Day 2 – Phase 2: File & Directory Management + Search
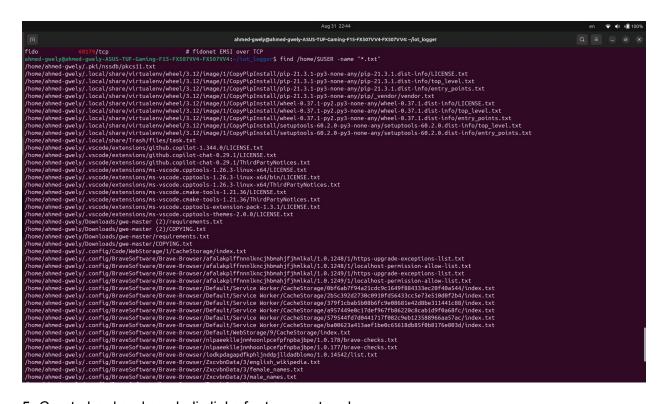
1- Inside iot_logger, create logs/temperature.log and scripts/sensor_script.py:

2- Copy /etc/services into data and search for patterns like ssh or http.

3- Use regex to find lines starting with t or containing numbers.

4- Locate .txt files in /home/<username> and remove temporary ones if needed.

```
fido              60179/tcp                    # fidonet EMSI over TCP
ahmed-gwely@ahmed-gwely-ASUS-TUF-Gaming-F15-FX507VV4-FX507VV4:~/iot_logger$ find /home/$USER -name "*.txt"
/home/ahmed-gwely/.pki/nssdb/pkcs11.txt
/home/ahmed-gwely/.local/share/virtualenv/wheel/3.12/image/1/CopyPipInstall/pip-21.3.1-py3-none-any/pip-21.3.1.dist-info/LICENSE.txt
/home/ahmed-gwely/.local/share/virtualenv/wheel/3.12/image/1/CopyPipInstall/pip-21.3.1-py3-none-any/pip-21.3.1.dist-info/top_level.txt
/home/ahmed-gwely/.local/share/virtualenv/wheel/3.12/image/1/CopyPipInstall/pip-21.3.1-py3-none-any/pip-21.3.1.dist-info/entry_points.txt
/home/ahmed-gwely/.local/share/virtualenv/wheel/3.12/image/1/CopyPipInstall/pip-21.3.1-py3-none-any/pip/_vendor/vendor.txt
/home/ahmed-gwely/.local/share/virtualenv/wheel/3.12/image/1/CopyPipInstall/wheel-0.37.1-py2.py3-none-any/wheel-0.37.1.dist-info/LICENSE.txt
/home/ahmed-gwely/.local/share/virtualenv/wheel/3.12/image/1/CopyPipInstall/wheel-0.37.1-py2.py3-none-any/wheel-0.37.1.dist-info/top_level.txt
/home/ahmed-gwely/.local/share/virtualenv/wheel/3.12/image/1/CopyPipInstall/wheel-0.37.1-py2.py3-none-any/wheel-0.37.1.dist-info/entry_points.txt
/home/ahmed-gwely/.local/share/virtualenv/wheel/3.12/image/1/CopyPipInstall/setuptools-60.2.0-py3-none-any/setuptools-60.2.0.dist-info/top_level.txt
/home/ahmed-gwely/.local/share/virtualenv/wheel/3.12/image/1/CopyPipInstall/setuptools-60.2.0-py3-none-any/setuptools-60.2.0.dist-info/entry_points.txt
/home/ahmed-gwely/.local/share/Trash/files/task.txt
/home/ahmed-gwely/.vscode/extensions/github.copilot-1.344.0/LICENSE.txt
/home/ahmed-gwely/.vscode/extensions/github.copilot-chat-0.29.1/LICENSE.txt
/home/ahmed-gwely/.vscode/extensions/github.copilot-chat-0.29.1/ThirdPartyNotices.txt
/home/ahmed-gwely/.vscode/extensions/ms-vscode.cpptools-1.26.3-linux-x64/LICENSE.txt
/home/ahmed-gwely/.vscode/extensions/ms-vscode.cpptools-1.26.3-linux-x64/bin/LICENSE.txt
/home/ahmed-gwely/.vscode/extensions/ms-vscode.cpptools-1.26.3-linux-x64/ThirdPartyNotices.txt
/home/ahmed-gwely/.vscode/extensions/ms-vscode.cmake-tools-1.21.36/LICENSE.txt
/home/ahmed-gwely/.vscode/extensions/ms-vscode.cmake-tools-1.21.36/ThirdPartyNotices.txt
