

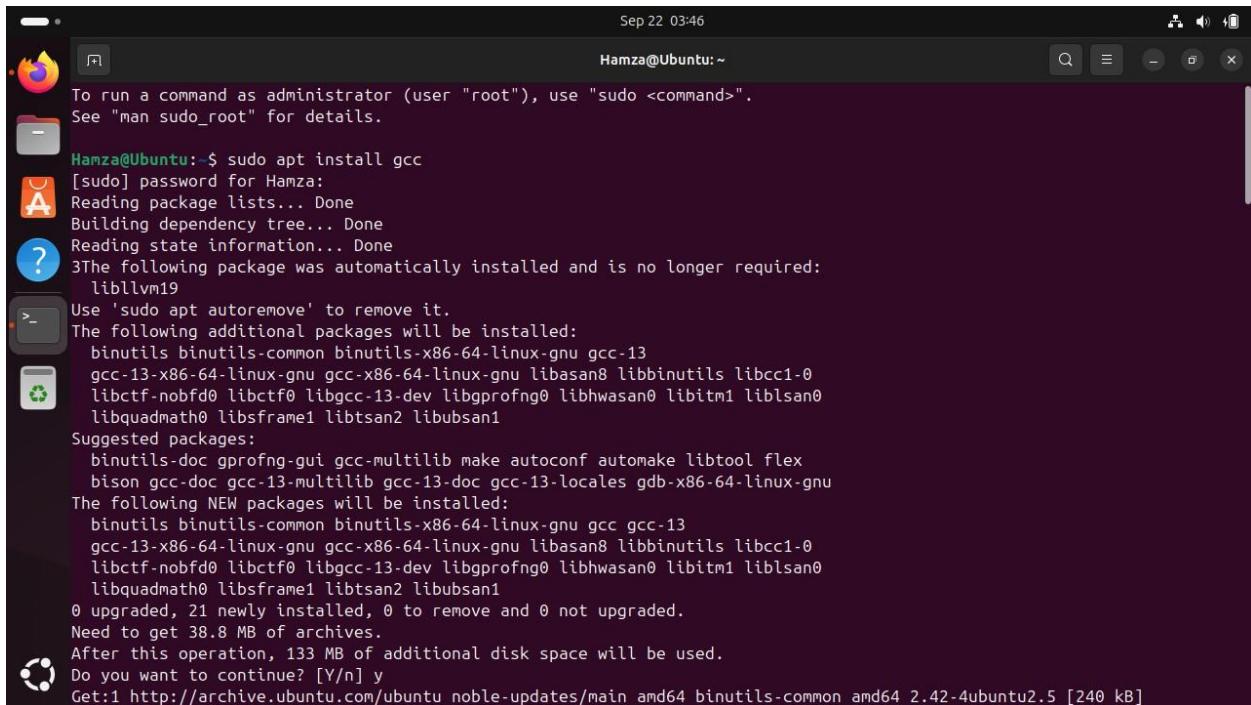
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COURSE: OPERATING SYSTEM

Installing GCC:

Sudo apt install gcc



```
Sep 22 03:46
Hamza@Ubuntu:~ To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

Hamza@Ubuntu:~$ sudo apt install gcc
[sudo] password for Hamza:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
3The following package was automatically installed and is no longer required:
 libllvm19
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
 binutils binutils-common binutils-x86-64-linux-gnu gcc-13
 gcc-13-x86-64-linux-gnu gcc-x86-64-linux-gnu libasan8 libbinutils libcc1-0
 libctf-nobfd0 libctf0 libgcc-13-dev libgprofng0 libhwasan0 libitm1 liblsan0
 libquadmath0 libsframe1 libtsan2 libubsan1
Suggested packages:
 binutils-doc gprofng-gui gcc-multilib make autoconf automake libtool flex
 bison gcc-doc gcc-13-multilib gcc-13-doc gcc-13-locales gdb-x86-64-linux-gnu
The following NEW packages will be installed:
 binutils binutils-common binutils-x86-64-linux-gnu gcc gcc-13
 gcc-13-x86-64-linux-gnu gcc-x86-64-linux-gnu libasan8 libbinutils libcc1-0
 libctf-nobfd0 libctf0 libgcc-13-dev libgprofng0 libhwasan0 libitm1 liblsan0
 libquadmath0 libsframe1 libtsan2 libubsan1
0 upgraded, 21 newly installed, 0 to remove and 0 not upgraded.
Need to get 38.8 MB of archives.
After this operation, 133 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 binutils-common amd64 2.42-4ubuntu2.5 [240 kB]
```

