

**STUDY GUIDE FOR MODULE NO. LAB 12****VIDEO CONFERENCE USING TV MONITOR****MODULE OVERVIEW**

By connecting a Raspberry Pi to a TV monitor and allowing remote access from a laptop via SSH and VNC for easier control, the Raspberry Pi Video Conferencing module simplifies the process of setting up a video conferencing system. This all-inclusive module makes use of the Raspberry Pi's capabilities to provide an affordable and adaptable video conferencing solution. The components that are required include the Raspberry Pi board, TV monitor, camera module, microphone, speakers, and a laptop that supports SSH and VNC remote control. This arrangement makes management and configuration simpler. Users can effectively construct, manage, and personalize their video conferencing setup by utilizing these components and remote access capabilities.

**MODULE LEARNING OUTCOMES**

After completing this module, students ought to be capable of:

- Understanding Raspberry Pi 4 Basics: Students will gain a foundational understanding of the Raspberry Pi 4, including its components, capabilities, and how to set it up for various applications.
- Exploring Video Conference Software: Learners will explore different video conferencing software options compatible with Raspberry Pi 4, understanding their features, installation processes, and usage.
- Configuring Raspberry Pi 4 for Video Conferencing: Participants will learn how to configure Raspberry Pi 4 settings, including network setup, audio and video settings, and compatibility with peripherals like cameras and microphones.

**Hardware Requirement:**

- Raspberry Pie 4b
- Computer/Laptop
- Ethernet Cable
- Router
- TV/Monitor/Display
- Keyboard and Mouse
- Webcam
- HDMI cable
- Internet Connection





## LEARNING CONTENT

Name: Cerujano, Erman Ace M.Due date: April 22, 2024**Setting up the Video Conference using TV Monitor****Part 1: Enabling and Accessing VNC on Raspberry Pi**

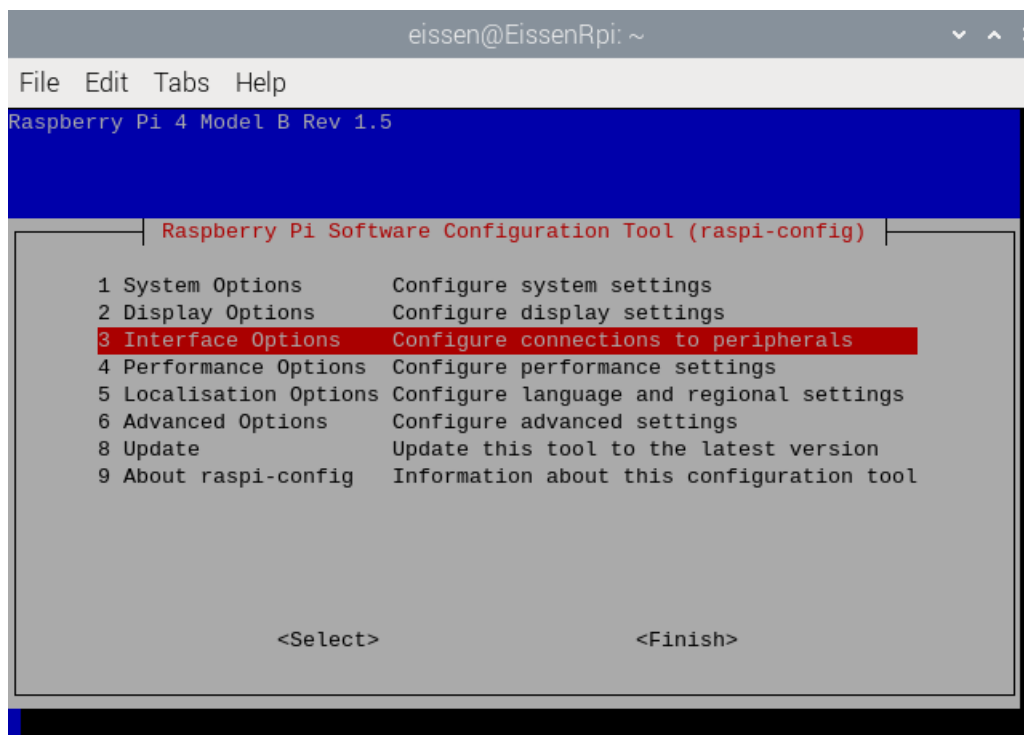
Step 1: The first thing is to enable VNC on the Raspberry Pi, You can SSH into your Raspberry Pi, or alternatively, open your Raspberry Pi and open your terminal on your computer. Input the command “sudo raspi-config”.



```
eissen@EissenRpi: ~  
File Edit Tabs Help  
eissen@EissenRpi:~ $ sudo raspi-config
```

