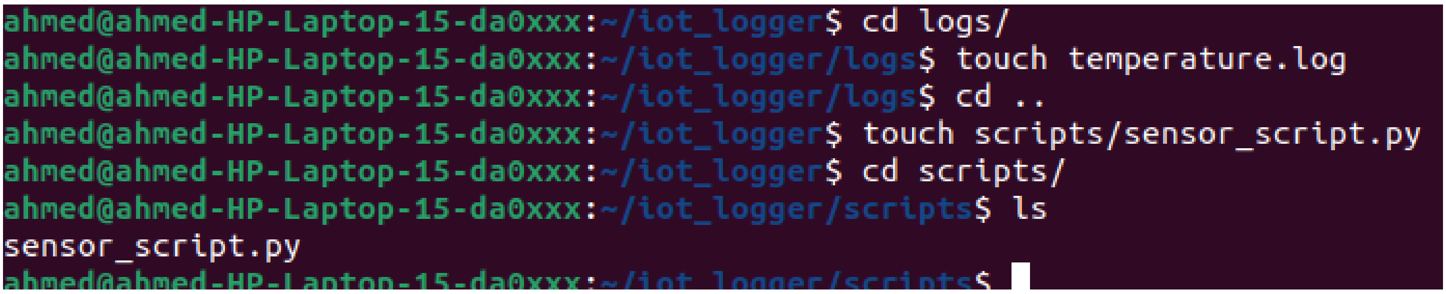
Name : Ahmed Khaled Abdelmaksod

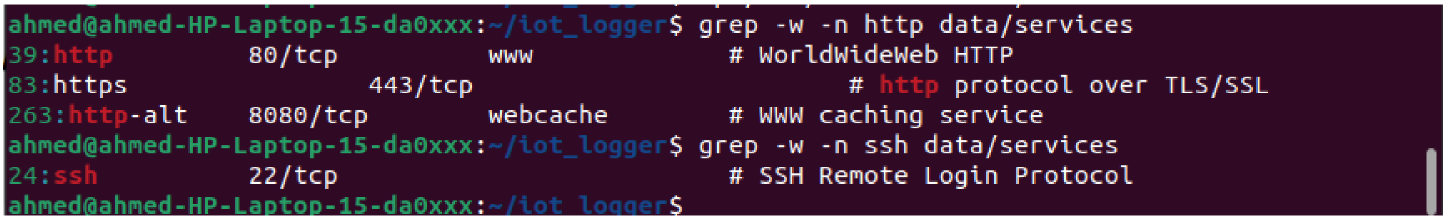
Group : IOT_701_O

- **Inside iot_logger, create logs/temperature.log and scripts/sensor_script.py.**



```
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger$ cd logs/
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger/logs$ touch temperature.log
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger/logs$ cd ..
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger$ touch scripts/sensor_script.py
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger$ cd scripts/
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger/scripts$ ls
sensor_script.py
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger/scripts$
```

