Operating Systems

Lab File

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Group – 6

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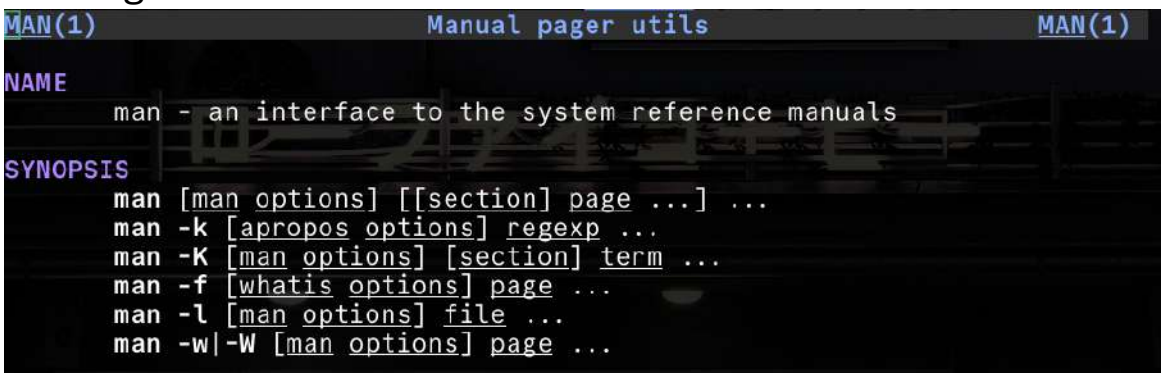
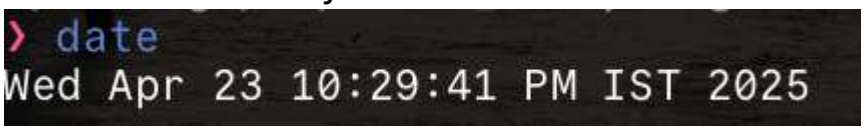
Basic Commands

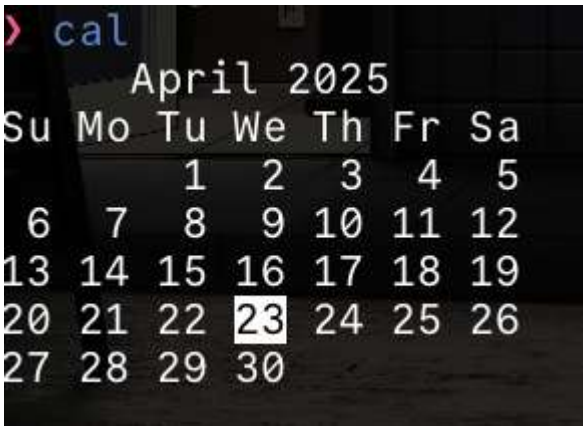
- Man – Give information of a command and what various flags do



