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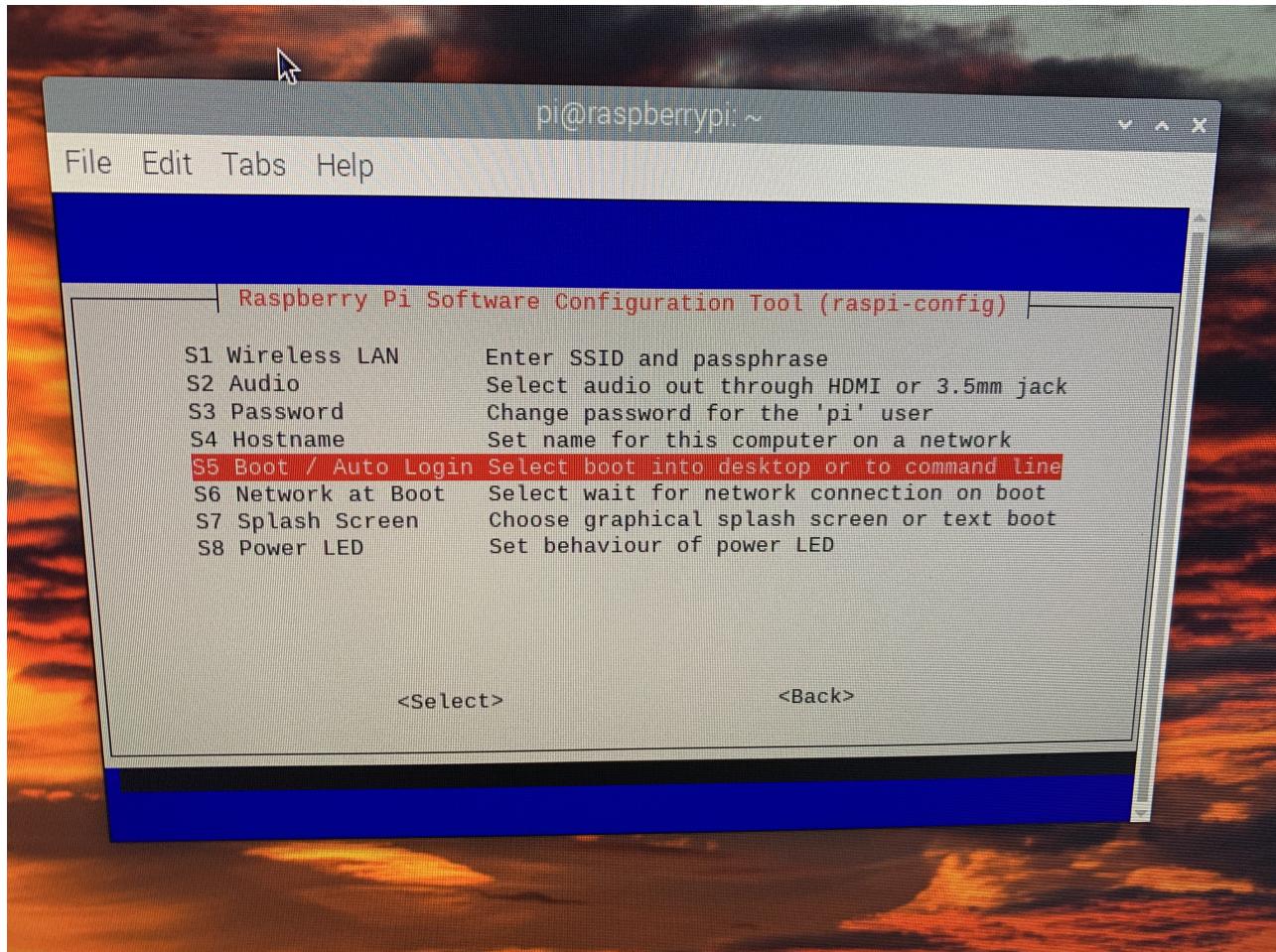
Assignment 1

Objective

The Objective of the assignment is to build and configure the embedded development environment for the raspberry pi. In this assignment the goal is to learn the basics of hardware and software part of the raspberry pi and troubleshooting the problems that encountered during the initial set up.