*Figure 1 input sudo raspi-config*

Step 2: Select “Interface Options”



```
eissen@EissenRpi: ~  
File Edit Tabs Help  
Raspberry Pi 4 Model B Rev 1.5  
Raspberry Pi Software Configuration Tool (raspi-config)  
1 System Options      Configure system settings  
2 Display Options     Configure display settings  
3 Interface Options   Configure connections to peripherals  
4 Performance Options Configure performance settings  
5 Localisation Options Configure language and regional settings  
6 Advanced Options    Configure advanced settings  
8 Update              Update this tool to the latest version  
9 About raspi-config  Information about this configuration tool  
  
<Select>              <Finish>
```

*Figure 2 select interface options*

Step 3: Choose option 2 and select Yes to enable VNC Server.

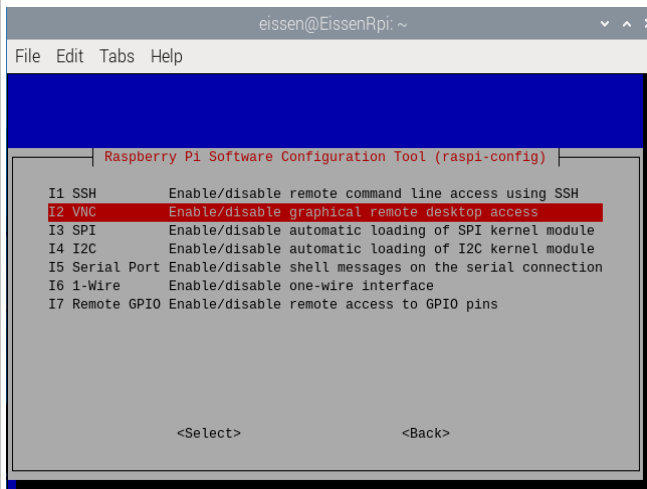


Figure 3 select VNC

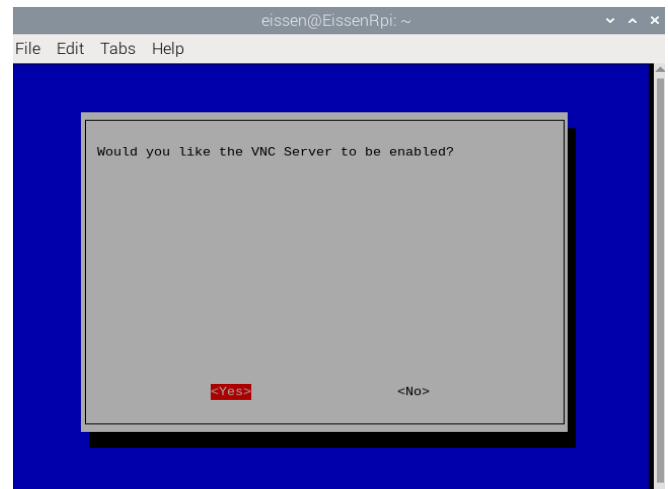


Figure 4 Confirming VNC

Step 4: Next go to Display Options and set the Resolution to 1280x720. Press enter to apply changes.

