Concepts of Operating System

Assignment 2

Part A

What will the following commands do?

Q1 echo "Hello, World!"
Ans: echo command Prints Hello, World!

Q2 name="Productive"
Ans: variable declaration when paired with echo it print Productive

```
#!/bin/bash
name="Productive"
echo "$name"
```

Q3 touch file.txt
Ans: touch commands creates a new txt file

Q4 ls -a
Ans: ls list directory content, with -a entries starting with .(hidden files) are not ignored

Q5 rm file.txt
Ans: rm command paired with a file removes the file from system

Q6 cp file1.txt file2.txt
Ans: cp source destination
cp command copies the contents of file1(source file) and overwrites it in to file2(destination file) if it exists or else creates.

Q7 mv file.txt /path/to/directory/

Ans: mv command moves the content of source file to destination files(overwrite) or create file in case it doesn't exist and add contents of source file and deletes source file.

```
cdac@Tanmaypc:~$ echo "This content will be moved" > source.txt
cdac@Tanmaypc:~$ mv source.txt LinuxAssignment/destination.txt
cdac@Tanmaypc:~$ cd LinuxAssignment
cdac@Tanmaypc:~/LinuxAssignment$ cat destination.txt
This content will be moved
cdac@Tanmaypc:~/LinuxAssignment$ cd ~
cdac@Tanmaypc:~$ cat source.txt
cat: source.txt: No such file or directory
```

Q8 chmod 755 script.sh

Ans: chmod 755 gives execute permission to user,group and other

```
cdac@Tanmaypc:~/LinuxAssignment$ ls -l script.sh
-rw-r--r-- 1 cdac cdac 16 Aug 20 15:24 script.sh
cdac@Tanmaypc:~/LinuxAssignment$ chmod 755 script.sh
cdac@Tanmaypc:~/LinuxAssignment$ ls -l script.sh
-rwxr-xr-x 1 cdac cdac 16 Aug 20 15:24 script.sh
```

Q9 grep "pattern" file.txt

Ans: Highlights the pattern in the file

Q10 kill PID

Ans: Sends a signal to a process

Q11 mkdir mydir && cd mydir && touch file.txt && echo "Hello, World!" > file.txt && cat file.txt

Ans: Prints "Hello" | What happens it mkrdir mydir creates directory mydir and cd changes directory to mydir and touch creates file.txt and echo used together with > creates file.txt and adds "Hello, World!" into it and finally cat file1.txt displays the content of the file

Q12 ls -l | grep ".txt"

Ans: returns all .txt files with their permissions

```
cdac@Tanmaypc:~$ ls -l | grep ".txt"
-rwxr--r-- 1 cdac cdac   19 Aug 21 19:10 file1.txt
-rw-r--r-- 1 cdac cdac   26 Aug 21 19:06 file2.txt
-rw-r--r-- 1 cdac cdac   33 Aug 21 19:39 input.txt
-rw-r--r-- 1 cdac cdac   33 Aug 21 19:40 uppcase.txt
```

Q13 cat file1.txt file2.txt | sort | uniq

Ans:

Cat displays the output of both files of both files and pipe sends it to sort which sorts it and uniq returns unique line

Q14 ls -l | grep "^d"

Q15 grep -r "pattern" /path/to/directory/

Q16 cat file1.txt file2.txt | sort | uniq –d

Q17 chmod 644 file.txt

Ans: 644 permissions --> user: read & write, group: read, other(all): read but basically nothing changes since they are the default permission

Q18 cp -r source_directory destination_directory

Ans: makes a copy of source_directory and copies it to destination_directory

Q19 find /path/to/search -name "*.txt"

Ans: search for .txt files in specified directory

Q20 chmod u+x file.txt

Ans: Give execute permission to user

Q21 echo $PATH

Ans: prints the environment variable path

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.

