

# Assignment 2: Linux & Shell Scripting Tasks

**Name:** Priyadarshi Prabhakar

**Roll No.:** 590029237

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## Aim

To perform scripting and system tasks covering file renaming, searching, Fibonacci generation, permission checks, system info, monitoring, text statistics, sorting, GCD/LCM, palindrome checks, and string operations.

## Requirements

- Linux system with bash
- Terminal access
- Text editor (nano/vim)

## Task 1: Add Prefix or Suffix to All Files in a Directory

**Script**

```
#!/bin/bash
read -p "Enter prefix or suffix (prefix: p:TEXT or suffix: s:TEXT): " opt
for f in *; do
    if [[ -f "$f" ]]; then
        if [[ "$opt" == p:* ]]; then
            p=${opt#p:}
            mv "$f" "${p}${f}"
        elif [[ "$opt" == s:* ]]; then
            s=${opt#s:}
            mv "$f" "${f}${s}"
        fi
    fi
done
```

## Output

```
wizzz@wizzz-VirtualBox: ~
wizzz@wizzz-VirtualBox:~$ vim prefix.sh
wizzz@wizzz-VirtualBox:~$ bash prefix.sh
Enter prefix or suffix (prefix: p:TEXT or suffix: s:TEXT): p:Linux
wizzz@wizzz-VirtualBox:~$ ls
Desktop    Downloads    Linuxnatural.sh  Linuxprefix.sh  Music    Pictures    system_logs  Videos
Documents  LinuxMyLinuxFiles.tar.gz  Linuxnumbers.sh  Linuxtime_log.txt  MyLinuxFiles  Public      Templates
```

## Task 2: Recursive File Search (by extension or size)

### Commands

# Find by extension (e.g., .log)

```
find ~ -type f -name "*.log"
```

# Find files larger than 1MB

```
find ~ -type f -size +1M
```

## Output

```
wizzz@wizzz-VirtualBox:~$ find ~ -type f -name "*.log"
/home/wizzz/system_logs/system_info_2025-10-17.log
/home/wizzz/.config/libreoffice/4/user/GraphicsRenderTests.log
/home/wizzz/.local/share/gvfs-metadata/home-e680175f.log
wizzz@wizzz-VirtualBox:~$ find ~ -type f -size +1M
/home/wizzz/.mozilla/firefox/1e5dr5qj.default-release/storage/permanent/chrome/ldb/3870112724rsegmnoittet-es.sqlite
```

# Task 3: Fibonacci Series up to N terms

## Script

```
#!/bin/bash
read -p "Enter limit: " n
a=0; b=1
for ((i=0;i<n;i++)); do
    echo -n "$a "
    fn=$((a+b))
    a=$b
    b=$fn
done
echo
```

## Example Output

```
Enter limit: 8
0 1 1 2 3 5 8 13
```

```
wizzz@wizzz-VirtualBox:~/Desktop/linux_lab$ vim filename.sh
wizzz@wizzz-VirtualBox:~/Desktop/linux_lab$ chmod +x filename.sh
wizzz@wizzz-VirtualBox:~/Desktop/linux_lab$ ./filename.sh
Enter filename: Readme.txt
Enter word to search: hello
The word 'hello' appears 1 times in the file 'Readme.txt'.
wizzz@wizzz-VirtualBox:~/Desktop/linux_lab$ vim fibonacci.sh
wizzz@wizzz-VirtualBox:~/Desktop/linux_lab$ chmod +x fibonacci.sh
wizzz@wizzz-VirtualBox:~/Desktop/linux_lab$ ./fibonacci.sh
Enter the value of N: 156
The first 156 Fibonacci numbers are:
0 1 1 2 3 5 8 13 21 34 55 89 144 233 377 610 987 1597 2584 4181 6765 10946 17711 28657 46368 75025 121393 196418 317811 514229 832040 1346269 2178309 3524578 5702887 9227465 1493
0352 24157817 39088169 63245986 102334155 165588141 267914296 433494437 701408733 1134903170 1836311903 2971215073 4807526976 7778742049 12586269025 20365011074 32951280099 53316
291173 86267571272 139583862445 225851433717 365435296162 591286729879 956722626041 1548008755920 2504730781961 4052739537881 6557470319842 10610209857723 17167680177565 27777890
035288 44945570212853 72723460248141 117669030460994 190392490709135 308061521170129 498454011879264 806515533049393 1304969544928657 2111485077978050 3416454622906707 5527939700
884757 8944394323791464 14472334024676221 23416728348467685 37889062373143906 61305790721611591 99194853094755497 160500643816367088 259695496911122585 420196140727489673 6798916
37638612258 1100087778366101931 1779979416004714189 2880067194370816120 4660046610375530309 7540113804746346429 -6246583658587674878 1293530146158671551 -4953053512429003327 -365
9523366270331776 -8612576878699335103 6174643828739884737 -2437933049959450366 3736710778780434371 129877728820984005 5035488507601418376 6334266236422402381 -707698932968573085
9 -742723093263328478 -7819712422949059337 -8562435516212387815 2064596134548104464 -6497839381664283351 -4433243247116178887 7515661444929089378 3082418197812910491 -78486644309
67551747 -4766246233154641256 5831833409587358613 1065587176432717357 6897420580020875970 796308776245279337 -3586315725236682210 4376692037216111008 790376311979428689 51670683
49195539697 5957444661174968386 -732223106339043533 -1364786402164075147 -8687017465503118680 8394940206042357789 -292077259460760891 8102862946581596898 7810785687120836007 -25
33095440007118711 5277690247113717296 2744594807106598585 8022285054220315881 -7679804212382637150 342420841837678731 -7337443370544958419 -6995022528707279688 411427817445731350
9 -2880744354249966179 1233533820207347330 -1647210534042618849 -413676713835271519 -2060887247877890368 -2474563961713161887 -4535451209591052255 -7010015171304214142 6901277692
814285219 -108737478489928923 6792540214324356296 6683802735834427373 -4970401123550767947 1713401612283659426 -3256999511267108521 -1543597898983449095
wizzz@wizzz-VirtualBox:~/Desktop/linux_lab$
```