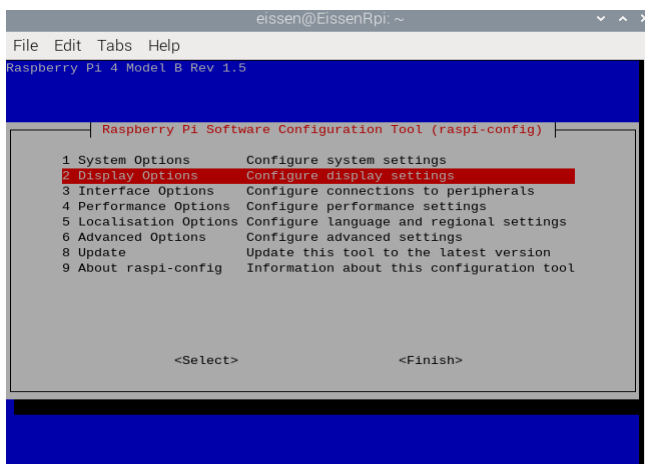


Figure 5 select option 2

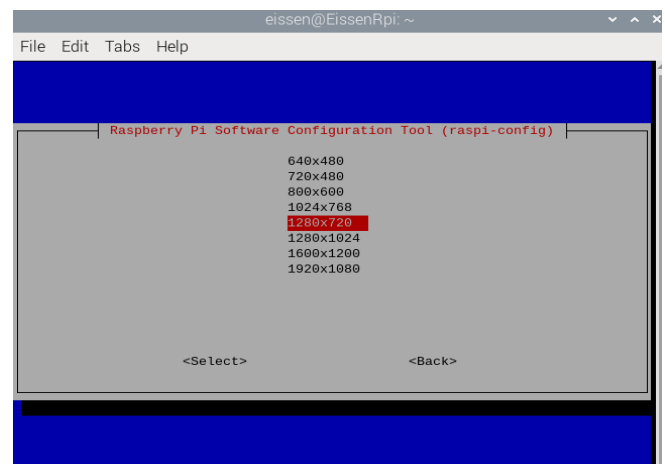


Figure 6 select 1280x720

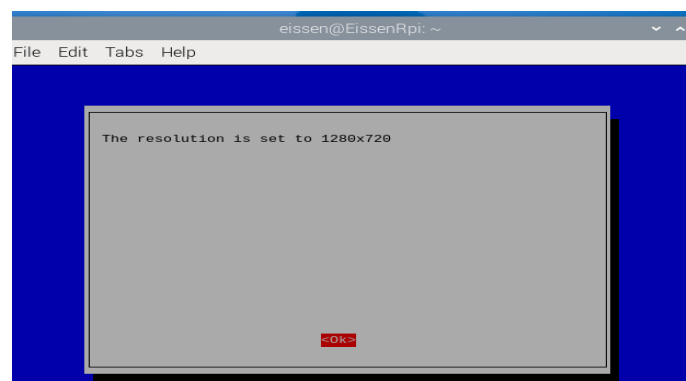
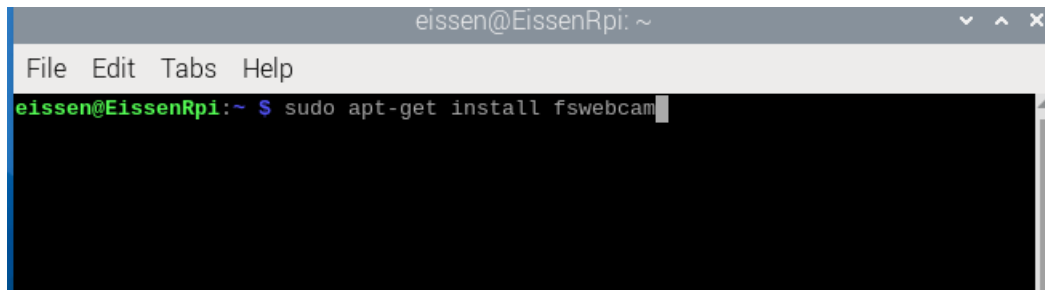