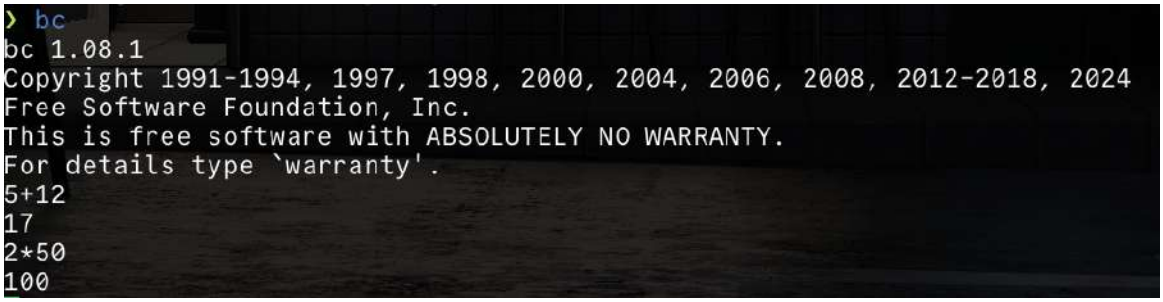
- Date - shows system time and date



- Cal/ncal – show the calendar for a specified month and year

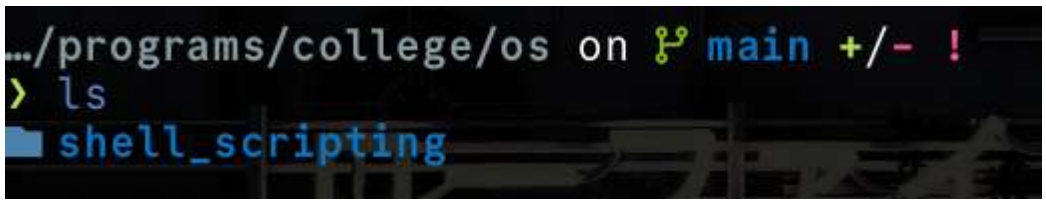


- Bc – turns on calculator mode



- Cd – change directory

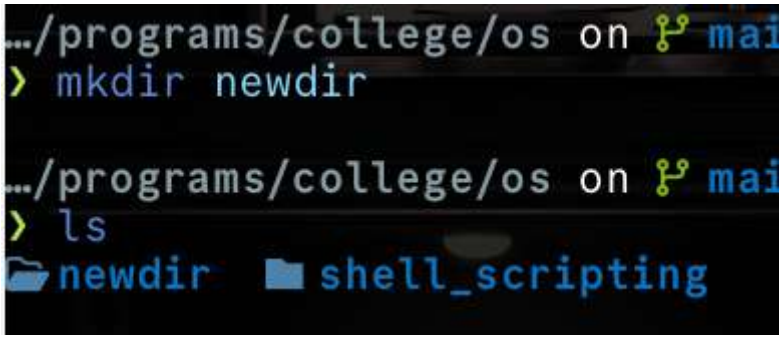
- Ls – list contents of directory



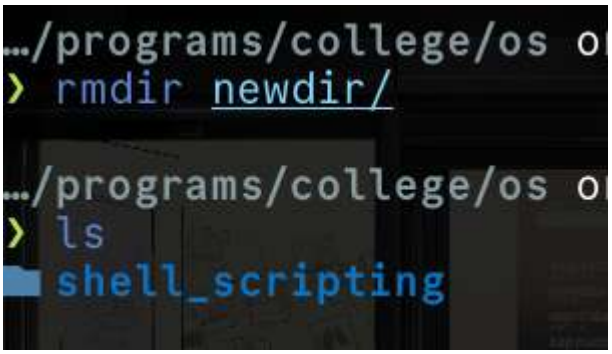
- Who/whoami – show current logged in user

