

Lab 0.1 Edge Computer and Headless Environment Setup

Learning Goals

Students will be able to:

1. Model the essential steps to setup network connection to Raspberry Pi
2. Contrast the different network connection options available for Raspberry Pi
3. Perform basic setup and get access to Raspberry Pi in headless system

1.1 Introduction

Headless and remote access allows us to control and manage the edge device without hardware interface and visiting the site. In this lab, you will do basic setup and make the wireless or wired connection of Raspberry Pi to a network and access it using SSH and VNC software.

1.2 Access to Raspberry Pi using SSH

In this section we will access Raspberry Pi using SSH via the ethernet cable. Follow the steps below.

1. Run CMD on your laptop
2. Type `ssh pi@firstnamelastname.local` for Host Name
3. Enter your password. (If you forgot, you need to install OS again...)

You will see the terminal window of Raspberry pi as Figure 1. This is SSH access to headless computer. Through SSH, you can do all: setup, manage file systems, write code, install packages, and so on.

```
pi@nabinmyeong: ~
Microsoft Windows [Version 10.0.19045.6691]
(c) Microsoft Corporation. All rights reserved.

C:\#Users\#nabin>ssh pi@nabinmyeong.local
pi@nabinmyeong.local's password:
Linux nabinmyeong 6.12.47+rpt-rpi-v8 #1 SMP PREEMPT Debian 1:6.12.47-1+rpt1 (2025-09-16) 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: Thu Dec  4 09:53:01 2025 from fe80::b89:a557:ba6a:249f%eth0
pi@nabinmyeong: ~ $
```

Figure 1 SSH access to Raspberry Pi

Task 1.1

Capture your terminal window after login to Raspberry Pi as Figure 1 and attach it to the report below:

```
pi@robertclaud: ~
$ ssh pi@robertclaud
The authenticity of host 'robertclaud (fe80::83:6f25:26bd:fc51%12)' can't be established.
ED25519 key fingerprint is: SHA256:N6d/qEUYjeRQ8dcjEl70Si9uNB0t+vp2TbxJft24JaA
This host key is known by the following other names/addresses:
  -./ssh/known_hosts:4: 192.168.50.190
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'robertclaud' (ED25519) to the list of known hosts.
** WARNING: connection is not using a post-quantum key exchange algorithm.
** WARNING: RSA keys are more vulnerable to store now, decrypt later attacks.
** The server may need to be upgraded. See https://openssh.com/pq.html
pi@robertclaud's password:
Linux robertclaud 6.1.21-v8+ #1642 SMP PREEMPT Mon Apr  3 17:24:16 BST 2023 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: Fri Jan 29 00:56:40 2026
pi@robertclaud: ~
```

1.3 Basic setup of Raspberry Pi

Now, you can access Raspberry Pi from your laptop using SSH via an Ethernet cable. Even if your laptop can use the Internet, Raspberry Pi is not because we haven't make the Internet connection yet. We will deal with the Internet sharing in the next section. Before that, let's do basic configurations for Raspberry Pi such as 'Country', 'Keyboard', 'Timezone', and so on.

The essential configurations can be set up using 'sudo raspi-config' command.

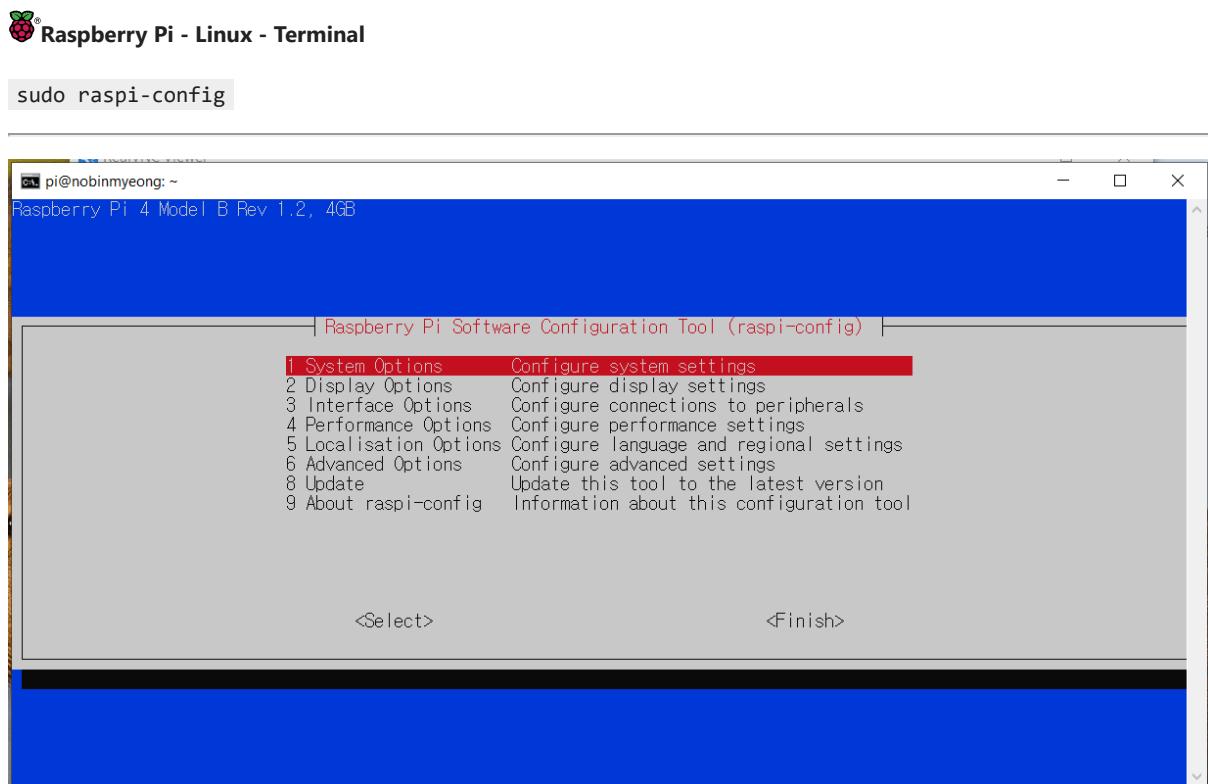


Figure 2 Raspberry Pi Configuration Tool

※ *sudo* is a Linux command meaning 'super user do'. This command means execute *raspi-config* command in super user (root/admin) privilege.