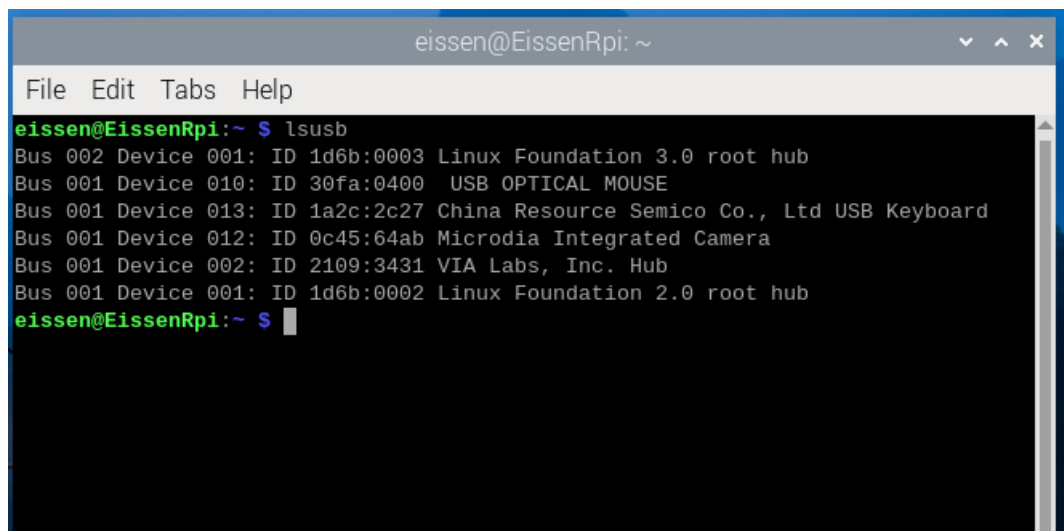
Figure 7 press enter to apply changes

Step 5: Additional step for Part 1, in case your webcam is not plug and play, we can install packages of webcam with the command “sudo apt-get install fswebcam” and we can also check the connection of our webcam to the Raspberry Pi with the command “lsusb”, If you see your webcam then its ready.



```
eissen@EissenRpi: ~  
File Edit Tabs Help  
eissen@EissenRpi:~ $ sudo apt-get install fswebcam
```

*Figure 8 install package*



```
eissen@EissenRpi: ~  
File Edit Tabs Help  
eissen@EissenRpi:~ $ lsusb  
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub  
Bus 001 Device 010: ID 30fa:0400 USB OPTICAL MOUSE  
Bus 001 Device 013: ID 1a2c:2c27 China Resource Semico Co., Ltd USB Keyboard  
Bus 001 Device 012: ID 0c45:64ab Microdia Integrated Camera  
Bus 001 Device 002: ID 2109:3431 VIA Labs, Inc. Hub  
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub  
eissen@EissenRpi:~ $
```

*Figure 9 Check the connection*

**Part 2: Accessing Raspberry Pi in VNC**

Step 1: In this part, the first thing we need to do is to download the VNC application to our computer, we will use that medium to connect our desktop and the Raspberry Pi in same network.