- Clear – clear the terminal

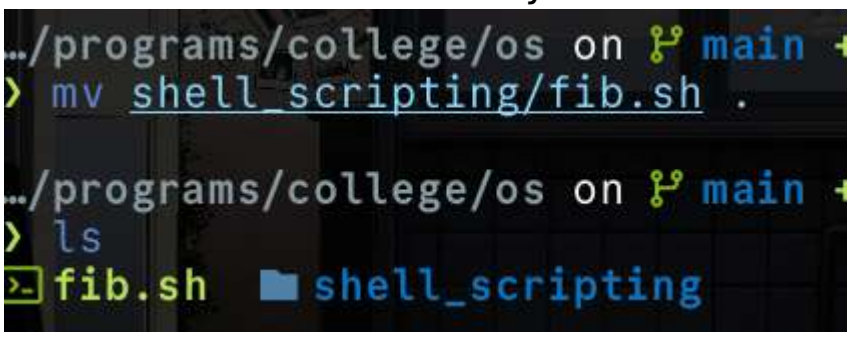
- Mkdir – create a new directory



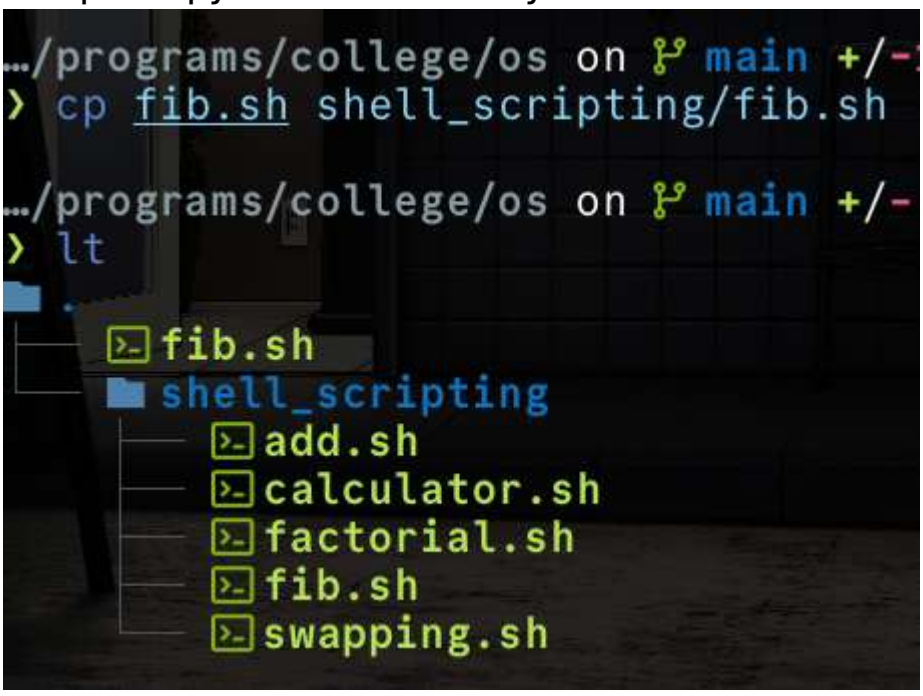
- Rm/rmdir – remove a file or a directory



- Mv – move a file or directory



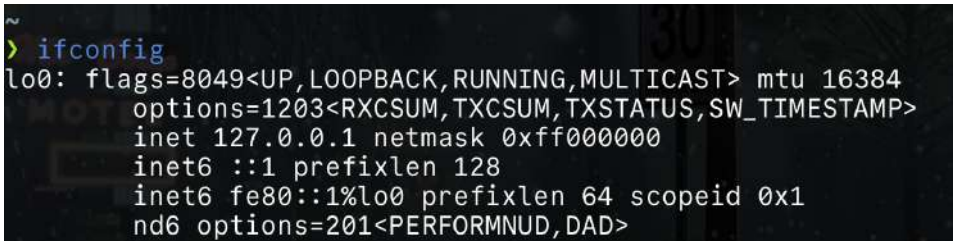
- Cp – copy a file or directory



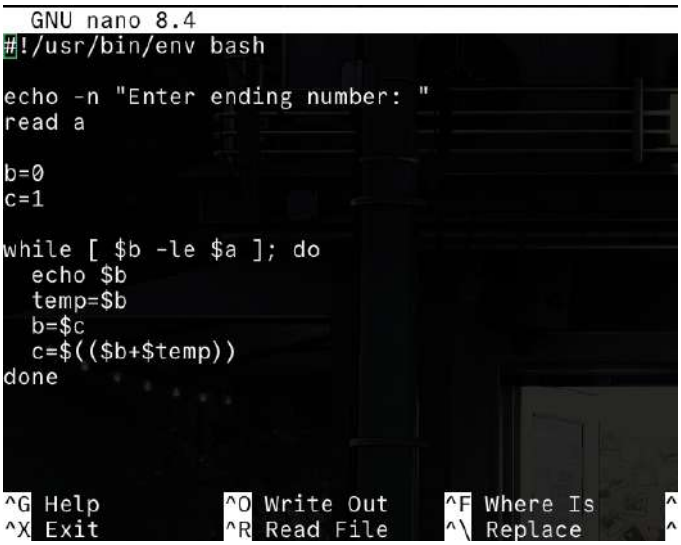
- Echo – output text or variables onto the terminal

