System Fundamentals Experiment List

Explore the internal commands of Linux and Write shell scripts to do the following:

1. **Display top 10 processes in descending order**

   ps aux --sort -%cpu
2. **Display processes with highest memory usage.**
   ps aux --sort -%mem
3. **Display current logged in user and logname.**
   Whoami
   id
4. **Display current shell, home directory, operating system type, current path setting, current working directory.**
   echo $SHELL
   echo $HOME
   uname -s
   echo $PATH
   pwd
5. **Display OS version, release number, kernel version.**
   uname -s
   uname -r
   uname -v
   uname -o

6. **Write a command to display the first 15 columns from each line in the file**
   cut -c 1-15 pikachu.txt
7. **cut specified columns from a file and display them**
   cut -d " " -f 2,3 pikachu.txt
   cut -c 1,5,7,8 Harsh.txt
8. **Sort given file ignoring upper and lower case**
   sort -f pikachu.txt
9. **Displays only directories in current working directory.**
   ls -dF */
10. **copying files from one place to another,**
    cp pikachu.txt raichu.txt
11. **moving files from one place to another.**
    mv raichu.txt /root/first/second/
12. **Removing specific directory with various options**
    rm -r /home/savioratharv/animals
    rm -rv /home/savioratharv/pokemon
    rm -rf /home/savioratharv/gpt
13. **list the numbers of users currently login in the system and then sort it.**
    w | sort
14. **Merge two files into one file**

cat squirtle.txt charmander.txt > water_and_fire.txt

15. **changes the access mode of one file**
    chmod u+w charmander.txt
    chmod +w charmander.txt

    chmod +r charmander.txt

    chmod +x charmander.txt

16. **display the last ten lines of the file.**
    tail -n 10 water_and_fire.txt
17. **to locate files in a directory and in a subdirectory.**
    find /home/savioratharv/pracs -name "squirtle.txt"
18. **This displays the contents of all files having a name starting with ap followed by any number of characters.**
    ls sq*
    cat Ha*
19. **Rename any file aaa to aaa.aa1, where aa1 is the user login name.**
    mv aaa aaa.$(whoami)

Illustrate the use of sort, grep, awk, etc.

20. **Write a command to search the word 'picture' in the file and if found, the lines containing it would be displayed on the screen.**

    grep "pictures" picturesque.txt
21. **Write a command to search for all occurrences of 'Rebecca' as well as 'rebecca' in file and display the lines which contain one of these words.**
    grep -i "pictures" picturesque.txt
22. **Write a command to search all four-letter words whose first letter is a 'b' and last letter, a 'k'.**
    grep '\<b[a-z][a-z]ks\>' books
23. **Write a command to see only those lines which do not contain the search patterns**
    grep -v '\<b[a-z][a-z]k\>' books

System fundamentals Algorithm
https://colab.research.google.com/drive/1u2pgUM0mpt5Rgerh06rWB6zm4QQZLdoG?usp=sharing

24. **Implement Booth's multiplication algorithm.**
25. **Implement Restoring division algorithm.**
26. **Implement Non-Restoring division algorithm.**
27. **Implement fully associative memory mapped cache organization.**
28. **Implement various LRU cache/page replacement policy**

29. **Implement various optimal cache/page replacement policy**
30. **Implement various FIFO cache/page replacement policy**
31. **Implement FCFS CPU scheduling algorithm.**
32. **Implement SJF CPU scheduling algorithm.**
33. **Implement Non Prremptive Priority CPU scheduling algorithm.**
34. **Implement Prremptive Priority CPU scheduling algorithm.**
35. **Implement SRTF CPU scheduling algorithm.**
36. **Implement Round Robin CPU scheduling algorithm.**
37. **Implement Best Fit Memory allocation policy.**
38. **Implement First Fit Memory allocation policy.**
39. **Implement Worst Fit Memory allocation policy.**
40. **Implement Producer -Consumer problem with Semaphore.**
41. **Implement order scheduling in supply chain using Banker's Algorithm**
42. **Implement FIFO Disk Scheduling Algorithms.**
43. **Implement SSTF Disk Scheduling Algorithms.**
44. **Implement SCAN Disk Scheduling Algorithms.**
45. **Implement C-SCAN Disk Scheduling Algorithms.**
46. **Implement Look Disk Scheduling Algorithms.**
47. **Implement Look Disk Scheduling Algorithms.**

Shell Scripting

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

```
#!/bin/bash
dst_dir="/home/savioratharv/pokemons"
src_dir="/home/harsh.txt"
cp "$src_dir" "$dst_dir"
echo "Files copied successfully"
```

```
#!/bin/bash
dst="/root/first1"
src="/root/Harsh.txt"
cp "$src" "$dst"
echo "Files copied successfully"
```

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

```
#!/bin/bash
file="/home/savioratharv/pokemons/pikachu.txt"
c=$(cat "$file"|wc -c)
w=$(cat "$file"|wc -w)
```

```
l=$(cat "$file"|wc -l)
echo "Number of characters: $c"
echo "Number of words: $w"
echo "Number of lines: $l"
```

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

```
#!/bin/bash
file="/home/savioratharv/pokemons/pikachu.txt"
c=$(stat $file)
echo "$c"
```

51. Write Shell script to find factorial of given number using bash script

```
#!/bin/bash
echo "Enter the number"
read num
fact=1
for ((i=1;i<=$num;i++))
do
        fact=$((fact*i))
done
echo "The factorial of a number is $fact"
```

