# UNIX LAB TASK

TASK-1:

1. Obtain the following results

(i) To print the name of operating system

(ii) To print the login name

(iii) To print the host name

```
student@ai-HP-ProDesk-600-G4-MT:~$ UNAME
UNAME: command not found
student@ai-HP-ProDesk-600-G4-MT:~$ uname
Linux
student@ai-HP-ProDesk-600-G4-MT:~$ whoami
student
student@ai-HP-ProDesk-600-G4-MT:~$ hostname
ai-HP-ProDesk-600-G4-MT
```

2. Display the calendar for

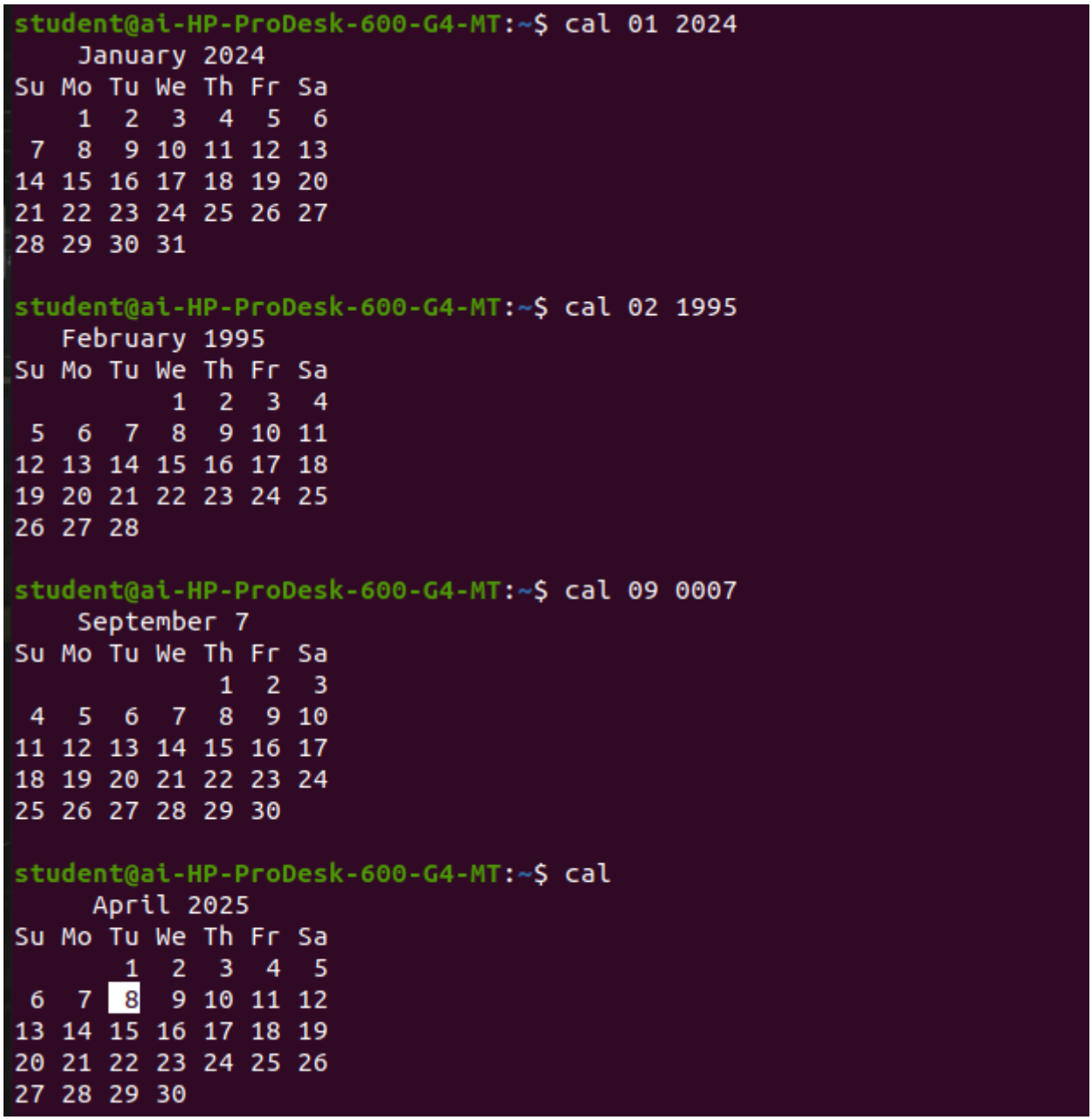
(i) Jan 2024

(ii) Feb 1995

(iii) 9 th month of the year 7 A.D

(iv) For the current month

(v) Current Date Day Abbreviation , Month Abbreviation along with year




3. Display the time in 12-Hour and 24 Hour Notations.

4. Display the Current Date and Current Time.

5. Display the message “GOOD MORNING” in enlarged characters.

```
student@ai-HP-ProDesk-600-G4-MT:~$ date "+%a %b %d, %y"
Tue Apr 08, 25
student@ai-HP-ProDesk-600-G4-MT:~$ date "+%I:%M:%S %p"
12:19:22 PM
student@ai-HP-ProDesk-600-G4-MT:~$ date "+%H:%M:%S"
12:19:48
student@ai-HP-ProDesk-600-G4-MT:~$ date
Tuesday 08 April 2025 12:19:58 PM IST
student@ai-HP-ProDesk-600-G4-MT:~$ figlet GOOD MORNING
```

TASK – 2:

Question 1:

List all files in the current directory that start with the letter a.

```
student@ai-HP-ProDesk-600-G4-MT:~$ ls a*
a.c  a.out

all:
1                 9212433e3.py      lucky.py            rw.c
11.py             9212433.py        manasa.py           sd.py