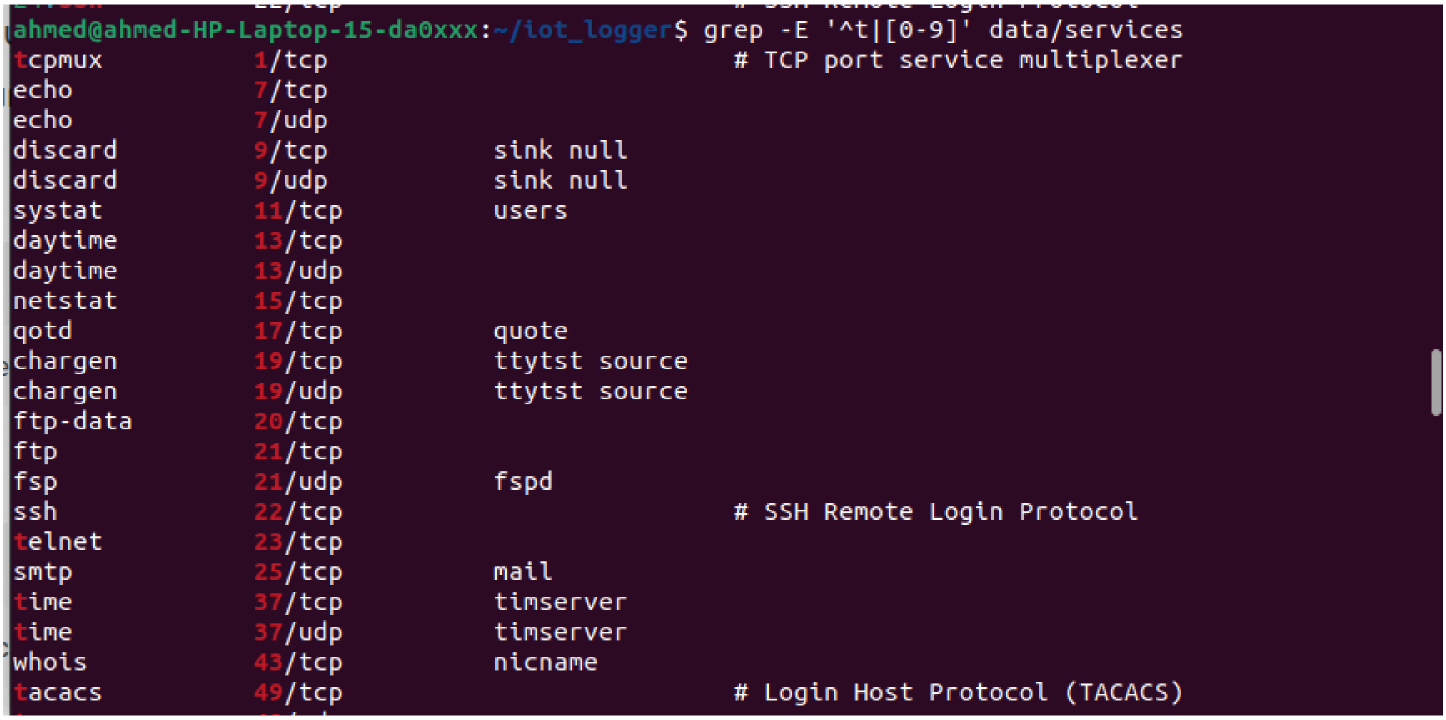
- **Copy /etc/services into data and search for patterns like ssh or http.**