/home/ahmed-gwely/.vscode/extensions/ms-vscode.cpptools-extension-pack-1.3.1/LICENSE.txt
/home/ahmed-gwely/.vscode/extensions/ms-vscode.cpptools-themes-2.0.0/LICENSE.txt
/home/ahmed-gwely/Downloads/gwe-master (2)/requirements.txt
/home/ahmed-gwely/Downloads/gwe-master (2)/COPYING.txt
/home/ahmed-gwely/Downloads/gwe-master/requirements.txt
/home/ahmed-gwely/Downloads/gwe-master/COPYING.txt
/home/ahmed-gwely/.config/Code/WebStorage/1/CacheStorage/index.txt
/home/ahmed-gwely/.config/BraveSoftware/Brave-Browser/afalakplffnnnlkncjhbmahjfjhmlkal/1.0.1248/1/https-upgrade-exceptions-list.txt
/home/ahmed-gwely/.config/BraveSoftware/Brave-Browser/afalakplffnnnlkncjhbmahjfjhmlkal/1.0.1248/1/localhost-permission-allow-list.txt
/home/ahmed-gwely/.config/BraveSoftware/Brave-Browser/afalakplffnnnlkncjhbmahjfjhmlkal/1.0.1249/1/https-upgrade-exceptions-list.txt
/home/ahmed-gwely/.config/BraveSoftware/Brave-Browser/afalakplffnnnlkncjhbmahjfjhmlkal/1.0.1249/1/localhost-permission-allow-list.txt
/home/ahmed-gwely/.config/BraveSoftware/Brave-Browser/Default/Service Worker/CacheStorage/0bf6ab7f94a21cdc9c1649f884333ec20f40a544/index.txt
/home/ahmed-gwely/.config/BraveSoftware/Brave-Browser/Default/Service Worker/CacheStorage/2b5c392d2730c0910fd56433cc5e73e510d0f2b4/index.txt
/home/ahmed-gwely/.config/BraveSoftware/Brave-Browser/Default/Service Worker/CacheStorage/379f1cbab5b08b6fc9e08681e42d8be311441c88/index.txt
/home/ahmed-gwely/.config/BraveSoftware/Brave-Browser/Default/Service Worker/CacheStorage/a957449e0c17def967fb86220c8cab1d9f0a68fc/index.txt
/home/ahmed-gwely/.config/BraveSoftware/Brave-Browser/Default/Service Worker/CacheStorage/579544fd7d0441717f082c9eb123588966aa57ac/index.txt
/home/ahmed-gwely/.config/BraveSoftware/Brave-Browser/Default/Service Worker/CacheStorage/ba00623a413aef1be0c65618db85f0b8176e803d/index.txt
/home/ahmed-gwely/.config/BraveSoftware/Brave-Browser/Default/WebStorage/9/CacheStorage/index.txt
/home/ahmed-gwely/.config/BraveSoftware/Brave-Browser/nlpaeekllejnmhoonlpcefpfnpbajbpe/1.0.178/brave-checks.txt
/home/ahmed-gwely/.config/BraveSoftware/Brave-Browser/nlpaeekllejnmhoonlpcefpfnpbajbpe/1.0.177/brave-checks.txt
/home/ahmed-gwely/.config/BraveSoftware/Brave-Browser/iodkpdagapdfkphljnddpjlldadblomo/1.0.14542/list.txt
/home/ahmed-gwely/.config/BraveSoftware/Brave-Browser/ZxcvbnData/3/english_wikipedia.txt
/home/ahmed-gwely/.config/BraveSoftware/Brave-Browser/ZxcvbnData/3/female_names.txt
/home/ahmed-gwely/.config/BraveSoftware/Brave-Browser/ZxcvbnData/3/male_names.txt
```

5- Create hard and symbolic links for temperature.log.