1a.c              9212447.c         manu.py             signals.c
1ac.c             9212546.c         MIS.py              'star tri.py'
1a.cpp            Adaboost.ipynb    'non prime.ipynb'   st.py
1.c               akhil.c           'non prime.py'      stuff.py
3des.c            a.out             pattern10.py        surya.py
9211433.py        ar.py             pattern16.py        TD-1.C
9211518_2_1.py    bst.c             pattern17.py        test.c
9211518_2_3.py    bst.h             prg1.py             two.l
9211525.c         bstmain.c         pt.py               two.y
9211525.os.c      cs102.py          py.py               Untitled1.ipynb
9212433.2.py      D_H.c             q1.c                Untitled2.ipynb
9212433.3.py      diffi_H.c         q2.c                Untitled3.ipynb
92124333.py       example.c         q8_a.c              Untitled.ipynb
'9212433 3 .py'   fact.c            q8_b                untitled.txt
9212433e12.py     hello.c           q8_b.c
9212433e1.py      jy.py             quicksort.c
9212433e2.py      lex.yy.c          rishy.py
```

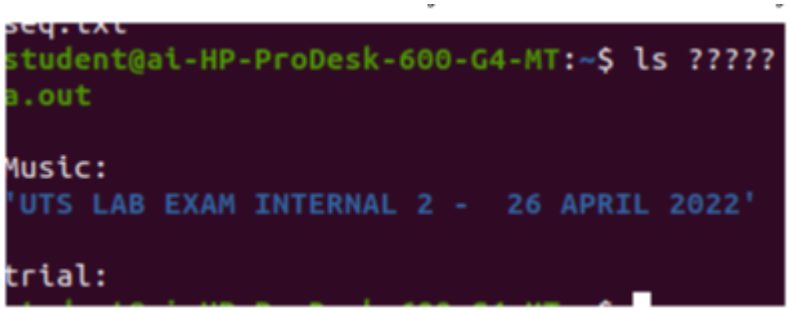
Question 2:

List all files in the current directory with a .txt extension.

```
student@ai-HP-ProDesk-600-G4-MT:~$ ls *.txt
seq.txt
```

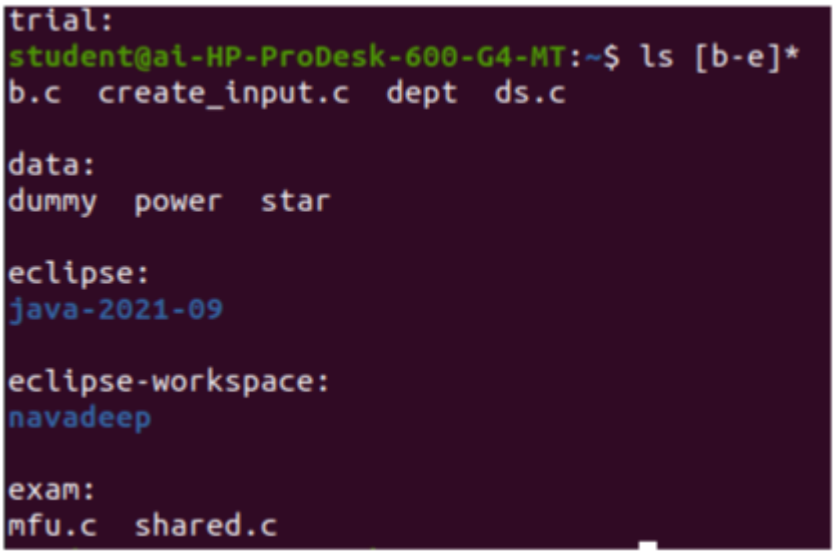
Question 3:

Find all files in the current directory whose names have exactly five characters.