Figure 2 shows an interface windows of '*raspi-config*'. You use keyboard (number keys, arrow keys, Enter, ESC, Space, etc.) to manipulate the configuration setting. Try to move using keyboard. For the basic configurations, follow the steps below.

1. Enable 'VNC' interface > Location: Interface Options/VNC

2. Change WLAN country to 'US United States' > Location: Localisation Options/WLAN country

3. Finish (save) *raspi-config*

※ *Raspberry Pi* may ask you 'Would you like to reboot now?' If you choose , you can skip step 7.

4. Reboot Raspberry Pi using the command below

Raspberry Pi - Linux - Terminal

```
sudo reboot
```

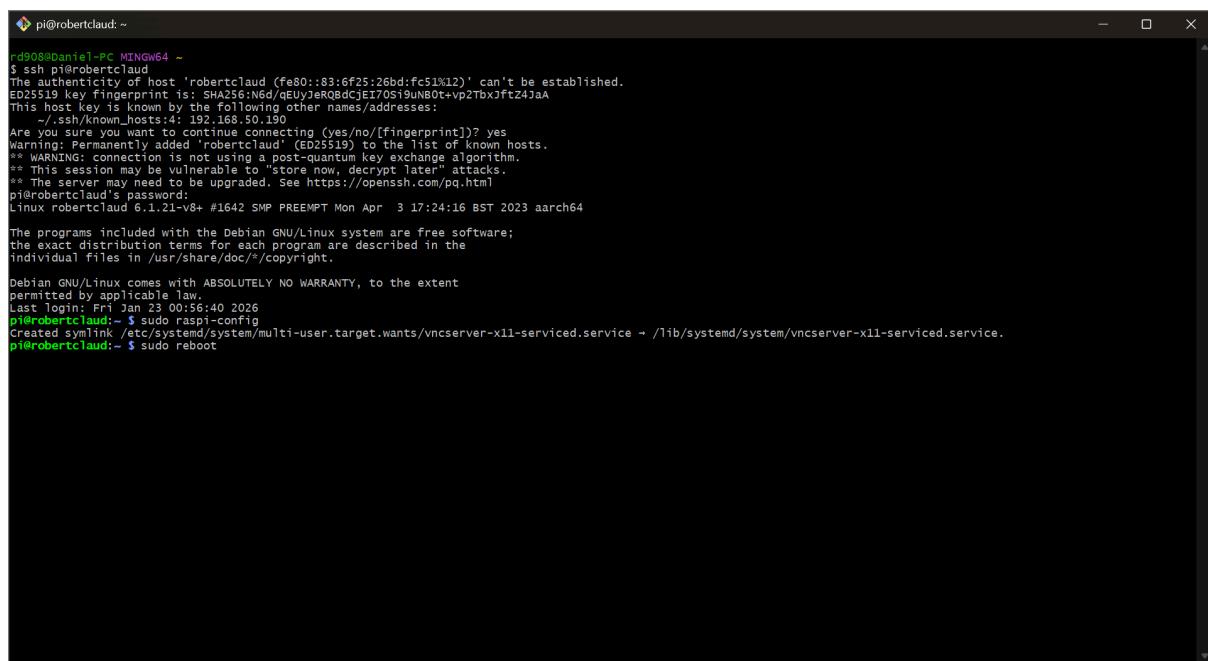
※ We will frequently use 'sudo reboot' after configuration changes, package installations, and so on so that the changes can be reflected properly.

※ If you execute 'sudo reboot', the ethernet connection must be inactive because the Raspberry Pi restarts.

Now, you finished basic setup for Raspberry Pi other than the network connection.

Task 1.2

Capture your terminal window after rebooting as Figure 1 and attach it to the report below:



```
pi@robertclaud:~  
$ ssh pi@robertclaud  
The authenticity of host 'robertclaud (fe80::83:6f25:26bd:fc51%12)' can't be established.  
ED25519 key fingerprint is: SHA256:N6d/qEUYjeRQBdcjEI70Si9uNB0t+vp2TbxJftZ4jaA  
This host key is known by the following other names/addresses:  
~/ssh/known_hosts:4: 192.168.50.190  
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes  
Warning: Permanently added "robertclaud" (ED25519) to the list of known hosts.  
pi@robertclaud:~$  
** Connection closed without reading the key exchange algorithm.  
** This session may be vulnerable to "store now, decrypt later" attacks.  
** The server may need to be upgraded. See https://openssh.com/pq.html  
pi@robertclaud's password:  
Linux robertclaud 6.1.21-v8+ #1642 SMP PREEMPT Mon Apr  3 17:24:16 BST 2023 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: Fri Jan 23 00:56:40 2026  
pi@robertclaud:~ $ sudo raspi-config  
Created symlink /etc/systemd/system/multi-user.target.wants/vncserver-x11-service.service → /lib/systemd/system/vncserver-x11-service.service.  
pi@robertclaud:~ $ sudo reboot
```

1.4 Assign static IP and the Internet connection sharing

In this section, we will make the Raspberry Pi use the Internet by routing network of the laptop. We first assign static IP addresses for both laptop and the Raspberry Pi. For the network sharing and routing, we will use the Internet sharing of your Windows machine so that the Raspberry Pi can get the Internet access through your laptop. Note that your laptop must be connected to the Internet.

The ethernet IP of your laptop will be `192.168.137.1` and the ethernet IP of Raspberry Pi will be `192.168.137.2`, as shown in Figure 3.

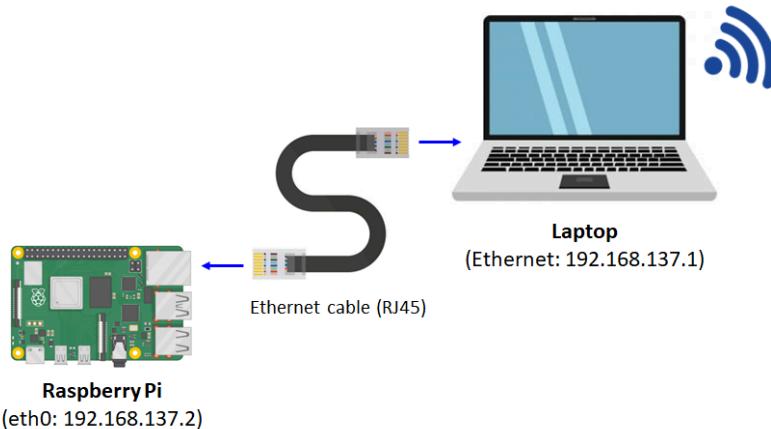


Figure 3 Wired connection configuration between Raspberry Pi and laptop

Let's set up your Raspberry Pi. Follow the steps below after get access to the Raspberry Pi using CMD.

