

Day 5 – Phase 5: Scripting Automation, Redirection & FDs

Tasks

1)

```
aya@aya-VirtualBox: ~/Desktop
aya@aya-VirtualBox:~/Desktop$ export sensor_type=temperature
aya@aya-VirtualBox:~/Desktop$ echo $sensor_type
temperature
```

2) I am gonna do this step with echo not nano because the “x” letter is not working.

```
aya@aya-VirtualBox: ~/iot_logger/scripts
aya@aya-VirtualBox:~/Desktop$ cd ~
aya@aya-VirtualBox:~$ sudo chmod 777 iot_logger
[sudo] password for aya:
aya@aya-VirtualBox:~$ cd iot_logger
aya@aya-VirtualBox:~/iot_logger$ ls
data  logs  scrips
aya@aya-VirtualBox:~/iot_logger$ cd scrips
aya@aya-VirtualBox:~/iot_logger/scrips$ echo '#!/usr/bin/bash' > sensor_script.py
echo 'import time' >> sensor_script.py
echo 'import random' >> sensor_script.py
echo 'from datetime import datetime' >> sensor_script.py
echo 'import os' >> sensor_script.py
echo 'sensor_type = os.getenv("Sensor_Type", "temperature")' >> sensor_script.py
echo 'def generate_sensor_value():' >> sensor_script.py
echo '    if sensor_type.lower() == "temperature":' >> sensor_script.py
echo '        return round(random.uniform(20.0, 35.0), 2) # Celsius' >> sensor_script.py
echo '    else:' >> sensor_script.py
echo '        return round(random.uniform(0.0, 100.0), 2) # Generic %' >> sensor_script.py
echo 'def log_sensor_data():' >> sensor_script.py
echo '    while True:' >> sensor_script.py
echo '        timestamp = datetime.now().strftime("%Y-%m-%d %H:%M:%S")' >> sensor_script.py
echo '        value = generate_sensor_value()' >> sensor_script.py
echo '        print(f"[{timestamp}] {sensor_type}: {value}")' >> sensor_script.py
echo '        time.sleep(2)' >> sensor_script.py
echo 'if __name__ == "__main__":' >> sensor_script.py
echo '    log_sensor_data()' >> sensor_script.py
```

3) Change it from bash to python → #!/usr/bin/env python3.

```
aya@aya-VirtualBox: ~/iot_logger
aya@aya-VirtualBox:~/iot_logger$ sudo chmod +x ./scrips/sensor_script.py
aya@aya-VirtualBox:~/iot_logger$ ./scrips/sensor_script.py > ./logs/temperature &
[1] 18436
aya@aya-VirtualBox:~/iot_logger$ ./scrips/sensor_script.py: line 2: import: command not found
./scrips/sensor_script.py: line 3: import: command not found
./scrips/sensor_script.py: line 4: from: command not found
./scrips/sensor_script.py: line 5: import: command not found
./scrips/sensor_script.py: line 6: syntax error near unexpected token `('
./scrips/sensor_script.py: line 6: `sensor_type = os.getenv("Sensor_Type", "temperature")'
^C
[1]+  Exit 2                  ./scrips/sensor_script.py > ./logs/temperature
aya@aya-VirtualBox:~/iot_logger$ ./scrips/sensor_script.py > ./logs/temperature &
[1] 18548
aya@aya-VirtualBox:~/iot_logger$ man ps
aya@aya-VirtualBox:~/iot_logger$ ps -a | grep sensor_script.py
aya@aya-VirtualBox:~/iot_logger$ ps aux | grep sensor_script.py
aya      18548  0.0  0.4 18880  8960 pts/3    S   17:48   0:00 python3 ./scrips/sensor_script.py
aya      18599  0.0  0.1  9228  2304 pts/3    S+  17:50   0:00 grep --color=auto sensor_script.py
```

4)

```
aya@aya-VirtualBox: ~/iot_logger

aya@aya-VirtualBox:~/iot_logger$ ls -l /proc/18548/fd
total 0
lrwx----- 1 aya aya 64 0 17:52 1 سبت -> /dev/pts/3
l-wx----- 1 aya aya 64 1 17:52 1 سبت -> /home/aya/iot_logger/logs/temperature
lrwx----- 1 aya aya 64 2 17:52 1 سبت -> /dev/pts/3
```