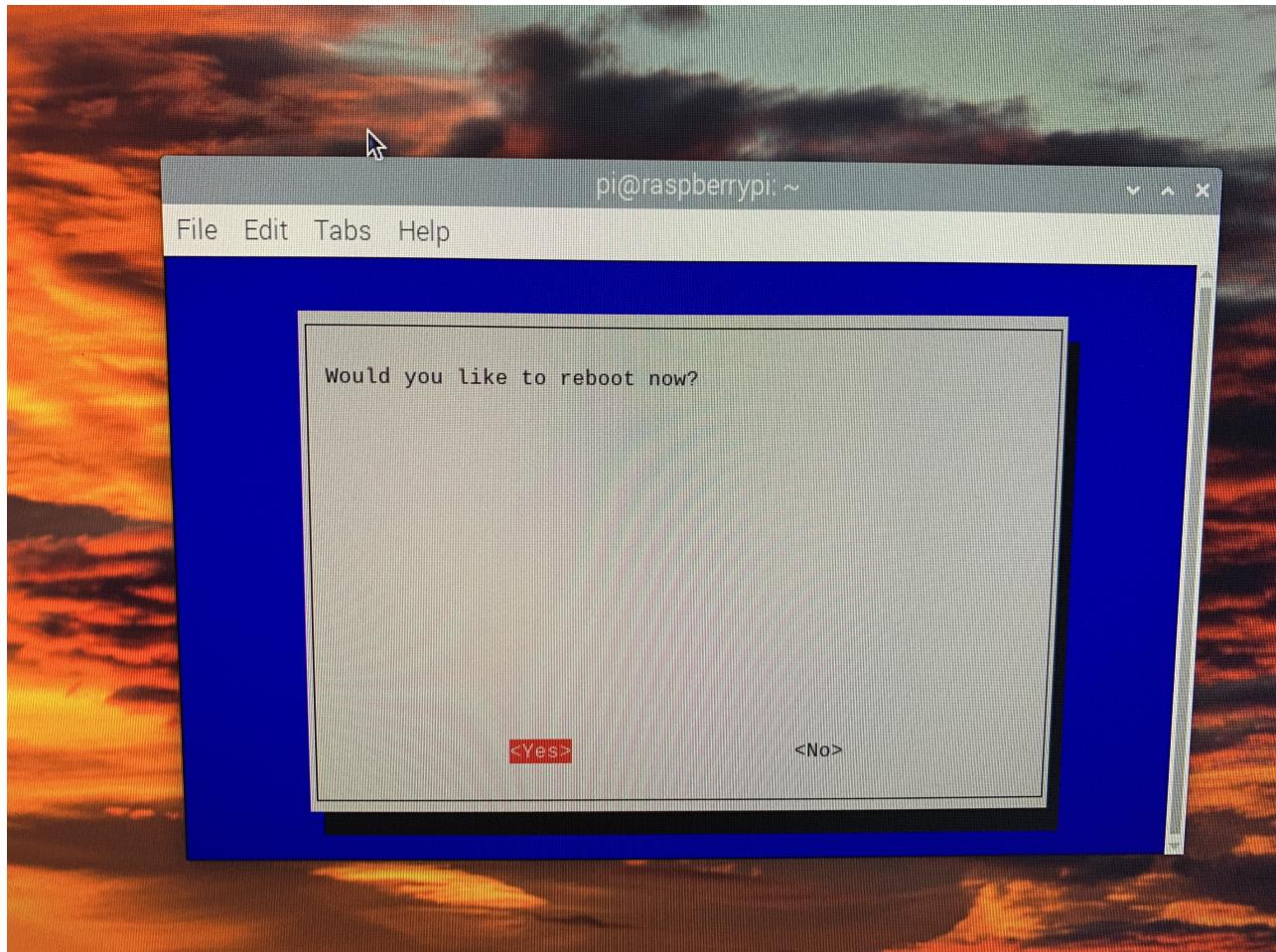
Procedure

1. Set up the raspberry pi board with all the equipments provided starting with the box to encase, connecting fan, connecting to keyboard mouse to USB port. Connect to desktop(HDMI0) and power supply.
2. Inserting the MicroSD card after the first step.
3. Switching on the power to the raspberry pi board. The MicroSD should have already be preloaded with NOOBS in it. But for me it was not working and I got the rainbow splash screen in the desktop. I ensured everything was connected properly.
4. I referred to www.canakit.com/pi/recovery to get details on what needs to be done.
5. Installed Raspberry pi Imager to install the Operating system Raspberry Pi OS 32-bit Bullseye version into the MicroSD card using my Mac.
6. After OS has been installed to my MicroSD I connected that back to raspberry pi board and I got the first page in my desktop to select the Language and time zone.
7. Using \$ sudo raspi -config command choose the console auto login option.



8.

9. Now rebooting the board from desktop menu.



10.

