

1.Caesar Cipher

```
#include <stdio.h>
```

```
#include <string.h>
```

```
void encrypt(char message[], int key) {
```

```
    int i;
```

```
    char ch;
```

```
    for(i = 0; message[i] != '\0'; ++i) {
```

```
        ch = message[i];
```

```
        if(ch >= 'a' && ch <= 'z') {
```

```
            ch = ch + key;
```

```
            if(ch > 'z') {
```

```
                ch = ch - 26;
```

```
            }
```

```
            message[i] = ch;
```

```
        } else if(ch >= 'A' && ch <= 'Z') {
```

```
            ch = ch + key;
```

```
            if(ch > 'Z') {
```

```
                ch = ch - 26;
```

```
            }
```

```
            message[i] = ch;
```

```
        }
```

```
}
```

```
}
```

```
void decrypt(char message[], int key) {
```

```
    int i;
```

```
    char ch;
```

```
    for(i = 0; message[i] != '\0'; ++i) {
```

```
        ch = message[i];
```

```
if(ch >= 'a' && ch <= 'z') {
    ch = ch - key;
    if(ch < 'a') {
        ch = ch + 26;
    }
    message[i] = ch;
} else if(ch >= 'A' && ch <= 'Z') {
    ch = ch - key;
    if(ch < 'A') {
        ch = ch + 26;
    }
    message[i] = ch;
}
}

int main() {
    char message[100];
    int key, choice;

    printf("Enter a message: ");
    fgets(message, sizeof(message), stdin);
    message[strcspn(message, "\n")] = 0;

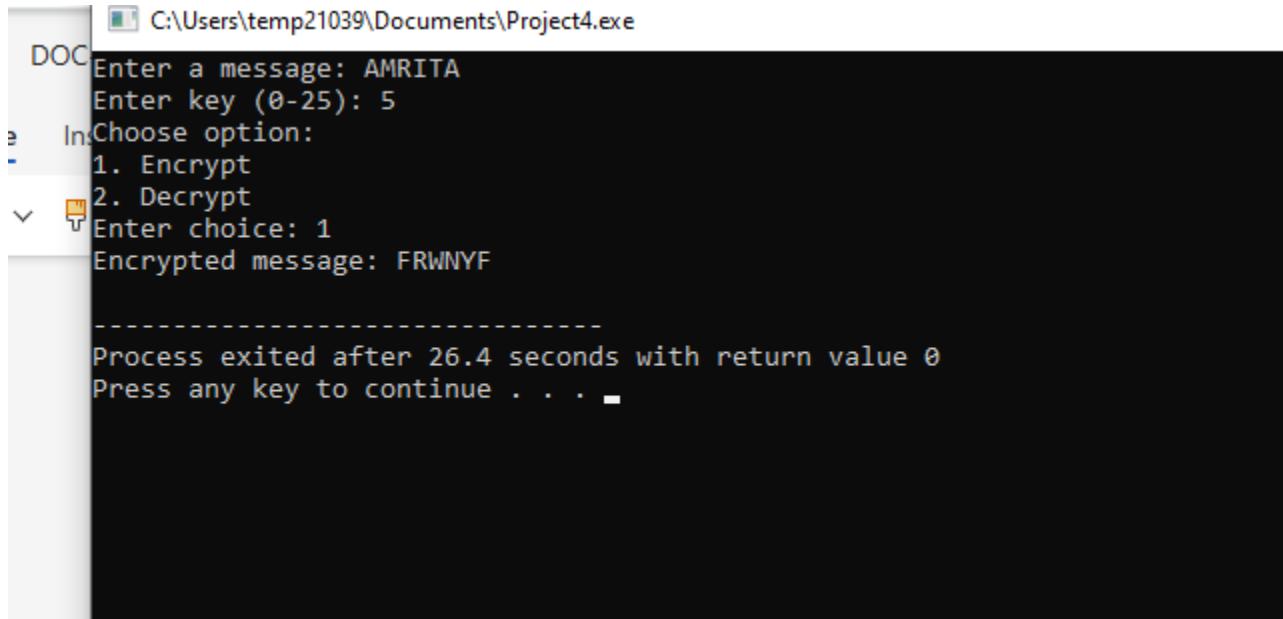
    printf("Enter key (0-25): ");
    scanf("%d", &key);

    key = key % 26;

    printf("Choose option:\n1. Encrypt\n2. Decrypt\nEnter choice: ");
    scanf("%d", &choice);
```

```
if(choice == 1) {  
    encrypt(message, key);  
    printf("Encrypted message: %s\n", message);  
} else if(choice == 2) {  
    decrypt(message, key);  
    printf("Decrypted message: %s\n", message);  
} else {  
    printf("Invalid choice.\n");  
}  
  
return 0;  
}
```