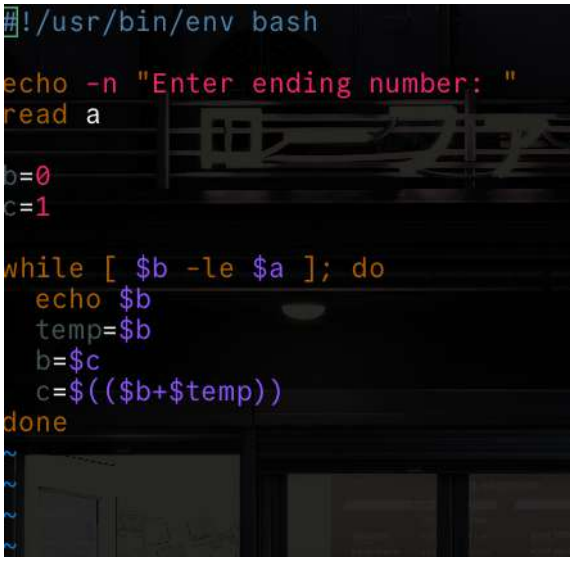
- Printf – like echo but provides more output format control using C like format specifiers

- Ifconfig – used to configure and display network interface parameters

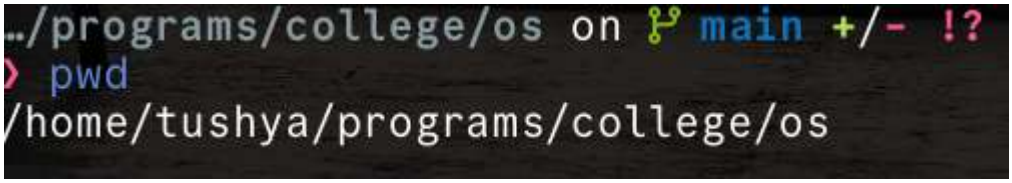


- Vi/nano – terminal based text editors





- Pwd – print the absolute path of current working directory



- Su – used to switch user

```
> su newuser
su: user newuser does not exist or the user entry does not contain all th
e required fields
```

- Kill – used to kill a process by giving its pid

```
> kill 12432
kill: sending signal to 12432 failed: No such process
```

- Ping – send packets to a url or ip address

```
~
> ping google.com
PING google.com (142.250.206.110): 56 data bytes
64 bytes from 142.250.206.110: icmp_seq=0 ttl=118 time=50.251 ms
64 bytes from 142.250.206.110: icmp_seq=1 ttl=118 time=47.820 ms
64 bytes from 142.250.206.110: icmp_seq=2 ttl=118 time=42.818 ms
64 bytes from 142.250.206.110: icmp_seq=3 ttl=118 time=53.382 ms
64 bytes from 142.250.206.110: icmp_seq=4 ttl=118 time=43.454 ms
^C
--- google.com ping statistics ---
5 packets transmitted, 5 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 42.818/47.545/53.382/4.014 ms
```

