Concepts of Operating System
Assignment 2

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Part A

What will the commands do?

1. echo "Hello, World!"
   This command prints text or string between the double quotes on to the terminal.
   Output → Hello, World!

2. name="Productive"
   This assigns the value "Productive" to a variable named name.

3. touch file.txt
   It creates an empty file named file.txt.

4. ls -a
   Lists all files and directories in the current directory, including hidden files

5. rm file.txt
   It deletes or removes the file named file.txt permanently.

6. cp file1.txt file2.txt
   It copies the contents of file1.txt into a file called file2.txt.

7. mv file.txt /path/to/directory/
   It moves file.txt to the mentioned directory.

8. chmod 755 script.sh
   It changes the permissions of script.sh such as follow
   Owner → read (r), write (w), and execute (7)
   Group → read (r) and execute (5)
   Others → read (r) and execute (5)

9. grep "pattern" file.txt
   It searches for lines containing "pattern" inside file.txt.

10. kill PID
    It terminates the process with the given Process ID (PID).

11. mkdir mydir && cd mydir && touch file.txt && echo "Hello, World!" > file.txt && cat file.txt
    && is operator, It does next command will only execute if the previous one is successful.
    A) mkdir → Create mydir directory.
    B) cd mydir → Change to mydir
    C) touch file.txt → Create an empty file of name file.txt
    D) echo “Hello, World!” → Write text to the file.
    E) cat file.txt → Display file content.

12. ls -l | grep ".txt"
    A) ls -l → Lists files in the current directory with detailed information.
    B) | → (Pipe) Passes the output if ls -l as input to grep.
    C) grep “.txt” → It filters and displays only lines that contain .txt

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

A) cat file1.txt cat file2.txt → Displays the contents of file1.txt and file2.txt together.
B) | → (Pipe) Passe the output of cat as input to the next command.
C) sort → Sorts the combined output alphabetically.
D) uniq → Removes duplicate lines.

14. ls -l | grep "^d"

A) ls -l → Lists files and directories in long (detail) format.
B) | → (Pipe) Passes the output of ls -l to grep.
C) Grep "^d" → Filters only directories by checking if the line starts (^) with d (it shows directory)

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

A) grep → Searches for text inside files.
B) -r → (Recursive) Searches inside all files and subdirectories within /path/to/directory/.
C) "pattern" → The text or pattern you want to find.
D) /path/to/directory/ → The directory where the search begins.

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

A) cat file1.txt file2.txt → Displays the contents of file1.txt and file2.txt. together.
B) | → (Pipe) Passes the combined output to the next sort command.
C) sort → Sorts the combined content
D) uniq -d → Displays only the duplicate lines that appear in both files.

17. chmod 644 file.txt

It changes the permissions of file.txt such as follow
Owner → read (r), write (w) (6)
Group → read (r) (4)
Others → read (r) (4)

18. cp -r source_directory destination_directory

A) cp → It is used to copy files and directories.
B) -r → (Recursive) tells cp to copy directories and their contents, including subdirectories and files.
C) source_directory → It is the folder you want to copy.
D) destination_directory → It is where you want to copy it.

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

A) find → Searches for files and directories.
B) /path/to/search → The directory where the search starts (e.g., /home/user/).
C) -name "*.txt" → It looks for files with the .txt extension.

20. chmod u+x file.txt

A) chmod → Changes file permissions.
B) u+x → Grants execute (x) permission to the owner (u) of file.txt.
C) file.txt → The file whose permissions are being modified.

21. echo $PATH

A) echo → Displays text or variable values in the terminal.
B) $PATH → Prints the system's PATH environment variable, which contains directories where executable programs are stored.

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 (Used to change directories)

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. → False (rm -f file.txt → this command deletes a file forcefully without confirmation.)