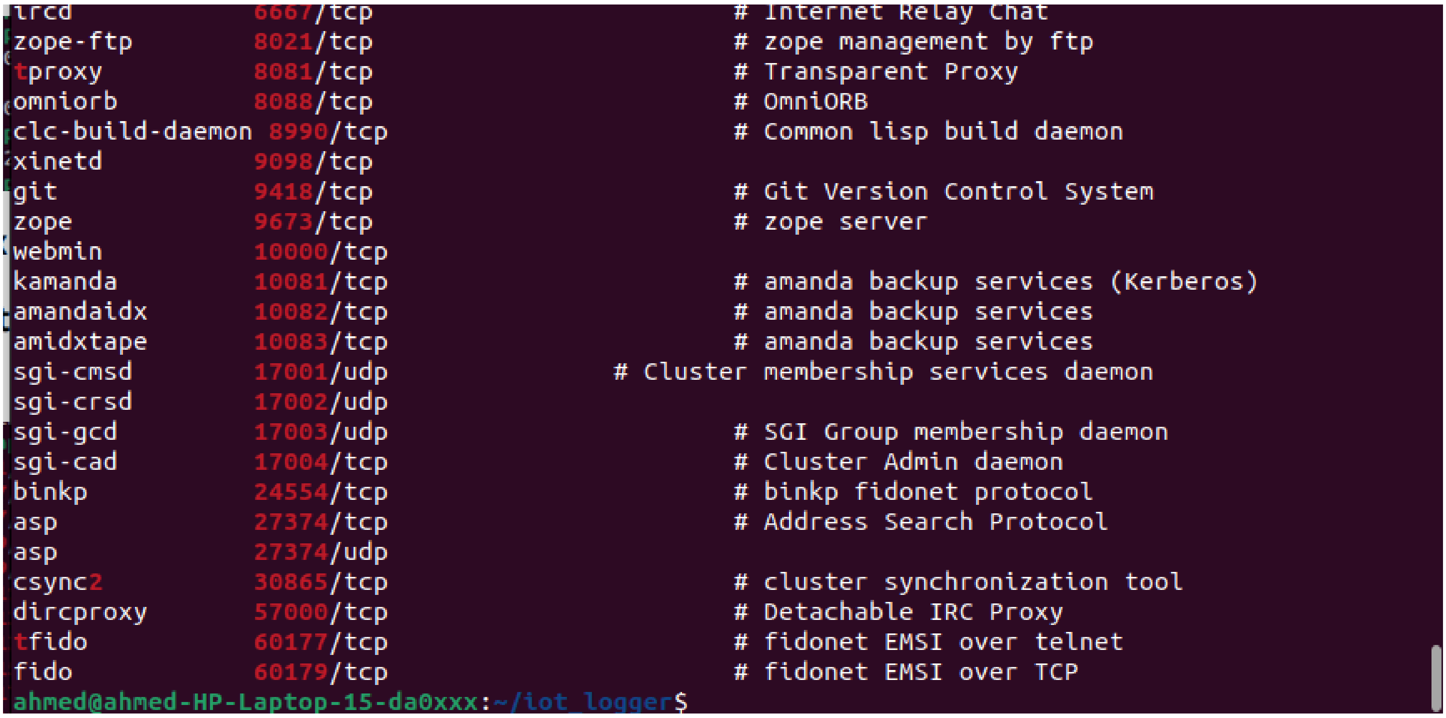
```
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger$ grep -w -n http data/services
39:http         80/tcp          www             # WorldWideWeb HTTP
83:https                443/tcp                         # http protocol over TLS/SSL
263:http-alt    8080/tcp        webcache        # WWW caching service
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger$ grep -w -n ssh data/services
24:ssh          22/tcp                          # SSH Remote Login Protocol
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger$
```

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

note: the output is huge so I put screens from start and end of the output



```
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger$ grep -E '^t|[0-9]' data/services
tcpmux          1/tcp                           # TCP port service multiplexer
echo            7/tcp
echo            7/udp
discard         9/tcp           sink null
discard         9/udp           sink null
systat          11/tcp          users
daytime         13/tcp
daytime         13/udp
netstat         15/tcp
qotd            17/tcp          quote
chargen         19/tcp          ttytst source
chargen         19/udp          ttytst source
ftp-data        20/tcp
ftp             21/tcp
fsp             21/udp          fspd
ssh             22/tcp                          # SSH Remote Login Protocol
telnet          23/tcp
smtp            25/tcp          mail
time            37/tcp          timserver
time            37/udp          timserver
whois           43/tcp          nicname
tacacs          49/tcp                          # Login Host Protocol (TACACS)
```