Output:



The screenshot shows a terminal window titled 'C:\Users\temp21039\Documents\Project4.exe'. The window displays the following interaction:

```
DOC Enter a message: AMRITA  
DOC Enter key (0-25): 5  
DOC In: Choose option:  
DOC 1. Encrypt  
DOC 2. Decrypt  
DOC Enter choice: 1  
DOC Encrypted message: FRWNYF  
  
-----  
DOC Process exited after 26.4 seconds with return value 0  
DOC Press any key to continue . . .
```

Hill cipher

```
#include <stdio.h>
#include <stdlib.h>

int main() {
    int a[10][10], b[10][10], mul[10][10];
    int r, i, j, k;
    int enc[10]; // This will hold the encrypted vector (e.g. one dimension)

    printf("Enter the size: ");
    scanf("%d", &r);

    printf("Enter the first matrix elements:\n");
    for (i = 0; i < r; i++) {
        for (j = 0; j < r; j++) {
            scanf("%d", &a[i][j]); // Fix: pass address
        }
    }

    printf("Enter the second matrix elements:\n");
    for (i = 0; i < r; i++) {
        for (j = 0; j < r; j++) {
            scanf("%d", &b[i][j]); // Fix: pass address
        }
    }

    // Initialize mul matrix to zero
    for (i = 0; i < r; i++) {
        for (j = 0; j < r; j++) {
            mul[i][j] = 0;
        }
    }
```

```
}
```

```
// Matrix multiplication: mul = a * b
```

```
for (i = 0; i < r; i++) {
```

```
    for (j = 0; j < 1; j++) {
```

```
        for (k = 0; k < r; k++) {
```

```
            mul[i][j] += a[i][k] * b[k][j];
```

```
        }
```

```
    }
```

```
}
```

```
// For encryption, assuming you want to mod each element of the product matrix by  
26
```

```
printf("Encrypted matrix (each element mod 26):\n");
```

```
for (i = 0; i < r; i++) {
```

```
    for (j = 0; j < 1; j++) {
```

```
        enc[j] = mul[i][j] % 26; // Modulo 26 encryption on row i
```

```
        printf("%d\t", enc[j]);
```

```
    }
```

```
    printf("\n");
```

```
}
```

```
// Print original multiplication matrix without mod
```

```
printf("\nMultiplied matrix:\n");
```

```
for (i = 0; i < r; i++) {
```

```
    for (j = 0; j < 1; j++) {
```

```
        printf("%d\t", mul[i][j]);
```

```
    }
```

```
printf("\n");
```

```
printf("encrypted text");
for (i = 0; i < r; i++) {
    printf("%d\t",enc[i]);
    printf("\n");
}
}

return 0;
}
```

Output

Enter the size: 3

Enter the first matrix elements:

6 24 1

13 16 10

20 17 15

Enter the second matrix elements:

0 2 19

Encrypted matrix (each element mod 26):

15

14

7

Multiplied matrix:

67

encrypted text7

0

Code

```
asas@ICTS-MYS-21038:~$ pwd
```

```
/home/asas
```

```
asas@ICTS-MYS-21038:~$ ls
```

abcd.c	Documents	ipclsc	p4.txt	tcpclientc
abcd.txt	Downloads	Lab3	p6.txt	tcpserverc
amrita	efgh.txt	linuxlabfile.txt	Pictures	Templates
amrita.txt	f1.txt	mca	proc	UDPcleint.C
a.out	file10.txt	mca.c	product.txt	udpclientc
athul	file1.c	mca.txt	Public	udpclient.C
bca.txt	file1.txt	Music	read.sh	udpserverc
cars	file6.c	output.txt	rec	udpserver.C
course	fruits	p11.txt	shellscrip	v.c
courses.txt	gadget.txt	p1.txt	snetc	Videos
cypher.C	gagan	p2.txt	student.txt	
Desktop	'greater than.sh'	p3.txt	sum.sh	

```
asas@ICTS-MYS-21038:~$ ls -l
```

```
total 236
```