- Traceroot – trace the path to a url or ip address

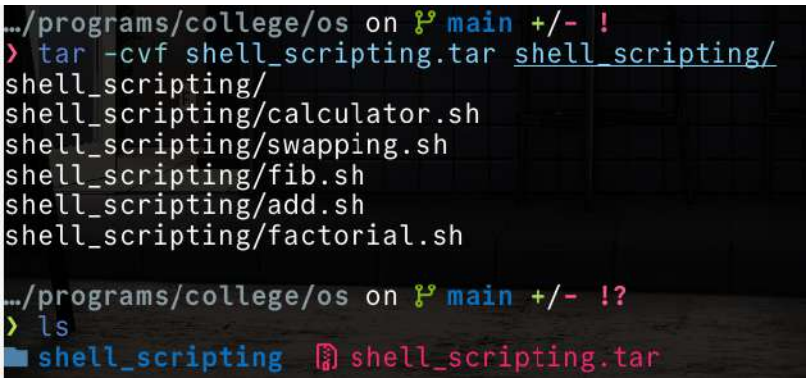
```
~
> traceroute google.com
traceroute to google.com (142.250.206.110), 64 hops max, 40 byte packets
 1  unit (192.168.1.1)  9.220 ms  3.077 ms  2.946 ms
 2  10.240.15.125 (10.240.15.125)  28.542 ms  28.014 ms  25.245 ms
 3  172.30.1.138 (172.30.1.138)  37.993 ms  26.128 ms
    172.30.1.154 (172.30.1.154)  29.941 ms
 4  125.16.191.65 (125.16.191.65)  37.042 ms
    125.16.191.81 (125.16.191.81)  33.994 ms
    125.16.191.65 (125.16.191.65)  31.434 ms
 5  116.119.52.34 (116.119.52.34)  41.143 ms
    182.79.208.12 (182.79.208.12)  28.908 ms
    116.119.52.34 (116.119.52.34)  47.718 ms
 6  142.250.161.56 (142.250.161.56)  33.223 ms  56.612 ms  36.917 ms
 7  * * *
 8  142.251.52.214 (142.251.52.214)  59.018 ms
    142.251.52.228 (142.251.52.228)  36.584 ms
    142.251.76.168 (142.251.76.168)  44.772 ms
 9  142.251.76.193 (142.251.76.193)  62.100 ms  51.188 ms
    142.251.76.195 (142.251.76.195)  46.289 ms
10  192.178.82.235 (192.178.82.235)  44.452 ms
    142.250.63.53 (142.250.63.53)  59.764 ms  146.436 ms
11  del11s20-in-f14.1e100.net (142.250.206.110)  49.023 ms  49.337 ms  38.160 ms
```

- chmod – Change the permissions on a file

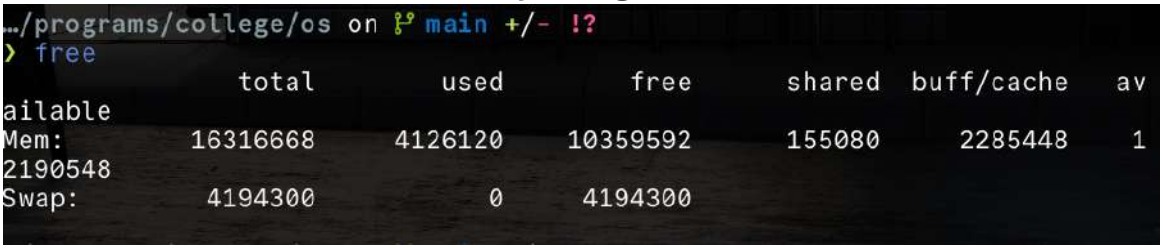
```
…/programs/college/os on  main +/- !?
> chmod +x fib.sh

…/programs/college/os on  main +/- !?
> l
.rwxr-xr-x 144 tushya 23 Apr 21:45 -N  fib.sh
```

- chown – Change the owner of a file or directory

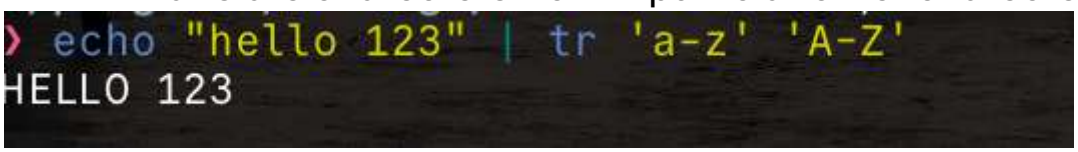
- tar – To compress and decompress files into .tar



