CS433: Internet of Things (IoT)



Lab no 03 Part 1 – Intro Raspbian OS & Raspberry Pi

This lab provides a basic guideline to install the Raspbian OS on the Raspberry Pi board and connect Raspberry Pi to a Wi-Fi network.

Parts: -

- 1. Download and Install Raspbian.
- 2. Create a Hotspot Network.
- 3. Connect Raspberry Pi Via Wi-Fi
- 4. Use VNC viewer to open Raspbian in Windows.

Required Resources

- Raspbian OS.
- Raspberry Pi imager.
- Putty application.
- Advanced IP Scanner.
- Virtual Network Computing (VNC).
- Raspberry Pi with a power adapter.
- SD card.

Part 1: Download and Install Raspbian OS.

- a. Navigate to URL <u>https://distrowatch.com/?newsid=11392</u> in your web browser and download Raspbian os.
- b. Navigate to URL <u>https://www.raspberrypi.com/software/</u> in your web browser and download Raspberry pi imager to install Raspbian OS on an SD card.
- Steps to Install Raspbian os in SD card
 - 1. Start the Raspberry imager application. You should see the below screen,

Choose OS:



2. Choose Use custom image then choose Raspbian OS located on the computer.



3. **<u>Choose</u> Storage** that SD card located.



4. Choose SD card to install Raspbian OS on the SD card.



5. <u>Configure</u> Settings of Raspberry Pi "Username", "Password", Enable SSh, and Wi-Fi Setting.

Password: ●● Configure wireless LAN SSID: iotlab
Configure wireless LAN SSID: iotlab
SSID: iotlab
Hidden SSID
Password:
Show password
Wireless LAN country: GB
1.

6. <u>Write</u> Raspbian OS on the SD card.

Raspberry Pi Imager v1.7.3	Raspberry Pi Imager v1.7.3 — \Box ×									
Raspberry Pi										
Operating System 2022-07-01-RASPIOS-BULLSEYE-I386.ISO	Operating System Storage 2022-07-01-RASPIOS-BULLSEYE-I386.ISO MXT-USB STO WRITE									
Writing 8%										
		CANCE	L WRITE							

7. After Raspbian OS installation, **Open** the SD card and add these files (SSh, WPA supplicant)

Note: WPA supplicant obtain the Wi-Fi configuration, Open this file and add the SSID and password of Wi-Fi that will be created in part 2

												*wpa_supplicant - Notepad File Edit View	- 0	×
creates	bon2014-sp-bd b bon2711-spi-400 dtb fsupkd fsupkd sart,xef	kan2006-pp-bp kan2 kan2 kan2011-pp-en 4.cm fmp460 starket	bort/278-pH-Fr evida bootcodebin fisspås suntkode?	endine endine endine isse sast4b.ef	cotig cotig cotig cotig cotig kenel sunticef	e-odb COPYINGINAX COPYINGINAX kenef7	bon 2014-pi-2-b db fotmust kernelin kernelin	db fup keneð	de effectives de factor factor factor n	fing.db	bori270-o-o- 3deb faxe_x sart_odel	country=us update_config=1 ctrl_interface=/var/run/wpa_supplicant network={ scan_ssid=1 ssid='iotlab" psk="hostiotlab" }		
												Ln 8, Col 17 100% Unix (LF)	UTF-8	

Part 2: Create a Hotspot Network.

1. Open Network and internet from search in windows,

Open the mobile hotspot and activate it, then

Edit properties, enter the SSID and password of the network and choose the 2.4 band.