5)

```
aya@aya-VirtualBox: ~/iot_logger/logs

aya@aya-VirtualBox:~/iot_logger$ cd logs
aya@aya-VirtualBox:~/iot_logger/logs$ grep 1 temperature > newfile
aya@aya-VirtualBox:~/iot_logger/logs$ cat newfile
[2025-09-01 17:48:48] temperature: 21.51
[2025-09-01 17:48:50] temperature: 28.58
[2025-09-01 17:48:52] temperature: 27.4
[2025-09-01 17:48:54] temperature: 20.89
[2025-09-01 17:48:56] temperature: 33.01
[2025-09-01 17:48:58] temperature: 21.63
[2025-09-01 17:49:00] temperature: 31.06
[2025-09-01 17:49:02] temperature: 26.0
[2025-09-01 17:49:04] temperature: 24.92
[2025-09-01 17:49:06] temperature: 25.29
[2025-09-01 17:49:08] temperature: 29.73
[2025-09-01 17:49:10] temperature: 27.72
[2025-09-01 17:49:12] temperature: 33.61
[2025-09-01 17:49:14] temperature: 26.11
[2025-09-01 17:49:16] temperature: 32.79
[2025-09-01 17:49:18] temperature: 29.79
[2025-09-01 17:49:20] temperature: 25.38
[2025-09-01 17:49:22] temperature: 33.69
[2025-09-01 17:49:24] temperature: 27.44
[2025-09-01 17:49:26] temperature: 32.4
[2025-09-01 17:49:28] temperature: 32.27
[2025-09-01 17:49:30] temperature: 26.44
[2025-09-01 17:49:32] temperature: 27.57
[2025-09-01 17:49:34] temperature: 24.98
[2025-09-01 17:49:36] temperature: 30.69
[2025-09-01 17:49:38] temperature: 25.15
[2025-09-01 17:49:40] temperature: 26.66
[2025-09-01 17:49:42] temperature: 26.64
[2025-09-01 17:49:44] temperature: 21.49
```

6)

```
aya@aya-VirtualBox: ~/iot_logger/data

aya@aya-VirtualBox:~/iot_logger/logs$ cd ..
aya@aya-VirtualBox:~/iot_logger$ cp ./logs/newfile ./data/
aya@aya-VirtualBox:~/iot_logger$ cd data
aya@aya-VirtualBox:~/iot_logger/data$ ls
data newfile services
aya@aya-VirtualBox:~/iot_logger/data$ cat newfile
[2025-09-01 17:48:48] temperature: 21.51
[2025-09-01 17:48:50] temperature: 28.58
[2025-09-01 17:48:52] temperature: 27.4
[2025-09-01 17:48:54] temperature: 20.89
[2025-09-01 17:48:56] temperature: 33.01
[2025-09-01 17:48:58] temperature: 21.63
[2025-09-01 17:49:00] temperature: 31.06
[2025-09-01 17:49:02] temperature: 26.0
[2025-09-01 17:49:04] temperature: 24.92
[2025-09-01 17:49:06] temperature: 25.29
[2025-09-01 17:49:08] temperature: 29.73
[2025-09-01 17:49:10] temperature: 27.72
[2025-09-01 17:49:12] temperature: 33.61
[2025-09-01 17:49:14] temperature: 26.11
[2025-09-01 17:49:16] temperature: 32.79
[2025-09-01 17:49:18] temperature: 29.79
[2025-09-01 17:49:20] temperature: 25.38
[2025-09-01 17:49:22] temperature: 33.69
[2025-09-01 17:49:24] temperature: 27.44
[2025-09-01 17:49:26] temperature: 32.4
[2025-09-01 17:49:28] temperature: 32.27
[2025-09-01 17:49:30] temperature: 26.44
[2025-09-01 17:49:32] temperature: 27.57
[2025-09-01 17:49:34] temperature: 24.98
[2025-09-01 17:49:36] temperature: 30.69
[2025-09-01 17:49:38] temperature: 25.15
[2025-09-01 17:49:40] temperature: 26.66
```

7)

```
aya@aya-VirtualBox: ~/iot_logger
aya@aya-VirtualBox:~/iot_logger$ unset temperature
aya@aya-VirtualBox:~/iot_logger$ echo $temperature

aya@aya-VirtualBox:~/iot_logger$
```

Challenge

```
aya@aya-VirtualBox: ~/iot_logger
aya@aya-VirtualBox:~/iot_logger$ ls -l | grep .py & sleep 300
[2] 19569

aya@aya-VirtualBox: ~/iot_logger
aya@aya-VirtualBox:~/Desktop$ cd ~
aya@aya-VirtualBox:~$ cd iot_logger
aya@aya-VirtualBox:~/iot_logger$ ps aux | grep sleep
aya      19570  0.0  0.0  8376  1792 pts/3    S+   18:54   0:00 sleep 300
aya      19623  0.0  0.1  9216  2432 pts/0    S+   18:56   0:00 grep --color=
auto sleep
aya@aya-VirtualBox:~/iot_logger$ ps aux | grep grep
aya      19625  0.0  0.1  9216  2304 pts/0    S+   18:56   0:00 grep --color=
auto grep
aya@aya-VirtualBox:~/iot_logger$ ls /proc/19570/fd
0 1 2
aya@aya-VirtualBox:~/iot_logger$ ls -l /proc/19570/fd
total 0
lrwx----- 1 aya aya 64 0 18:57 1  سب  -> /dev/pts/3
lrwx----- 1 aya aya 64 1 18:57 1  سب  -> /dev/pts/3
lrwx----- 1 aya aya 64 2 18:57 1  سب  -> /dev/pts/3
```