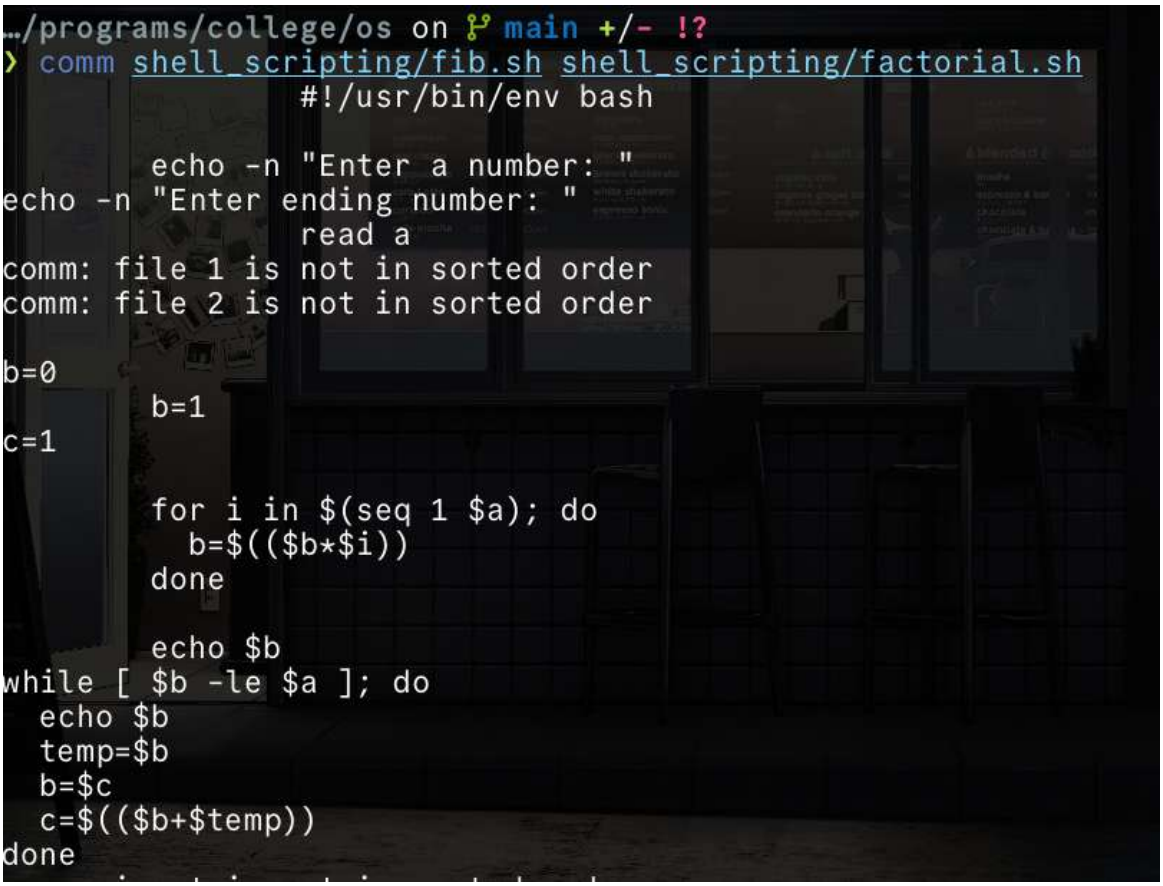
- shutdown – Shutdown computer
- cut – Get specific selections from a file
- free – Shows the memory usage



- tr – translate charecters from input to another charecters



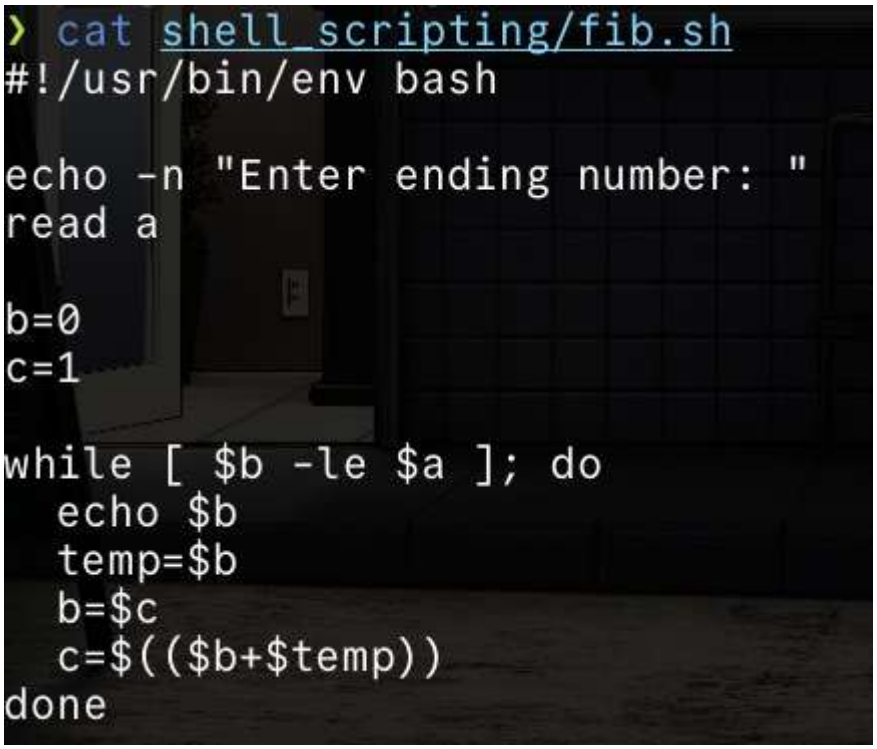
- comm – segregates common lines between files