NOTE: Do chmod +x fourth.sh and use ./fourth.sh instead of sh fourth.sh

52. Display first 10 natural numbers using bash script

```
#!/bin/bash
for ((i=1;i<=10;i++))
do
        echo $i
done
```

53. Display Fibonacci series using bash script

```
#!/bin/bash
echo "How long Fibbo"
read num
a=1
b=1
echo "$a"
echo "$b"
for((i=1;i<=num;i++))
do
        c=$((a+b))
        echo "$c "
        a=$b
        b=$c
done
```

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

```
#!/bin/bash
echo "Enter the number"
read num
count=0
for((i=2;i<num;i++))
do
```

```
        if (($num%$i==0))
        then
                count=$((count+1))
        fi
done
if (($count==0))
then
        echo "Prime number"
else
        echo "Not a prime number"
fi
```

55. Write shell script to find biggest of three numbers

```
#!/bin/bash
echo "Enter first number"
read num1
echo "Enter second number"
read num2
echo "Enter third number"
read num3
if(($num1>$num2 && $num1>$num3))
then
        echo "Biggest number is $num1"
elif(($num2>$num1 && $num2>$num3))
then
        echo "Biggest number is $num2"
else
        echo "Biggest number is $num3"
fi
```

56. Write shell script to reverse a given number

```
#!/bin/bash
echo "Enter the number"
read num
new=0
while(($num>0))
do
        rem=$((num%10))
        new=$((new*10 + rem))
        num=$((num/10))
done
echo "Reverse number is: $new"
```

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

```
#!/bin/bash
echo "Enter number"
read num
sum=0
while(($num>0))
do
        rem=$num%10
        sum=$((sum+rem))
```

```
        num=$num/10
    done
    echo "The total sum of digits is $sum"
```

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

```
    #!/bin/bash
    c=$(w)
    echo "Users logged in:"
    echo "$c"
```

59. Write a shell script to perform arithmetic operations.

```
    #!/bin/bash
    echo "1. Add, 2. Subtract, 3.Multiply, 4.Divide, 5.Exponent"
    read num
    echo "Enter two numbers"
    read a b
    case $num in
        1) echo "The sum is $((a+b))"
            ;;
        2) echo "The difference is $((a-b))"
            ;;
        3) echo "The product is $((a*b))"
            ;;
        4) echo "The division is $((a/b))"
            ;;
        5) echo "The exponent is $((a**b))"
            ;;
        *) echo "Invalid choice! Please try again!"
            ;;
    esac
```

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

```
    repeat
```

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

```
    echo "Enter max range"
    read range
    echo "Enter number"
    read num
    for((i=1;i<=$range;i++))
    do
        echo "$i * $num = $((i*num))"
    done
```

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

```
    #!/bin/bash
    file="/home/saviorathary/animals"
    c=$(ls -1p $file | wc -l)
    echo "Number of files in directory: $c"
```

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

```
    #!/bin/bash
```

```
file="/home/savioratharv/pracs/picturesque.txt"
c=$(grep -o "pictures" $file | wc -c)
w=$(grep -o "pictures" $file | wc -w)
l=$(grep -o "pictures" $file | wc -l)
echo "Number of matched characters: $c"
echo "Number of matched words: $w"
echo "Number of matched lines: $l"
```

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

65. Write a script to display list of files starting with particular letter in the directory.

```
#!/bin/bash
c=$(ls -1p "/home/savioratharv/pokemons" pi*)
echo "List of files: "
echo "$c"
```

```
#!/bin/bash

# Directory path
directory="/root"

# Letter to filter files
letter="H"

# Display list of files starting with the specified letter
ls -p "$directory" | grep "^$letter"
```

66. Write a script to develop a Fibonacci series.
Repeat

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

```
#!/bin/bash

sed -i "s/$1/$2/$3" "$4" && echo "Pattern '$1' replaced with '$2' at the $3 occurrence in '$4'." ||
echo "Error occurred while replacing the pattern."
```

On cli

```
root@HARSH-SHETYE:~# ./fifty.sh "pictures" "HEYYYYYY" 2 picturesque.txt
Pattern 'pictures' replaced with 'HEYYYYYY' at the 2 occurrence in 'picturesque.txt'.
root@HARSH-SHETYE:~# more picturesque.txt
In today's digital age, sharing moments through pictures has become an integral part of our lives. Whether it's a breathtaking landscape, a deliciously prepared meal, or a preciou
s memory with loved ones, HEYYYYYY have the power to capture
and preserve these experiences. With just a simple click, we can freeze a moment in time and create a lasting visual representation. Social media platforms have further amplified
the significance of pictures, allowing us to share our stories and connect with others through captivating visuals. From selfies to professional photography, pictures enable us to
 express ourselves, convey emotions, and document the world around us. So, grab your camera or smartphone, and let's continue to paint our lives with the vibrant colors of picture
s.


have here ahvjav
jgsydjh have
```

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

```
#!/bin/bash
echo "Enter fahrenheit"
read num
cel=$(( (num-32)*5/9 ))
echo "Celsius is $cel"
```

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

```
#!/bin/bash
echo "Enter number and exponent"
read num exp
echo "Exponent is $((num**exp))"
```

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

repeat

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

```
#!/bin/bash
echo "Enter year"
read num
if(( ($num%4==0 && $num%100!=0) || ($num%400==0) ))
then
        echo "Leap year"
else
        echo "Not Leap year"
      fi
```

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

```
#!/bin/bash
echo "Enter number"
read num
if(($num%2==0))
then
        echo "Even number"
else
        echo "Odd number"
      fi
```