Installed Gcc:

gcc -version

Sep 22 03:47
Hamza@Ubuntu:~

```
Setting up libctf-nobfd0:amd64 (2.42-4ubuntu2.5) ...
Setting up libsframe1:amd64 (2.42-4ubuntu2.5) ...
Setting up libquadmath0:amd64 (14.2.0-4ubuntu2~24.04) ...
Setting up libubsan1:amd64 (14.2.0-4ubuntu2~24.04) ...
Setting up libhwasan0:amd64 (14.2.0-4ubuntu2~24.04) ...
Setting up libasan8:amd64 (14.2.0-4ubuntu2~24.04) ...
Setting up libtsan2:amd64 (14.2.0-4ubuntu2~24.04) ...
Setting up libbinutils:amd64 (2.42-4ubuntu2.5) ...
Setting up libcc1-0:amd64 (14.2.0-4ubuntu2~24.04) ...
Setting up liblsan0:amd64 (14.2.0-4ubuntu2~24.04) ...
Setting up libitm1:amd64 (14.2.0-4ubuntu2~24.04) ...
Setting up libctf0:amd64 (2.42-4ubuntu2.5) ...
Setting up libgprofng0:amd64 (2.42-4ubuntu2.5) ...
Setting up libgcc-13-dev:amd64 (13.3.0-6ubuntu2~24.04) ...
Setting up binutils-x86-64-linux-gnu (2.42-4ubuntu2.5) ...
Setting up gcc-13-x86-64-linux-gnu (13.3.0-6ubuntu2~24.04) ...
Setting up binutils (2.42-4ubuntu2.5) ...
Setting up gcc-13 (13.3.0-6ubuntu2~24.04) ...
Setting up gcc-x86-64-linux-gnu (4:13.2.0-7ubuntu1) ...
Setting up gcc (4:13.2.0-7ubuntu1) ...
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for libc-bin (2.39-0ubuntu8.5) ...
Hamza@Ubuntu:~$ gcc --version
gcc (Ubuntu 13.3.0-6ubuntu2~24.04) 13.3.0
Copyright (C) 2023 Free Software Foundation, Inc.
This is free software; see the source for copying conditions. There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
```

C++ PROGRAM:

```
Hamza@Ubuntu:~$ touch firstprogram.c
Hamza@Ubuntu:~$ mkdir lab05
Hamza@Ubuntu:~$ cd lab05
Hamza@Ubuntu:~/lab05$ touch hello.c
Hamza@Ubuntu:~/lab05$ cat>hello.c
#include<stdio.h>
int main(){
printf("Hello world.....\n");
return 0;
}Hamza@Ubuntu:~/lab05$ gcc hello.c -O hello
gcc: error: unrecognized command-line option '-O'
Hamza@Ubuntu:~/lab05$ gcc hello.c -o hello
Hamza@Ubuntu:~/lab05$ gcc hello.c -o hello
Hamza@Ubuntu:~/lab05$ ./hello
Hello world.....
```

Even and odd code:

```
#include<stdio.h>
int main(){
int num;
printf("Enter a NUMBER");
scanf("%d",&num);
if(num% 2==0){
printf("%d is even",num);
}
else{
printf("%d is odd",num);
}return 0;
}
```

```
Hamza@Ubuntu:~$ mkdir lab-5
Hamza@Ubuntu:~$ cd lab-5
Hamza@Ubuntu:~/lab-5$ gcc hello.c -o hello
Hamza@Ubuntu:~/lab-5$ ./hello
Enter a NUMBER0
0 is evenHamza@Ubuntu:~/lab-5$
```