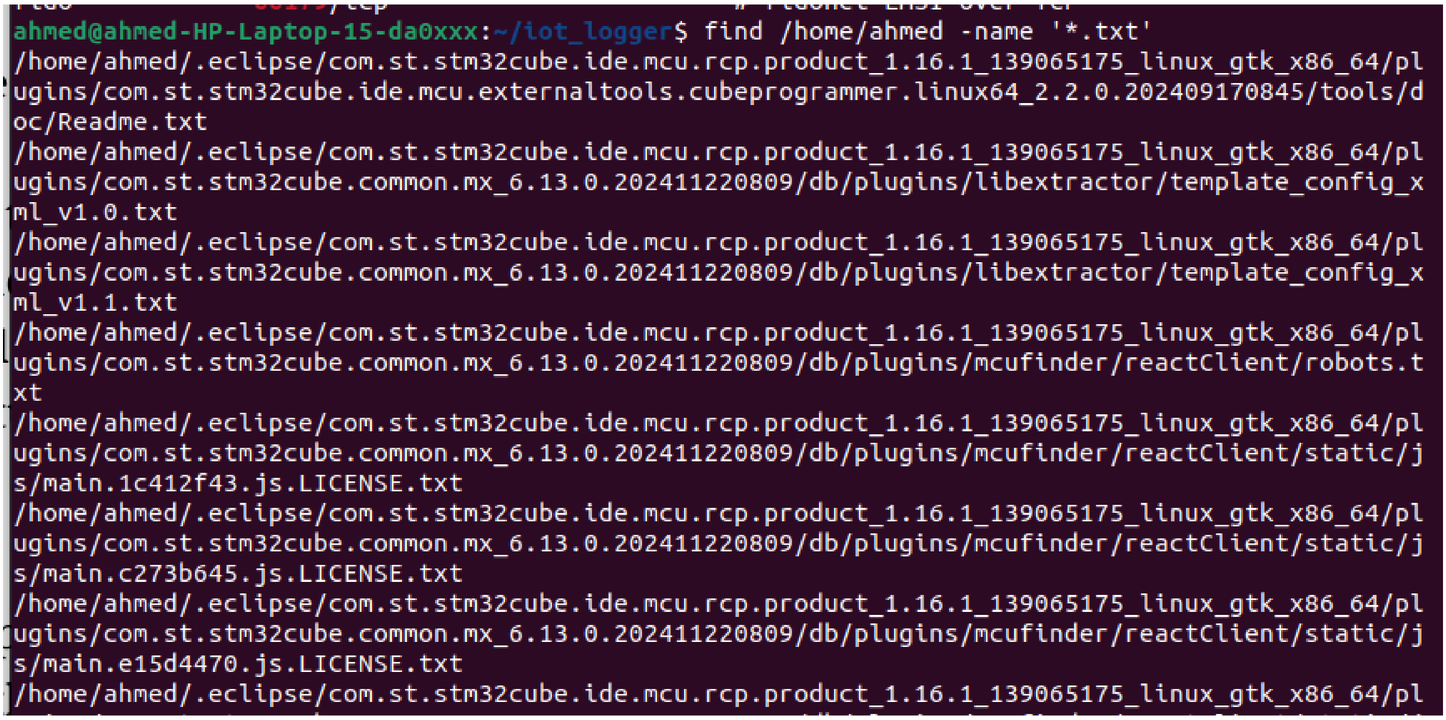


```
ircd            6667/tcp                        # Internet Relay Chat
zope-ftp        8021/tcp                        # zope management by ftp
tproxy          8081/tcp                        # Transparent Proxy
omniorb         8088/tcp                        # OmniORB
clc-build-daemon 8990/tcp                       # Common lisp build daemon
xinetd          9098/tcp
git             9418/tcp                        # Git Version Control System
zope            9673/tcp                        # zope server
webmin          10000/tcp
kamanda         10081/tcp                       # amanda backup services (Kerberos)
amandaidx       10082/tcp                       # amanda backup services
amidxtape       10083/tcp                       # amanda backup services
sgi-cmsd        17001/udp               # Cluster membership services daemon
sgi-crsd        17002/udp
sgi-gcd         17003/udp                       # SGI Group membership daemon
sgi-cad         17004/tcp                       # Cluster Admin daemon
binkp           24554/tcp                       # binkp fidonet protocol
asp             27374/tcp                       # Address Search Protocol
asp             27374/udp
csync2          30865/tcp                       # cluster synchronization tool
dircproxy       57000/tcp                       # Detachable IRC Proxy
tfido           60177/tcp                       # fidonet EMSI over telnet
fido            60179/tcp                       # fidonet EMSI over TCP
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger$
```