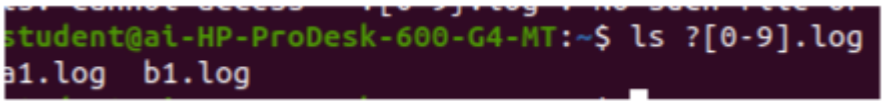

Question 4:

List files in the current directory that start with any letter between b and e.




Question 5:

List files in the current directory ending with .log, where the second character is a number (e.g., a1.log).



TASK – 3:

1. Write a Shell program to check the given number is even or odd

```
echo "Enter a number:"
read num
if [[ $((num % 2)) -eq 0 ]]; then
echo "$num is even"
else
echo "$num is odd"
fi
```

```
./423182.sh: line 4:: syntax error: operand expected
student@ai-HP-ProDesk-600-G4-MT:~$ ./423182.sh
./423182.sh: line 1: --1: command not found
Enter a number:
5
5 is odd
```

2. Write a Shell program to check the given year is leap year or not

```
--2
echo "Enter a year:"
read year
if [ $((year % 4)) -eq 0 ] && [ $((year % 100)) -ne 0 ] || [ $((year % 400)) -eq 0 ];
then
echo "$year is a leap year"
else
echo "$year is not a leap year"
fi
```

```
5 is odd
./423182.sh: line 9: --2: command not found
Enter a year:
2003
2003 is not a leap year
```

3. Write a Shell program to find the factorial of a number

```
echo "Enter a number:"
read num
fact=1
for ((i=1; i<=num; i++)); do
fact=$((fact * i))
done
echo "Factorial of $num is $fact"
```

```
./423182.sh: line 18: --3: command not found
Enter a number:
4
Factorial of 4 is 24
```

4. Write a Shell program to swap the two integers

```
echo "Enter two numbers:"
read a
read b
temp=$a
a=$b
b=$temp
echo "After swapping: a=$a, b=$b"
```

```
bash: ./423182.1.sh: Permission denied
student@ai-HP-ProDesk-600-G4-MT:~$ chmod +x 423182.1.sh
student@ai-HP-ProDesk-600-G4-MT:~$ ./423182.1.sh
Enter two numbers:
1
2
After swapping: a=2, b=1
```

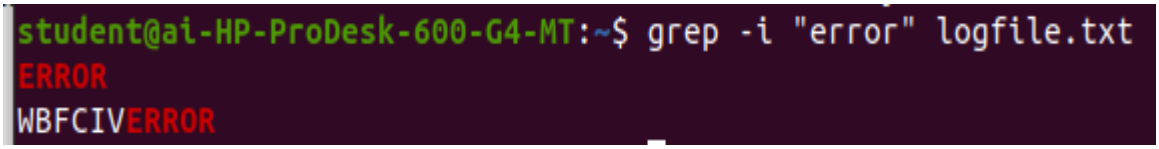
5. Write a shell script to compute GCD & LCM of two numbers.

```
echo "Enter two numbers:"
read a b
y=$b
while [ $b -ne 0 ]; do
temp=$b
b=$((a % b))
a=$temp
done
gcd=$a
lcm=$(( (x * y) / gcd ))
echo "GCD: $gcd, LCM: $lcm"
```

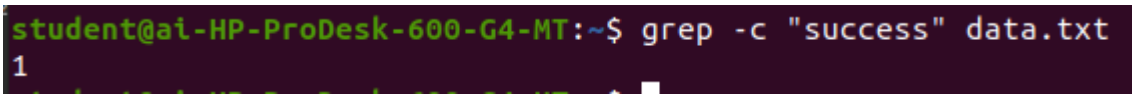
```
GCD: 1, LCM: 0
student@ai-HP-ProDesk-600-G4-MT:~$ ./423182.1.sh
Enter two numbers:
1 2
GCD: 1, LCM: 2
```

TASK – 4:

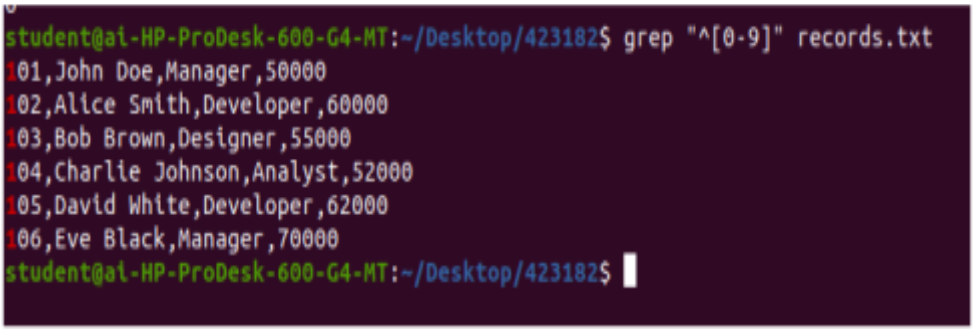
1. Find all lines containing the word "error" in a log file (log.txt).



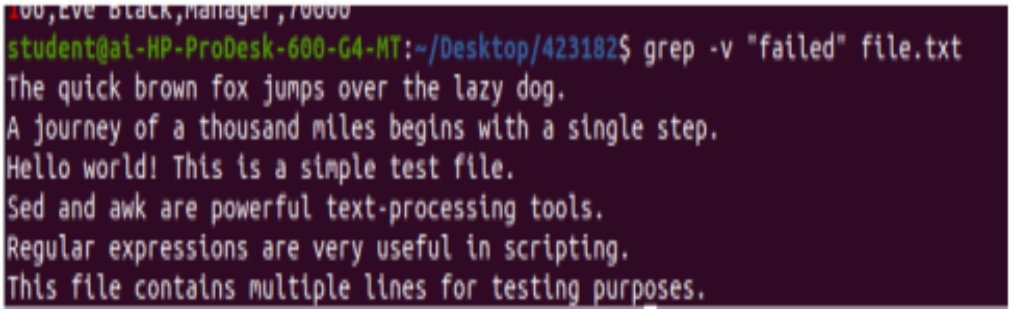

2. Count the occurrences of the word "success" in a file (data.txt).



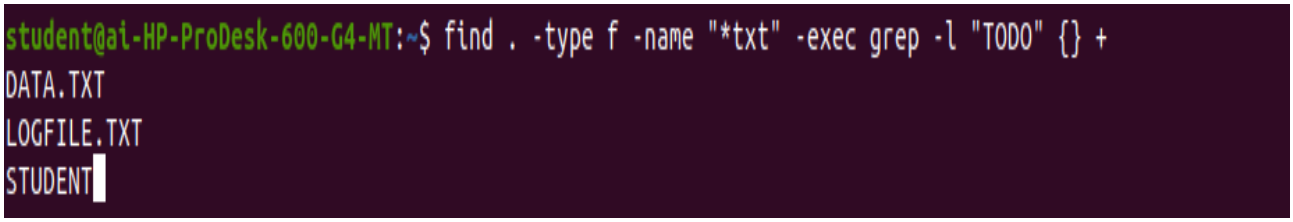

3. Extract all lines from a file (records.txt) that start with a digit.




4. Display all lines in file.txt that do not contain the word "failed".




5. Find all .txt files in the current directory that contain the word "TODO".

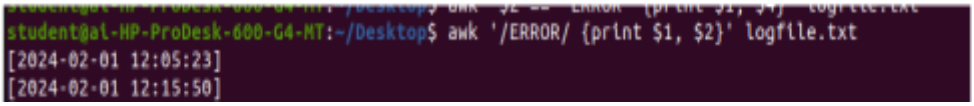


TASK – 5:

1. Given a log file with the format:

[Timestamp] [Log Level] [Module] [Message].

Write an awk command to extract only ERROR messages along with their timestamps.




2. Given a CSV file with tab-separated values.

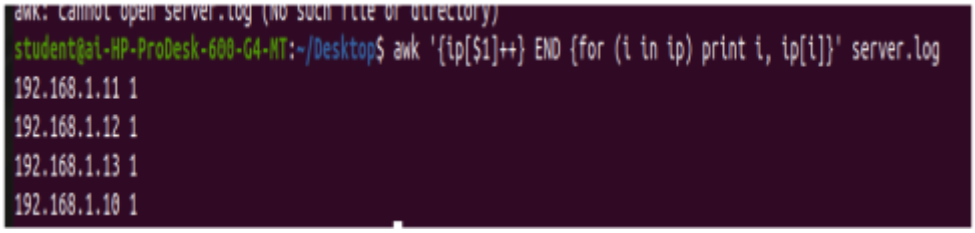
ID Math Science English

1 78 85 90

2 82 80 88

3 75 92 95

Write an awk script to compute the average of each subject.



