

# Capstone Task Day 01

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## Tasks:

**open terminal in raspi OS then :**

**1.sudo apt update && upgrade**

**2.echo "Kernel: \$(uname -r) | user: \$(whoami) | date: \$(date) "**

**3.mkdir iot\_logger**

**4.cd iot\_logger/**

**5.mkdir logs scripts data**

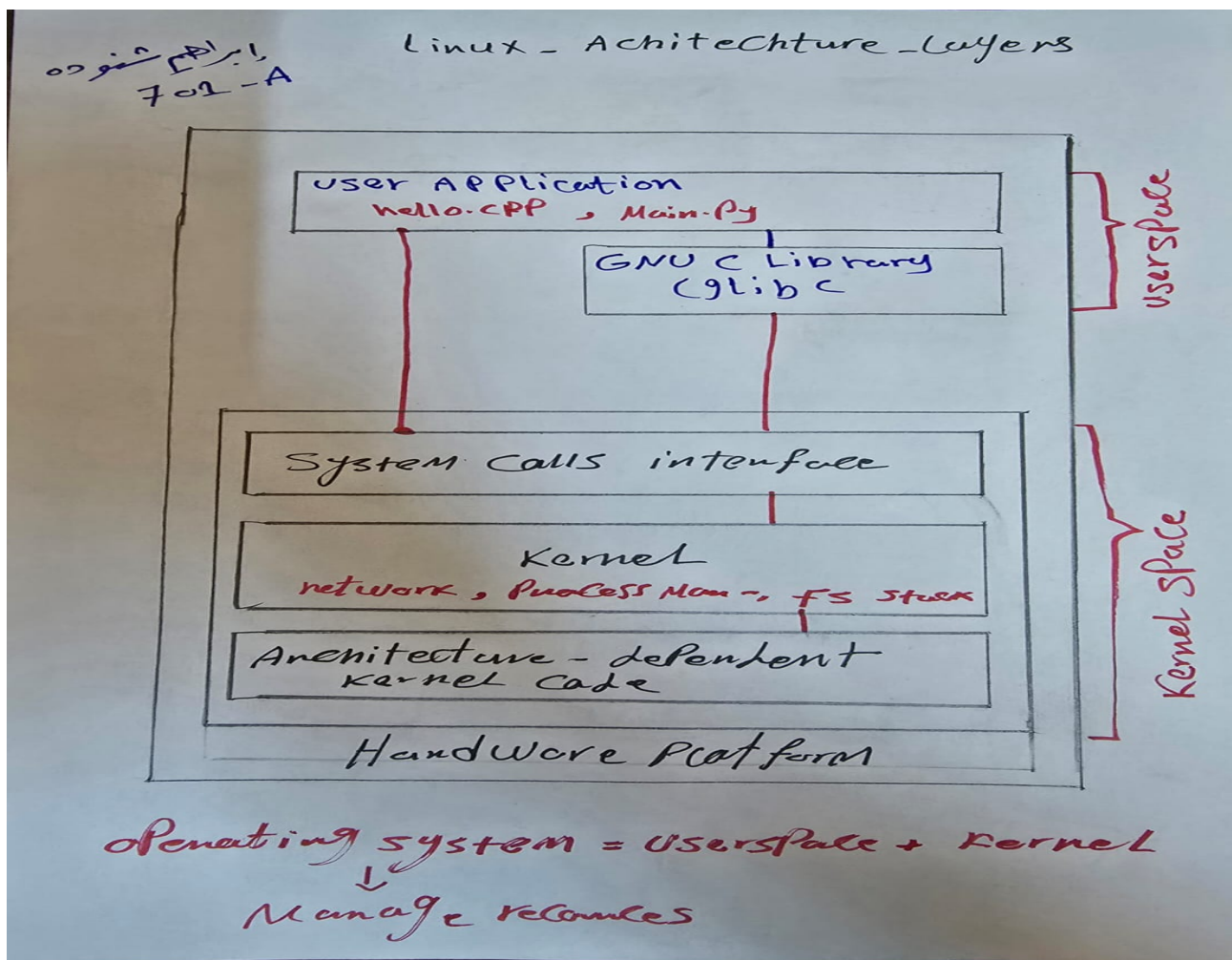
```
ibrahim@rpi4: ~/iot_logger
ibrahim@rpi4: ~/iot_logger
ibrahimshnouda@dell-g15:~$ ssh ibrahim@192.168.1.7
ibrahim@192.168.1.7's password:
Linux rpi4 6.12.25+rpt-rpi-v8 #1 SMP PREEMPT Debian 1:6.12.25-1+rpt1 (2025-04-30) aarch64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Sun Aug 31 08:29:04 2025
-bash: warning: setlocale: LC_ALL: cannot change locale (en_US.UTF-8)
ibrahim@rpi4:~$ sudo apt update && upgrade
Hit:1 http://deb.debian.org/debian bookworm InRelease
Hit:2 http://deb.debian.org/debian-security bookworm-security InRelease
Get:3 http://deb.debian.org/debian bookworm-updates InRelease [55.4 kB]
Hit:4 http://archive.raspberrypi.com/debian bookworm InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
218 packages can be upgraded. Run 'apt list --upgradable' to see them.
-bash: upgrade: command not found
ibrahim@rpi4:~$ uname -r
6.12.25+rpt-rpi-v8
ibrahim@rpi4:~$ whoami
ibrahim
ibrahim@rpi4:~$ date
Sun Aug 31 09:41:56 BST 2025
ibrahim@rpi4:~$ echo "Kernel: $(uname -r) | user: $(whoami) | date: ${date} "
Kernel: 6.12.25+rpt-rpi-v8 | user: ibrahim | date:
ibrahim@rpi4:~$ echo "Kernel: $(uname -r) | user: $(whoami) | date: $(date) "
Kernel: 6.12.25+rpt-rpi-v8 | user: ibrahim | date: Sun Aug 31 09:43:34 BST 2025
ibrahim@rpi4:~$ pwd
/home/ibrahim
ibrahim@rpi4:~$ mkdir iot_logger
ibrahim@rpi4:~$ mkdir ./iot_logger/ logs scripts data