11. Next for setting up the WiFi I used the command \$dmesg | more to check all the hardware connected. WiFi was not present. Then using command \$ sudo nano /etc/network/interfaces edited the file using instruction given in configuration file by Professor. It did not work. I tried many commands found in internet but couldn't work it. After spending more than an hour I connected the WiFi using desktop GUI.

```
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1
network{
    ssid="testRouter5"
    psk="Connect@Sachin"
}
```

12. 
13. Changed target name using command \$ sudo nano /etc/hosts and changes 127.0.1.1 raspberry pi to 127.0.1.1 ANUSHA0. Then modified the hostname file too. After all these steps save and reboot using \$ sudo reboot.

```

GNU nano 5.4
127.0.0.1      localhost
::1            localhost ip6-localhost ip6-loopback
ff02::1        ip6-allnodes
ff02::2        ip6-allrouters

127.0.1.1      ANUSHAO

```

14.

15. Updated the software using \$ sudo apt-get update followed by command \$ sudo apt-get upgrade.

After update restart.

```

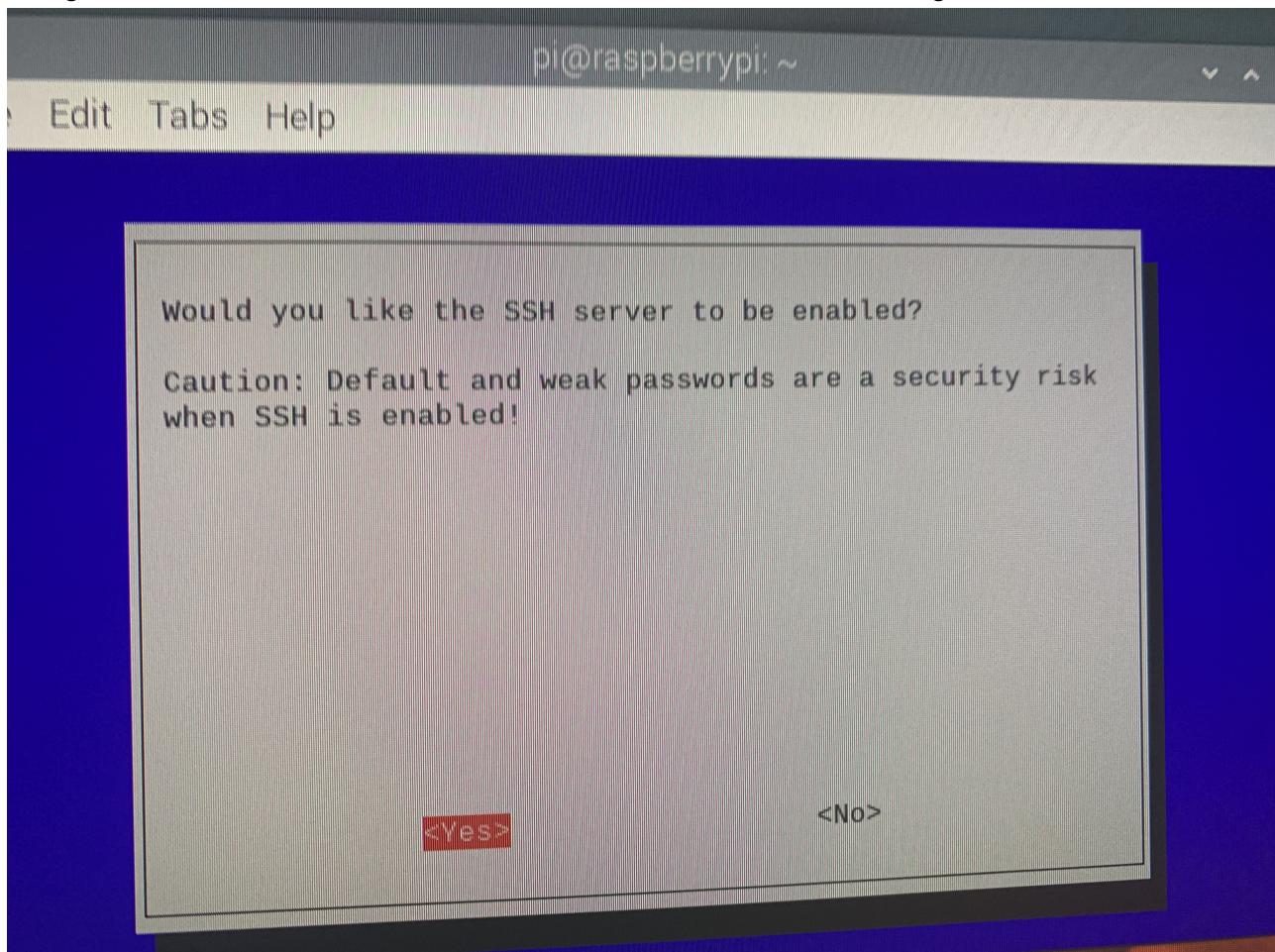
Linux ANUSHAO 5.10.63-v71+ #1459 SMP Wed Oct 6 16:41:57 BST 2021 armv7l
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Wed Jan 12 21:30:44 2022
pi@ANUSHAO: ~$ sudo nano /etc/hosts
pi@ANUSHAO: ~$ sudo nano /etc/hostname
pi@ANUSHAO: ~$ sudo apt update
Get:1 http://archive.raspberrypi.org/debian bullseye InRelease [23.6 kB]
Get:2 http://raspbian.raspberrypi.org/raspbian bullseye InRelease [15.0 kB]
Get:3 http://archive.raspberrypi.org/debian bullseye/main armhf Packages [246 kB]
Get:4 http://raspbian.raspberrypi.org/raspbian bullseye/main armhf Packages [13.2 MB]
Fetched 13.5 MB in 8s (1,633 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
112 packages can be upgraded. Run 'apt list --upgradable' to see them.
N: Repository 'http://archive.raspberrypi.org/debian bullseye' changed its 'Suite' value from 'unstable' to 'stable'.
