Task 1: Basic and Advance Linux Commands

Directory and File Operations

1. **Creating Directories:**

   mkdir -p {documents,logs,data/{csv,txt},backup}

   -p: Creates parent directories as needed.

   {}: Brace expansion to create multiple directories.

```
ubuntu@ubuntu:~/Desktop$ mkdir -p test_env
ubuntu@ubuntu:~/Desktop$ cd test_env
ubuntu@ubuntu:~/Desktop/test_env$ mkdir -p{documents,logs,data/(csv,txt),backup}
bash: syntax error near unexpected token `('
ubuntu@ubuntu:~/Desktop/test_env$ mkdir -p{documents,logs,data/{csv,txt},backup}
mkdir: invalid option -- 'd'
Try 'mkdir --help' for more information.
ubuntu@ubuntu:~/Desktop/test_env$ mkdir -p {documents,logs,data/{csv,txt},backup}
ubuntu@ubuntu:~/Desktop/test_env$ ls
```

2. **Creating Files with Content:**

   cat > file: Redirects input to create a file.

   EOF: Here document to input multiple lines.

3. **Viewing File Contents:**

   cat logs/system.log

```
ubuntu@ubuntu:~/Desktop/test_env$ cat > documents/employees.txt << EOF
> John Smith|IT|75000|john@company.com
> Mary Johnson|HR|65000|mary@company.com
> Bob Wilson|Sales|80000|bob@company.com
> Alice Brown|IT|72000|alice@company.com
> James Davis|Marketing|70000|james@company.com
> EOF
ubuntu@ubuntu:~/Desktop/test_env$ cat > logs/system.log << EOF
> 2024-03-15 10:15:23 INFO  Server started successfully
> 2024-03-15 10:15:24 ERROR Failed to connect to database
> 2024-03-15 10:15:25 WARN  Low memory warning
> 2024-03-15 10:16:30 INFO  Database connection established
> 2024-03-15 10:17:45 ERROR Authentication failed for user 'admin'
> 2024-03-15 10:18:00 INFO  Backup process started
> 2024-03-15 10:18:30 INFO  Backup completed successfully
> EOF
```

4. **Using sed to Edit Files:**

   sed -i '1c\Date, Product, Quantity, Price' data/csv/sales.csv

   -i: Edits the file in place.

   '1c...': Changes the first line.

```
ubuntu@ubuntu:~/Desktop/test_env$ sed -i '1c\Date,Product,Quantity,Price' data/csv/sales.csv
ubuntu@ubuntu:~/Desktop/test_env$ cat > config.txt << EOF
> # Server Configuration
PORT=8080
HOST=localhost
DEBUG_MODE=true
MAX_CONNECTIONS=100
TIMEOUT=30

# Database Settings
DB_HOST=127.0.0.1
DB_PORT=5432
DB_NAME=production
DB_USER=admin
> EOF
```

File Listing and Searching

1. **Listing Files:**

   ls -lh documents/

   -l: Long format.

   -h: Human-readable sizes.

2. **Finding Files:**

   find . -name "*.txt"

   - .: Current directory.

   -name "*.txt": Finds files with .txt extension.

```
ubuntu@ubuntu:~/Desktop/test_env$ echo "Test content 1" > data/txt/file1.txt
ubuntu@ubuntu:~/Desktop/test_env$ echo "Test content 2" > data/txt/file2.txt
ubuntu@ubuntu:~/Desktop/test_env$ echo "Test content 3" > data/txt/file3.txt
ubuntu@ubuntu:~/Desktop/test_env$ echo "Different content" > data/txt/test.bak
ubuntu@ubuntu:~/Desktop/test_env$ ls -r
logs  documents  data  config.txt  backup
ubuntu@ubuntu:~/Desktop/test_env$ ls -lh documents/
total 4.0K
-rw-rw-r-- 1 ubuntu ubuntu 200 Jan  8 11:14 employees.txt
ubuntu@ubuntu:~/Desktop/test_env$ ls -lh documents/
total 4.0K
-rw-rw-r-- 1 ubuntu ubuntu 200 Jan  8 11:14 employees.txt
ubuntu@ubuntu:~/Desktop/test_env$ find . -name "*.txt"
./documents/employees.txt
./data/txt/file1.txt
./data/txt/file2.txt
./data/txt/file3.txt
./config.txt
```

