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Experiment 5 (Shell scripts)

Aim: To study and implement basic Shell scripting.

Theory:

Shell Script

Shell is a program which interprets user commands through CLI like Terminal. The Bourne shell, bash shell and the C shell are the most used shells in Unix. Unix commands may also be executed non-interactively in the form of a Shell program or a Shell Script. The script is a series of commands that will be run together.

It can combine lengthy and repetitive sequences of commands into a single and simple script, which can be stored and executed anytime. This reduces the effort required by the end user. Typical operations performed by shell scripts include file manipulation, program execution, and printing text.

Creating and executing a shell script

Steps in creating a Shell Script:

1. **Create a file using a vi editor** (or any other editor).
2. Name the script file with **extension .sh**
3. **Start** the script with **#!/bin/sh**
4. Write some code.
5. Save the script file as filename.sh
6. Give the shell permission to execute it.
7. For **executing** the script type **bash filename.sh**

An example shell script

The following example shows a simple shell script that lists the contents of the current directory and also shows the path of the current directory.

```
#!/bin/sh  
ls  
pwd
```



Lab Assignments to complete in this session

Implementation Instruction:

Objectives:

- To understand shell variables and shell programming.
- To develop shell scripts.

Outcomes: After study of this experiment, the student will be able to

- Develop shell scripts for simple tasks.

Prerequisite: UNIX shell.

Requirements: Personal Computer, Ubuntu OS, Text Editor, LibreOffice.

1. Write Shell script to copy files from one folder to another

```
$ sh exp5_SF.sh  
Files copied successfully!
```

```
$ ls  
file1.txt file2.txt
```

2. Write Shell script Count number of words, characters and lines.

```
$ sh exp5_SF.sh  
Number of characters in file is 49  
Number of words in file is 11  
Number of lines in file is 4
```

3. Write Shell script To describe files in different format.

```
$ sh exp5_SF.sh  
Enter file name:  
f1  
File does not exist.
```

```
$ sh exp5_SF.sh  
Enter file name:  
f1.txt  
File Name: f1.txt  
Size: 1.0K  
Type: ASCII text, with CRLF line terminators  
Permissions: -rw-r--r--
```

4. Write Shell script to find factorial of given number using bashscript



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Class: S.Y.B.Tech

Sub: System Fundamentals

```
$ sh exp5_SF.sh
Enter a number:
5
Factorial of 5 is: 120
```

5. Display first 10 natural numbers using bash script

```
$ sh exp5_SF.sh
Enter a integer number
15
Printing numbers:
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
```

6. Display Fibonacci series using bash script

```
$ sh exp5_SF.sh
Enter end point for Fibonacci series: 5
0 1 1 2 3
```

7. Find given number is prime or nor using bash script

```
$ sh exp5_SF.sh
Enter a number: 100
100 is not a prime number.
```

```
$ sh exp5_SF.sh
Enter a number: 2
2 is a prime number.
```

Write shell script to find biggest of three numbers



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```
$ sh exp5_SF.sh
===== Greatest of 3 Numbers =====
Please enter 3 numbers: 100 50 60
100 is the greatest number!
```

```
$ sh exp5_SF.sh
===== Greatest of 3 Numbers =====
Please enter 3 numbers: 20 20 20
All numbers are equal!
```

8. Write shell script to reverse a given number

```
$ sh exp5_SF.sh
Enter a Number: 123456789
Reverse of num is 987654321
```

9. Write shell script to find Sum of individual digits (1234 => 1+2+3+4=10)

```
$ sh exp5_SF.sh
Enter a 5 Digit Number: 12345
Addition = 15
```

10. Write a shell script to display a list of users currently logged in.

OUTPUT:- (it is showing no output as there are no user logged currently)

11. Write a shell script to perform arithmetic operations.



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```
$ sh exp5_SF.sh
Enter 2 numbers: 10 20

1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Exit
Enter the Operation to be performed: 1

Addition: 30

1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Exit
Enter the Operation to be performed: 2

Subtraction: -10

1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Exit
Enter the Operation to be performed: 3

Multiplication: 200

1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Exit
Enter the Operation to be performed: 4

Division: 0

1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Exit
Enter the Operation to be performed: 5
```

12. Write a shell script to copy contents of one file to another.



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```
$ sh exp5_SF.sh
Contents have been copied

File2 content's are :-
Hi !
```

Write a shell program to generate multiplication table of a number upto a given range.