E: Invalid operation dist-upgrade
pi@ANUSHAO: ~$ sudo apt dist-upgrade
E: Invalid operation apt-dist-upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following package was automatically installed and is no longer required:
  libfuse2
Use 'sudo apt autoremove' to remove it.
The following NEW packages will be installed:
  exfatprogs libbasicsusageenvironment libgroupsock8 liblivemedia77 libusageenvironment3
The following packages will be upgraded:
  arandr base-files chromium-browser chromium-browser-l10n chromium-codecs-ffmpeg-extra curl dhpcd5 distro-info-data ffmpeg firmware-atheros firmware-brcm80211 firmware-libertas firmware-misc-nonfree firmware-realtek ghostscript gir1.2-gtk-3.0 gtk-update-icon-cache libasound2-data libatkpolkit2 libavcodec58 libavdevice58 libavfilter7 libavformat58 libavresample4 libavutil56 libayatane-indicator3-7 libc-dev libcamera-dev libcamera9 libcurl3-gnutls libcurl4 libgmp10 libgs9 libgs9-common libgtk3-3.0 libgtk3-3-common libjavascriptcoregtk-4.0-18 libid3v2 libmetacity-2-0 libnss3 libplymouth5 libpostproc55 libraspberrypi-bin libraspberrypi-doc libraspberrypi9 libseccomp2 libsmclient libswresampled libswscale5 libudisks2-0 libvlc-bin libvlc5 libvnccore9 libwbclient0 libwebkit2gtk-4.0-37 linux-libc-dev locales lxiinput lxpanel-data lxplug-magnifier lxplug-network lxplug-updater mutter mutter-common pcmamf pipanel raspberrypi-ui-mods raspi-config rc-gui rpi-chromium-mods rpi-eeprom samba-libs tzdata udisks2 vcdbg vim-common vim-tiny vlc vlc-bin vlc-data vlc-l10n vlc-plugin-access-extra vlc-plugin-base vlc-plugin-notify vlc-plugin-gt vlc-plugin-samba vlc-plugin-skins2 vlc-plugin-video-output vlc-plugin-video-splitter vlc-plugin-visualization wget xxd
112 upgraded, 5 newly installed, 0 to remove and 0 not upgraded.
Need to get 343 MB of archives.
After this operation, 179 MB of additional disk space will be used.
Do you want to continue? [Y/n] 

```

16.