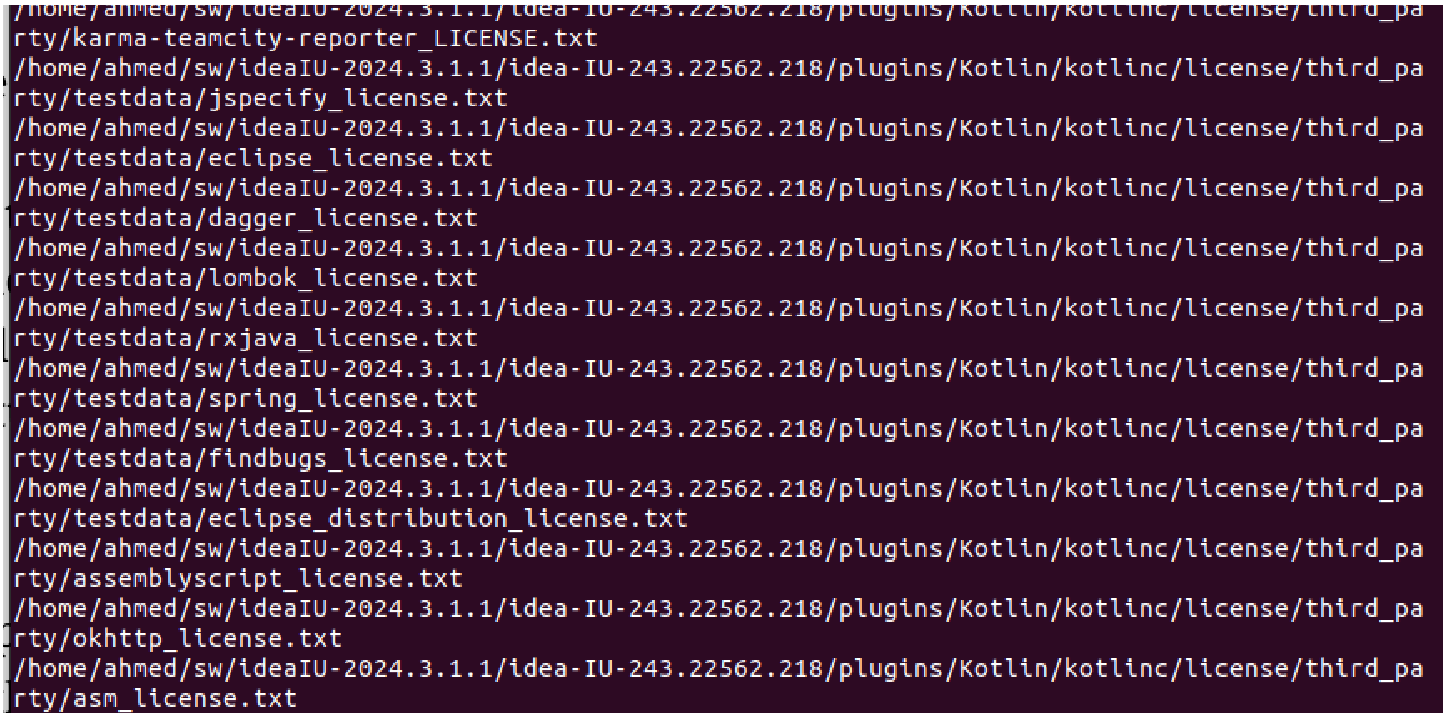
- **Locate .txt files in /home/<username> and remove temporary ones if needed.**