1. Type `sudo nano /etc/dhcpcd.conf`

※ This command line means edit 'dhcpcd.conf' file at '/etc' directory using 'nano' editor in the root privilege.

2. Write the following at the end of the 'dhcpcd.conf' file.

Raspberry Pi - `/etc/dhcpcd.conf`

```
interface eth0

static ip_address=192.168.137.2/24
static routers=192.168.137.1
static domain_name_servers=192.168.137.1 8.8.8.8
```

```

pi@raspberrypi: ~
GNU nano 8.4          /etc/dhcpcd.conf
# Most distributions have NTP support.
#option ntp_servers

# A ServerID is required by RFC2131.
require dhcp_server_identifier

# Generate SLAAC address using the Hardware Address of the interface
#slaac hwaddr
# OR generate Stable Private IPv6 Addresses based from the DUID
slaac private

interface eth0

static ip_address=192.168.137.2/24
static routers=192.168.137.1
static domain_name_servers=192.168.137.1 8.8.8.8

[ Wrote 52 lines ]
^G Help      ^O Write Out  ^F Where Is  ^K Cut      ^T Execute  ^C Location
^X Exit      ^R Read File  ^N Replace   ^U Paste    ^J Justify  ^/ Go To Line

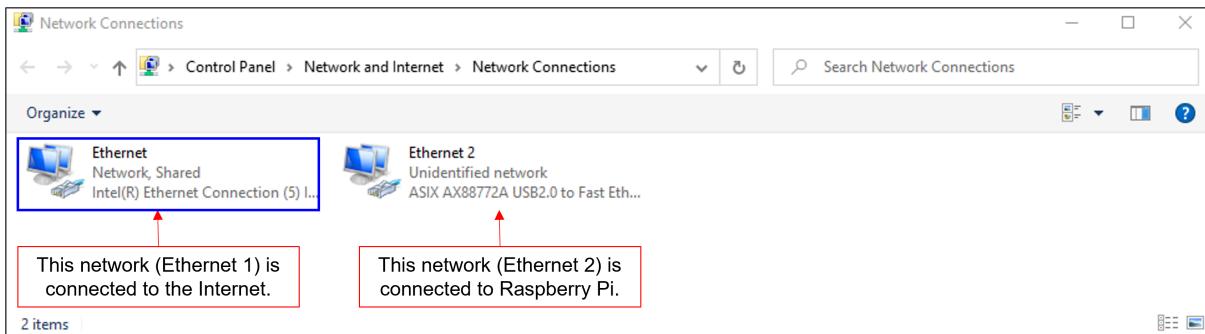
```

* You can easily paste the text using right-click of your mouse on the terminal window after copying the text.

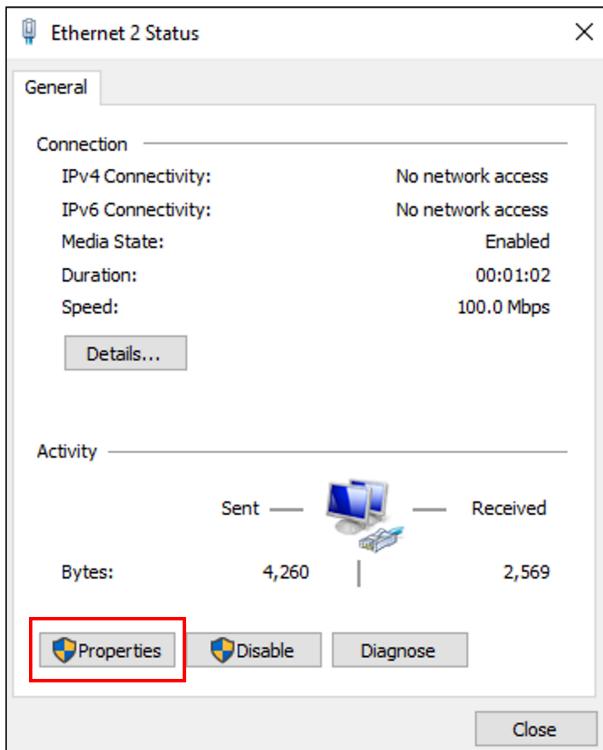
3. Save this configuration file (Shortcut: Ctrl+s)
4. Exit this configuration file (Shortcut: Ctrl+x)
5. Reboot the Raspberry Pi in the terminal using `sudo reboot` command and then unplug the ethernet cable temporarily.

Next, let's set up your laptop (Windows 10). Follow the steps below.

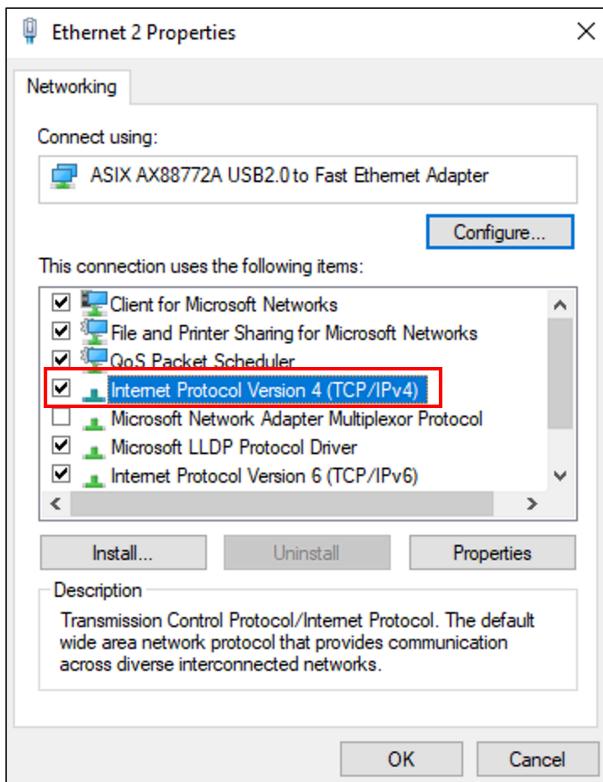
1. Open 'Network Connection' in 'Control Panel'