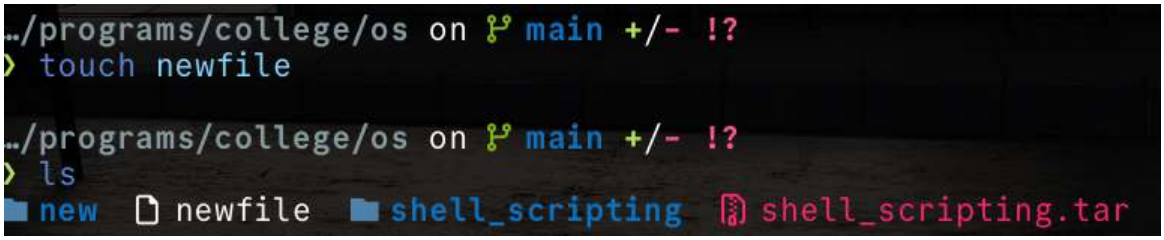
- type – Shows how a command is interpreted by the shell

- find – Find files and directories in a hierarchy

- cat – display the contents of a file



- touch – Update timestamp of a file



Shell Scripting

Q1 - Add 2 numbers
Code –

```
#!/usr/bin/env bash

echo -n "Give first number: "
read a
echo -n "Give another number: "
read b

echo $(($a+$b));
```

Output –

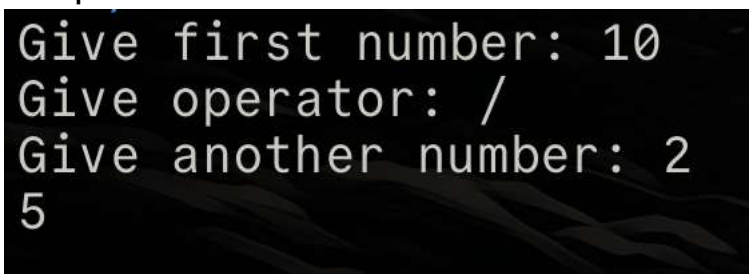
```
Give first number: 5
Give another number: 4
9
```

Q2 – Calculator
Code –

```
#!/usr/bin/env bash

echo -n "Give first number: "
read a

echo -n "Give operator: "
read op

echo -n "Give another number: "
read b

case $op in
 "+")
   echo $(($a+$b));
```

```
  ;;

"-")
  echo $(($a-$b));
  ;;

"*")
  echo $(($a*$b));
  ;;

"/")
  echo $(($a/$b));
  ;;

Esac
```

Output –



Q3 – Swapping

Code –

```
#!/usr/bin/env bash

echo -n "Give first number: "
read a

echo -n "Give another number: "
read b

temp=$a
a=$b;
b=$temp;
```

```
echo "a = $a";
echo "b = $b";
```

Output –

```
Give first number: 10
Give another number: 5
a = 5
b = 10
```

Q4 – Factorial

Code –

```
#!/usr/bin/env bash

echo -n "Enter a number: "
read a

b=1
for i in $(seq 1 $a); do
  b=$(($b*$i))
done

echo $b
```

