Operating System Lab Practice Test

Part A : Basic Linux Commands (10 Marks)
Scenario : You are given a Directory named **/home/student/files** that contains various files related to a project. Perform the following tasks using **Linux Commands** :

1. List all files and directories in **/home/student/files**, include hidden files. (2 marks)
   Ans : ls -la /home/student/files

2. Display the content of a file named **project_notes.txt** in the terminal. (1 mark)
   Ans : cat /home/student/files/project_notes.txt

3. Create a new directory named **backup** inside /home/student/files. (1 mark)
   Ans : mkdir /home/student/files/backup

4. Copy the file **project_notes.txt** into the backup directory. (1 mark)
   Ans : cp /home/student/files/project_notes.txt /home/student/files/backup/

5. Rename the file project_notes.txt to **project_summary.txt**. (1 mark)
   Ans : mv /home/student/files/project_notes.txt /home/student/files/project_summary.txt

6. Move the file **project_summary.txt** from the backup directory to **/home/student/archives**.
   Ans : mv /home/student/files/backup/project_summary.txt /home/student/archives/

7. Count the number of lines in the project_summary.txt (2 marks)
   Ans : wc -l /home/student/archives/project_summary.txt

Part B : Shell Programming (10 marks)

1. Word Count and Letter Count (5 marks)

Problem :
Write a shell script that counts the number of words and the number of occurrences of a given letter in a given file. The script should :

- Accept a file name and a letter as input
- Count the number of words in the file
- Count how many Times the specified letter appears in the file (case-insensitive).
- Display the word count and the letter count.

Sample Input :
./word_letter_count.sh document.txt a

Expected Output :
Word Count : 120
Letter ‘a’ occurrence : 25

Answer To The Question No. 1

Code :

```
#!/bin/bash

#Taking input from file
file=$1
letter=$2

# Check if the file exists
if [ ! -f "$file" ]; then
    echo "Error: File '$file' not found!"
    exit 1
fi

# Count words in the file
word_count=$(wc -w < "$file")

# Count occurrences of the letter (case-insensitive)
letter_count=$(grep -oi "$letter" "$file" | wc -l)

#Count Line in the file
line_count=$(wc -l < "$file")

# Display the results
echo "Line count: $line_count"
echo "Word count: $word_count"
echo "Letter '$letter' occurrence: $letter_count"



#command - ./word_letter_count.sh document.txt a
```

2. Fibonacci Sequence Generator (5 marks)

Problem :
Write a shell script that generates the Fibonacci sequence up to n terms. The script should :

- Accept the number of terms (n) as an argument.
- Display the Fibonacci sequence up to n terms.
- Ensure that the input is a valid integer and prompt the user if the input is invalid.

Sample Input :
./fibonacci.sh 10

Expected Output :
Fibonacci Sequence up to 10 terms : 0 1 1 2 3 5 8 13 21 34

Answer To The Question No. 2

Code :

```
#!/bin/bash

# Check if an argument is provided
if [ $# -ne 1 ]; then
    read -p "Enter any positive Integer : " n
else
    n=$1
fi

# Validate input (must be a positive integer)
if ! [[ "$n" =~ ^[0-9]+$ ]] || [ "$n" -le 0 ]; then
    echo "Error: Input must be a positive integer."
    exit 1
fi

# Generate Fibonacci sequence
a=0
b=1
echo -n "Fibonacci sequence up to $n terms: $a"

for (( i=1; i<n; i++ )); do
    echo -n " $b"
    temp=$((a + b))
    a=$b
    b=$temp
done

echo
```