```
$ sh exp5_SF.sh
Enter a number to generate multiplication table : 10
Enter the range for the multiplication table : 15
10 x 1 = 10
10 x 2 = 20
10 x 3 = 30
10 x 4 = 40
10 x 5 = 50
10 x 6 = 60
10 x 7 = 70
10 x 8 = 80
10 x 9 = 90
10 x 10 = 100
10 x 11 = 110
10 x 12 = 120
10 x 13 = 130
10 x 14 = 140
10 x 15 = 150
```

13. Write a shell program to count the number of files in a directory.

```
$ sh exp5_SF.sh
Number of files in G:/DJ Sanghvi/NOTES/SEM 4/SF/shell_scripting/folder1: 2
```

to find the number of matched characters, words and lines in a file.

```
$ sh exp5_SF.sh
Enter the file name : f1.txt
Enter the search string : Hi
Number of matched characters: 15
Number of matched words: 3
Number of matched lines: 1
```

Write a script to find the number of characters, words and lines in a file.

```
$ sh exp5_SF.sh
Enter file name : f1.txt
Number of characters: 64
Number of words: 14
Number of lines: 4
```

Write a script to display list of files starting with particular



A.Y.: 2022-23

Class: S.Y.B.Tech

Sub: System Fundamentals

letter in the directory.

```
$ ls  
eg.txt  exp5_SF.sh*  f1.txt  f2.txt  folder1/  folder3/
```

```
$ sh exp5_SF.sh  
Enter a letter : f  
Files starting with 'f':
```

```
folder1:  
total 2
```

```
folder3:  
total 0
```

Write a script to develop a Fibonacci series.

Write a shell script to replace the Nth occurrence of a pattern.

```
$ cat f1.txt  
Hi  
Hello  
How are you ?  
What are you doing ?
```

```
$ sh exp5_SF.sh  
Enter the file name : f1.txt  
Enter the pattern to replace : Hi  
Enter the replacement string : Hello  
Enter the Nth occurrence to replace : 1  
Nth occurrence of Hi has been replaced with Hello
```

```
$ cat f1.txt  
Hello  
Hello  
How are you ?  
What are you doing ?
```

Write a shell script to convert temperature from Centigrade to Fahrenheit.



```
Enter degree celsius temperature: 25
25 degree celsius is equal to 77.0 degree fahrenheit
```

This is required to installed in your pc :- sudo apt-get install bc
only then this centigrade to Fahrenheit will work

Write a shell script to compute the power of a given number.

```
$ sh exp5_SF.sh
Enter a number : 2
Enter a power : 3
8
```

Write a shell script to check whether the entered number is prime or not.

Write a shell script to check whether the year is leap year or not.

```
$ sh exp5_SF.sh
Enter a year : 2023
2023 is not a leap year
```

```
$ sh exp5_SF.sh
Enter a year : 2000
2000 is a leap year
```

Write a shell script to check whether a number is even or odd.

```
$ sh exp5_SF.sh
Enter a number : 100
100 is even
```

```
$ sh exp5_SF.sh
Enter a number : 45
45 is odd
```

When to use shell scripts?



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Shell scripts are useful in various situations. Here are some examples:

- i. Automation: Shell scripts can automate repetitive tasks that would otherwise require manual intervention.
- ii. System administration: Shell scripts can be used to perform system administration tasks such as backups, monitoring, and file management.
- iii. Data processing: Shell scripts can be used to process data such as log files, system performance statistics, and other types of data.
- iv. Customizing system behavior: Shell scripts can be used to customize the behavior of a system by modifying system settings or configuration files.
- v. Rapid prototyping: Shell scripts can be used for rapid prototyping of ideas or algorithms, providing a quick way to test and iterate on a solution.

Overall, shell scripts are a powerful tool for automating tasks, processing data, and customizing system behavior in Unix-like systems.

14. Where is the bash program located on your system?

```
$ sh exp5_SF.sh  
/usr/bin/bash
```

15. How to find the current shell which you are using in UNIX?

```
$ sh exp5_SF.sh  
/usr/bin/bash
```