Link: <https://www.realvnc.com/en/connect/download/viewer>

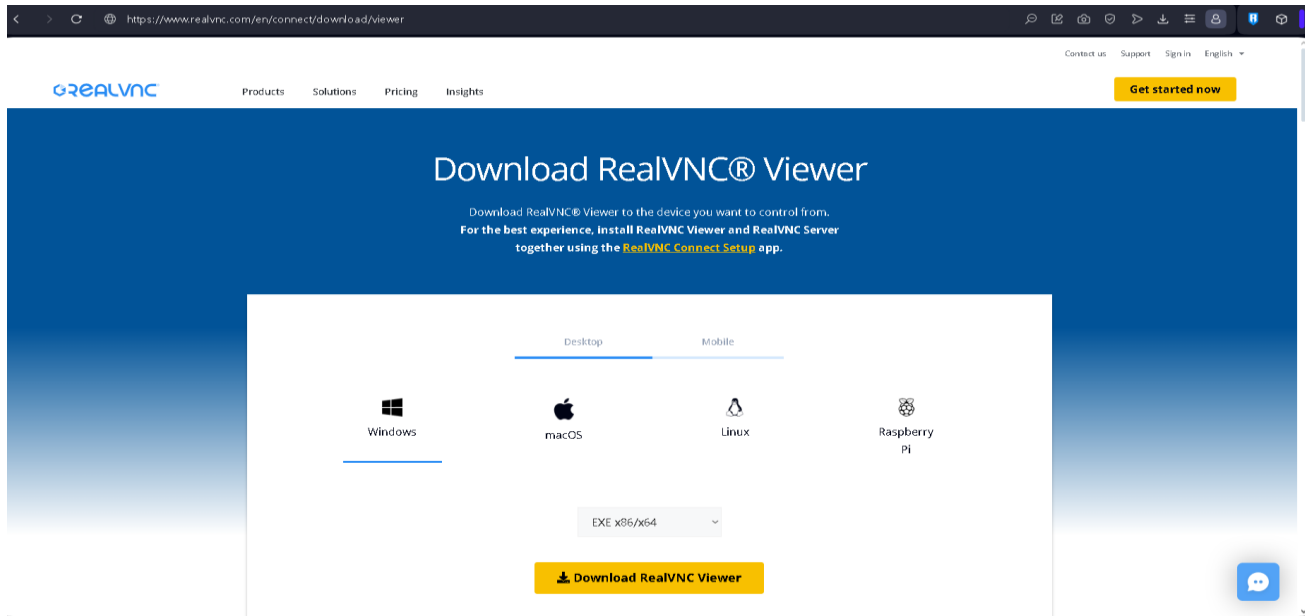


Figure 10 website

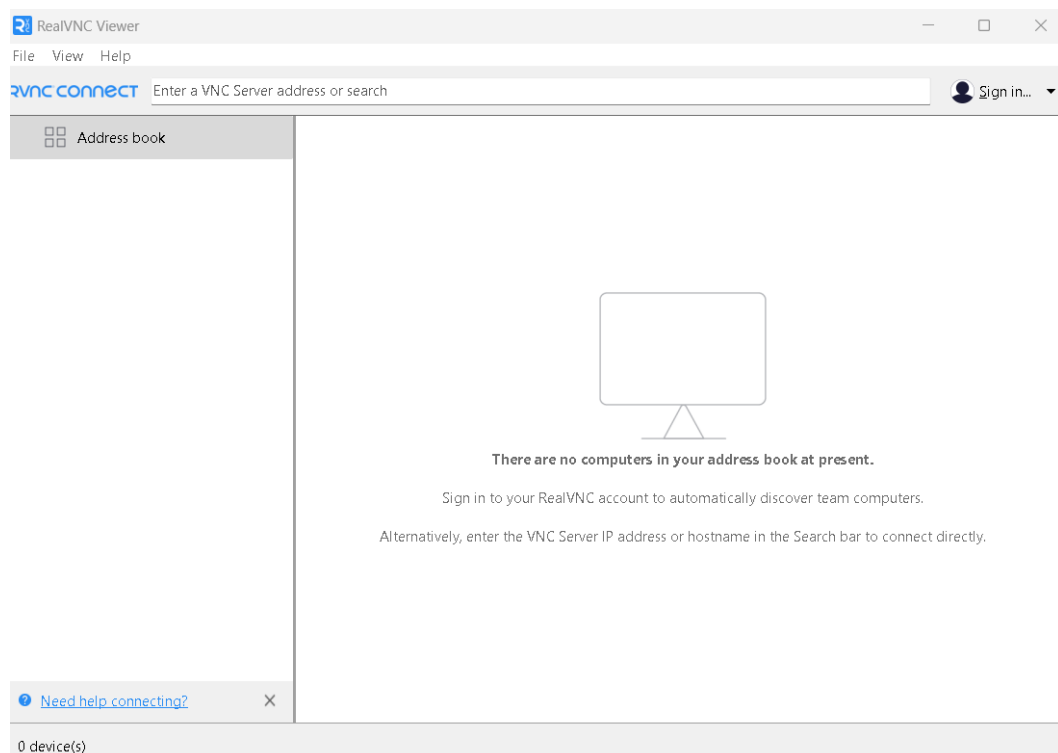
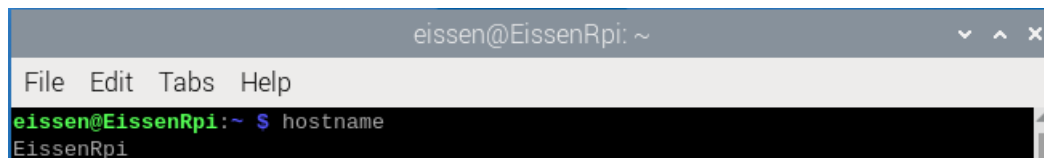