Java code:

```
public class hamza {
    public static void main(String[] args) {
        System.out.println("Hello, World!");
    }
}
```

Java commands:

```
-----  
1 problem (1 error)  
Hamza@Ubuntu:~/lab-5$ javac hamza.java  
Hamza@Ubuntu:~/lab-5$ Java hamza  
Command 'Java' not found, did you mean:  
  command 'java' from deb openjdk-17-jre-headless (17.0.16+8~us1-0ubuntu1~24.04  
1)  
  command 'java' from deb openjdk-21-jre-headless (21.0.8+9~us1-0ubuntu1~24.04.  
)  
  command 'java' from deb default-jre (2:1.17-75)  
  command 'java' from deb openjdk-11-jre-headless (11.0.28+6-1ubuntu1~24.04.1)  
  command 'java' from deb openjdk-8-jre-headless (8u462-ga~us1-0ubuntu2~24.04.2)  
  command 'java' from deb openjdk-19-jre-headless (19.0.2+7-4)  
  command 'java' from deb openjdk-20-jre-headless (20.0.2+9-1)  
  command 'java' from deb openjdk-22-jre-headless (22~22ea-1)  
  command 'fava' from deb python3-fava (1.23.1+dfsg-1)  
  command 'cava' from deb cava (0.7.4-1)  
  command 'ava' from deb ava (5.3.1+dfsg+~cs46.3.10-3)  
Try: sudo apt install <deb name>  
Hamza@Ubuntu:~/lab-5$ java hamza  
Hello, World!  
Hamza@Ubuntu:~/lab-5$
```

DATE COMMAND:

```
0 is evenHamza@Ubuntu:~/lab-5$ date  
Mon Sep 22 04:59:08 AM UTC 2025  
Hamza@Ubuntu:~/lab-5$
```

Remain Parts of Lab 4:

1. Create 3 empty text files

```
Hamza@Ubuntu:~$ touch students.txt  
Hamza@Ubuntu:~$ touch pstudent.txt  
Hamza@Ubuntu:~$ touch fstudent.txt  
Hamza@Ubuntu:~$ ls  
adir          hamza.c    labo5    Pictures      Templates  
Desktop       hamza.txt  laboo5   pstudent.txt  Videos  
Documents     hello.c    labs05   Public  
Downloads     lab_05     labs3    snap  
firstprogram.c lab05     labs4    students  
fstudent.txt   lab-5     Music    students.txt  
Hamza@Ubuntu:~$
```

2. Assign read-only permission to the user

Symbolic method:

```
Hamza@Ubuntu:~$ chmod u=r students.txt
Hamza@Ubuntu:~$ chmod u=r pstudent.txt
Hamza@Ubuntu:~$ chmod u=r fstudent.txt
Hamza@Ubuntu:~$ █
```

- Numeric method:

```
Hamza@Ubuntu:~$ chmod 400 students.txt
Hamza@Ubuntu:~$ chmod 400 pstudent.txt
Hamza@Ubuntu:~$ chmod 400 fstudent.txt
Hamza@Ubuntu:~$ █
```

3. Add 10 student names

```
Hamza@Ubuntu:~$ echo -e "ALi\nAli\nHamza\nNoman\nAHMAD\nCAT\nNOman\nALi\nALi\nAli\n" >pstudent.txt
bash: pstudent.txt: Permission denied
Hamza@Ubuntu:~$ sudo echo -e "ALi\nHamza\nHamza\nHamza\nHamza\nHamza\nHamza\nHamza\nHamza\nHamza\n" >pstudent.txt
bash: pstudent.txt: Permission denied
Hamza@Ubuntu:~$ chmod u+w pstudent.txt fstudent.txt
Hamza@Ubuntu:~$ sudo echo -e "ALI\nHamza\nHamza\nHamza\nHamza\nHamza\nHamza\nHamza\nHamza\nHamza\n" >pstudent.txt
[sudo] password for Hamza:
123
Sorry, try again.
[sudo] password for Hamza:
Hamza@Ubuntu:~$ sudo echo -e "ALi\nHamza\nHamza\nHamza\nHamza\nHamza\nHamza\nHamza\nHamza\nHamza\n" >fstudent.txt
Hamza@Ubuntu:~$ █
```