Identify the Incorrect Commands:

1. chmodx is used to change file permissions. → chmod (chmod 755 file.txt)

2. cpy is used to copy files and directories. → cp (cp file1.txt file2.txt)

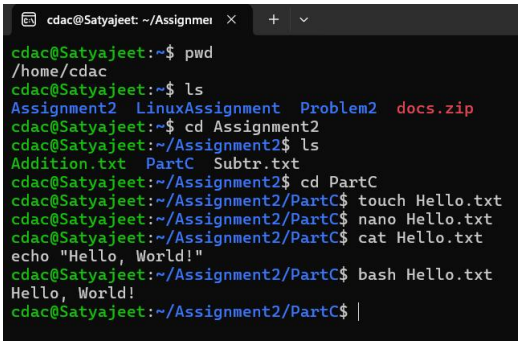
3. mkfile is used to create a new file. → touch (touch file.txt)

4. catx is used to concatenate files. → cat (cat file.txt)

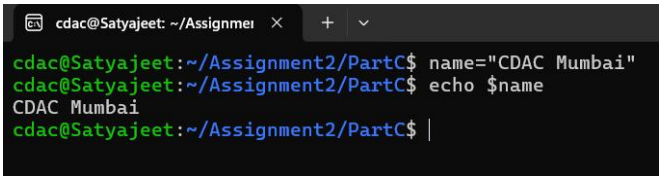
5. rn is used to rename files. → mv

Part C

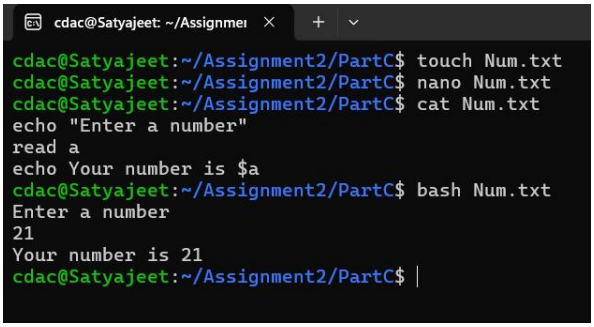
1: Write a shell script that prints "Hello, World!" to the terminal.



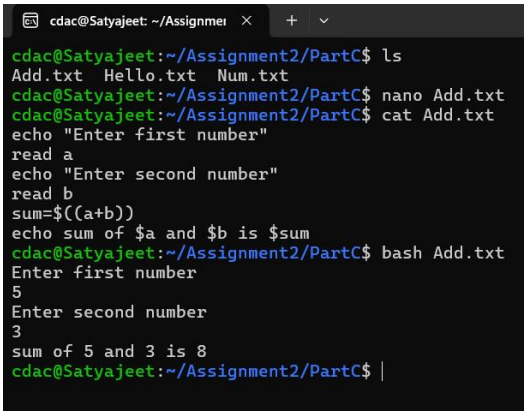
2: Declare a variable named "name" and assign the value "CDAC Mumbai" to it. Print the value of the variable.



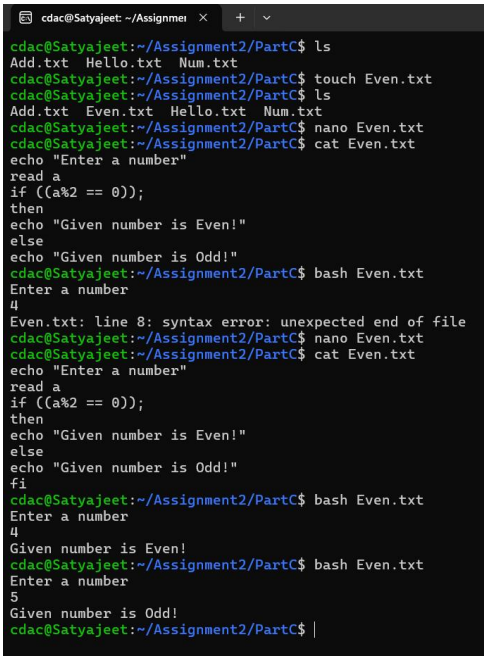
3: Write a shell script that takes a number as input from the user and prints it.



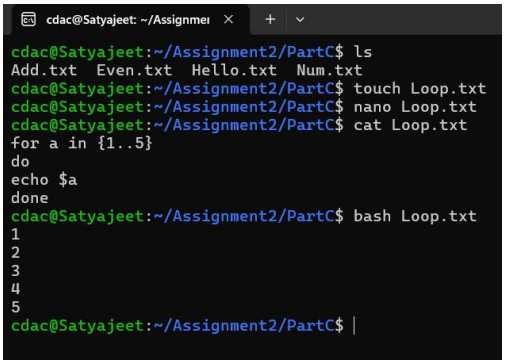
4: Write a shell script that performs addition of two numbers (e.g., 5 and 3) and prints the result.