Shell Script Execution

1. **Making a Script Executable:**

   chmod +x setup_test_env.sh

2. **Running a Script:**

   ./setup_test_env.sh

```
ubuntu@ubuntu:~/Desktop/test_env$ chmod +x setup_test_env.sh
ubuntu@ubuntu:~/Desktop/test_env$ ./setup_test_env.sh
=== File Operations Practice ===

Listing all .txt files:
Found: ./documents/employees.txt
Content preview:
John Smith|IT|75000|john@company.com
---
Found: ./data/txt/file1.txt
Content preview:
Test content 1
---
Found: ./data/txt/file2.txt
Content preview:
Test content 2
---
Found: ./data/txt/file3.txt
Content preview:
Test content 3
---
Found: ./config.txt
Content preview:
# Server Configuration
---

Processing employees:
IT Department employees:
John Smith|IT|75000|john@company.com
Alice Brown|IT|72000|alice@company.com
```

Text Processing

1. **Using cut to Extract Fields:**

   cut -d'|' -f1,2 documents/employees.txt

   -d'|': Delimiter is |.

   -f1,2: Extracts the first and second fields.

```
ubuntu@ubuntu:~/Desktop/test_env$ cut -d"|" -f1,2 documents/employees.txt
John Smith|IT
Mary Johnson|HR
Bob Wilson|Sales
Alice Brown|IT
James Davis|Marketing
```

Using grep to Search Logs:

grep "2024" logs/system.log

grep -i "info" logs/system.log

grep -r "test"

- grep "2024": Searches for lines containing "2024".

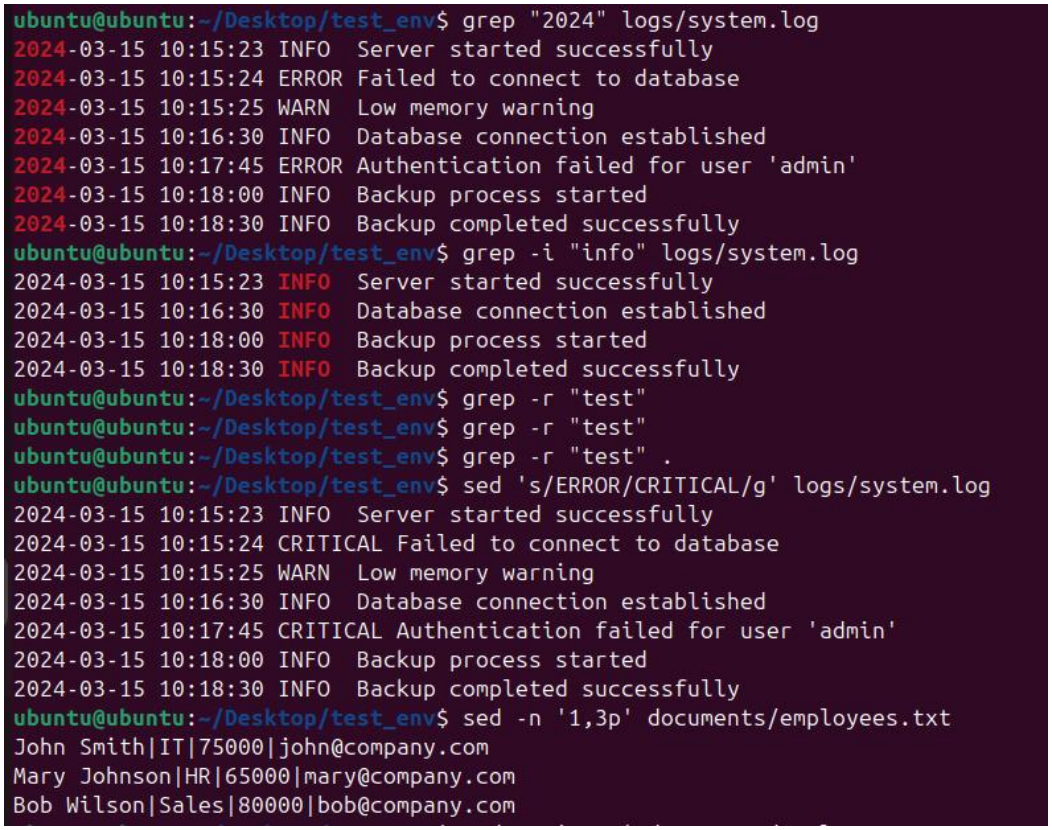
-i: Case-insensitive search.

-r: Recursively search directories.

Using sed for Text Replacement:

sed 's/ERROR/CRITICAL/g' logs/system.log

- s/old/new/g: Replaces "ERROR" with "CRITICAL" globally.



Using sed to Print Specific Lines:

sed -n '1,3p' documents/employees.txt

-n: Suppresses automatic printing.

'1,3p': Prints lines 1 to 3.