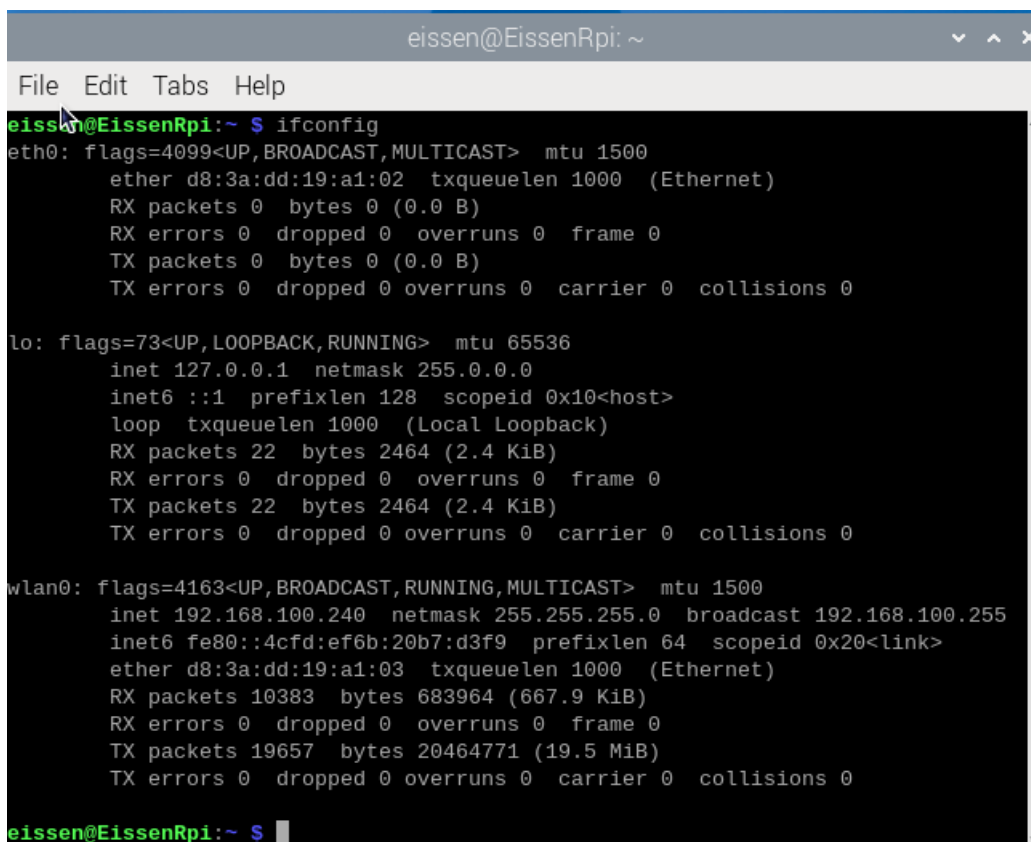
Figure 11 RealVNC Viewer GUI

Step 2: Determine the hostname or Local IP address of your Raspberry Pi. In my case my hostname is EissenRpi and the local IP address is 192.168.100.240.



```
eissen@EissenRpi: ~  
File Edit Tabs Help  
eissen@EissenRpi:~ $ hostname  
EissenRpi
```

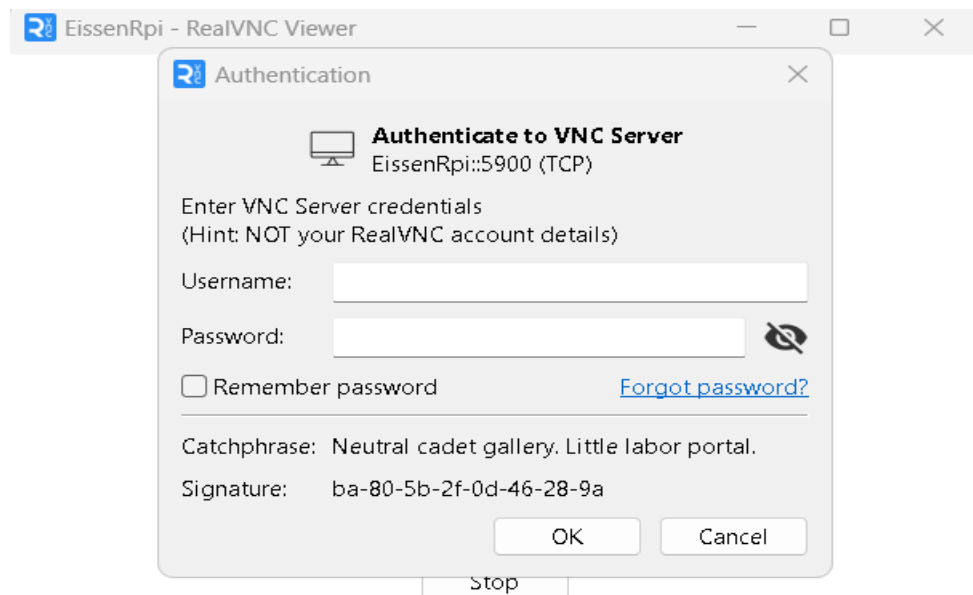
Figure 12 hostname



```
eissen@EissenRpi:~ $ ifconfig  
eth0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500  
    ether d8:3a:dd:19:a1:02 txqueuelen 1000 (Ethernet)  
    RX packets 0 bytes 0 (0.0 B)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 0 bytes 0 (0.0 B)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536  
    inet 127.0.0.1 netmask 255.0.0.0  
    inet6 ::1 prefixlen 128 scopeid 0x10<host>  
    loop txqueuelen 1000 (Local Loopback)  
    RX packets 22 bytes 2464 (2.4 KiB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 22 bytes 2464 (2.4 KiB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
wlan0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
    inet 192.168.100.240 netmask 255.255.255.0 broadcast 192.168.100.255  
    inet6 fe80::4cfd:ef6b:20b7:d3f9 prefixlen 64 scopeid 0x20<link>  
    ether d8:3a:dd:19:a1:03 txqueuelen 1000 (Ethernet)  
    RX packets 10383 bytes 683964 (667.9 KiB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 19657 bytes 20464771 (19.5 MiB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
eissen@EissenRpi:~ $
```