4. Create directory RIPHAH and set permissions

```
Hamza@Ubuntu:~$ mkdir RIPHAH
Hamza@Ubuntu:~$ chmod u=r,g=r RIPHAH
Hamza@Ubuntu:~$ chmod 400 RIPHAH
Hamza@Ubuntu:~$ █
```

5. Copy all files into RIPHAH

```
Hamza@Ubuntu:~$ sudo cp students.txt pstudent.txt fstudent.txt RIPHAH/
Hamza@Ubuntu:~$ █
```

6. Append sorted names into students.txt

```
Hamza@Ubuntu:~$ chmod u+w pstudent.txt
Hamza@Ubuntu:~$ sudo sort pstudent.txt | head -5 >>pstudent.txt
Hamza@Ubuntu:~$ sudo sort pstudent.txt | tail -5 >>pstudent.txt
Hamza@Ubuntu:~$ █
```

7. Show contents of pstudents.txt (sorted names only)

Hamza@Ubuntu:~\$ cat pstudent.txt

ALI
Hamaz
HAmza
HAMZA
HAMZA
HAMZA
HAMZA
HAMZA
HAMZA
HAZMA

8 Change permissions

```
Hamza@Ubuntu:~$ chmod u=r students.txt  
Hamza@Ubuntu:~$ chmod u=r pstudent.txt fstudent.txt  
Hamza@Ubuntu:~$ chmod 400 students.txt  
Hamza@Ubuntu:~$ chmod 600 pstudent.txt fstudent.txt  
Hamza@Ubuntu:~$ █
```

9. Append another student name in students.txt

```
Hamza@Ubuntu:~$ chmod u+w students.txt
Hamza@Ubuntu:~$ echo "Newstudent">>>students.txt
Hamza@Ubuntu:~$ chmod u=r students.txt
Hamza@Ubuntu:~$
```

10. Display contents of all files

```
Hamza@Ubuntu:~$ cat students.txt
```

```
Newstudent
```

```
Hamza@Ubuntu:~$ cat pstudent.txt
```

```
ALI
```

```
HAmza
```

```
HAzma
```

```
Hamaz
```

```
HAmza
```

```
ALI
```

```
Hamaz
```

```
HAmza
```

```
HAzma
```

```
Hamza@Ubuntu:~$ cat fstudent.txt
```

```
ALi
```

```
Hamza
```

11. Show permissions and contents of RIPHAH

```
Hamza@Ubuntu:~$ ls -l RIPHAH
ls: cannot access 'RIPHAH/fstudent.txt': Permission denied
ls: cannot access 'RIPHAH/students.txt': Permission denied
ls: cannot access 'RIPHAH/pstudent.txt': Permission denied
total 0
-????????? ? ? ? ?          ? fstudent.txt
-????????? ? ? ? ?          ? pstudent.txt
-????????? ? ? ? ?          ? students.txt
Hamza@Ubuntu:~$ sudo ls -l RIPHAH
total 8
-rw----- 1 root root 59 Sep 23 06:42 fstudent.txt
-rw----- 1 root root 59 Sep 23 06:42 pstudent.txt
-r----- 1 root root  0 Sep 23 06:42 students.txt
Hamza@Ubuntu:~$
```

```
Hamza@Ubuntu:~$ cat RIPHAH/students.txt
cat: RIPHAH/students.txt: Permission denied
Hamza@Ubuntu:~$ sudo cat RIPHAH/students.txt
Hamza@Ubuntu:~$ sudo cat RIPHAH/pstudent.txt
ALI
HAMZA
```

```
Hamza@Ubuntu:~$ sudo cat RIPHAH/fstudent.txt
ALi
Hamza
```

```
Hamza@Ubuntu:~$
```