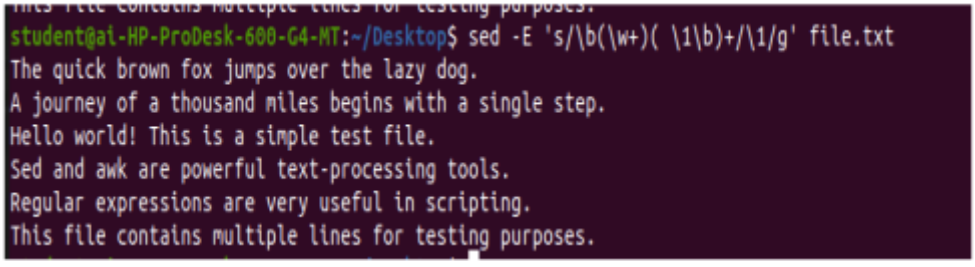

3. Given a server log with IP addresses:

192.168.1.1 - - [17/Feb/2025:12:00:01] "GET /index.html"

192.168.1.2 - - [17/Feb/2025:12:05:23] "POST /login"

192.168.1.1 - - [17/Feb/2025:12:10:45] "GET /dashboard"

Write an awk script to count occurrences of each IP.




4. Given lines of text:

apple banana cherry

dog cat elephant

Write a sed command to swap the first and last words.

```
awk: cannot open server.log (No such file or directory)
student@ai-HP-ProDesk-600-G4-MT:~/Desktop$ awk '{ip[$1]++} END {for (i in ip) print i, ip[i]}' server.log
192.168.1.11 1
192.168.1.12 1
192.168.1.13 1
192.168.1.10 1
```

5. Given a file with duplicate words:

hello hello worldthis is is a test test

Write a sed command to remove consecutive duplicate words.

```
This file contains multiple lines for testing purposes.
student@ai-HP-ProDesk-600-G4-MT:~/Desktop$ sed -E 's/\b(\w+)( \1\b)+/\1/g' file.txt
The quick brown fox jumps over the lazy dog.
A journey of a thousand miles begins with a single step.
Hello world! This is a simple test file.
Sed and awk are powerful text-processing tools.
Regular expressions are very useful in scripting.
This file contains multiple lines for testing purposes.
```

TASK – 6:

The tar command in Linux, which stands for ‘tape archive’, is an essential command for creating and managing archives. It was originally designed for use with tape drives but is now widely used for different purposes, such as making tar backups, sharing files, and compressing data. In this article, we will explore how to use the ‘tar’ command in Linux, including its basic functions, and provide practical examples.

What is an Archive file?

An archive file is a single file that holds multiple compressed or uncompressed files and folders, making data storage and organization more convenient.

1)

syntax:

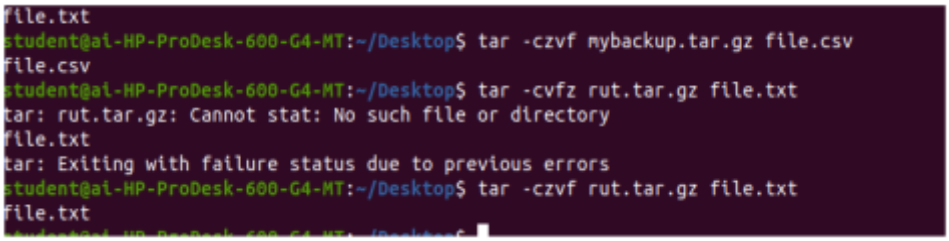
-cvf:

```
tar: Exiting with failure status due to previous errors
student@ai-HP-ProDesk-600-G4-MT:~/Desktop$ tar -cvf mybackup.tar file.csv file.txt
file.csv
file.txt
```

```
file.txt
student@ai-HP-ProDesk-600-G4-MT:~/Desktop$ tar -cvf arc.tar file.csv
file.csv
student@ai-HP-ProDesk-600-G4-MT:~/Desktop$ tar -cvf sito.tar file.txt
file.txt
student@ai-HP-ProDesk-600-G4-MT:~/Desktop$
```

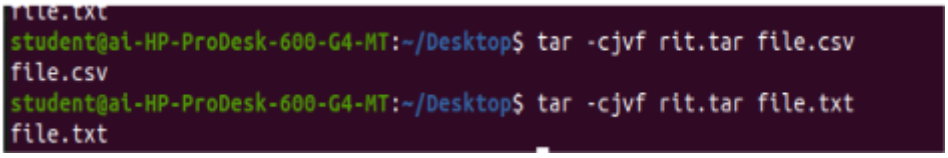
2)

-z:When you want to compress your archive using the gzip compression algorithm, you can employ the ‘-z’ option with the ‘tar’ command.