-rw-rw-r-- 1 asas asas 608 Nov 14 2024	abcd.c
-rw-rw-r-- 1 asas asas 188 Sep 18 2024	abcd.txt
drwxrwxr-x 2 asas asas 4096 Sep 18 2024	amrita
-rw-rw-r-- 1 asas asas 79 Sep 18 2024	amrita.txt
-rwxrwxr-x 1 asas asas 16936 Aug 23 14:42	a.out
drwxrwxr-x 3 asas asas 4096 Sep 8 19:33	athul
-rw-rw-r-- 1 asas asas 85 Sep 18 2024	bca.txt
drwxrwxr-x 2 asas asas 4096 Sep 18 2024	cars

drwxrwxr-x 4 asas asas 4096 Oct 5 2024 course
-rw-rw-r-- 1 asas asas 83 May 7 16:44 courses.txt
-rw-rw-r-- 1 asas asas 456 Aug 23 15:47 cypher.C
drwxr-xr-x 3 asas asas 4096 May 7 16:42 Desktop
drwxr-xr-x 2 asas asas 4096 Sep 11 2024 Documents
drwxr-xr-x 2 asas asas 4096 Sep 11 2024 Downloads
-rw-rw-r-- 1 asas asas 188 Sep 18 2024 efgh.txt
drwxrwxr-x 2 asas asas 4096 Sep 18 2024 f1.txt
-rw-rw-r-- 1 asas asas 0 Oct 20 2024 file10.txt
-rw-rw-r-- 1 asas asas 0 Nov 9 2024 file1.c
-rw-rw-r-- 1 asas asas 24 Oct 20 2024 file1.txt
drwxrwxr-x 2 asas asas 4096 Nov 9 2024 file6.c
drwxrwxr-x 2 asas asas 4096 Sep 18 2024 fruits
-rw-rw-r-- 1 asas asas 324 Oct 19 2024 gadget.txt
drwxrwxr-x 2 asas asas 4096 Nov 9 2024 gagan
-rw-rw-r-- 1 asas asas 133 Nov 13 2024 'greater than.sh'
-rw-rw-r-- 1 asas asas 3660 Aug 23 14:14 ipclsc
-rw-rw-r-- 1 asas asas 898 Aug 16 14:24 Lab3
-rw-rw-r-- 1 asas asas 151 Oct 16 2024 linuxlabfile.txt
drwxrwxr-x 2 asas asas 4096 Sep 18 2024 mca
-rw-rw-r-- 1 asas asas 177 Nov 14 2024 mca.c
-rw-rw-r-- 1 asas asas 87 Sep 18 2024 mca.txt
drwxr-xr-x 2 asas asas 4096 Sep 11 2024 Music
-rw-rw-r-- 1 asas asas 83 May 7 16:49 output.txt
-rw-rw-r-- 1 asas asas 85 Sep 18 2024 p11.txt
drwxrwxr-x 2 asas asas 4096 Sep 18 2024 p1.txt
-rw-rw-r-- 1 asas asas 75 Sep 18 2024 p2.txt
drwxrwxr-x 2 asas asas 4096 Sep 18 2024 p3.txt
drwxrwxr-x 2 asas asas 4096 Sep 18 2024 p4.txt
-rw-rw-r-- 1 asas asas 0 Sep 18 2024 p6.txt
drwxr-xr-x 2 asas asas 4096 Sep 11 2024 Pictures

```
-rw-rw-r-- 1 asas asas 1231 Aug 23 14:07 proc
-rw-rw-r-- 1 asas asas 471 Oct 19 2024 product.txt
drwxr-xr-x 2 asas asas 4096 Sep 11 2024 Public
-rw-rw-r-- 1 asas asas 53 Oct 23 2024 read.sh
-rw-rw-r-- 1 asas asas 1140 Aug 23 14:07 rec
drwxrwxr-x 2 asas asas 4096 Oct 26 2024 shellscript
-rw-rw-r-- 1 asas asas 2988 Aug 23 14:19 snetc
-rw-rw-r-- 1 asas asas 264 Oct 16 2024 student.txt
-rwxrwxr-x 1 asas asas 47 Oct 30 2024 sum.sh
-rw-rw-r-- 1 asas asas 1285 Aug 23 14:05 tcpclientc
-rw-rw-r-- 1 asas asas 1627 Aug 23 14:05 tcpserverc
drwxr-xr-x 2 asas asas 4096 Sep 11 2024 Templates
-rw-rw-r-- 1 asas asas 899 Aug 16 14:42 UDPcleint.C
-rw-rw-r-- 1 asas asas 1178 Aug 23 14:03 udpclientc
