Experiment Title: SHELL SCRIPTING

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Aim/Objective: The student should be able to understand, how to write Shell Scripts, uses of Shell Scripts, different shells available, shell comment, and the Shell Variables.

Description:

The A shell script is a type of computer program developed to be executed by a Unix shell, which is also known as a command-line interpreter. Several shell script dialects are treated as scripting languages. Classic operations implemented by shell scripts contain printing text, program execution, and file manipulation. A script configures the environment, and executes the program.

Prerequisite:

- **Basic functionality of Unix Commands.**
- **Complete idea of Disk Operating System and Batch Files**

Pre-Lab Task:

Shell Scripting terms	FUNCTIONALITY
Batch File	A script file containing a series of commands executed sequentially.
Shell Scripting	Writing scripts to automate tasks in a shell environment.

Shell Scripting terms	FUNCTIONALITY
Shell Variables	Variables used to store data within scripts.
Shell Types	Different types of shells (e.g., Bash, Zsh) used for scripting.
Shell Comments	Non-executable lines in scripts for documentation.

In Lab

1. Write a Shell Script to accept a number and find Even or ODD

```
#!/bin/bash

echo "Enter a number: "
read number

if [ $((number % 2)) -eq 0 ]; then
   echo "The number $number is even."
else
   echo "The number $number is odd."
fi
```

2. Write a Shell Script to find the Factorial of a given number.

```
#!/bin/bash

echo "Enter a number: "
read number

factorial=1

for ((i = 1; i <= number; i++)); do
   factorial=$((factorial * i))
done

echo "Factorial of $number is $factorial"
```

3. Write a Shell Script to find the Greatest of the given Three numbers.

```
#!/bin/bash

echo "Enter the first number: "
read num1
echo "Enter the second number: "
read num2
echo "Enter the third number: "
read num3

greatest=$num1

if [ $num2 -gt $greatest ]; then
   greatest=$num2
fi
if [ $num3 -gt $greatest ]; then
   greatest=$num3
fi

echo "The greatest number among $num1, $num2, and $num3 is $greatest"
```

4. Write a Shell Script to accept numbers and print sorted numbers.

```
#!/bin/bash

numbers=()

echo "Enter numbers (separate with spaces, e.g., 5 3 8 1): "
read -a input_numbers

for number in "${input_numbers[@]}"; do
   numbers+=("$number")
done

sorted_numbers=($(printf "%s\n" "${numbers[@]}" | sort -n))

echo "Sorted numbers: ${sorted_numbers[*]}"
```

5. Write a Shell Script for an Arithmetic Calculator using CASE

```
#!/bin/bash

addition() {
  result=$((num1 + num2))
}

subtraction() {
  result=$((num1 - num2))
}

multiplication() {
  result=$((num1 * num2))
}

division() {
  if [ $num2 -eq 0 ]; then
    echo "Division by zero is not allowed."
    exit 1
  fi
  result=$(awk "BEGIN {printf \"%.2f\", $num1 / $num2}")
}

echo "Enter the first number: "
read num1
echo "Enter the second number: "
read num2

echo "Arithmetic Calculator Menu:"
echo "1. Addition"
echo "2. Subtraction"
echo "3. Multiplication"
echo "4. Division"

echo "Enter your choice (1/2/3/4): "
read choice
```

```
case $choice in
   1) addition ;;
   2) subtraction ;;
   3) multiplication ;;
   4) division ;;
   *) echo "Invalid choice"; exit 1 ;;
esac

echo "Result: $result"
```

POST LAB

1. Write a Shell Script to accept a year and find Leap Year or Not

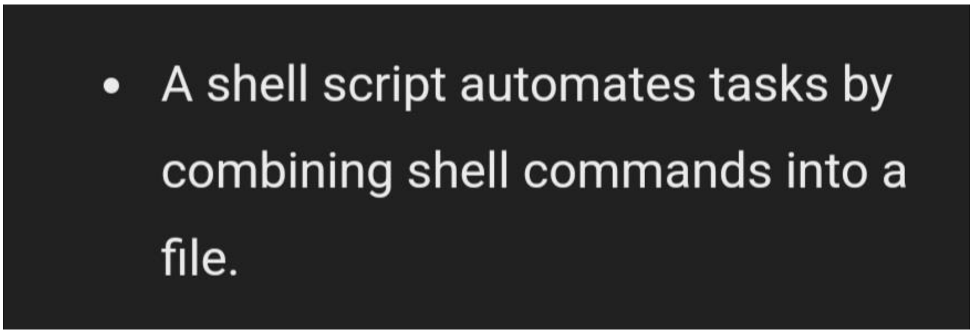
```
#!/bin/bash


echo "Enter a year: "
read year


if [ $((year % 4)) -eq 0 ] && [ $((year % 100)) -ne 0 ] || [ $((year % 400)) -eq 0 ]; then
   echo "$year is a leap year."
else
   echo "$year is not a leap year."
fi
```