mkdir: cannot create directory './iot_logger/': File exists
ibrahim@rpi4:~$ cd iot_logger/
ibrahim@rpi4:~/iot_logger$ mkdir logs scripts data
ibrahim@rpi4:~/iot_logger$ ls
data logs scripts
ibrahim@rpi4:~/iot_logger$
```

## Open-Ended Questions:

### 1. Linux Architecture



some definitions:

1. Kernel: kernel simply is the Software can manage Hardware direct
2. Hardware: is the platform or the machine can run S/W Programs
3. User space: applications run in the upper layer of OS can not access H/W direct
4. System calls: S/W play the role between user space apps and kernel to ask kernel to run this app
5. shell: is a user space app

2. the purpose of these directories:

- 2.1. /: root directory is the upper layer of linux file system, that all directories starts from the root directory.

**2.2. /bin:** binary contains the essential user command for operational use like: cd, ls , cat, mkdir

**2.3./sbin:** similar to /bin but contains system administration command, mostly used by root file system like: shutdown, ifconfig, fdisk

**2.4./usr:** contains the most installed applications , librares and documents like */bin/lib*

**2.5./etc:** contains the system configurations files like */etc/passwd* : usr account info

**2.6./var:** contains the variables data that changes while the system running like */var/log*

### **3. Every thing is a File , Process vs Program**

**3.1.**in linux you can treat with any file by open(), read(), write(), close() system calls because it SIMPLE AND UNIFORM.

**3.2.** Program is the instructions code in the hard disk, but process the the running of this program in memory and program can create many and process can be multiple of threads, thread is execution inside process