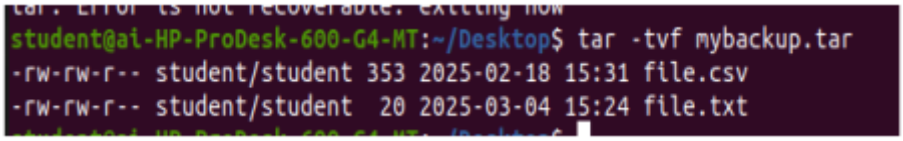

3)

-j: Similarly, if you prefer bzip2 compression for your archive, you can enable it using the ‘-j’ option in the ‘tar’ command.



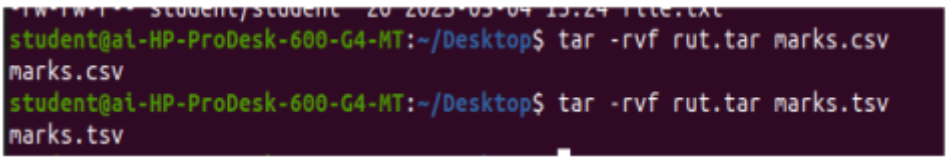

4)

-t: The ‘-t’ option allows you to list the contents of an archive, providing you with an overview of what’s stored within it.




5)

-r: If you want to add or append files to an existing archive, the ‘-r’ option can be used with the ‘tar’ command.



TASK – 7:

Git is a distributed version control system (VCS) used for tracking changes in source code during software development. It allows multiple developers to work on a project simultaneously, manage code versions, and collaborate efficiently.

Key Features of Git:

• Version Control: Tracks changes in code, allowing you to revert to previous versions if needed.

• Branching and Merging: Developers can create branches for separate tasks and merge them when ready.

• Distributed System: Every developer has a local copy of the entire repository.

• Collaboration: Multiple developers can work on the same project without conflicts.

• Speed and Efficiency: Git is optimized for fast performance.

Basic Git Commands:

•

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•

•

•

git

git

git

git

git

git

git

git

git

init – Initializes a new Git repository.

clone <repo-url> – Copies a remote repository to your local system.

add <file> – Stages changes for commit.

commit -m "message" – Saves changes with a message.

push – Uploads local commits to a remote repository.

pull – Fetches and merges changes from a remote repository.

branch – Lists, creates, or deletes branches.

checkout <branch> – Switches to a different branch.

merge <branch> – Merges changes from another branch.

A repository (repo) in Git is a storage location where a project's files, along with their version history, are stored. It can be either local (on your computer) or remote (on platforms like GitHub, GitLab, or Bitbucket).

Types of Git Repositories:

1. Local Repository – Exists on your computer after running git init or git clone. It contains:

• Working Directory (your actual files)

• Staging Area (files prepared for commit)

• .git Directory (stores all history, branches, and configurations)

2. Remote Repository – Hosted on a remote server (e.g., GitHub) for collaboration. Developers push and pull code from it.

Common Git Repository Commands:

•

•

•

•

•

git

git

git

git

git

init – Creates a new local repository.

clone <repo-url> – Copies an existing remote repository to your local machine.

add <file> – Adds changes to the staging area.

commit -m "message" – Saves changes locally.

push origin <branch> – Uploads local commits to the remote repository.• git pull origin <branch> – Fetches and merges changes from a remote repository.

ChatGPT said:

In Git, a commit is a snapshot of the project's changes at a specific point in time. Each commit has

a unique SHA-1 hash that identifies it.

Viewing Commit Logs:

You can see the commit history using:

1. Basic Log Command:

bash

CopyEdit

git log

This shows:

• Commit hash (unique identifier)

• Author name and email

• Date and time of commit

• Commit message

2. Compact Log (One-Line Format):

bash

CopyEdit

git log --oneline

This displays commits in a short format with just the commit hash and message.

3. Graphical View (Branches & Merges):

bash

CopyEdit

git log --oneline --graph --decorate --all

This helps visualize branches and merges.

4. Filter by Author:

bash

CopyEdit

git log --author="John Doe"

Shows commits made by a specific author.