-rw-rw-r-- 1 asas asas 901 Aug 16 14:46 udpclient.C
-rw-rw-r-- 1 asas asas 1523 Aug 23 14:04 udpserverc
-rw-rw-r-- 1 asas asas 1164 Aug 16 14:46 udpserver.C
-rw-rw-r-- 1 asas asas 608 Nov 14 2024 v.c
drwxr-xr-x 2 asas asas 4096 Sep 11 2024 Videos
asas@ICTS-MYS-21038:~$ mkdir ss
asas@ICTS-MYS-21038:~$ ls ss
asas@ICTS-MYS-21038:~$ touch new.txt
asas@ICTS-MYS-21038:~$ pwd
/home/asas
asas@ICTS-MYS-21038:~$ cd/home/asas/ss
bash: cd/home/asas/ss: No such file or directory
asas@ICTS-MYS-21038:~$ cd /home/asas/ss
asas@ICTS-MYS-21038:~/ss$ touch word.txt
asas@ICTS-MYS-21038:~/ss$ gedit word.txt
asas@ICTS-MYS-21038:~/ss$ ls word.txt
word.txt
```

```
asas@ICTS-MYS-21038:~/ss$ ls -l word.txt
-rw-rw-r-- 1 asas asas 9 Sep 12 17:16 word.txt
asas@ICTS-MYS-21038:~/ss$ cat word.txt
hello hi
asas@ICTS-MYS-21038:~/ss$ sudo chmod 700 word.txt
[sudo] password for asas:
asas is not in the sudoers file. This incident will be reported.
asas@ICTS-MYS-21038:~/ss$ sudo chmod 700 word.txt
[sudo] password for asas:
asas is not in the sudoers file. This incident will be reported.
asas@ICTS-MYS-21038:~/ss$ sudo chmod 700 word.txt
[sudo] password for asas:
asas is not in the sudoers file. This incident will be reported.
asas@ICTS-MYS-21038:~/ss$ sudo chmod 700 word.txt
[sudo] password for asas:
Sorry, try again.
[sudo] password for asas:
asas is not in the sudoers file. This incident will be reported.
asas@ICTS-MYS-21038:~/ss$ chmod 140 word.txt
asas@ICTS-MYS-21038:~/ss$ ls -l
total 4
---xr---- 1 asas asas 9 Sep 12 17:16 word.txt
asas@ICTS-MYS-21038:~/ss$ mkdir subdir
asas@ICTS-MYS-21038:~/ss$ ls -ld subdir
drwxrwxr-x 2 asas asas 4096 Sep 12 17:27 subdir
asas@ICTS-MYS-21038:~/ss$ chmod 777 subdir
asas@ICTS-MYS-21038:~/ss$ ls -ld
drwxrwxr-x 3 asas asas 4096 Sep 12 17:27 .
asas@ICTS-MYS-21038:~/ss$ sudo chmod 700 word.txt
asas@ICTS-MYS-21038:~/ss$ chmod 700 word.txt
sas@ICTS-MYS-21038:~/ss$ chmod o+r word.txt
```

```
asas@ICTS-MYS-21038:~/ss$ ls -l word.txt
-rwx---r-- 1 asas asas 9 Sep 12 17:16 word.txt
asas@ICTS-MYS-21038:~/ss$ chmod u+w word.txt
asas@ICTS-MYS-21038:~/ss$ ls -l word.txt
-rwx---r-- 1 asas asas 9 Sep 12 17:16 word.txt
asas@ICTS-MYS-21038:~/ss$ cd ...
bash: cd: ...: No such file or directory
asas@ICTS-MYS-21038:~/ss$ cd ..
asas@ICTS-MYS-21038:~$ cd ...
bash: cd: ...: No such file or directory
asas@ICTS-MYS-21038:~$ cd ..
asas@ICTS-MYS-21038:/home$ pwd
/home
asas@ICTS-MYS-21038:/home$ cd ..
asas@ICTS-MYS-21038:$ ls
bin boot cdrom dev etc home lib lib32 lib64 libx32 lost+found media mnt opt
proc root run sbin snap srv sys tmp usr var
```