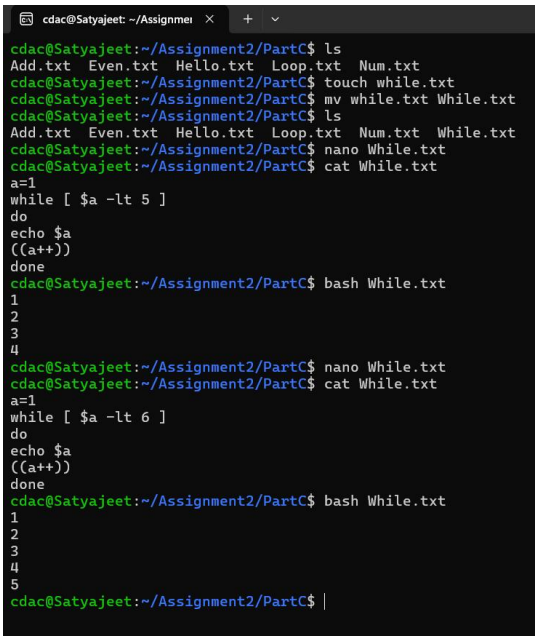
5: Write a shell script that takes a number as input and prints "Even" if it is even, otherwise prints "Odd".



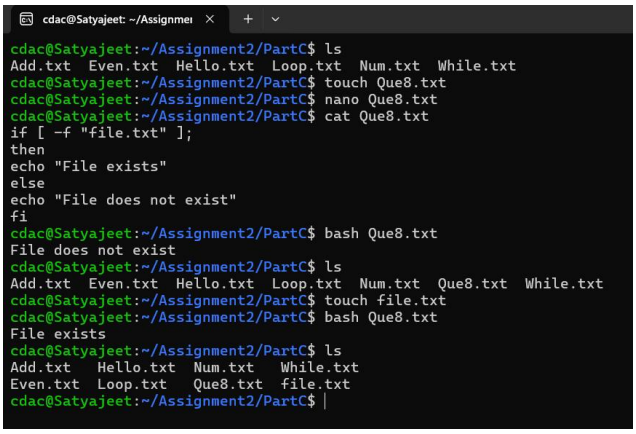
6: Write a shell script that uses a for loop to print numbers from 1 to 5.



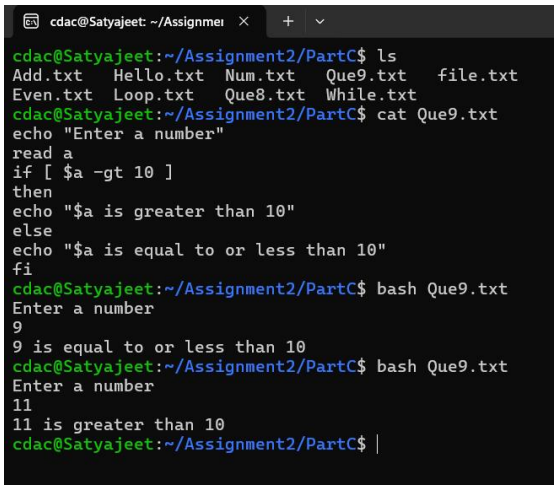
7: Write a shell script that uses a while loop to print numbers from 1 to 5.



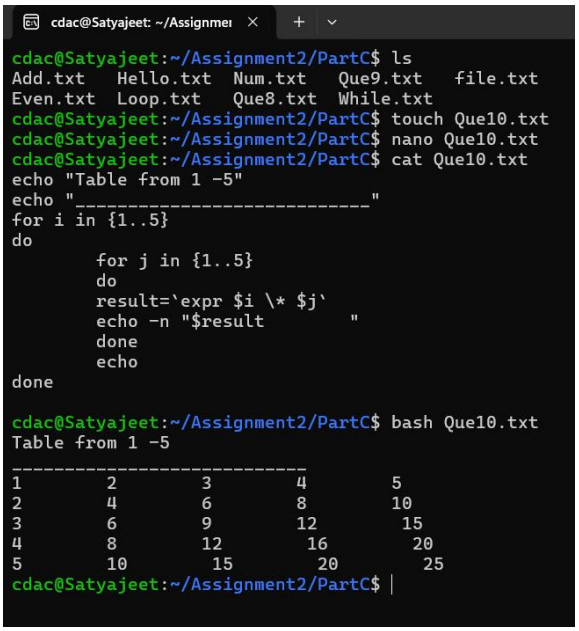
8: Write a shell script that checks if a file named "file.txt" exists in the current directory. If it does, print "File exists", otherwise, print "File does not exist".