5. Check Changes in a Commit:

bash

CopyEdit

git show <commit-hash>

Displays what changed in a particular commit.

TASK – 8:

Debugging with GDB:

First we need A c program :

c program:

```
#include <stdio.h>
int divide(int a, int b) {
return a / b; // Bug: division by zero can cause runtime error
}
int main() {
int x = 10;
int y = 0; // Bug: setting y to zero
int result;
result = divide(x, y); // This will crash the program due to division by zero
printf("The result of %d / %d is %d\n", x, y, result);
return 0;
}
```

Getting Started: Starting and Stopping

GDB A.OUT:

```
student@ai-HP-ProDesk-600-G4-MT:~$ gdb ./divide
GNU gdb (Ubuntu 9.2-0ubuntu1~20.04.2) 9.2
Copyright (C) 2020 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
Type "show copying" and "show warranty" for details.
This GDB was configured as "x86_64-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<http://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
    <http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from ./divide...
(gdb) run
Starting program: /home/student/divide

Program received signal SIGFPE, Arithmetic exception.
0x000055555555515b in divide (a=10, b=0) at divide.c:4
4           return a / b; // Bug: division by zero can cause runtime error
(gdb)
```

```
(gdb) backtrace
#0  0x000055555555515b in divide (a=10, b=0) at divide.c:4
#1  0x0000555555555189 in main () at divide.c:12
(gdb)
```

Stepping Through Code :

```
Program received signal SIGFPE, Arithmetic exception.
0x000055555555515b in divide (a=10, b=0) at divide.c:4
4           return a / b; // Bug: division by zero can cause runtime error
(gdb) backtrace
#0  0x000055555555515b in divide (a=10, b=0) at divide.c:4
#1  0x0000555555555189 in main () at divide.c:12
(gdb) list
1       #include <stdio.h>
2
3       int divide(int a, int b) {
4           return a / b; // Bug: division by zero can cause runtime error
5       }
6
7       int main() {
8           int x = 10;
9           int y = 0;  // Bug: setting y to zero
10          int result;
(gdb) list 20
15          return 0;
16      }
(gdb) break before 15
Function "before 15" not defined.
Make breakpoint pending on future shared library load? (y or [n]) y
Breakpoint 1 (before 15) pending.
(gdb) break 15
Breakpoint 2 at 0x55555555518a: file divide.c, line 15.
(gdb) quit
A debugging session is active.

        Inferior 1 [process 6917] will be killed.

Quit anyway? (y or n) y
student@ai-HP-ProDesk-600-G4-MT:~$
```

Breakpoints and Watchpoints :

```
(gdb) run
Starting program: /home/student/divide

Program received signal SIGFPE, Arithmetic exception.
0x000055555555515b in divide (a=10, b=0) at divide.c:4
4           return a / b; // Bug: division by zero can cause runtime error
(gdb) list 20
15          return 0;
16      }
(gdb) break 14
Note: breakpoint 1 also set at pc 0x5555555551a8.
Breakpoint 2 at 0x5555555551a8: file divide.c, line 15.
(gdb) watch result == 2
Watchpoint 3: result == 2
(gdb) continue
Continuing.

Program terminated with signal SIGFPE, Arithmetic exception.
The program no longer exists.
(gdb) delete N
(gdb)
```

Setting Variables and Calling Functions:

```
(gdb) break main
Breakpoint 4 at 0x555555555160: file divide.c, line 7.
(gdb) run
Starting program: /home/student/divide
Error in re-setting breakpoint 3: No symbol "result" in current context.
Error in re-setting breakpoint 3: No symbol "result" in current context.
Error in re-setting breakpoint 3: No symbol "result" in current context.

Breakpoint 4, main () at divide.c:7
7       int main() {
(gdb) info locals
x = 32767
y = 0
result = 0
```

```
(gdb) info locals
x = 32767
y = 0
result = 0
(gdb) set x = 344
(gdb) set x = y
(gdb) print x
$2 = 0
(gdb) print y
$3 = 0
(gdb) set x = 50
(gdb) print x
$4 = 50
(gdb) set y = 23
(gdb) print y
```

TASK – 9:

Installing a package using apt

```
student@system-48:~$ sudo apt install alien
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  gir1.2-clutter-1.0 gir1.2-clutter-gst-3.0 gir1.2-cogl-1.0
  gir1.2-coglpango-1.0 gir1.2-gnomebluetooth-1.0 gir1.2-gtkclutter-1.0
  libamtk-5-0 libamtk-5-common libboost-date-time1.71.0
  libboost-filesystem1.71.0 libboost-locale1.71.0 libcbor0.6 libcmis-0.5-5v5
  libextutils-pkgconfig-perl libgdk-pixbuf-xlib-2.0-0:i386
  libgdk-pixbuf2.0-0:i386 libhogweed5:i386 libicu66:i386 libjson-c4
  libjuh-java libjurt-java liblibreoffice-java liblua5.2-0 libmozjs-68-0
  libneon27-gnutls libnettle7:i386 libntfs-3g883 liborcus-0.15-0
  libphonenumber7 libpoppler97 libprotobuf17 libpython3.8-dev libqpdf26
  libridl-java librpm8 librpmbuild8 librpmio8 librpmsign8
  libsasl2-modules:i386 libssl1.1:i386 libtepl-4-0 libtracker-control-2.0-0
  libtracker-miner-2.0-0 libunoloader-java libwrap0:i386 lz4 pkg-config
  python3.8-dev ure-java x11proto-input-dev x11proto-xext-dev
Use 'sudo apt autoremove' to remove them.
Suggested packages:
  lintian
The following NEW packages will be installed:
  alien
```

Upgrading a package

```
student@system-48:~$ sudo apt install alien
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  gir1.2-clutter-1.0 gir1.2-clutter-gst-3.0 gir1.2-cogl-1.0
  gir1.2-coglpango-1.0 gir1.2-gnomebluetooth-1.0 gir1.2-gtkclutter-1.0
  libamtk-5-0 libamtk-5-common libboost-date-time1.71.0
  libboost-filesystem1.71.0 libboost-locale1.71.0 libcbor0.6 libcmis-0.5-5v5
  libextutils-pkgconfig-perl libgdk-pixbuf-xlib-2.0-0:i386
  libgdk-pixbuf2.0-0:i386 libhogweed5:i386 libicu66:i386 libjson-c4
  libjuh-java libjurt-java liblibreoffice-java liblua5.2-0 libmozjs-68-0
  libneon27-gnutls libnettle7:i386 libntfs-3g883 liborcus-0.15-0
  libphonenumber7 libpoppler97 libprotobuf17 libpython3.8-dev libqpdf26
  libridl-java librpm8 librpmbuild8 librpmio8 librpmsign8
  libsasl2-modules:i386 libssl1.1:i386 libtepl-4-0 libtracker-control-2.0-0
  libtracker-miner-2.0-0 libunoloader-java libwrap0:i386 lz4 pkg-config
  python3.8-dev ure-java x11proto-input-dev x11proto-xext-dev
Use 'sudo apt autoremove' to remove them.
Suggested packages:
  lintian
The following NEW packages will be installed:
  alien
```

Removing a package using apt

```
student@system-48:~$ sudo apt remove alien
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  gir1.2-clutter-1.0 gir1.2-clutter-gst-3.0 gir1.2-cogl-1.0 gir1.2-coglpango-1.0 gir1.2-gnomebluetooth-1.0 gir1.2-gtkclutter-1.0 libamtk-5-0
  libamtk-5-common libboost-date-time1.71.0 libboost-filesystem1.71.0 libboost-locale1.71.0 libcbor0.6 libcmis-0.5-5v5 libextutils-pkgconfig-perl
  libgdk-pixbuf-xlib-2.0-0:i386 libgdk-pixbuf2.0-0:i386 libhogweed5:i386 libicu66:i386 libjson-c4 libjuh-java libjurt-java liblibreoffice-java
  liblua5.2-0 libmozjs-68-0 libneon27-gnutls libnettle7:i386 libntfs-3g883 liborcus-0.15-0 libphonenumber7 libpoppler97 libprotobuf17
  libpython3.8-dev libqpdf26 libridl-java librpm8 librpmbuild8 librpmio8 librpmsign8 libsasl2-modules:i386 libssl1.1:i386 libtepl-4-0
  libtracker-control-2.0-0 libtracker-miner-2.0-0 libunoloader-java libwrap0:i386 lz4 pkg-config python3.8-dev ure-java x11proto-input-dev
  x11proto-xext-dev
Use 'sudo apt autoremove' to remove them.
The following packages will be REMOVED:
  alien
0 upgraded, 0 newly installed, 1 to remove and 1271 not upgraded.
After this operation, 107 kB disk space will be freed.
Do you want to continue? [Y/n] Y
(Reading database ... 240438 files and directories currently installed.)
Removing alien (8.95.5) ...
Processing triggers for man-db (2.9.1-1) ...
```

Removing packages along with their config. Files


Updating the package list