Ans:
```
#!/bin/bash
echo “Hello, World!”
```

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

Ans:
```
#!/bin/bash
name="CDAC Mumbai"
echo "$name"
```

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

Ans:
```
#!/bin/bash
echo "Enter a number"
read num
echo "You have entered the number $num"
```

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

Ans:
```
#!/bin/bash
echo "Enter two number"
read num1
read num2
((sum=num1+num2))
echo "The sum of your entered numbers is $sum"
```

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

Ans:
```
#!/bin/bash
echo "Enter a number"
read n
if [[ ( $n%2 -eq 0 ) ]]; then
        echo "Your entered number is even"
else
        echo "Your entered number is odd"
fi
```

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

Ans:
```
#!/bin/bash
for var in 1 2 3 4 5
do
        echo -n "$var "
done
```

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

Ans:
```
#!/bin/bash
i=1
while [ $i -le 5 ]
do
        echo -n "$i "
        ((i++))
done
```

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".

Ans:
```
#!/bin/bash
if [ -f "file.txt" ]; then
        echo "File exists"
else
        echo "File does not exist"
fi
```

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.

Ans:
```
#!/bin/bash
echo "Enter a number"
read n
if [[ ( $n -ge 10 ) ]]; then
          echo "Entered number is equal to or greater than 10"
else
          echo "Emtered number is samller than 10"
fi
```

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.

Ans:

```
#!/bin/bash
echo "Here is the multiplicaion table"

for i in {1..5}
do
	for j in {1..5}
	do
		echo -n "$(( $i*$j )) "
	done
	echo
done
```

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.

Ans:

```
#!/bin/bash
echo "Enter any number. Negative to stop:"

while true
do
  read num

  if [ $num -lt 0 ]
  then
    echo "Negative number entered"
    break
  fi

  square=$((num * num))
  echo "Square of $num is $square"
done
```

Part E

Q1.

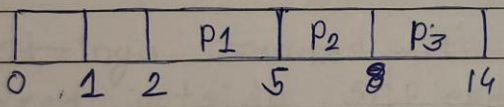
Assignment 2

Q1 FCFS

→

Process	Arrival time	Burst time
P_1	0	5
P_2	1	3
P_3	2	6

Gant chart



Process	Burst time	TAT(CT-AT)	WT(TAT-BT)
P_1	5	5	0
P_2	3	7	4
P_3	6	12	6

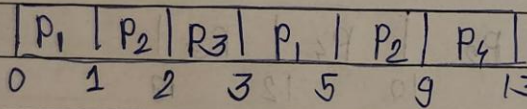
Avg. $WT = \frac{0+4+6}{3} = \frac{10}{3} = 3.33$

Q2 SJF

→

Process	Arrival time	Burst time
P_1	0	3 2 0
P_2	1	5 4
P_3	2	1 0
P_4	3	4 4

Gant chart



Process	Burst time	TAT	WT
P_1	3	5	2
P_2	5	8	3
P_3	1	1	0
P_4	4	10	6

Avg. TAT $= \frac{5+8+1+10}{4} = \frac{24}{4} = 6$

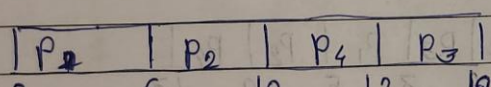
Q2

__/__/____

Q3 → Priority

Process	Arrival time	Burst time	Priority
P_1	0	6	3
P_2	1	4	1
P_3	2	7	4
P_4	3	2	2

Gant Chart



Process	Arrival time	Burst time	TAT	WAT
P_1	0	6	6	0
P_2	1	4	9	5
P_3	2	7	17	10
P_4	3	2	9	7

Avg. WT $= \frac{0+5+10+7}{4} = 5.5$

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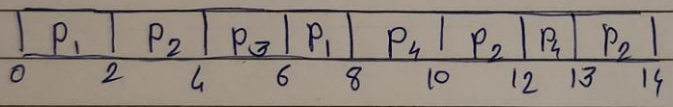
Q.4 Round Robin (time quantum = 2)

→

Process	Arrival Time	Burst time
P_1	0	4
P_2	1	5
P_3	2	2
P_4	3	3

Gant chart



Process	Arrival Time	Burst time	TAT	WAT
P_1	0	4	8	4
P_2	1	5	13	7
P_3	2	2	4	2
P_4	3	3	10	7

Avg TAT = $\frac{8+13+4+10}{4}$ = 8.75

Q4