Hint : this command output is very huge as I am using linux as my main os so I have a lot of .txt 🙂

also we can use $USER variable instead of ahmed in next command



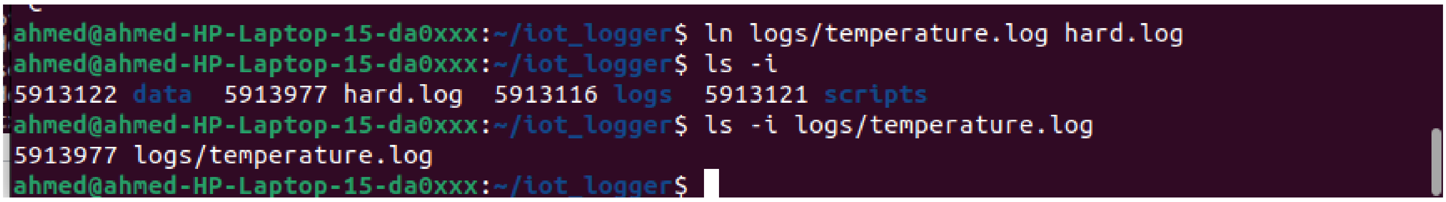
```
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger$ find /home/ahmed -name '*.txt'
/home/ahmed/.eclipse/com.st.stm32cube.ide.mcu.rcp.product_1.16.1_139065175_linux_gtk_x86_64/pl
ugins/com.st.stm32cube.ide.mcu.externaltools.cubeprogrammer.linux64_2.2.0.202409170845/tools/d
oc/Readme.txt
/home/ahmed/.eclipse/com.st.stm32cube.ide.mcu.rcp.product_1.16.1_139065175_linux_gtk_x86_64/pl
ugins/com.st.stm32cube.common.mx_6.13.0.202411220809/db/plugins/libextractor/template_config_x
ml_v1.0.txt
/home/ahmed/.eclipse/com.st.stm32cube.ide.mcu.rcp.product_1.16.1_139065175_linux_gtk_x86_64/pl
ugins/com.st.stm32cube.common.mx_6.13.0.202411220809/db/plugins/libextractor/template_config_x
ml_v1.1.txt
/home/ahmed/.eclipse/com.st.stm32cube.ide.mcu.rcp.product_1.16.1_139065175_linux_gtk_x86_64/pl
ugins/com.st.stm32cube.common.mx_6.13.0.202411220809/db/plugins/mcufinder/reactClient/robots.t
xt
/home/ahmed/.eclipse/com.st.stm32cube.ide.mcu.rcp.product_1.16.1_139065175_linux_gtk_x86_64/pl
ugins/com.st.stm32cube.common.mx_6.13.0.202411220809/db/plugins/mcufinder/reactClient/static/j
s/main.1c412f43.js.LICENSE.txt
/home/ahmed/.eclipse/com.st.stm32cube.ide.mcu.rcp.product_1.16.1_139065175_linux_gtk_x86_64/pl
ugins/com.st.stm32cube.common.mx_6.13.0.202411220809/db/plugins/mcufinder/reactClient/static/j
s/main.c273b645.js.LICENSE.txt
/home/ahmed/.eclipse/com.st.stm32cube.ide.mcu.rcp.product_1.16.1_139065175_linux_gtk_x86_64/pl
ugins/com.st.stm32cube.common.mx_6.13.0.202411220809/db/plugins/mcufinder/reactClient/static/j
s/main.e15d4470.js.LICENSE.txt
/home/ahmed/.eclipse/com.st.stm32cube.ide.mcu.rcp.product_1.16.1_139065175_linux_gtk_x86_64/pl
```



```
/home/ahmed/sw/ideaIU-2024.3.1.1/idea-IU-243.22562.218/plugins/Kotlin/kotlinc/license/third_pa
rty/karma-teamcity-reporter_LICENSE.txt
/home/ahmed/sw/ideaIU-2024.3.1.1/idea-IU-243.22562.218/plugins/Kotlin/kotlinc/license/third_pa
rty/testdata/jspecify_license.txt
/home/ahmed/sw/ideaIU-2024.3.1.1/idea-IU-243.22562.218/plugins/Kotlin/kotlinc/license/third_pa
rty/testdata/eclipse_license.txt
/home/ahmed/sw/ideaIU-2024.3.1.1/idea-IU-243.22562.218/plugins/Kotlin/kotlinc/license/third_pa
rty/testdata/dagger_license.txt
/home/ahmed/sw/ideaIU-2024.3.1.1/idea-IU-243.22562.218/plugins/Kotlin/kotlinc/license/third_pa
rty/testdata/lombok_license.txt
/home/ahmed/sw/ideaIU-2024.3.1.1/idea-IU-243.22562.218/plugins/Kotlin/kotlinc/license/third_pa
rty/testdata/rxjava_license.txt
/home/ahmed/sw/ideaIU-2024.3.1.1/idea-IU-243.22562.218/plugins/Kotlin/kotlinc/license/third_pa
rty/testdata/spring_license.txt
/home/ahmed/sw/ideaIU-2024.3.1.1/idea-IU-243.22562.218/plugins/Kotlin/kotlinc/license/third_pa
rty/testdata/findbugs_license.txt
/home/ahmed/sw/ideaIU-2024.3.1.1/idea-IU-243.22562.218/plugins/Kotlin/kotlinc/license/third_pa
rty/testdata/eclipse_distribution_license.txt
/home/ahmed/sw/ideaIU-2024.3.1.1/idea-IU-243.22562.218/plugins/Kotlin/kotlinc/license/third_pa
rty/assemblyscript_license.txt
/home/ahmed/sw/ideaIU-2024.3.1.1/idea-IU-243.22562.218/plugins/Kotlin/kotlinc/license/third_pa
rty/okhttp_license.txt
/home/ahmed/sw/ideaIU-2024.3.1.1/idea-IU-243.22562.218/plugins/Kotlin/kotlinc/license/third_pa
rty/asm_license.txt
```