19-09-25

Railfence

```
#include<stdio.h>
#include<string.h>
#include<stdlib.h>
main()
{
int i,j,len,rails,count,code[100][1000];
char str[1000];
```

```
printf("Enter the secret message:");
gets(str);
len=strlen(str);
printf("enter the no of rails:");
scanf("%d",&rails);
for(i=0;i<rails;i++){
for(j=0;j<len;j++){
code[i][j]=0;
}
}
count==0;
j=0;
while(j<len){
if (count%2==0){
for(i=0;i<rails;i++){
code[i][j]=(int)str[j];
j++;
}
}
else{
for(i=rails-2;i>0;i--){
code[i][j]=(int)str[j];
j++;
}
}
for(i=0;i<rails;i++){
for(j=0;j<len;j++){
if (code[i][j]!=0)
printf("%c",code[i][j]);
}
```

```
}

}

printf("\n");

}}
```

Linux code [ownership file change]

```
asas@ICTS-MYS-021039:~$ mkdir -p lab/file
```

```
asas@ICTS-MYS-021039:~$ sudo chown -R root:root lab
```

[sudo] password for asas:

```
asas@ICTS-MYS-021039:~$ ls -ld lab
```

```
drwxrwxr-x 3 root root 4096 Sep 19 17:13 lab
```

```
asas@ICTS-MYS-021039:~$ cd lab
```

```
asas@ICTS-MYS-021039:~/lab$ ls -ld file
```

```
drwxrwxr-x 2 root root 4096 Sep 19 17:13 file
```

```
asas@ICTS-MYS-021039:~/lab$ cd ..
```

```
asas@ICTS-MYS-021039:~$ mkdir -p security/cyber
```

```
asas@ICTS-MYS-021039:~$ ls -ld
```

```
drwxr-xr-x 72 asas asas 4096 Sep 19 17:16 .
```

```
asas@ICTS-MYS-021039:~$ ls -ld security
```

```
drwxrwxr-x 3 asas asas 4096 Sep 19 17:16 security
```

```
asas@ICTS-MYS-021039:~$ sudo chown -R root:root security
```

```
asas@ICTS-MYS-021039:~$ ls -ld security
```

```
drwxrwxr-x 3 root root 4096 Sep 19 17:16 security
```

```
asas@ICTS-MYS-021039:~$ cd security
```

```
asas@ICTS-MYS-021039:~/security$ ls -ld cyber
```

```
drwxrwxr-x 2 root root 4096 Sep 19 17:16 cyber
```

```
asas@ICTS-MYS-021039:~/security$ sudo chown -R asas:asas cyber
```

```
asas@ICTS-MYS-021039:~/security$ ls -ld cyber
```

```
drwxrwxr-x 2 asas asas 4096 Sep 19 17:16 cyber
```

```
asas@ICTS-MYS-021039:~/security$ sudo touch file2.txt
asas@ICTS-MYS-021039:~/security$ ls -l
total 4
drwxrwxr-x 2 asas asas 4096 Sep 19 17:16 cyber
-rw-r--r-- 1 root root 0 Sep 19 17:25 file1.txt
-rw-r--r-- 1 root root 0 Sep 19 17:26 file2.txt
```

Username and password create

```
asas@ICTS-MYS-021039:~/security$ sudo useradd -m -s/bin/bash security
asas@ICTS-MYS-021039:~/security$ sudo passwd security
```

New password:

Retype new password:

```
passwd: password updated successfully
```

Giving time limit for password

```
asas@ICTS-MYS-021039:~/security$ sudo chage -M 90 -m 10 security
```

history

```
asas@ICTS-MYS-021039:~/security$ history
```

Hash

```
asas@ICTS-MYS-021039:~/security$ hash
```

hits command

```
2 /usr/bin/mkdir
9 /usr/bin/sudo
3 /usr/bin/touch
9 /usr/bin/ls
```

Update

```
asas@ICTS-MYS-021039:~/security$ sudo apt-get update
```

Gcc install

```
asas@ICTS-MYS-021039:~/security$ sudo apt-get install gcc
```

Reading package lists... Done

Building dependency tree

Reading state information... Done

gcc is already the newest version (4:9.3.0-1ubuntu2).

gcc set to manually installed.

The following packages were automatically installed and are no longer required:

```
gir1.2-goa-1.0 libfwupdplugin1 libxmlb1
```

Use 'sudo apt autoremove' to remove them.

0 upgraded, 0 newly installed, 0 to remove and 211 not upgraded.

G++

```
asas@ICTS-MYS-021039:~/security$ sudo apt-get install g++
```

Reading package lists... Done

Building dependency tree

Reading state information... Done

g++ is already the newest version (4:9.3.0-1ubuntu2).

The following packages were automatically installed and are no longer required:

```
gir1.2-goa-1.0 libfwupdplugin1 libxmlb1
```

Use 'sudo apt autoremove' to remove them.

0 upgraded, 0 newly installed, 0 to remove and 211 not upgraded.