2. Double click the network connected to Raspberry Pi ('Ethernet 2' in this example)
3. Click 'Properties'



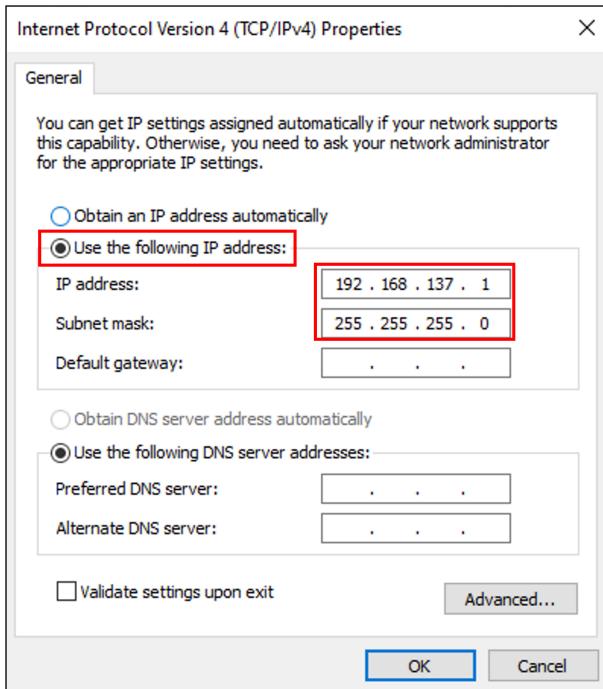
4. Double click 'Internet Protocol Version 4 (TCP/IPv4)'



5. Click 'Use the following IP address'

6. Set 'IP address' and 'subnet mask' as followed:

IP address: 192.168.137.1
Subnet mask: 255.255.255.0



7. click 'OK'

Now, static IP assignment for the wired (ethernet) connection is done. Plug the ethernet cable into Raspberry Pi again. Then, access it using CMD. You can use the same host name. Let's see if it works using ping test by performing Task1.3.

Do you think the static IP address of the Raspberry Pi can be used as the host name for SSH access in CMD? Try it!

Task 1.3

Capture your ping test results from both machines each other and attach those to the report below:

** If you want to halt a process or execution in the terminal, the shortcut is Ctrl+c.*

```

MINGW64/c/Users/rd908
pi@robertc-laud:~ $ ping 192.168.137.1
PING 192.168.137.1 (192.168.137.1) 56(84) bytes of data.
64 bytes from 192.168.137.1: icmp_seq=1 ttl=128 time=0.238 ms
64 bytes from 192.168.137.1: icmp_seq=2 ttl=128 time=0.253 ms
64 bytes from 192.168.137.1: icmp_seq=3 ttl=128 time=0.278 ms
64 bytes from 192.168.137.1: icmp_seq=4 ttl=128 time=0.277 ms
64 bytes from 192.168.137.1: icmp_seq=5 ttl=128 time=0.238 ms
64 bytes from 192.168.137.1: icmp_seq=6 ttl=128 time=0.234 ms
64 bytes from 192.168.137.1: icmp_seq=7 ttl=128 time=0.249 ms
64 bytes from 192.168.137.1: icmp_seq=8 ttl=128 time=0.245 ms
64 bytes from 192.168.137.1: icmp_seq=9 ttl=128 time=0.245 ms
64 bytes from 192.168.137.1: icmp_seq=10 ttl=128 time=0.270 ms
64 bytes from 192.168.137.1: icmp_seq=11 ttl=128 time=0.236 ms
^C
--- 192.168.137.1 ping statistics ---
11 packets transmitted, 11 received, 0% packet loss, time 10230ms
rtt min/avg/max/mdev = 0.234/0.251/0.278/0.015 ms
pi@robertc-laud:~ $ exit
Logout
Connection to 192.168.137.2 closed.

rd908@daniel1-PC MINGW64 ~
$ ping 192.168.137.2
Pinging 192.168.137.2 with 32 bytes of data:
Reply from 192.168.137.2: bytes=32 time<1ms TTL=64

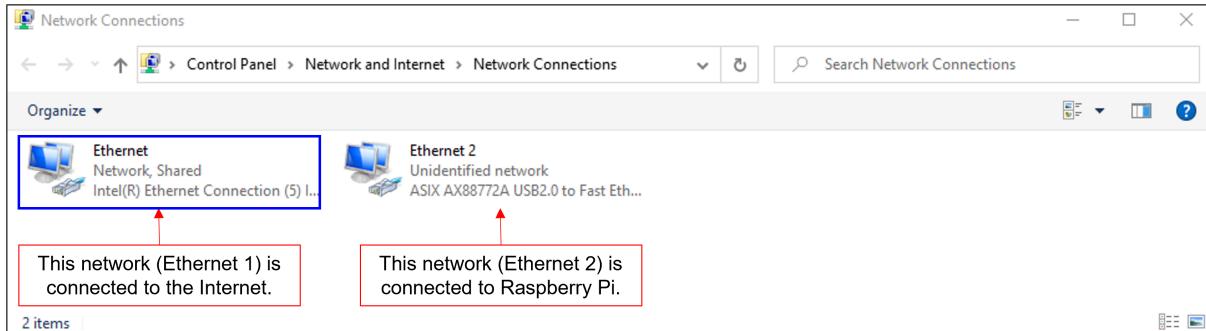
Ping statistics for 192.168.137.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
rd908@daniel1-PC MINGW64 ~
$ |