Open-Ended Questions

- 1) The `'` is used if I want the text exactly as written; however, `"` if I want the shell to expand variables or commands inside. For instance,
name="Aya"
echo 'Hello \$name'
echo "Hello \$name"
The output will be: Hello \$name
Hello Aya
- 2) `-f`: file exists and is a regular file, and `-d`: file exists and is a directory. For example,
[-f myscript.py] && echo "file ok" # true
[-d myscript.py] && echo "dir ok" # false
[-f logs] && echo "file ok" # false
[-d logs] && echo "dir ok" # true
- 3) Every process has three default file descriptors: 0 → stdin (input), 1 → stdout (standard output), and 2 → stderr (standard error). The stdout (output) redirection is redirecting the values into another file such as `echo 1 temperature > newfile` → its like filtering the “1”

number in temperature file and adding it in the “newfile” file while the stderr is the error redirection.

Appending is adding a new element to the file; however, overwriting is removing what exists and adding these new values. For example,

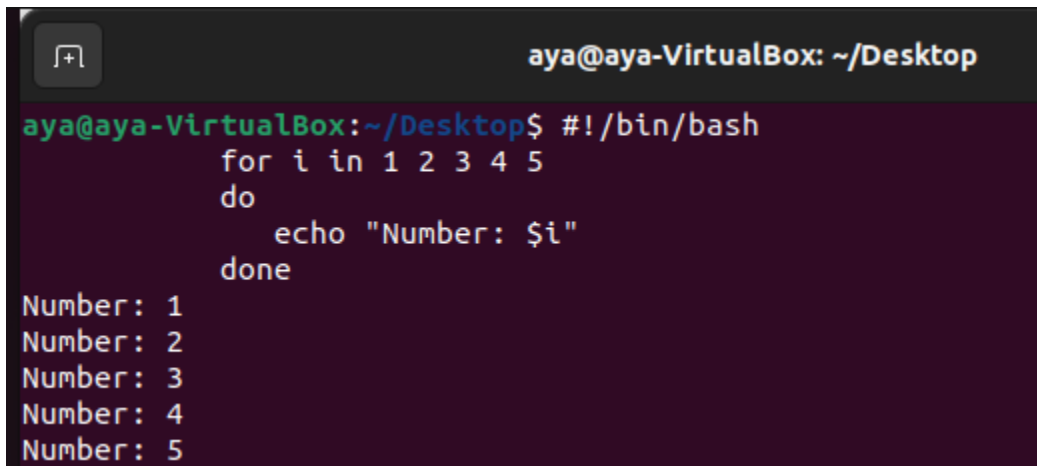
```
echo "Hello" > file # overwrite file with "Hello"
```

```
echo "Aya" >> file # append "Aya" to the end of file
```

I can confirm the redirection by the three file descriptors by checking /proc/<pid>/fd/ to see where file descriptors point.

4) A for loop code:

```
#!/bin/bash
for i in 1 2 3 4 5
do
    echo "Number: $i"
done
```

A screenshot of a terminal window titled 'aya@aya-VirtualBox: ~/Desktop'. The terminal shows a bash script being executed. The script is a for loop that iterates from 1 to 5, printing 'Number: 1' through 'Number: 5'. The output of the script is visible in the terminal, showing each number on a new line.

```
aya@aya-VirtualBox: ~/Desktop$ #!/bin/bash
for i in 1 2 3 4 5
do
    echo "Number: $i"
done
Number: 1
Number: 2
Number: 3
Number: 4
Number: 5
```

Calculator code:

```
#!/bin/bash
echo "Simple Calculator"
echo "Choose operation"
read -p "If you want to add, choose 1 and for subtraction, choose 2" choice
read -p "Enter first number: " num1
read -p "Enter second number: " num2
if [ "$choice" -eq 1 ]; then
    result=$((num1 + num2))
    echo "Result: $result"
elif [ "$choice" -eq 2 ]; then
    result=$((num1 - num2))
    echo "Result: $result"
else
    echo "Invalid choice"
```

fi

```
aya@aya-VirtualBox: ~/Desktop
aya@aya-VirtualBox:~/Desktop$ #!/bin/bash

echo "Simple Calculator"
echo "Choose operation"
read -p "If you want to add, choose 1 and for subtraction, choose 2" choice
read -p "Enter first number: " num1
read -p "Enter second number: " num2

if [ "$choice" -eq 1 ]; then
    result=$((num1 + num2))
    echo "Result: $result"
elif [ "$choice" -eq 2 ]; then
    result=$((num1 - num2))
    echo "Result: $result"
fi

echo "Invalid choice"
Simple Calculator
Choose operation
If you want to add, choose 1 and for subtraction, choose 2 1
Enter first number: 1
Enter second number: 2
Result: 3
```