# Task 4: Check File Readable/Writable/Executable

## Commands

```
read -p "Enter filename: " f
[ -r "$f" ] && echo "Readable" || echo "Not readable"
[ -w "$f" ] && echo "Writable" || echo "Not writable"
[ -x "$f" ] && echo "Executable" || echo "Not executable"
```

## Output

```
wizzz@wizzz-VirtualBox: ~/MyLinuxFiles
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$ vim executable.sh
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$ bash executable.sh
Enter filename: file1.txt |
Readable
Writable
Not executable
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$
```

## Task 5: Display System Information

### Commands

date  
uptime  
who  
free -h  
df -h

## Output

```
wizzz@wizzz-VirtualBox: ~/MyLinuxFiles
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$ vim systeminfo.sh
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$ bash systeminfo.sh
Monday 24 November 2025 04:51:43 PM IST
 16:51:43 up 11 min,  1 user,  load average: 0.15, 0.41, 0.28
wizzz    tty7      2025-11-24 16:41 (:0)

```

|       |       |       |       |        |            |           |
|-------|-------|-------|-------|--------|------------|-----------|
|       | total | used  | free  | shared | buff/cache | available |
| Mem:  | 8.2Gi | 1.7Gi | 5.7Gi | 48Mi   | 1.0Gi      | 6.5Gi     |
| Swap: | 2.0Gi | 0B    | 2.0Gi |        |            |           |

```
Filesystem      Size  Used Avail Use% Mounted on
tmpfs            835M  1.3M  834M   1% /run
efivarfs         256K   29K  223K  12% /sys/firmware/efi/efivars
/dev/sda2        24G   11G   13G  46% /
tmpfs            4.1G     0   4.1G   0% /dev/shm
tmpfs            5.0M   8.0K  5.0M   1% /run/lock
/dev/sda1        511M   6.2M  505M   2% /boot/efi
tmpfs            835M  192K  835M   1% /run/user/1000
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$
```

# Task 6: Continuously Monitor and Log Top Memory-Consuming Processes

## Script (one-shot)

```
top -b -o %MEM -n 1 | head -20
```

## Script (continuous logging every minute)

```
#!/bin/bash
while true; do
    echo "--- $(date) ---" >> memlog.txt
    top -b -o %MEM -n 1 | head -20 >> memlog.txt
    sleep 60
done
```

## Output

```
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$ vim monitor.sh
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$ bash monitor.sh
top - 16:53:24 up 12 min, 1 user, load average: 0.18, 0.35, 0.27
Tasks: 235 total, 1 running, 234 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.0 us, 0.4 sy, 0.0 ni, 99.6 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 8346.2 total, 5874.4 free, 1693.9 used, 1065.5 buff/cache
MiB Swap: 2048.0 total, 2048.0 free, 0.0 used, 6652.3 avail Mem

  PID USER      PR  NI   VIRT   RES   SHR  S  %CPU  %MEM     TIME+ COMMAND
 2425 wizzz    20   0 2953588 427808 118080 S   0.0   5.0   1:08.04 Isolate+
 2127 wizzz    20   0  11.1g 388292 180456 S   0.0   4.5   1:19.61 firefox+
 1531 wizzz    20   0 5620584 255156 147912 S   0.0   3.0   1:44.75 cinnamon
 2232 wizzz    20   0 2517236 146360 106464 S  15.4   1.7   0:04.76 Privile+
   886 root     20   0  453472 138260  89588 S   0.0   1.6   0:37.22 Xorg
 2301 wizzz    20   0 2466836 95552  75312 S   0.0   1.1   0:01.06 WebExte+
 1875 wizzz    20   0  899888 95244  52316 S   0.0   1.1   0:00.63 mintUpd+
 2006 wizzz    20   0  496192 62224  35840 S   0.0   0.7   0:02.01 mintrep+
 1610 wizzz    20   0 1173840 61940  39168 S   0.0   0.7   0:02.37 nemo-de+
 1597 wizzz    20   0  631920 59252  33536 S   0.0   0.7   0:00.77 blueman+
 1594 wizzz    20   0  810592 58692  46816 S   0.0   0.7   0:00.43 evoluti+
 2702 wizzz    20   0 2422940 51124  38232 S   0.0   0.6   0:00.16 Web Con+
 2759 wizzz    20   0 2422956 51116  38228 S   0.0   0.6   0:00.17 Web Con+
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$
```