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

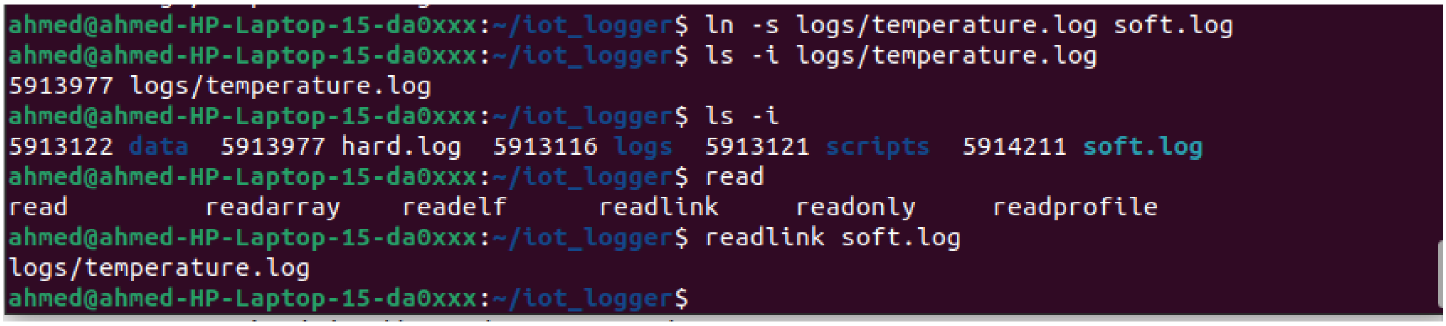
hard :-



```
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger$ ln logs/temperature.log hard.log
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger$ ls -i
5913122 data   5913977 hard.log  5913116 logs   5913121 scripts
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger$ ls -i logs/temperature.log
5913977 logs/temperature.log
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger$ 
```