In depth explanation of the owning or file change code done before

1. `mkdir -p lab/file`

- **Purpose:** Creates a directory named lab and inside it, a directory named file.
- -p flag makes sure the parent directory (lab) is created if it doesn't exist.

2. `sudo chown -R root:root lab`

- **Purpose:** Changes the ownership of the lab directory and everything inside it (-R means recursive) to the user root and group root.
- sudo is needed because you are changing ownership to root.

3. `ls -ld lab`

- **Purpose:** Lists detailed information about the lab directory (not contents, just the directory itself).

- Output: drwxrwxr-x 3 root root 4096 Sep 19 17:13 lab
 - d means directory.
 - rwxrwxr-x are permissions (owner, group, others).
 - 3 is the number of links.
 - root root means user and group owner.
 - 4096 size in bytes.
 - Date and time.
 - lab is the directory name.

4. cd lab

- **Purpose:** Changes your current directory to lab.

5. ls -ld file

- **Purpose:** Lists details of the file directory inside lab.
- Shows similar info as above but for the file directory.

6. cd ..

- **Purpose:** Goes back to the parent directory (one level up).

7. mkdir -p security/cyber

- **Purpose:** Creates security directory and inside it cyber.
- If security doesn't exist, it is created due to -p.

8. ls -ld

- **Purpose:** Lists the current directory's details (denoted by .).
- Shows your current directory permissions, owner, etc.

9. ls -ld security

- **Purpose:** Shows detailed info of security directory.

10. sudo chown -R root:root security

- **Purpose:** Changes ownership of security directory and all inside it to user root and group root.

11. ls -ld security

- **Purpose:** Confirms ownership change for security.

12. cd security

- **Purpose:** Move inside the security directory.

13. ls -ld cyber

- **Purpose:** Lists details about the cyber directory.

14. sudo chown -R asas:asas cyber

- **Purpose:** Changes ownership of cyber directory and contents back to user asas and group asas.

15. ls -ld cyber

- **Purpose:** Confirm ownership change of cyber.

16. sudo touch file2.txt

- **Purpose:** Creates an empty file named file2.txt with root ownership (because of sudo).
- If the file exists, it updates the timestamp.

17. ls -l

- **Purpose:** Lists all files and directories with detailed info in current directory (security).
- Output shows:
 - cyber directory owned by asas.
 - file1.txt and file2.txt are root-owned files.

26-9-25

Networking linux codes

asas@ICTS-MYS-21040:~\$ sudo apt update

\$ sudo ufw enable

Firewall is active and enabled on system startup

\$ sudo ufw allow 22/tcp

Rule added

Rule added (v6)

sudo ufw allow http

Rule added

Rule added (v6)

```
asas@ICTS-MYS-21040:~$ sudo ufw default deny incoming  
Default incoming policy changed to 'deny'  
(be sure to update your rules accordingly)
```

```
asas@ICTS-MYS-21040:~$ sudo ufw status verbose  
Status: active  
Logging: on (low)  
Default: deny (incoming), allow (outgoing), disabled (routed)  
New profiles: skip
```

To	Action	From
--	-----	----
22/tcp	ALLOW IN	Anywhere
80/tcp	ALLOW IN	Anywhere
22/tcp (v6)	ALLOW IN	Anywhere (v6)
80/tcp (v6)	ALLOW IN	Anywhere (v6)

```
$ sudo nmap -sn 192.168.1.0/24  
Starting Nmap 7.80 ( https://nmap.org ) at 2025-09-26 09:28 IST  
Stats: 0:03:24 elapsed; 0 hosts completed (0 up), 256 undergoing Ping Scan  
Ping Scan Timing: About 99.95% done; ETC: 09:31 (0:00:00 remaining)  
Nmap done: 256 IP addresses (0 hosts up) scanned in 206.39 seconds
```

```
$ sudo nmap -p 80 192.168.1.1  
Starting Nmap 7.80 ( https://nmap.org ) at 2025-09-26 09:33 IST  
Note: Host seems down. If it is really up, but blocking our ping probes, try -Pn  
Nmap done: 1 IP address (0 hosts up) scanned in 3.20 seconds
```

```
sudo nmap -pn -p 80 192.168.1.1
```

```
$ sudo nmap -Pn -p 80,443 192.168.1.1
Starting Nmap 7.80 ( https://nmap.org ) at 2025-09-26 09:37 IST
Nmap scan report for 192.168.1.1
Host is up.

PORT      STATE    SERVICE
80/tcp    filtered http
443/tcp   filtered https

Nmap done: 1 IP address (1 host up) scanned in 3.15 seconds
```

```
$ nmap -Pn -sV -p 80,443 192.168.1.1
Starting Nmap 7.80 ( https://nmap.org ) at 2025-09-26 09:40 IST
Nmap scan report for 192.168.1.1
Host is up.
```

```
PORT      STATE    SERVICE VERSION
80/tcp    filtered http
443/tcp   filtered https
```

Service detection performed. Please report any incorrect results at
<https://nmap.org/submit/>.