## Task 7: Count Lines, Words, Characters of a File

### Commands

```
read -p "Enter filename: " f
wc "$f"
```

### Output

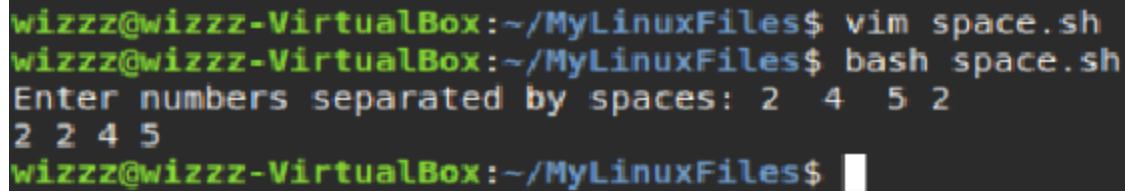
```
wizzz@wizzz-VirtualBox:~$
wizzz@wizzz-VirtualBox:~$ cd MyLinuxFiles/
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$ vim lines.sh
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$ bash lines.sh
Enter filename: file1.txt
0 0 0 file1.txt
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$
```

## Task 8: Accept Multiple Numbers and Sort Ascending

### Commands

```
read -p "Enter numbers separated by spaces: " nums
echo $nums | tr ' ' '\n' | sort -n | tr '\n' ' '
echo
```

### Output

A terminal window with a dark background and green text. The prompt is 'wizzz@wizzz-VirtualBox:~/MyLinuxFiles\$'. The user enters 'vim space.sh'. The prompt changes to 'wizzz@wizzz-VirtualBox:~/MyLinuxFiles\$'. The user enters 'bash space.sh'. The script prompts 'Enter numbers separated by spaces: ' and the user enters '2 4 5 2'. The script outputs '2 2 4 5' on the next line. The prompt returns to 'wizzz@wizzz-VirtualBox:~/MyLinuxFiles\$' with a cursor at the end.

```
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$ vim space.sh
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$ bash space.sh
Enter numbers separated by spaces: 2 4 5 2
2 2 4 5
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$
```

## Task 9: Calculate GCD and LCM of Two Numbers

### Script

```
#!/bin/bash
read -p "Enter two numbers: " a b
gcd() {
    local x=$1 y=$2 r
    while [ $y -ne 0 ]; do
        r=$(( x % y ))
        x=$y
        y=$r
    done
    echo $x
}
g=$(gcd $a $b)
l=$(( (a / g) * b ))
echo "GCD = $g"
echo "LCM = $l"
```

## Output

```
wizzz@wizzz-VirtualBox:~/Desktop/linux_lab$ chmod +x LCM.sh
wizzz@wizzz-VirtualBox:~/Desktop/linux_lab$ ./LCM.sh
Enter two numbers:
2 3
GCD: 1
LCM: 6
wizzz@wizzz-VirtualBox:~/Desktop/linux_lab$
```

# Task 10: Check Palindrome String

## Commands

```
read -p "Enter string: " s
rev=$(echo "$s" | rev)
if [[ "$s" == "$rev" ]]; then
    echo "Palindrome"
else
    echo "Not palindrome"
fi
```

## Output



```
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$ vim palindrome.sh
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$ bash palindrome.sh
Enter string: Priyadarshi
Not palindrome
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$
```

## Task 11: Length of a String

### Commands

```
read -p "Enter string: " s
echo "Length: ${#s}"
```

### Output

```
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$ vim string.sh
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$ bash string.sh
Enter string: Priyadarshi Prabhakar
Length: 21
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$
```

## Task 12: Reverse a Given String

### Commands

```
read -p "Enter string: " s
echo "Reverse: $(echo "$s" | rev)"
```

### Output

```
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$ vim reverse.sh
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$ bash reverse.sh
Enter string: Priyadarshi
Reverse: ihsradayirP
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$
```

## Task 13: Concatenate Two Input Strings

### Commands

```
read -p "Enter first string: " s1
read -p "Enter second string: " s2
echo "Concatenated: ${s1}${s2}"
```

### Output

```
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$ vim concatenation.sh
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$ bash concatenation.sh
Enter first string: Linux
Enter second string: Assignment 2
Concatenated: LinuxAssignment 2
wizzz@wizzz-VirtualBox:~/MyLinuxFiles$
```

## Result

All tasks cover common scripting patterns, file operations, monitoring, and string/number processing useful for system administration and scripting practice.

# Conclusion

Assignment 2 provides practical tasks to strengthen shell scripting and Linux command-line proficiency.