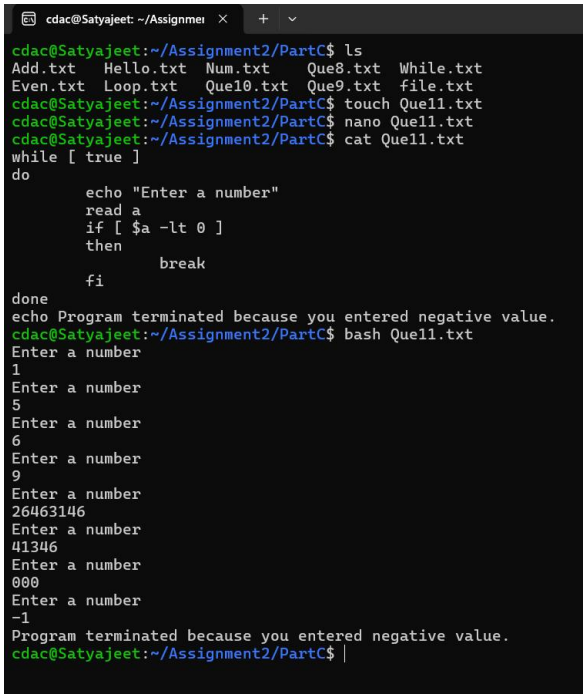
9: Write a shell script that uses the if statement to check if a number is greater than 10 and prints a message accordingly.



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.