Nmap done: 1 IP address (1 host up) scanned in 4.44 seconds

```
asas@ICTS-MYS-21040:~$ sudo tcpdump
```

It captures and displays network packets being transmitted or received on a network interface.

326 packets captured

326 packets received by filter

0 packets dropped by kernel

You're performing basic **Linux networking and firewall configuration** tasks, and then using **Nmap** to scan the network and specific hosts. Here's a breakdown of each step and what it means:

🔧 1. System Update

```
sudo apt update
```

- Updates the list of available packages and versions on the system.
- Does **not** install or upgrade any software; just checks for updates.

⌚ 2. UFW Firewall Configuration

UFW (Uncomplicated Firewall) is a simple interface to manage iptables (Linux's built-in firewall).

a. Enable Firewall

```
sudo ufw enable
```

- Activates the UFW firewall.
- Applies rules at every system startup.

b. Allow SSH (port 22)

```
sudo ufw allow 22/tcp
```

- Allows incoming **SSH** connections.
- **tcp** is the protocol used by SSH.

c. Allow HTTP (port 80)

```
sudo ufw allow http
```

- Allows incoming web traffic.
- **http** is equivalent to port 80.

d. Set Default Policy to Deny Incoming

```
sudo ufw default deny incoming
```

- Denies all incoming traffic **by default**.
- Only connections explicitly allowed (like ports 22 and 80) will be accepted.

e. Check Firewall Status

```
sudo ufw status verbose
```

Output:

Status: active

Logging: on (low)

Default: deny (incoming), allow (outgoing), disabled (routed)

This means:

- Incoming traffic: **denied unless allowed**
- Outgoing traffic: **allowed**
- Routed: disabled (used for forwarding traffic between interfaces)

Allowed rules:

22/tcp	ALLOW IN	Anywhere
80/tcp	ALLOW IN	Anywhere

⌚ 3. Network Scanning with Nmap

a. Ping Scan Entire Subnet

```
sudo nmap -sn 192.168.1.0/24
```

- `-sn` (ping scan): Finds which hosts are **up**, doesn't scan ports.
- `192.168.1.0/24`: Scans all 256 IPs in the range 192.168.1.0 to 192.168.1.255.

Result:

0 hosts up

- This means **no devices responded to ping**, possibly because:
 - Devices have firewalls blocking pings.
 - Network devices (like routers) ignore ICMP requests.

b. Port Scan Host (Port 80)

```
sudo nmap -p 80 192.168.1.1
```

- Tries to scan port 80 (HTTP) on 192.168.1.1.
- Failed: “Host seems down.” Probably because ICMP ping failed.

c. Disable Ping Detection (-Pn)

```
sudo nmap -Pn -p 80,443 192.168.1.1
```

- `-Pn`: Skip host discovery (assumes host is **up**, even if it doesn't respond to ping).
- Scans ports 80 and 443 (HTTP and HTTPS).

Result:

```
Host is up.  
80/tcp filtered  
443/tcp filtered
```

- **Filtered**: Host is **up**, but firewall is blocking or dropping the port.
- So Nmap can't confirm if port is open or closed.

d. Service Version Detection

```
nmap -Pn -sV -p 80,443 192.168.1.1
```

- -sV: Tries to detect service versions on the ports.
- Still shows filtered, so Nmap can't detect versions—again due to firewall filtering.

❖ Summary

Command	Purpose	Outcome
sudo apt update	Check for package updates	Successful
sudo ufw enable	Activate firewall	Enabled
sudo ufw allow 22/tcp	Allow SSH	Rule added
sudo ufw allow http	Allow HTTP	Rule added
sudo ufw default deny incoming	Deny all incoming by default	Set
sudo ufw status verbose	View rules	Firewall is active with port 22 and 80 open
nmap -sn 192.168.1.0/24	Ping all hosts	No response (0 hosts up)
nmap -p 80 192.168.1.1	Scan port 80	Host seems down
nmap -Pn -p 80,443 192.168.1.1	Skip ping, scan ports	Host up, ports filtered
nmap -Pn -sV -p 80,443 192.168.1.1	Detect services	Still filtered

► Final Notes:

- Your firewall setup is working correctly on **your own machine**.
- The router or remote device at 192.168.1.1 is **blocking pings and port scans**.
- This is common in routers and firewalls to avoid reconnaissance attacks.