Output –

```
Enter a number: 5
120
```

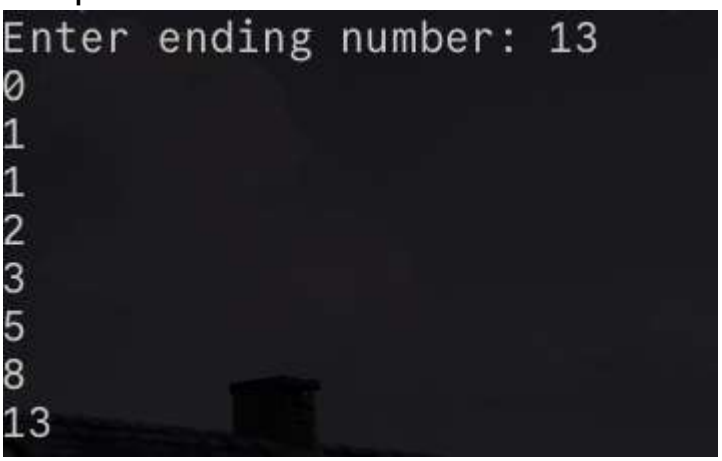
Q5 – Fibonacci series

Code –

```
#!/usr/bin/env bash

echo -n "Enter ending number: "
```

```
read a

b=0
c=1

while [ $b -le $a ]; do
  echo $b
  temp=$b
  b=$c
  c=$(($b+$temp))
done
```

Output –



Grep Command

The **grep** command in Linux is a powerful text-search utility. It scans files or input for lines that match a pattern — typically using regular expressions — and prints those lines.

```
❯ grep read calculator.sh
read a
read op
read b
```

Flag	Description
-i	Case-insensitive search
-v	Invert match — show lines **not** matching the pattern
-r or -R	Recursively search directories
-l	List only filenames with matches
-L	List files **without** matches
-n	Show line numbers of matching lines
-c	Count matching lines (per file)
-o	Show only the matching part of the line
-w	Match **whole words** only (e.g., match "cat" but not "catalog")
-x	Match **whole lines**
-A N	Show N lines **after** each match
-B N	Show N lines **before** each match
-C N	Show N lines **before & after** each match (context)
-e	Use multiple search patterns
-f file	Read patterns from a file

```
❯ grep -A 2 read calculator.sh
read a

echo -n "Give operator: "
read op

echo -n "Give another number: "
read b

case $op in
```

```
❯ grep -l read *
add.sh
calculator.sh
factorial.sh
fib.sh
swapping.sh
```

```
❯ grep -L for *
add.sh
calculator.sh
fib.sh
swapping.sh
```

```
❯ grep -w number: *
add.sh:echo -n "Give first number: "
add.sh:echo -n "Give another number: "
calculator.sh:echo -n "Give first number: "
calculator.sh:echo -n "Give another number: "
factorial.sh:echo -n "Enter a number: "
fib.sh:echo -n "Enter ending number: "
swapping.sh:echo -n "Give first number: "
swapping.sh:echo -n "Give another number: "
```

Sed Command

sed stands for **Stream EDitor** — it's a command-line tool used to **parse and transform text**, especially useful in shell scripting, data cleaning, and batch edits.

It works line-by-line on input (from a file or piped data), applying **editing commands** like substitute, delete, insert, and more.

Flag/Pattern	Description
-n	Suppress automatic printing of pattern space (used with p to print manually)
-e SCRIPT	Add a script to the commands to be executed
-f scriptfile	Read the sed script from a file
-i	Edit files **in-place** (overwrite the file)
-i.bak	Edit in-place and create a backup with .bak extension
s/pattern/replacement/	Substitution command: replaces pattern with replacement
s/pat/repl/g	Replace **all** matches on the line, not just the first
s/pat/repl/i	Case-insensitive replacement
s/pat/repl/2	Replace **second occurrence** only
p	Print the line (often used with -n)
d	Delete the line
q	Quit sed early
a\ text	Append text **after** the current line
i\ text	Insert text **before** the current line
c\ text	Change (replace) the entire line with new text

Flag/Pattern	Description
=	Print the current line number
!	Negate a command (e.g., 2!d keeps only line 2)
,	Used for **range of lines** (e.g., 1,3d deletes lines 1 to 3)