```

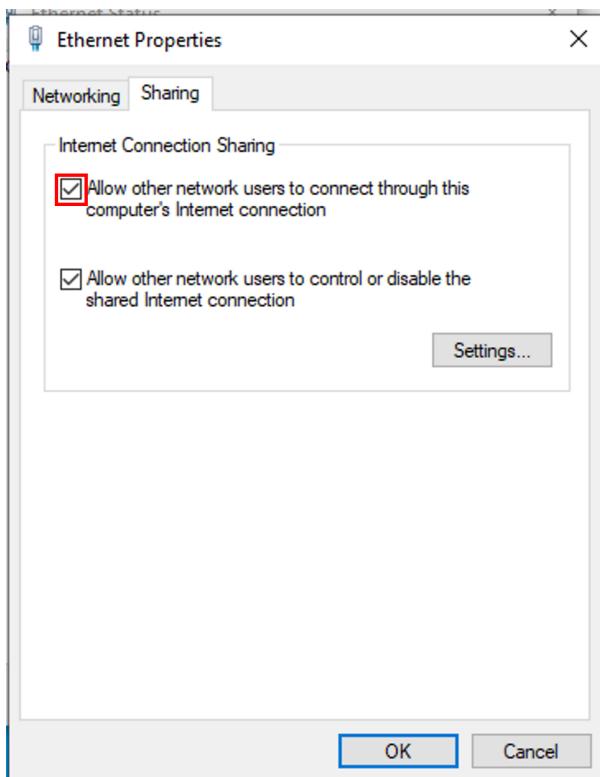
1.5 Internet connection sharing

In some cases, you may experience that Raspberry Pi cannot be connected to the Wifi. For example, Purdue's open Wifi (eduroam or PAL3.0) does not allow the Internet connection from Raspberry Pi because of security reasons. However, Raspberry Pi can use the laptop's internet connection via internet connection sharing. Leave the ethernet cable connection between laptop and Raspberry Pi and follow the step below.

1. Open 'Network Connections' of 'Control Panel'
2. Double click your network that is connected to the Internet (not the 'Ethernet #' connected to Raspberry Pi; in this case, the network 'Ethernet' is connected to the Internet. If you are using Wifi, you should choose it.)



3. Click 'Properties'
4. Check 'Allow other network users to connect through this computer's Internet connection' box in 'Sharing' tab (You may need to select the network (Ethernet) connected to Raspberry Pi of 'Home networking connection' if you have more than 2 networks.)



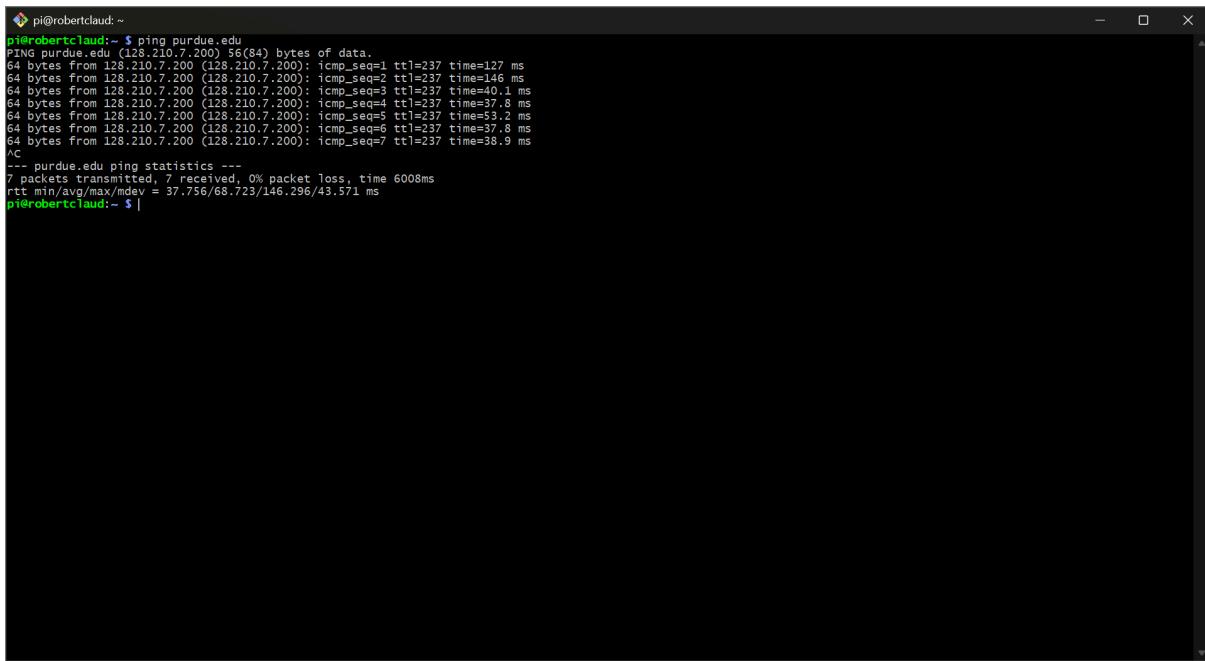
5. Click 'OK'

Now, you are all set for the network connection. Although Raspberry Pi does not have Wifi connection, it can access the Internet via the network connection to laptop. Try ping test by performing Task 1.4

Task 1.4

Capture your ping test results from the Raspberry Pi to Purdue webpage (purdue.edu, `ping purdue.edu`) and attach it to the report below:

* If want to halt a process or execution in the terminal, the shortcut is *Ctrl+c*.

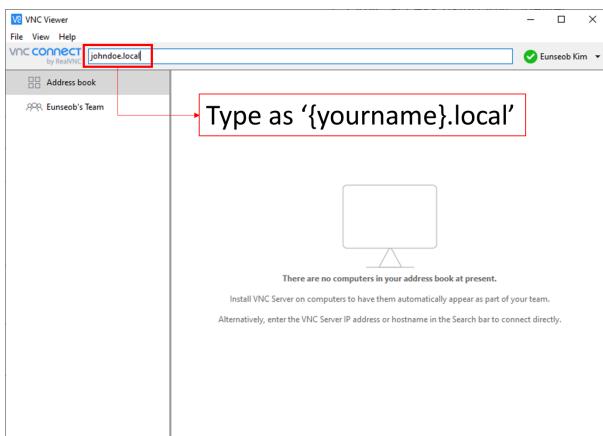


```
pi@robertclaud:~ $ ping purdue.edu
PING purdue.edu (128.210.7.200) 56(84) bytes of data.
64 bytes from 128.210.7.200 (128.210.7.200): icmp_seq=1 ttl=237 time=127 ms
64 bytes from 128.210.7.200 (128.210.7.200): icmp_seq=2 ttl=237 time=146 ms
64 bytes from 128.210.7.200 (128.210.7.200): icmp_seq=3 ttl=237 time=100 ms
64 bytes from 128.210.7.200 (128.210.7.200): icmp_seq=4 ttl=237 time=98.8 ms
64 bytes from 128.210.7.200 (128.210.7.200): icmp_seq=5 ttl=237 time=53.2 ms
64 bytes from 128.210.7.200 (128.210.7.200): icmp_seq=6 ttl=237 time=37.8 ms
64 bytes from 128.210.7.200 (128.210.7.200): icmp_seq=7 ttl=237 time=38.9 ms
^C
--- purdue.edu ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6008ms
rtt min/avg/max/mdev = 37.756/68.723/146.296/43.571 ms
pi@robertclaud:~ $ |
```