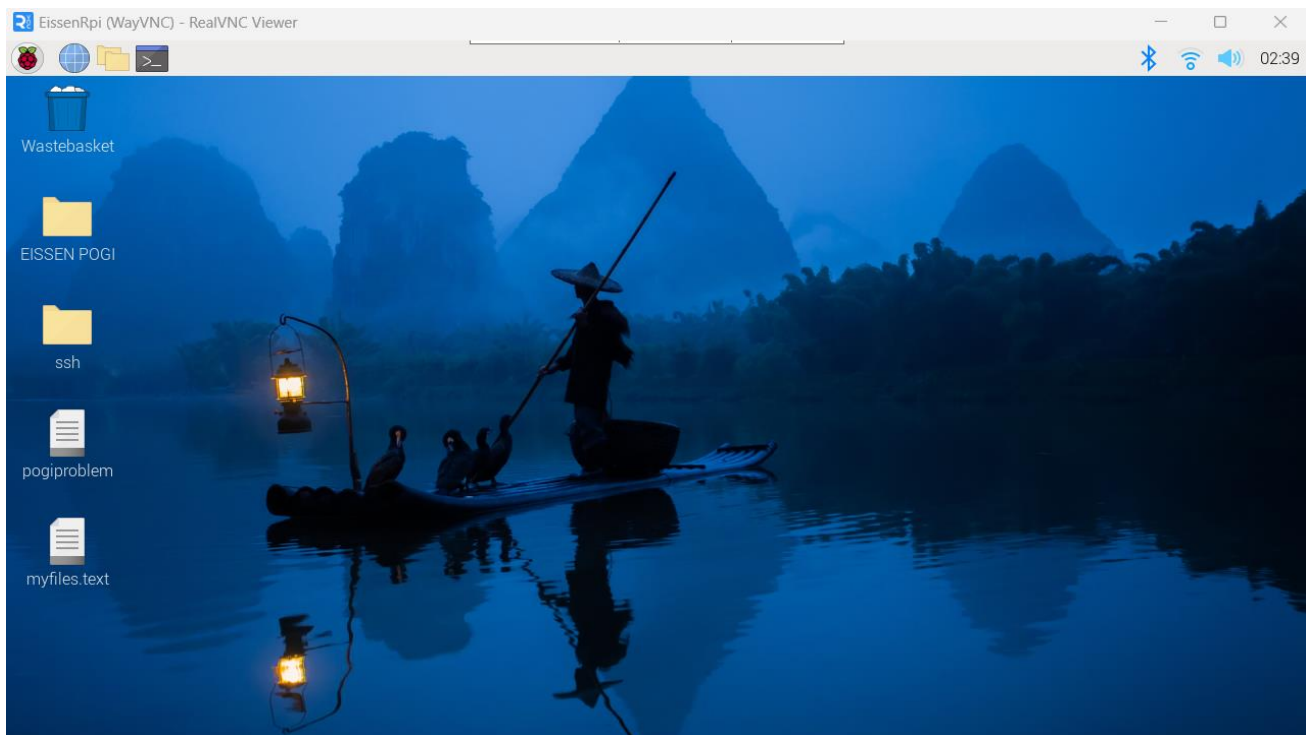
Figure 13 192.168.100.240

Step 3: In the search bar of VNC viewer application enter either the hostname or the local IP address of your Raspberry Pi and click connect. In my case I use the hostname, input the username and password.



*Figure 14 login to connect*

Step 4: Once you inputted the correct username and password, you will proceed to your Raspberry Pi, you can use your Raspberry Pi without monitor with the help of Real VNC viewer application.



*Figure 15 Raspberry Pi Desktop*

Step 5: You've successfully connect the Raspberry Pi in RealVNC viewer application and now you can setup your own Video Conferencing using the Raspberry Pi. Now we will create a google meet in our browser in Raspberry Pi.