2. Write a Shell Script to check whether a given number is a prime number or not.

```
#!/bin/bash

isPrime() {
   if [ $1 -le 1 ]; then
      return 1
   fi
   if [ $1 -le 2 ]; then
      return 0
   fi
   for ((i = 2; i * i <= $1; i++)); do
      if [ $((num % i)) -eq 0 ]; then
         return 1
      fi
   done
   return 0
}

echo "Enter a number: "
read num

isPrime $num

if [ $? -eq 0 ]; then
   echo "$num is a prime number."
else
   echo "$num is not a prime number."
fi
```

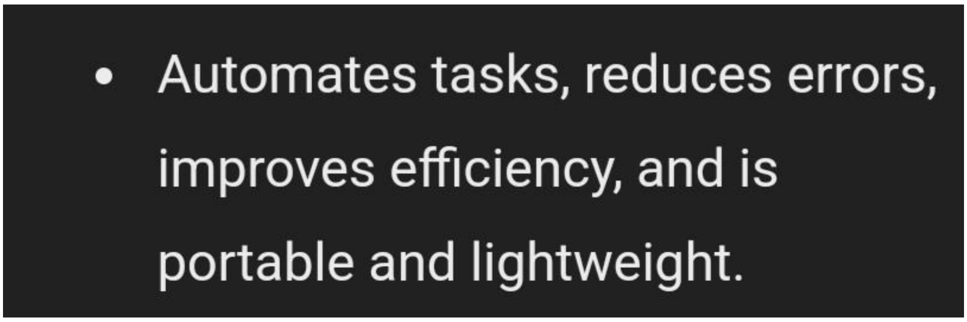
Sample VIVA-VOCE Questions (In-Lab):

1. Explain in detail about shell script.



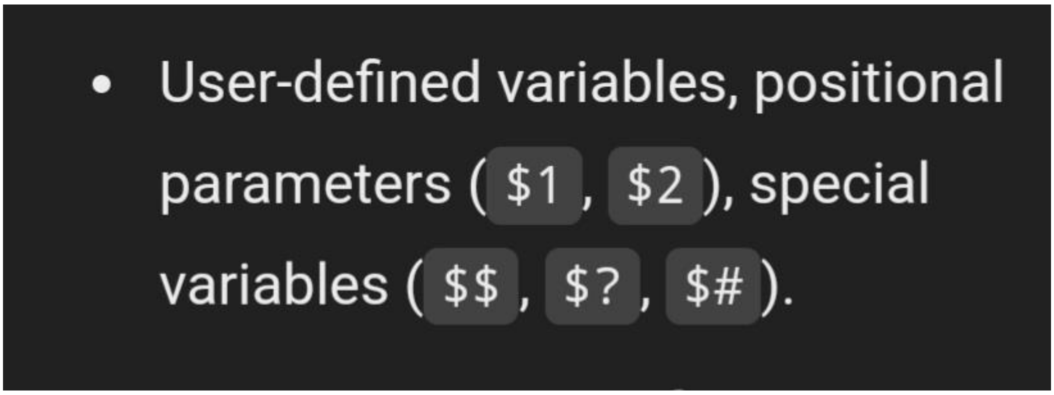
- A shell script automates tasks by combining shell commands into a file.