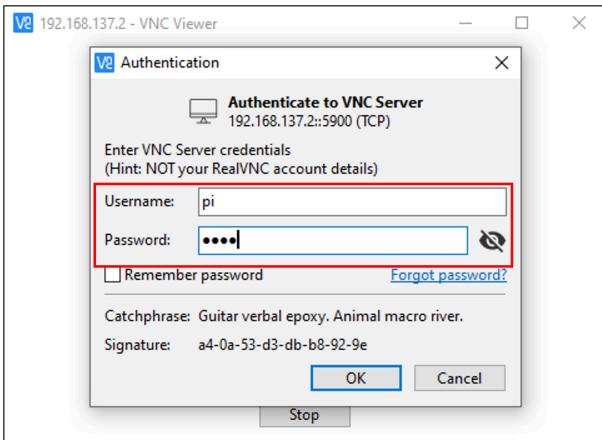
1.6 VNC access using VNC Viewer

In Prelab 0, you've installed VNC Viewer on your laptop. Follow the direction below. If you are using Linux, use Remmina instead of VNC Viewer.

1. Run VNC Viewer on your laptop
2. Type your IP address (`192.168.137.2`) or the host name of the Raspberry PI (`johndoe.local`) and then hit '*Enter*'



3. Type your login credential (username and password) on the pop-up window



4. Click 'OK'

If you see the error window as Figure 4, go to the next, **Troubleshooting Help**, to resolve the display issue.

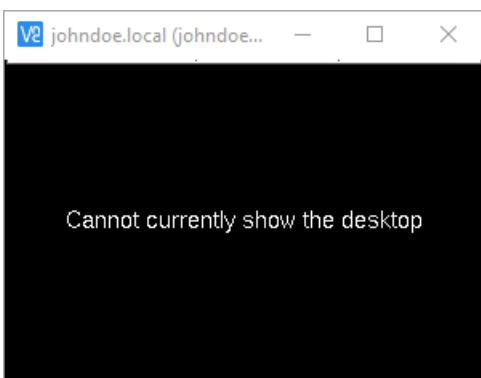


Figure 4 VNC Viewer Error

Now you will see the familiar screen like Figure 5. Play with it! The names of the Taskbar Icons are in Figure 6. If you create an account of RealVNC (<https://www.realvnc.com/en/raspberrypi/>) and your Raspberry Pi is connected to the Internet, you can also access Raspberry Pi via the Internet that means your laptop and Raspberry Pi do not need to be on the same local network for VNC access. A nice instruction is in MagPi (<https://magpi.raspberrypi.com/articles/vnc-raspberry-pi>, available on Jan. 13, 2022). Try file transfer using VNC Viewer between Raspberry Pi and laptop as well.

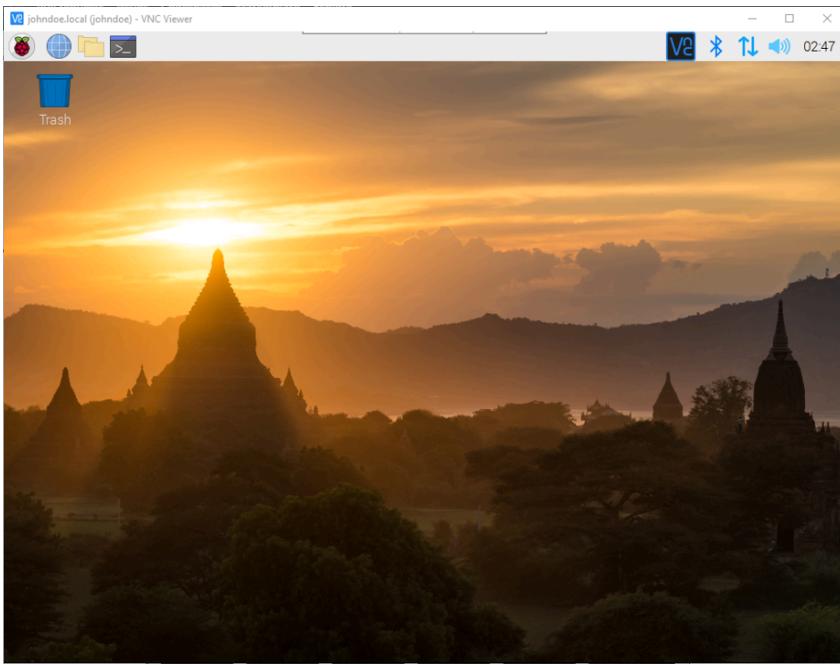


Figure 5 Raspberry Pi GUI using VNC Viewer

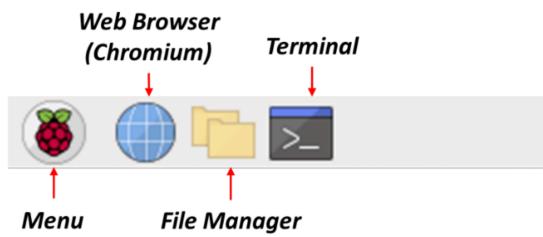


Figure 6 Taskbar Icons of Raspberry Pi GUI

Troubleshooting Help

After you start Raspberry Pi without display connection to it, you may see VNC access error, "Cannot currently show the desktop" as Figure 4. This is because Raspberry Pi cannot have monitor to show output without any connected display. But SSH works. Try it using PuTTY:

To resolve this issue, you need to make Raspberry Pi have forced display input when booted. Follow the step below after access the Raspberry Pi using PuTTY.