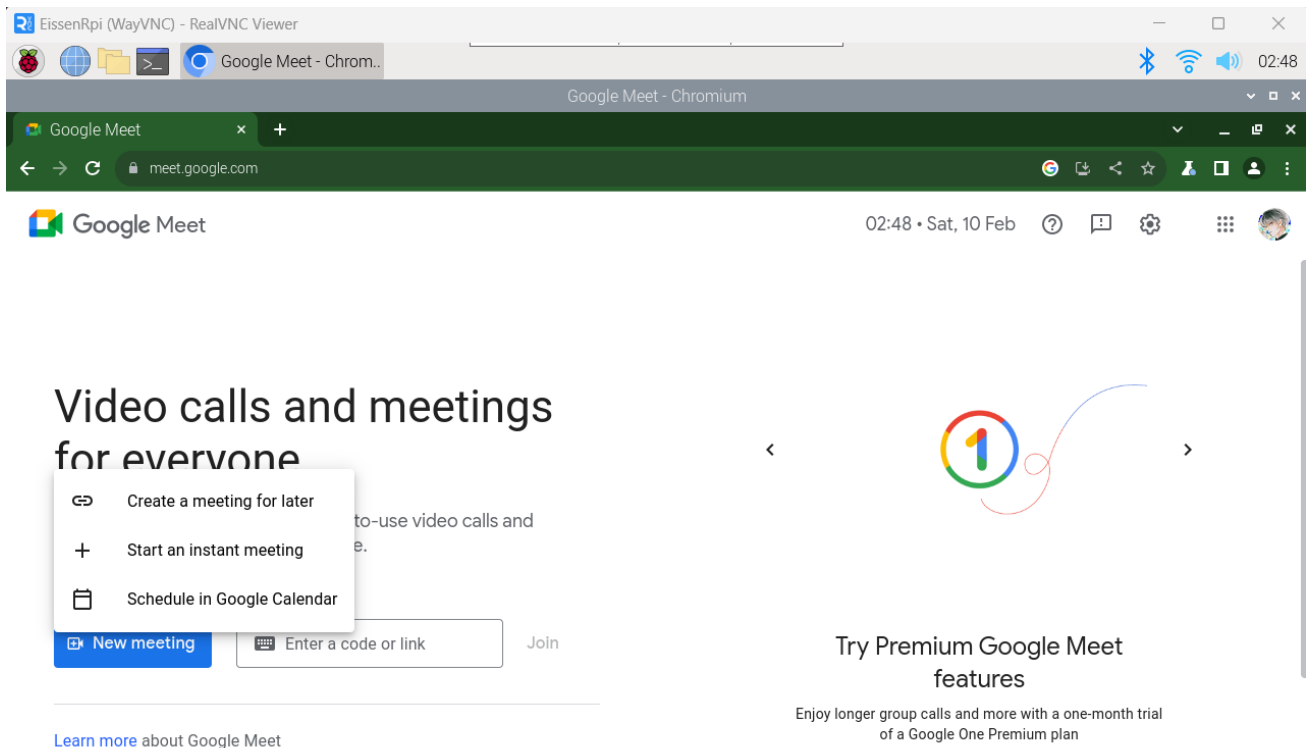


Figure 16 Video Conference



We successfully demonstrate the Video Conferencing in our Raspberry Pi, utilizing the Raspberry Pi 4, we seamlessly conducted a high-quality video conferencing session, showcasing the device's impressive capabilities and reliability in facilitating efficient remote communication.

## DOCUMENTATION



**SUMMARY / CONCLUSION**

By using readily available components, the Raspberry Pi Video Conferencing module simplifies the process of setting up a video conferencing system. With a Raspberry Pi connected to a TV monitor and remote access enabled via SSH and VNC, users may easily configure and modify their video conference system. A Raspberry Pi 4b, a PC or laptop, an Ethernet cable, a router, a TV or monitor, a webcam, an HDMI cable, a keyboard and mouse, and an internet connection are among the hardware requirements listed in the module. Users are guided through the procedure step-by-step by the instructional content, which begins with defining interface parameters, choosing the display resolution, and enabling VNC on the Raspberry Pi via SSH or terminal commands. Installing webcam packages and confirming webcam connectivity to the Raspberry Pi are extra procedures. After establishing VNC access, users can use the RealVNC Viewer application to remotely visit the Raspberry Pi desktop. This allows users to set up video conferencing platforms such as Google Meet directly on the Raspberry Pi. This program is appropriate for a variety of settings, including homes, offices, and classrooms, because it lays a strong emphasis on usability, accessibility, and affordability. Users can create feature-rich video conferencing solutions that improve distant cooperation by utilizing the Raspberry Pi's capabilities.

**REFERENCES**

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- [27] Let's do it. (2022, December 11). How to VNC and SSH into raspberry pi (Full steps) [Video]. YouTube. <https://www.youtube.com/watch?v=efCaFyIi6S4>
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