2. Explain in detail about Advantages of Shell Script.



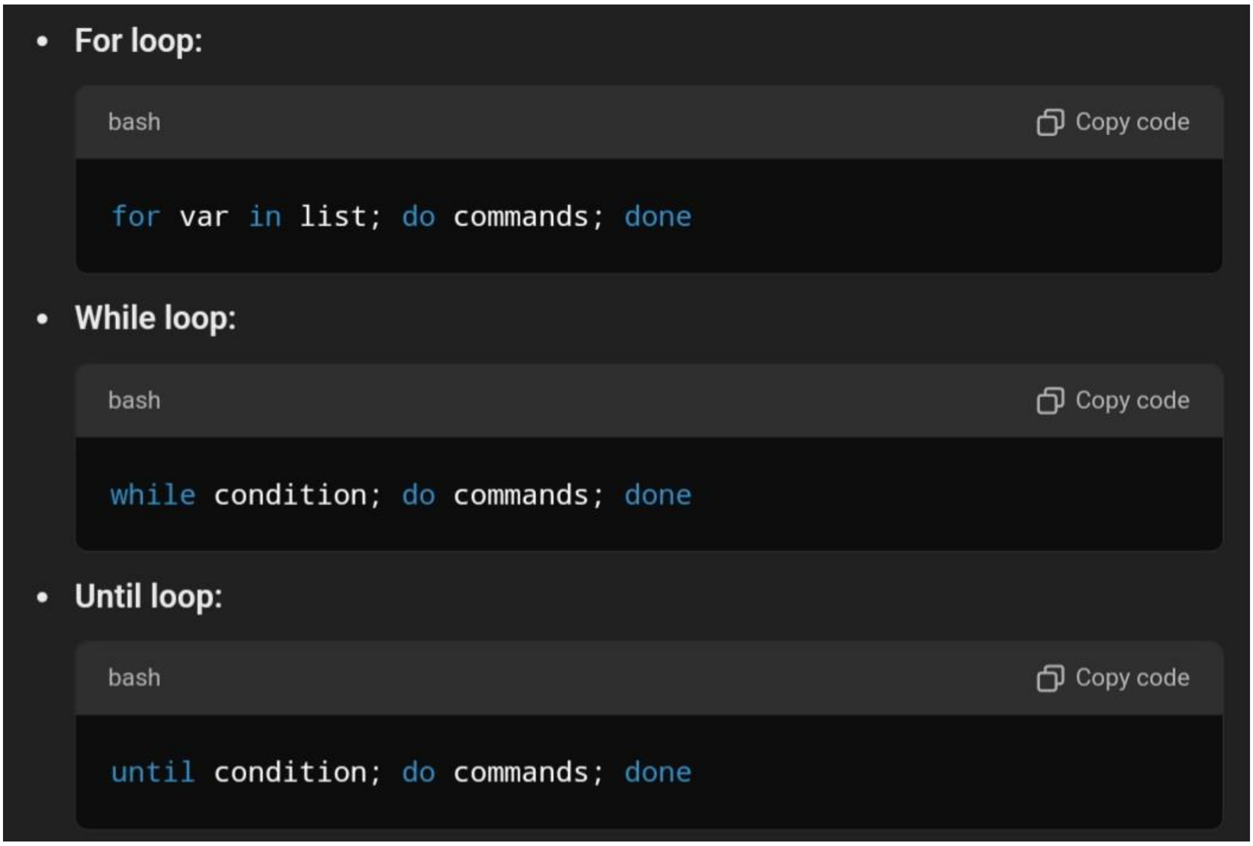
- Automates tasks, reduces errors, improves efficiency, and is portable and lightweight.

3. What are the different variables available in the shell script?



- User-defined variables, positional parameters (`$1` , `$2`), special variables (`$$` , `$?` , `$#`).

4. Write down the syntax of Loops in Shell Scripting.



- **For loop:**

```bash
for var in list; do commands; done
```

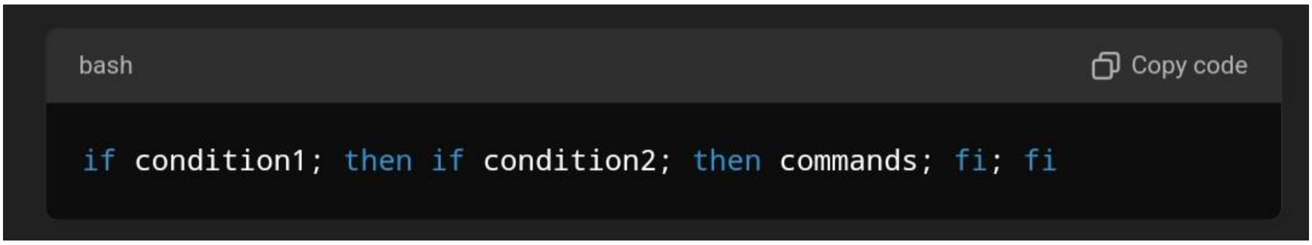
- **While loop:**

```bash
while condition; do commands; done
```

- **Until loop:**

```bash
until condition; do commands; done
```

5. Write down the syntax of nested if in the shell scripting.



```bash
if condition1; then if condition2; then commands; fi; fi
```

Evaluator Remark (if any):	**Marks Secured _____ out of 50**
	Signature of the Evaluator with Date

Note: Evaluator MUST ask Viva-voce before signing and posting marks for each experiment.