1. Type `sudo nano /boot/config.txt`
2. Write following at the end of 'config.txt'

Raspberry Pi - `/boot/config.txt`

```
hdmi_force_hotplug=1  
hdmi_group=2  
hdmi_mode=82
```

```
GNU nano 5.4          /boot/config.txt *
# Disable compensation for displays with overscan
disable_overscan=1

[cm4]
# Enable host mode on the 2711 built-in XHCI USB controller.
# This line should be removed if the legacy DWC2 controller is required
# (e.g. for USB device mode) or if USB support is not required.
otg_mode=1

[all]

[pi4]
# Run as fast as firmware / board allows
arm_boost=1

[all]
hdmi_force_hotplug=1
hdmi_group=2
hdmi_mode=82
```

- `hdmi_force_hotplug=1` means making a forced plugin of HDMI port 1.
- `hdmi_group=2` means DMT (Display Monitor Timings) group which is the same as a monitor.
- `hdmi_mode=82` means resolution is 1920x1080 in 60 Hz. You can change resolution you want according to your preference or your laptop display resolution. Refer to Table and Raspberry Pi documentation (<https://www.raspberrypi.com/documentation/computers/config.txt.html>, available on Jan. 13, 2023)

| hdmi_mode | Resolution | Aspect Ratio | Refresh Rate |
|-----------|-------------------|--------------|--------------|
| 5 | 640x480 (480p) | 4:3 | 60 Hz |
| 9 | 800x600 | 4:3 | 60 Hz |
| 16 | 1024x768 | 4:3 | 60 Hz |
| 51 | 1600x1200 | 4:3 | 60 Hz |
| 82 | 1920x1080 (1080p) | 4:3 | 60 Hz |
| 85 | 1280x720 (720p) | 4:3 | 60 Hz |

After saving the 'config.txt' file, reboot Raspberry Pi. Try to access VNC again. Is it working?

Now, you are all set for a headless computer for remote access. In the following lab, you do not need to bring any physical interfaces, a monitor, keyboard, or mouse.

1.7 Raspberry Pi terminal and packages

The terminal is a useful application. It allows you to navigate file directories and control your Raspberry Pi using typed commands instead of clicking on menu options. It's often in many tutorials and project guides, including the ones on our website.

In addition, we can take advantage of Raspberry Pi packages. In the terminal, we can install, uninstall, and manage the packages.

Let's try to install a Linux package. Install 'tmux' package on your Raspberry Pi using command below.

Raspberry Pi - Terminal

```
sudo apt install tmux -y
```

If you don't know or are unclear about a Linux command, google it! Or you can see a manual using command 'man packagename' such as below. Try 'man tmux'.

Raspberry Pi - Terminal

```
man apt
```

- This shows the manual document of 'apt' command.
- Tips: to change page, press PgUp or PgDn and to exit, press 'q'.

```
pi@johndoe: ~
APT(8)                                     APT(8)
NAME
    apt - command-line interface

SYNOPSIS
    apt [-h] [-o=config_string] [-c=config_file] [-t=target_release] [-a=architecture] {list | search
        | show | update | install pkg [{=pkg version number | /target_release}]... | remove pkg... |
        upgrade | full-upgrade | edit-sources | {-v | --version} | {-h | --help} }

DESCRIPTION
    apt provides a high-level commandline interface for the package management system. It is intended
    as an end user interface and enables some options better suited for interactive usage by default
    compared to more specialized APT tools like apt-get(8) and apt-cache(8).

    Much like apt itself, its manpage is intended as an end user interface and as such only mentions
    the most used commands and options partly to not duplicate information in multiple places and
    partly to avoid overwhelming readers with a cornucopia of options and details.

    update (apt-get(8))
        update is used to download package information from all configured sources. Other commands
        operate on this data to e.g. perform package upgrades or search in and display details about
        all packages available for installation.

    upgrade (apt-get(8))
        upgrade is used to install available upgrades of all packages currently installed on the
        system from the sources configured via sources.list(5). New packages will be installed if
        Manual page apt(8) line 1 (press h for help or q to quit)
```

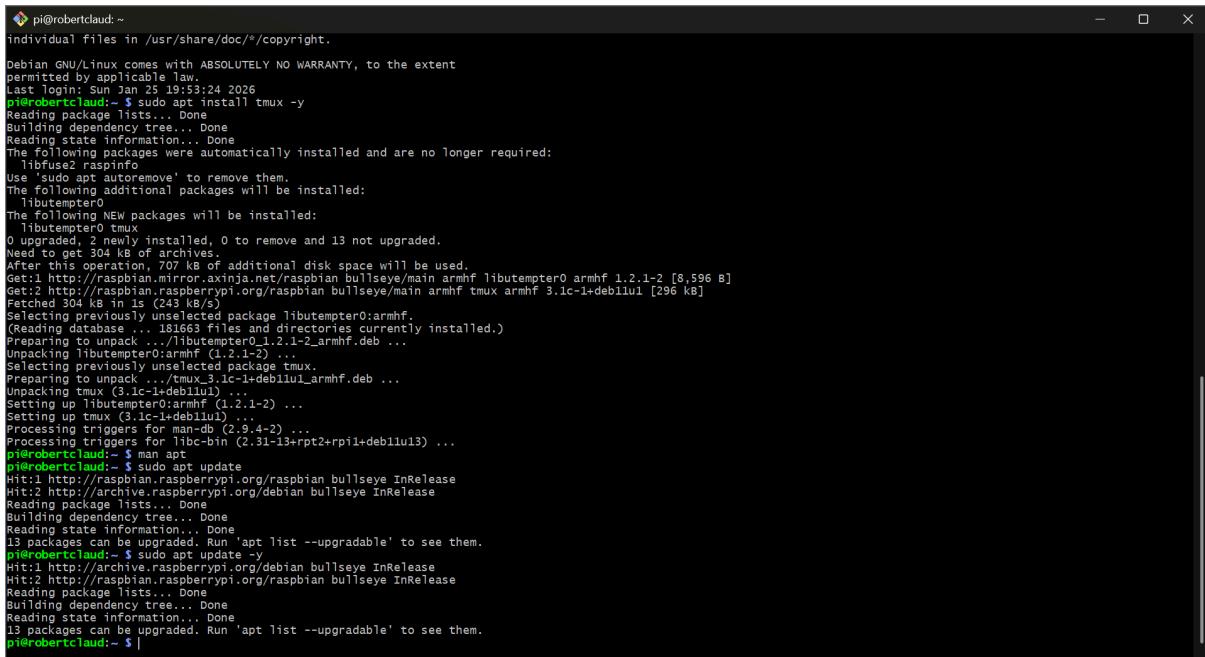
Figure 7 Manual of 'apt' command

It is recommended to go through a Raspberry Pi terminal guideline (<https://raspberrypi-guide.github.io/programming/working-with-the-command-line>, available on Jan. 13, 2023).