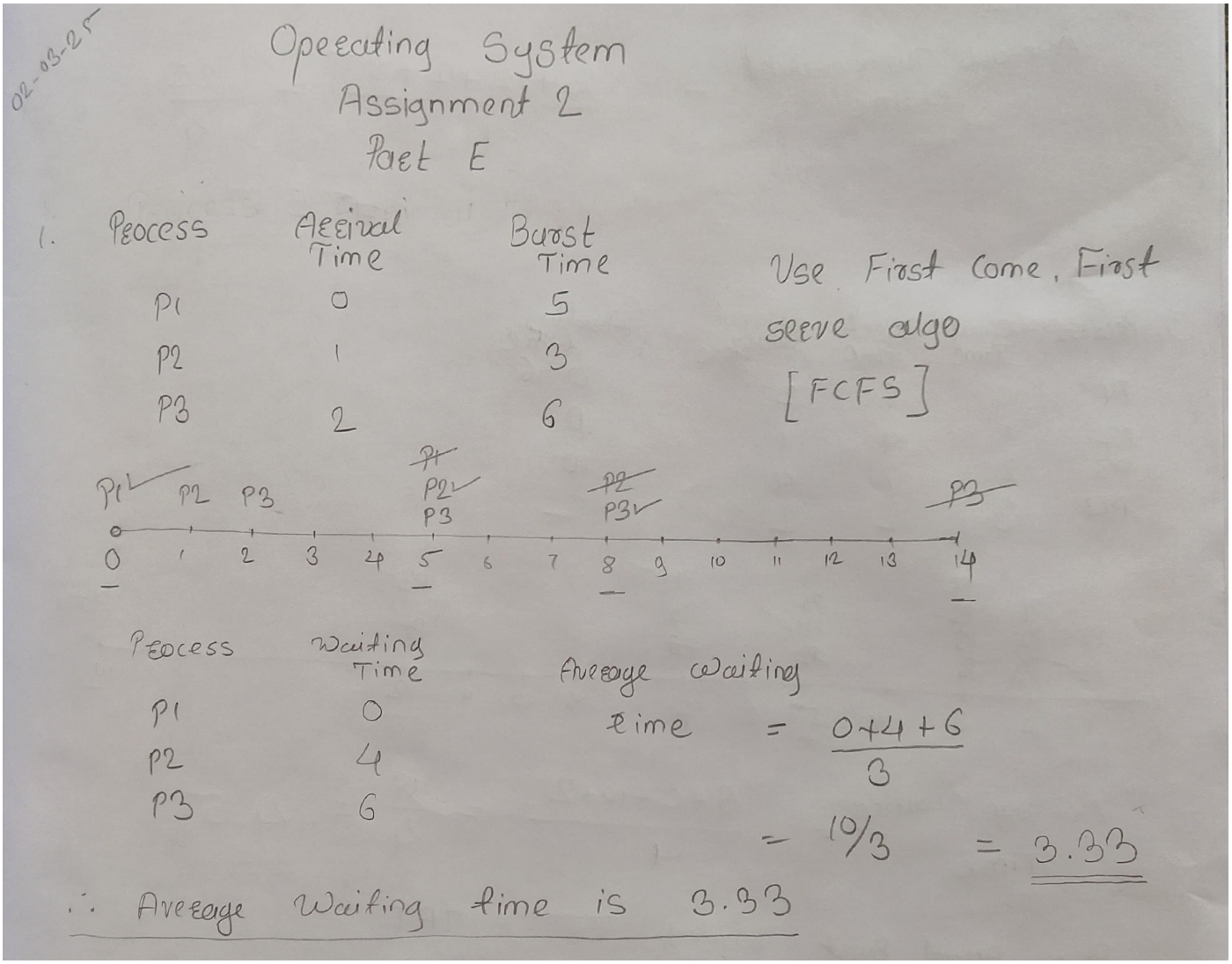


11: Write a shell script that uses a while loop to read numbers from the user until the user enters a negative number. For each positive number entered, print its square. Use the break statement to exit the loop when a negative number is entered.