Network & inte	ernet > Mo	obile hotspot			_	_)
Mobile hotspot				On	K	
Share my internet connectio	on from			Wi-Fi	~	
Share over				Wi-Fi	×	
Power saving When no devices are connected	l, automatically turn off r	nobile hotspot		On		
Properties					^	. 7
Network properties				Edit	æ	6
Name:	iotlab					
Password:	hostiotlab					
Band:	2.4 GHz					
Devices connected:	1 of 8					
Device name		IP address	Physical address (MAC)		_	
raspberrypi		192.168.137.134	b8:27:eb:45:0e:71			

Part 3: connect Raspberry Pi Via Wi-Fi

1. Open cmd and write ipconfig to get the network IP address.



2. Copy the network **IP address** and open the **IP scanner program** to search for the **Raspberry IP address (192.168.137.61)**.

2.168.13	7.1-255				Search	
sults	Favorites					
Status P Status Sta	Name LAPTOP-S2FUC OPPO-Reno5.m raspberrypi.msh	IP 192.168.137.1 192.168.137.60 192.168.137.61	Manufacturer Raspberry Pi Fo	MAC address 3A:68:93:93:C4:DE 3A:C0:CF:EE:5B:5D B8:27:EB:45:0E:71	Comments	

Open the PuTTY program Add raspberry IP address (192.168.137.61) in hostname and click Open.

Session	Bosic options for your PuTTY sossion	
	Specify the destination you want to connect to Host Name (or IP address) Port 192.168.137.61 22 Connection type:	
Behaviour Translation Selection Colours Connection Data	Load, save or delete a stored session Saved Sessions Default Settings Load	
⊕ SSH Serial Telnet Rlogin	Save	
SUPDUP		
SUPDUP	Close window on exit: Always Never Only on clean exit	

4. **<u>Connect</u>** to Raspberry Pi and Enter the password of the Raspberry Pi.

P 192.168.137.61 - PuTTY	_	×
🖁 login as: pi 🖁 pi@192.168.137.61's password: 🗌		

5. <u>Write</u> in PuTTY terminal: command **sudo raspi-config** to configure the setting of the Raspberry Pi.

🗬 pi@raspberrypi: ~			\times
⊿ login as: pi ⊿ pi@192.168.137.61's password: Linux raspberrypi 5.10.63-v7+ #1459 SMP Wed Oct 6 16:41:10 BST 24	021 arm	nv71	
The programs included with the Debian GNU/Linux system are free a the exact distribution terms for each program are described in th individual files in /usr/share/doc/*/copyright.	softwar ne	re;	
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the exten permitted by applicable law. Last login: Fri Oct 21 10:21:30 2022 from 192.168.137.1 pi@raspberrypi:~ \$ sudo raspi-config]			

6. <u>Click</u> on interface options, enable SSh, and click ok.



	1	Spoor.	Ly II SOICWAIC	configuración foor (faspi config)
P1	Camera		Enable/disable	connection to the Raspberry Pi Camera
Р2	SSH		Enable/disable	remote command line access using SSH
P3	VNC		Enable/disable	graphical remote access using RealVNC
P4	SPI		Enable/disable	automatic loading of SPI kernel module
P5	I2C		Enable/disable	automatic loading of I2C kernel module
P6	Serial	Port	Enable/disable	shell messages on the serial connection
P7	1-Wire		Enable/disable	one-wire interface
P8	Remote	GPIO	Enable/disable	remote access to GPIO pins
			<select></select>	<back></back>



7. Click on interface options, Enable VNC, and click ok



Part 4: using VNC viewer to open Raspbian in Windows.

1. Open VNC viewer, enter raspberry lp address 192.168.137.61 and connect.

VR Viewer				-	
VNC CONCECT by RealVNC 192.168.137.	51				Sign in •
by MarVVIC	192.168.137.61 - VNC Viewer	-)	- ×		
	Connecting to 192.168.137.6	51			
	Stop				

2. Enter raspberry **username** and **password** the open Raspbian os.



Resources:

- Setup Video link <u>https://www.youtube.com/watch?v=MQVVSxXKLGI</u>
- Raspbian OS link https://distrowatch.com/?newsid=11392
- Programs link <u>https://drive.google.com/file/d/1NHtVy78JDU6kUVAMOoV5JI-4WdkRI_7F/view?usp=sharing</u>