6- Display directory structure to confirm organization.


```
/home/ahmed-gwely/PycharmProjects/pythonProject/venv/lib/python3.12/site-packages/pip-21.3.1.dist-info/entry_points.txt
/home/ahmed-gwely/PycharmProjects/pythonProject/venv/lib/python3.12/site-packages/pip/_vendor/vendor.txt
/home/ahmed-gwely/.cache/tracker3/files/first-index.txt
/home/ahmed-gwely/.cache/tracker3/files/last-crawl.txt
/home/ahmed-gwely/task1_Linux.txt
ahmed-gwely@ahmed-gwely-ASUS-TUF-Gaming-F15-FX507VV4-FX507VV4:~/iot_logger$ find /home/$USER -name "*temp*.txt" -delete
ahmed-gwely@ahmed-gwely-ASUS-TUF-Gaming-F15-FX507VV4-FX507VV4:~/iot_logger$ ln logs/temperature.log logs/temp_hard.log
ahmed-gwely@ahmed-gwely-ASUS-TUF-Gaming-F15-FX507VV4-FX507VV4:~/iot_logger$ ln -s logs/temperature.log logs/temp_soft.log
ahmed-gwely@ahmed-gwely-ASUS-TUF-Gaming-F15-FX507VV4-FX507VV4:~/iot_logger$ tree ~/iot_logger
/home/ahmed-gwely/iot_logger
├── data
│   └── services
├── logs
│   ├── temperature.log
│   ├── temp_hard.log
│   └── temp_soft.log -> logs/temperature.log
├── scripts
│   └── sensor_script.py

4 directories, 5 files
ahmed-gwely@ahmed-gwely-ASUS-TUF-Gaming-F15-FX507VV4-FX507VV4:~/iot_logger$
```

File Types in Linux and How to Check Them

- Regular file (-): Normal files such as text, images, or programs.

  ls -l /etc/passwd

- Directory (d): A folder that contains other files or directories.

  ls -ld /etc

- Symbolic link (l): A shortcut that points to another file or directory.

  ln -s /etc/passwd mylink

  ls -l mylink

- Device files: Special files used to interact with hardware.
- Character device (c): Handles data character by character (e.g., /dev/tty).

  ls -l /dev/tty

- Block device (b): Handles data in blocks (e.g., /dev/sda).

  ls -l /dev/sda

- Pipe (p): A channel for transferring data between processes.

  mkfifo mypipe

  ls -l mypipe

- Socket (s): Used for communication between processes, often over a network.

  ls -l /var/run/docker.sock

To check file types, you can use:

- ls -l → shows the type by the first character.
- file <filename> → describes the file type.
- stat <filename> → detailed file info (including inode, type, etc.).

What's the difference between a hard link and a symbolic link? Give real examples of when to use each?

Hard Link

- Points directly to the **same inode** (the actual data on disk).
- The file and the hard link are **indistinguishable** — both are equal references.
- If the original file is deleted, the data is still accessible through the hard link.
- **Limitation**: Cannot span across different filesystems or partitions.

Example use case:

Imagine you have a big log file in /var/log/app.log. You want another name for it in /home/user/app.log without duplicating the file size. A hard link is perfect because both names refer to the same data.

Symbolic Link (Symlink)

- Works like a **shortcut** or pointer to another file's **path**.
- If the original file is deleted, the symlink becomes **broken** (dangling).
- Can span across different filesystems or partitions.

Example use case:

You have a config file /etc/myapp/config.yaml but want to access it easily from your home directory. You can create a symlink:

s rmdir the same as rm -r?

`rmdir <dir>`

- Removes a **directory only if it's empty**.
- Safe to use when you just want to delete an unused folder.
- Example:

`rmdir empty_folder`

`rm -r <dir>`

- Recursively removes a directory **and everything inside it** (files + subdirectories).
- Powerful but dangerous if used carelessly.
- Example:

`rm -r project_folder`

deletes the folder and all its contents.