Try update and upgrade packages using `sudo apt update` and `sudo apt upgrade -y`.

Task 1.5

Capture your terminal after upgrading packages using `apt` command and attach it in the space below:



```
pi@robertcloud:~ 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 Jan 25 19:53:24 2026 pi@robertcloud:~ $ sudo apt install tmux -y Reading package lists... Done Building dependency tree... Done Reading state information... Done The following packages were automatically installed and are no longer required: libtinfo5 raspinfo Use 'sudo apt autoremove' to remove them. The following additional packages will be installed: libutempter0 The following NEW packages will be installed: libutempter0 tmux 0 upgraded, 2 newly installed, 0 to remove and 13 not upgraded. Need to get 304 kB of archives. After this operation, 707 kB of additional disk space will be used. Get:1 http://raspbian.raspberrypi.org/raspbian bullseye/main armhf libutempter0 armhf 1.2.1-2 [8,596 B] Get:2 http://archive.raspberrypi.org/debian bullseye InRelease Fetched 304 kB in 1s (243 kB/s) Selecting previously unselected package libutempter0:armhf. (Reading database ... 181663 files and directories currently installed.) Preparing to unpack .../libutempter0_1.2.1-2_armhf.deb ... Unpacking libutempter0:armhf (1.2.1-2) ... Selecting previously unselected package tmux. Preparing to unpack .../tmux_3.1c-1+deb11u1_armhf.deb ... Unpacking tmux (3.1c-1+deb11u1) ... Setting up libutempter0:armhf (1.2.1-2) ... Setting up tmux (3.1c-1+deb11u1) ... Processing triggers for man-db (2.9.4-2) ... Processing triggers for libc-bin (2.31-13+rpi2+deb11u13) ... pi@robertcloud:~ $ man apt pi@robertcloud:~ $ sudo apt update Hit:1 http://raspbian.raspberrypi.org/raspbian bullseye InRelease Hit:2 http://archive.raspberrypi.org/debian bullseye InRelease Reading package lists... Done Building dependency tree... Done Reading state information... Done 13 packages can be upgraded. Run 'apt list --upgradable' to see them. pi@robertcloud:~ $ sudo apt update -y Hit:1 http://archive.raspberrypi.org/debian bullseye InRelease Hit:2 http://raspbian.raspberrypi.org/raspbian bullseye InRelease Reading package lists... Done Building dependency tree... Done Reading state information... Done 13 packages can be upgraded. Run 'apt list --upgradable' to see them. pi@robertcloud:~ $ |
```

1.8 (Offline class only) Looking Forward to Lab 1 (Router Network Connection)

At the beginning of Lab 1, you will be instructed with the SSID (Service Set Identifier) and Wifi password that we will continue using in all following lab sessions. Access your Raspberry Pi using SSH or VNC Viewer. Connect the Wifi on Raspberry Pi. Check your IP address using 'ifconfig' command in 'Terminal'. And then, let TA know your Raspberry Pi's IP address (wlan0).

In addition, your laptop should also use the router network. Connect the Wifi on your laptop. And then check your laptop's Wifi IP address using 'ipconfig' command in 'Command Prompt', and let TA know it.

TA will assign a static IP address to each student's laptop and Raspberry Pi. Note the two IP addresses.

Now, you do not need to use the ethernet cable anymore in lab. Try the section above (Remote access to Raspberry Pi; sections 1.2 or 1.6) using Wifi network in the lab.

1.9 (Online class only) Looking Forward to Lab 1

All online class students can use ethernet cable/WIFI network with *Purdue Cisco VPN*. You cannot access the router WIFI network directly (only available to offline class). To remotely connect with your Raspberry Pi, you can use the IP address or hostname.local. (If using IP address, you should check by using 'ifconfig' command in 'Terminal' because it sometimes may change). You can access your Raspberry Pi using SSH or VNC Viewer through this IP address. You don't need to let TA know the IP address (wlan0).

If you use same network for both Raspberry Pi and your laptop, you do not need to use the ethernet cable anymore in lab. Try the section above (Remote access to Raspberry Pi; sections 1.2 or 1.6) using your Wifi network.

You may use ethernet cable between Raspberry Pi and your laptop in the lab in case you don't have access to Wifi.

Here are the guidance to install Purdue Cisco VPN as follow.

1. Install VPN Client Raspberry Pi - Terminal

```
sudo apt install openconnect -y
```

```
sudo apt install network-manager-openconnect-gnome -y
```

2. Connect VPN Client



```
sudo openconnect -u purdue_username -b webvpn2.purdue.edu
```

As following the guidance, you should type your purdue password after.

FYI, Disconnect VPN Client (You don't need to try)



```
sudo kill -9 $(pgrep openconnect | awk '{print $1}')
```

- Trouble shooting about network connection

If someone want to connect Wifi network on Raspberry PI and maintain connection to the laptop using LAN cable (without sharing internet network), then you notice that Wifi network connection seems doesn't work. That is because of the priority of the network. In general, LAN cable connection has high priority and Wifi network has less priority. If this case, please revise this configuration file as follow.



```
interface wlan0
metric 202

interface eth0
metric 203

static ip_address=192.168.137.2/24
static routers=192.168.137.1
static domain_name_servers=192.168.137.1 8.8.8.8
```

Please check the network interface name from 'ifconfig' terminal of Raspberry Pi. When you set the metric as lower number, then its interface set as high priority than others.

Deliverable

Response to the following prompts

```
In [ ]: #@title 1. Summarize Lab0 (e.g., what did you Learn?)
```

```
Text = 'I learned more about how to configure static IPs for internet' \
'sharing and access, how to use SSH to connect to my raspberry pi, and how to use' \
'VNC viewer to connect to the desktop display of the raspberry pi.' \
'I also learned how to install software packages to my pi with the apt command' #@param {type:"string"}'
print(Text)
```

```
In [ ]: #@title 2. Compare SSH and VNC. What are the pros and cons of each remote access method?
```

```
Text = 'SSH provides command-line access to the pi, which can be useful for' \
'modifying config files and network settings. However, VNC makes it a more' \
'familiar GUI so it can be useful for browsing for files or the internet.' #@param {type:"string"}  
print(Text)
```

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