3-10-25

Shell scripting

```
asas@ICTS-MYS-21038:~$ gedit fl.sh
```

A text file appear type the following

```
echo "Welcome to shell scripting"  
echo "my current shell is $SHELL"  
echo "System Security lab"  
echo "Display today date"  
date  
echo "My MAC Addr"  
getmac  
echo "Host name is"  
hostname  
echo "mapping physical address"  
arp -a  
echo "display nams of all user"  
uname  
echo "current path is "  
pwd  
echo "interface config"  
ifconfig  
echo "ping a website"  
ping www.gmail.com
```

```
asas@ICTS-MYS-21038:~$ bash fl.sh
```

```
bash fl.sh
```

Welcome to shell scripting

my current shell is /bin/bash

System Security lab

Display today date

Friday 03 October 2025 04:32:12 PM IST

My MAC Addr

fl.sh: line 7: getmac: command not found

Host name is

ICTS-MYS-21038

mapping physical address

_gateway (192.168.104.1) at c8:29:c8:d5:1f:14 [ether] on eno1

display nams of all user

Linux

current path is

/home/asas

interface config

GIVES OUPTUT

For giving input

```
asas@ICTS-MYS-21038:~$ gedit fl.sh
```

Type

```
echo "Welcome"
```

```
echo "Enter a, b, and c:"
```

```
read a b c
```

```
echo "$a $b $c"
```

```
echo "a=$a"
```

```
echo "b=$b"
```

```
echo "c=$c"
```

```
sum=`expr $a + $b + $c`
```

```
echo "Sum is $sum"
```

```
if [ $a -gt $b ]; then
```

```
    echo "$a is big"
```

```
else
```

```
echo "$b is big"
fi

echo "Display 1 to 5 using while loop:"
i=1
while [ $i -le 5 ]; do
    echo $i
    i=`expr $i + 1`
done
```

```
echo "Display 1 to 5 using until loop:"
j=1
until [ $j -gt 5 ]; do
    echo $j
    j=`expr $j + 1`
done

echo "using for loop"
for((k=5;k<10;k++))
do
echo $k
Done
```

Output

```
Enter a, b, and c:
10 40 30
10 40 30
a=10
b=40
c=30
Sum is 80
```

40 is big

Display 1 to 5 using while loop:

```
1  
2  
3  
4  
5
```

Display 1 to 5 using until loop:

```
1  
2  
3  
4  
5
```

using for loop

```
5  
6  
7  
8  
9
```

Relation operator

-eq	Equal to
-ne	Not equal to
-gt	Greater than
-lt	Less than
-ge	Greater than or equal to
-le	Less than or equal to

Odd and even number and positive and negative number

asas@ICTS-MYS-21038:~\$ gedit fl.sh

```
asas@ICTS-MYS-21038:~$ bash fl.sh
```

```
Enter a number:
```

```
10
```

```
10 is Even
```

```
10 is Positive
```

```
asas@ICTS-MYS-21038:~$ bash fl.sh
```

```
Enter a number:
```

```
-7
```

```
-7 is Odd
```

```
-7 is Negative
```

Fibonacci series

```
asas@ICTS-MYS-21038:~$ gedit fl.sh
```

```
asas@ICTS-MYS-21038:~$ bash fl.sh
```

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

```
echo "Enter the number of terms:"
```

```
read n
```

```
a=0
```

```
b=1
```

```
echo "Fibonacci series up to $n terms:"
```

```
i=0
```

```
while [ $i -lt $n ]
```

```
do
```

```
echo -n "$a "
```

```
fn=$((a + b))
```

```
a=$b  
b=$fn  
i=$((i + 1))  
done  
echo  
asas@ICTS-MYS-21038:~$ bash fl.sh
```

Enter the number of terms:

10

Fibonacci series up to 10 terms:

0 1 1 2 3 5 8 13 21 34

Environment variable

```
asas@ICTS-MYS-21038:~$ env run a prg in modified environment
```

Add , div, mul,sub

```
#!/bin/bash  
  
echo "Enter the option"  
read option  
  
echo "option=$option"  
case $option in  
1) echo "case 1"  
;;
```

```
2) echo "case 2"
;;
3) echo "case 3"
;;
4) echo "case 3"
;;
*)echo "Invalid case"
essac
```