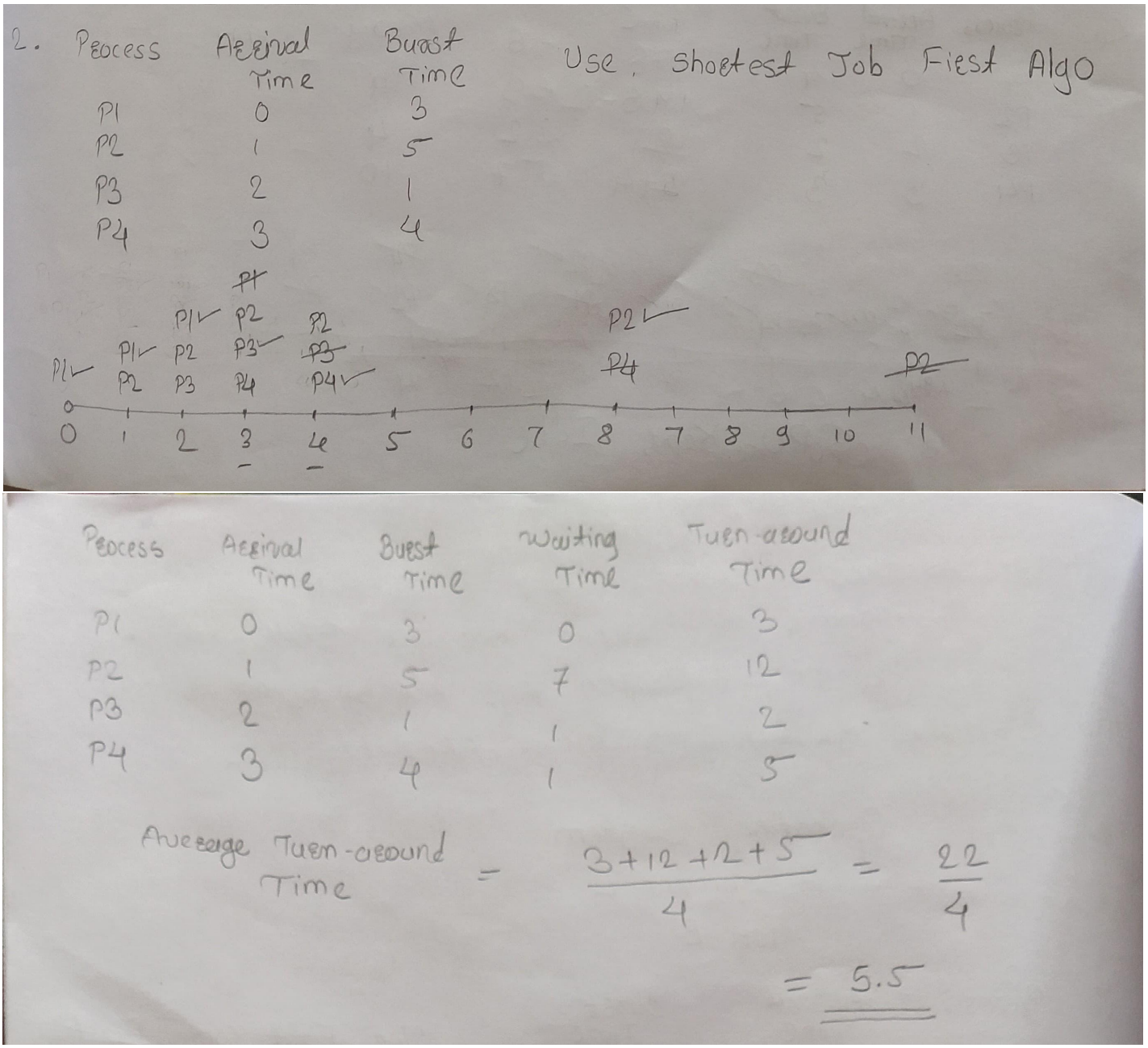
Part E

1.



Answer = the average waiting time using First-Come, First-Served (FCFS) schedulinh is 3.33

2.



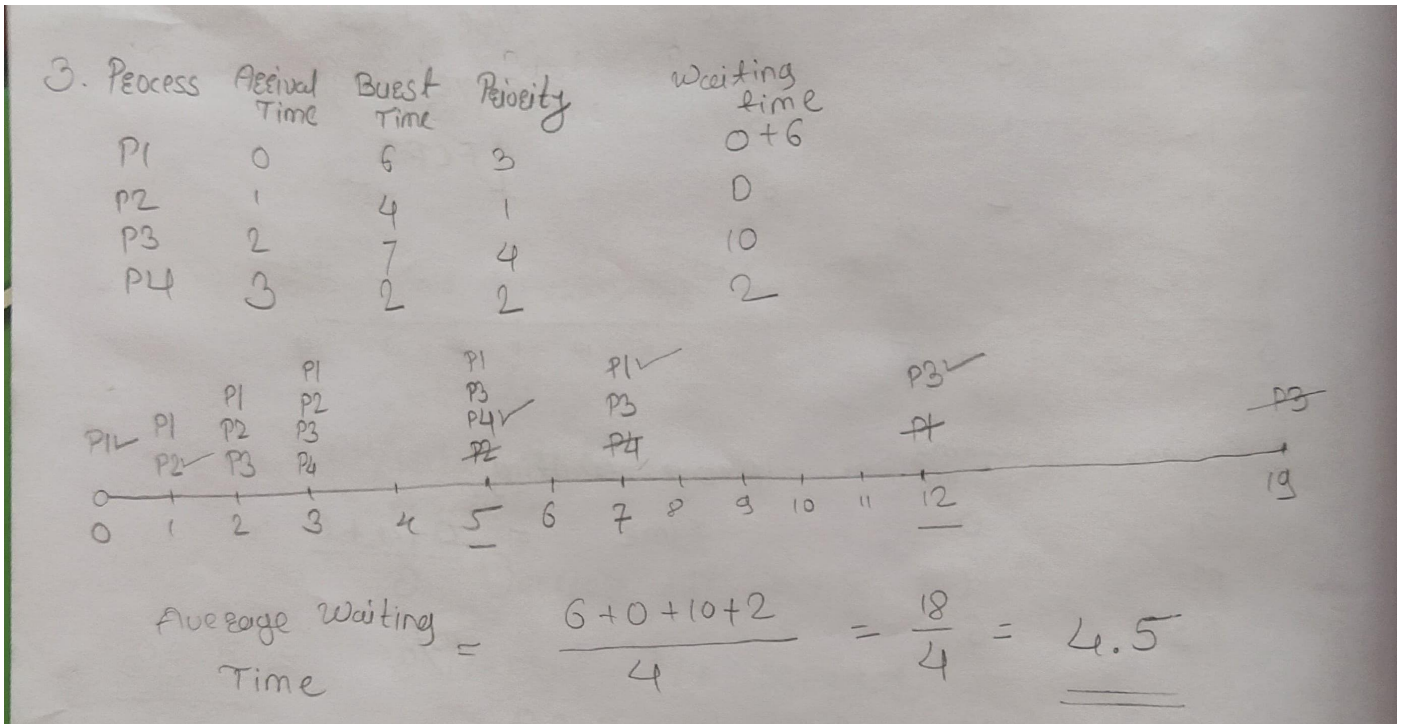
Process	Arrival Time	Burst Time	Waiting Time	Turn-around Time
P1	0	3	0	3
P2	1	5	7	12
P3	2	1	1	2
P4	3	4	1	5

