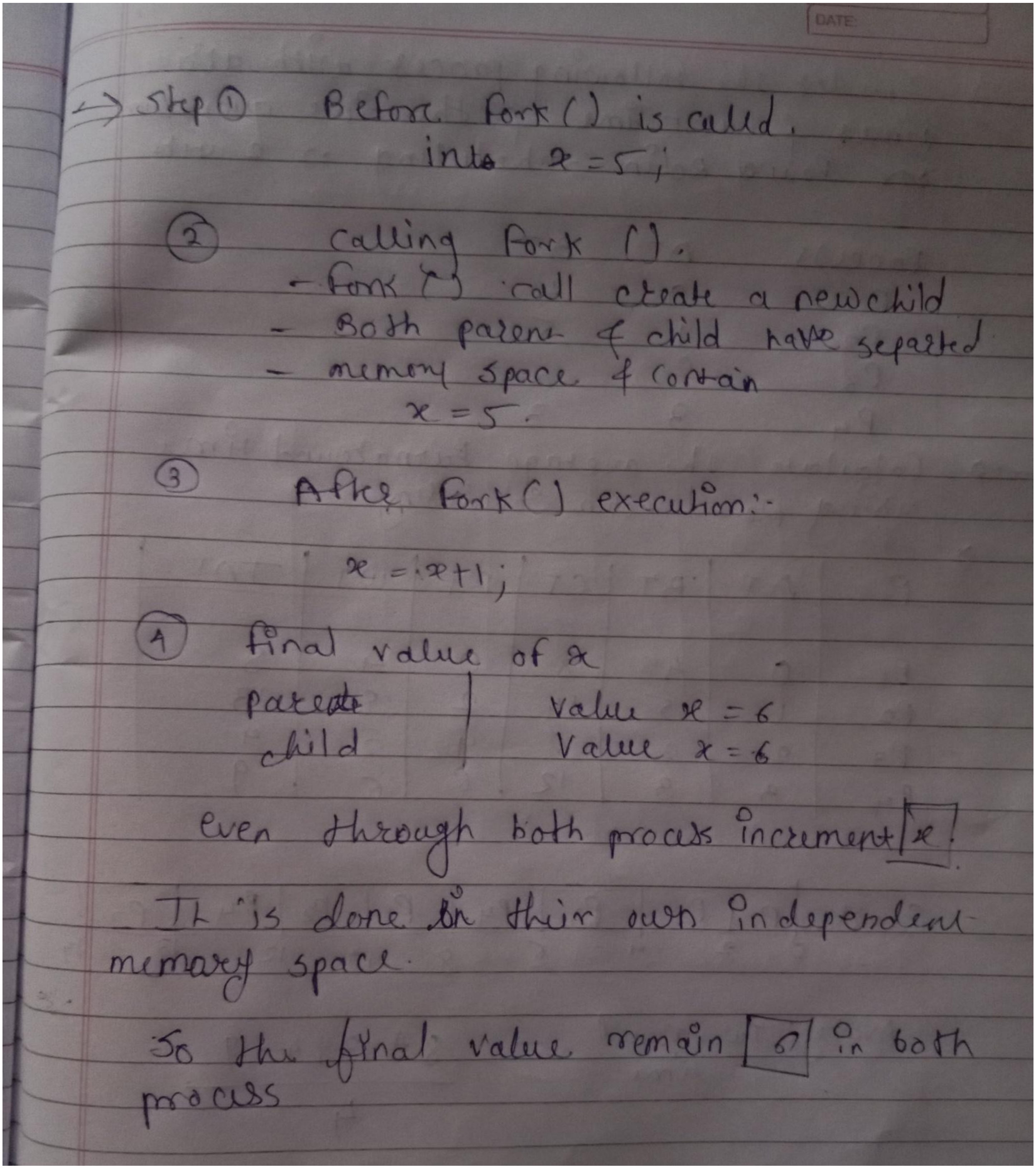
P1	P2	P3	P4	P1	P2	P4	P2

0 2 4 6 8 10 12 13 14

Avarage Turnaround time $= \dfrac{10 + 13 + 4 + 10}{4}$

= 9.25

5. 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?



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→ Step ① Before Fork () is called.

int x = 5;

② Calling Fork ().

- Fork () call create a new child
- Both parent & child have separated
- memory space & contain

x = 5.

③ After Fork() execution:-

x = x+1;

④ final value of x

parent	Value x = 6
child	Value x = 6

even through both process increment $\boxed{x}$.

It is done in their own independent memory space.

So the final value remain $\boxed{6}$ in both process