System Monitoring and Cleanup

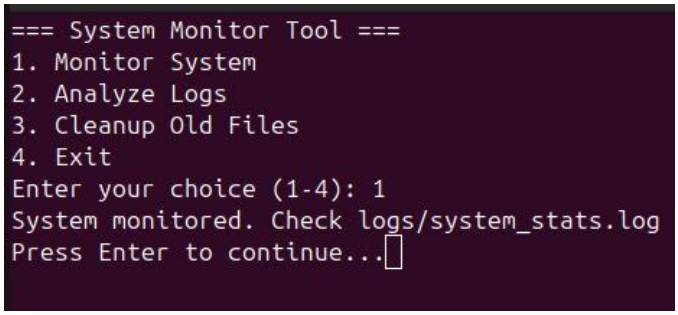
1. **System Statistics Display:**

   Displays CPU, memory, and disk usage.

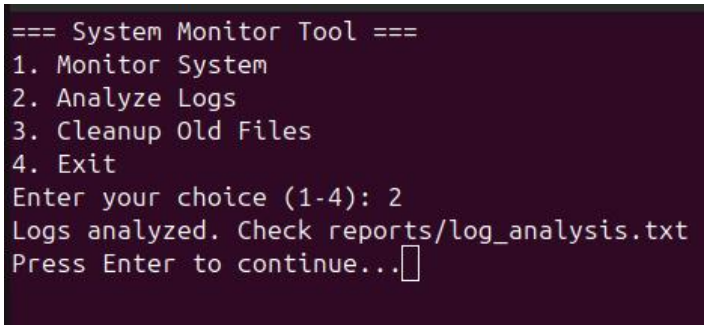
2. **System Monitor Tool:**

Options:

- Monitor System

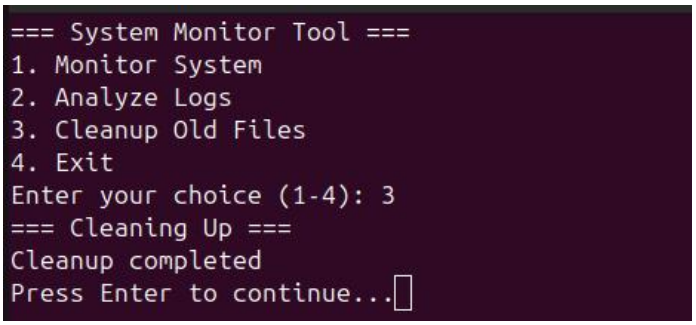


- Analyze Logs



3**. Cleanup Old Files**

- Exit

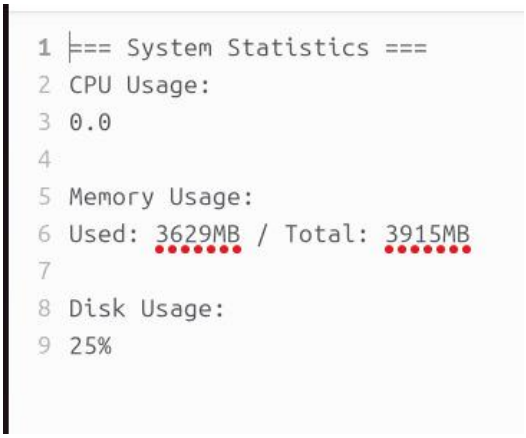


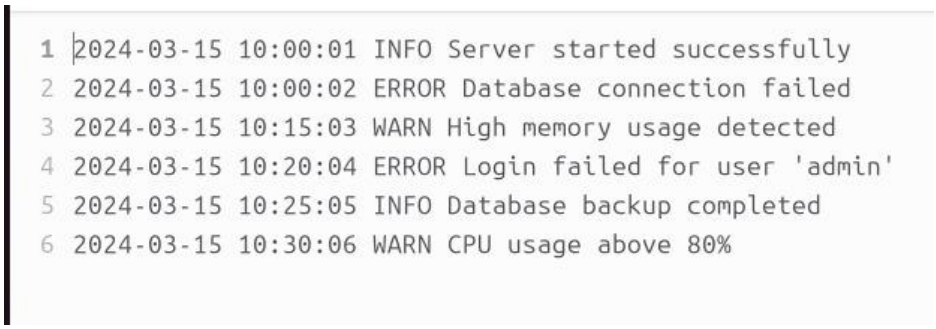
Example Usage:

Choosing option 2 analyzes logs and outputs results to log_analysis.txt.

Choosing option 1 monitors the system and logs to system_stats.log.

Choosing option 3 performs cleanup operations.





Summary

Log Searching and Editing: Use grep for searching and sed for editing text in logs.

System Monitoring: A script or tool provides options for monitoring, analyzing, and cleaning up system data.

Text Processing: Efficiently extract and manipulate text data using sed.

These operations are useful for managing and analyzing log files, monitoring system performance, and automating maintenance tasks in Unix/Linux environments.