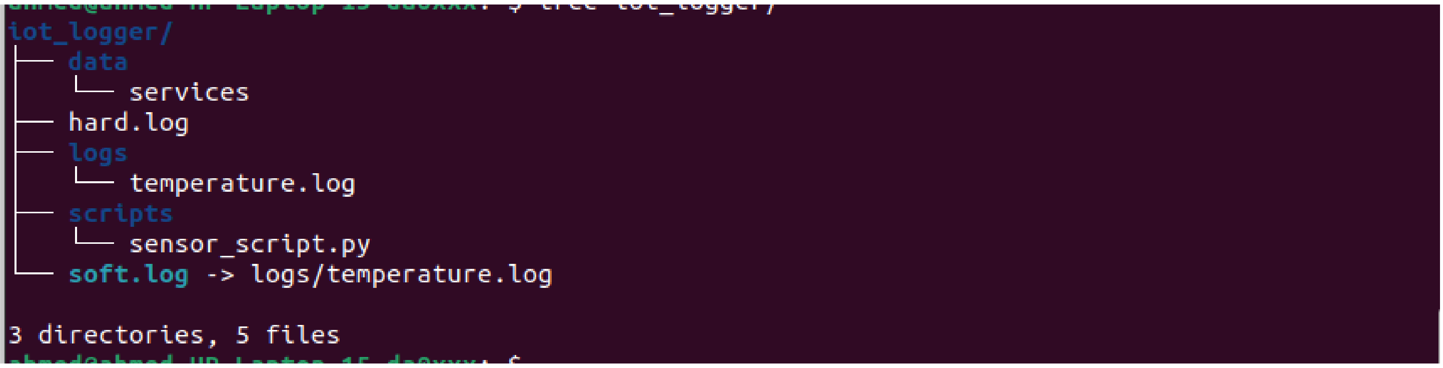
note : same inode hard.log and temperature.log

symbolic :-



```
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger$ ln -s logs/temperature.log soft.log
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger$ ls -i logs/temperature.log
5913977 logs/temperature.log
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger$ ls -i
5913122 data   5913977 hard.log  5913116 logs   5913121 scripts   5914211 soft.log
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger$ read
read          readarray     readelf       readlink      readonly      readprofile
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger$ readlink soft.log
logs/temperature.log
ahmed@ahmed-HP-Laptop-15-da0xxx:~/iot_logger$
```

- **Display directory structure to confirm organization.**



```
ahmed@ahmed-HP-Laptop-15-da0xxx:~$ tree iot_logger/
iot_logger/
├── data
│   └── services
├── hard.log
├── logs
│   └── temperature.log
├── scripts
│   └── sensor_script.py
└── soft.log -> logs/temperature.log

3 directories, 5 files
ahmed@ahmed-HP-Laptop-15-da0xxx:~$
```

Open-Ended Questions:

- **Explain the different types of files in Linux (regular, directory, symbolic link, device, etc.) and how to check them with commands.**

we can check them with “ls -l” command and check the first char in permission word in the start of the line:

– → regular

d → directory

l → symbolic link

c → character device

b → block device

Regular → called regular to distinguish it from other file types. it is as images,txt,compressed files and other ..

directory → it is a special file that work as container for other files. it contains the files names and its inode number

symbolic link → it is a special file that points to another file or directory, Also contains the path for another file character device → file provides interface for a device that transfer one character at a time. devices such as terminal and keyboards

block device → file provides interface for a device that transfer large fixed blocks such as hard and RAM.

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

– hard link points to the data itself and has the same inode of the pointed file

– if the pointed file is removed the data won’t be removed because the hard link still points to the data.

– I will use hard link if I have a critical file and I want to have copy or backup of it if I deleted the original by accident

– symbolic link is just a shortcut that contains only the path of the pointed file.

– if the pointed file deleted the symbolic link become dangling and the data on the disk removed.
– I will use symbolic link if I have large path file and I want to point to it easily.

Is rmdir the same as rm -r when deleting directories? Explain.

No, rmdir is more safe and used to remove only empty directories. rm -r is more dangerous as it used to delete the directory and its files and sub-directories.