Average Turn-around Time $= \frac{3+12+2+5}{4} = \frac{22}{4}$

$= 5.5$

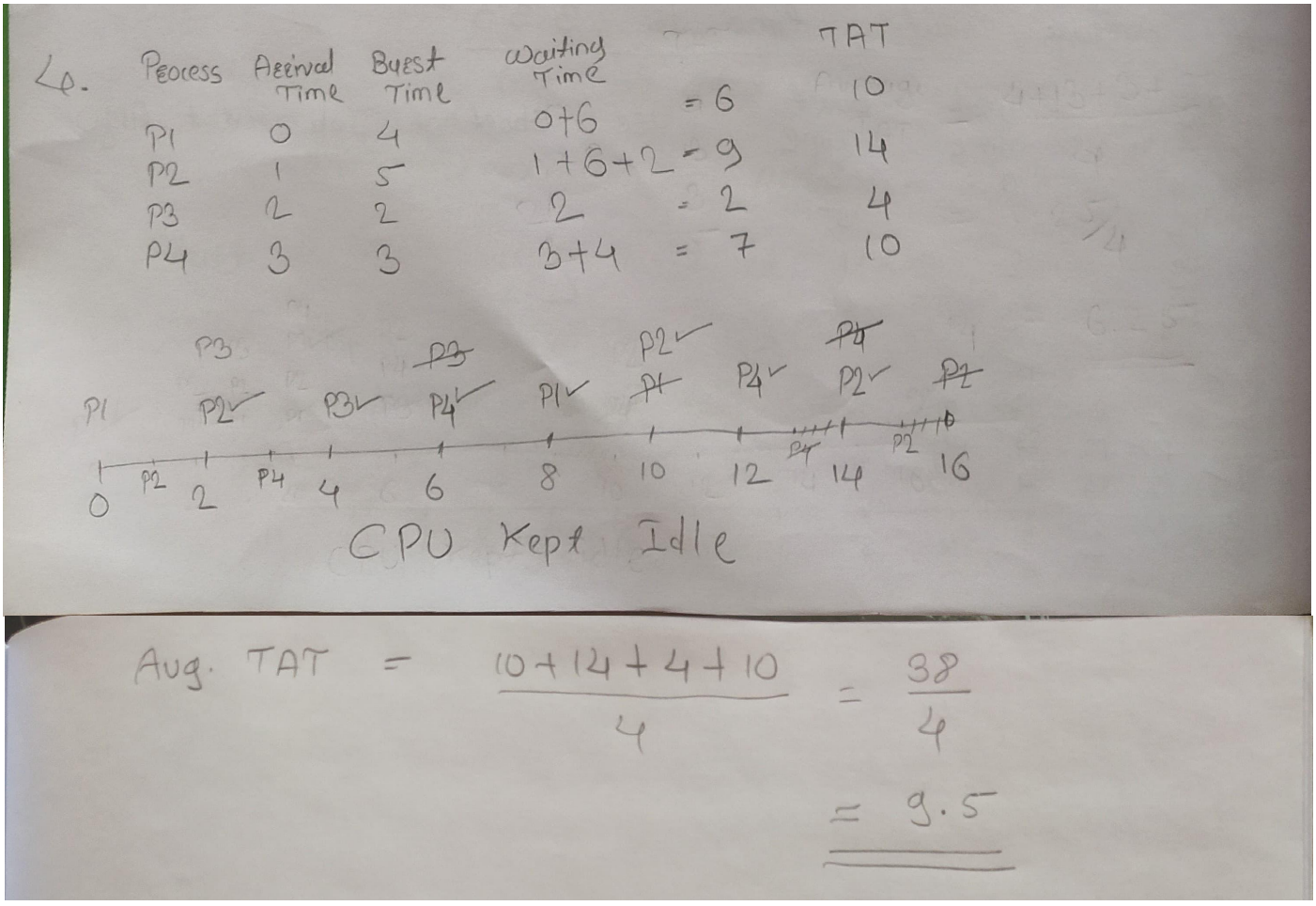
Answer = The average turnaround time using Shortest Job First (SJF) scheduling 5.5

3.



Answer = The average waiting time using Priority Scheduling is 4.5

4.



Answer = The average turnaround time using Round Robin scheduling is 9.5

5.
When a program uses the fork() system call, it creates a new child process that is a copy of the parent process.
If the parent process starts with x = 5, after forking, both the parent and child have their own copies of x = 5.
When both increment x by 1, the parent process updates x to 6, and the child process also updates x to 6.