17. Using command @ sudo service --status --all checked if the ssh is working.



```

REPOSITORY      TAG      IMAGE ID   CREATED      SIZE
ubuntu          latest   d13c942271d6  5 days ago  72.8MB
klavins/520w20  cpp     5173684dec0e  2 years ago  1.45GB
[(base) anushahegde@Anushas-MBP ~ % pwd
/Users/anushahegde
[(base) anushahegde@Anushas-MBP ~ % cd Desktop
[(base) anushahegde@Anushas-MBP Desktop % touch ssh
[(base) anushahegde@Anushas-MBP Desktop % ls
Anusha Hegde resume.pdf           Screen Shot 2021-12-16 at 1.40.41 PM.png
LTSpice screenshots                 ssh
[(base) anushahegde@Anushas-MBP Desktop % touch wpa_supplicant.conf
[(base) anushahegde@Anushas-MBP Desktop % ls
Anusha Hegde resume.pdf           Screen Shot 2021-12-16 at 1.40.41 PM.png
LTSpice screenshots                 ssh
[(base) anushahegde@Anushas-MBP Desktop % cd ..
[(base) anushahegde@Anushas-MBP ~ % ssh pi@ANUSHA0.local
The authenticity of host 'anusha0.local (2601:600:8600:9f:f656:f2d7:8849:5f93)' can't be established
ED25519 key fingerprint is SHA256:jgAnZRAqW5N25BIx8qcf2ajsoRhYTgqocKMQiLwkWSg.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'anusha0.local' (ED25519) to the list of known hosts.
pi@anusha0.local's password:
Linux ANUSHA0 5.10.63-v7l+ #1459 SMP Wed Oct 6 16:41:57 BST 2021 armv7l

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Last login: Wed Jan 12 21:30:44 2022
[pi@ANUSHA0:~ $ sudo nano /etc/hosts
[pi@ANUSHA0:~ $ ]
```



```

[(base) anushahegde@Anushas-MBP Desktop % cd ..
[(base) anushahegde@Anushas-MBP ~ % ssh pi@ANUSHA0.local
The authenticity of host 'anusha0.local (2601:600:8600:9f:f656:f2d7:8849:5f93)' can't be established
ED25519 key fingerprint is SHA256:jgAnZRAqW5N25BIx8qcf2ajsoRhYTgqocKMQiLwkWSg.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'anusha0.local' (ED25519) to the list of known hosts.
pi@anusha0.local's password:
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Last login: Wed Jan 12 21:30:44 2022
[pi@ANUSHA0:~ $ sudo nano /etc/hosts
[pi@ANUSHA0:~ $ ]
```

18. Verification to check the overall process

The screenshot shows a terminal window titled 'anushahegde — pi@ANUS'. The terminal displays the following command-line session:

```
[pi@ANUSHA0:~/Documents/hello_c $ cat test.c
#include<stdio.h>
int main(void)
{
printf("hello world\n");
return 1 ;
}
[pi@ANUSHA0:~/Documents/hello_c $ cc test.c
[pi@ANUSHA0:~/Documents/hello_c $ ls
a.out test.c
[pi@ANUSHA0:~/Documents/hello_c $ ./a.out
hello world
pi@ANUSHA0:~/Documents/hello_c $ ]
```

Road blocks

Installing operating system

After connecting all the hardware components I inserted the MicroSD card which was preloaded with OS. I started seeing rainbow splash screen. I ensured my desktop is connected properly to the HDMI0 and power supply cable. Then I ensured if the MicroSD card is inserted all the way in the slot but raspberry pi did not boot. Finally I reinstalled the operating system to the MicroSD using Raspberry pi Imager.

WiFi issues

I faced some issues while connecting to the WiFi. I tried different approaches listed in the reference by adding wpa_supplicant.conf file with/without adding country code and text code given in the configuration file by professor. Then I tried using system configuration. After many tries I decided to set up the WiFi in GUI, unfortunately even that method did not work(my WiFi name wasn't coming up). Hence I reinstalled the operating system to the MicroSD and configured the raspberry pi from beginning. At last I set up the WiFi using GUI. (Forgot to take the screenshot of setting up WiFi using GUI)

Conclusion

Configuration of raspberry pi 4 has been successfully done.I faced some problems throughout the process but it was interesting and fun to do it since this was my first time working on hands on project.I have created the repository in github for this course and assignment. I am new to github so it took 4-5 hours to create

and write in md file. It took around 3 hours to configure the raspberry pi. Excited and eager to learn more and explore the raspberry pi.

References

1. <https://www.tomshardware.com/reviews/raspberry-pi-set-up-how-to,6029.html>
2. <https://raspberrytips.com/raspberry-pi-wifi-setup/>
3. <https://www.seeedstudio.com/blog/2021/01/25/three-methods-to-configure-raspberry-pi-wifi/>
4. <https://howchoo.com/g/ndy1zte2yjn/how-to-set-up-wifi-on-your-raspberry-pi-without-ethernet>
5. <https://jamesjdavis.medium.com/how-to-update-raspberry-pi-just-follow-these-easy-steps-ac507cf70238>