**HOMEWORK 2**

**Question 1:**

**Describe (give the commands) on how to setup SSH on the RPi and connect to it from another computer using a client such as PUTTY.**

**Ans:**

In order to access the raspberry pi on another computer (remote computer), there is two way of doing this by using secure shell (SSH). If we use the first way, you only get access to the command line of the raspberry pi instead of the full desktop and that is done by using the ‘PUTTY’ where we search our network IPv4 range and find raspberry pi IP address and then get access by entering raspberry pi IP in PUTTY . While if we are going to use the second way then we have access to the whole raspberry pi like we use raspberry pi as individual computer and have access on all functions of the raspberry pi on remote computer. The second way include the use of ‘VNC Viewer’ which is used to see and operate one computer remotely on another computer by satisfying the condition either both the computers are connected on the same network or in some cases only connected with any of the network.

1. If you have Raspberry pi display on screen then follow the given steps:

* First of all, connect your raspberry pi with the network. This can be done either by directly connecting the raspberry pi with the internet router by using ethernet cable or connect using wireless networking by using desktop Wi-Fi interface or command line.
* After this you have to find out the IP address of raspberry pi. Open the terminal window and write ‘**ifconfig**’ command and press ENTER. You can see the information about the network status of raspberry pi where you see the pi IP address. If you directly want to show the IP address linked with the raspberry pi you can see by entering the following command in terminal window: ‘**hostname -I**’.

To connect raspberry pi to other computer we have to enable SSH, for this if we have display of raspberry pi on one computer then we use the following commands to show display on another computer:

* Open ‘raspberry pi configuration; by clicking on the pi icon at top left corner and then navigate to ‘**preference** ‘menu. Go to interface tab and enable ‘SSH’.

While by using terminal window and commands:

* Open terminal window and write ‘**sudo raspi-config’** and press enter. Select interfacing option and enable ‘SSH’.
* Also, you can start ‘SSH’ service by entering the following commands in raspberry pi:

**Sudo systemctl enable ssh**

**Sudo systemctl start ssh**

1. If you don’t have raspberry pi display then follow the given steps:

* When you prepare the OS image of the raspberry pi, after completing this add a file having no extension with name ‘ssh’. If raspberry pi is connected by using ethernet wire then pi run remotely.
* While if we want to connect raspberry pi by using wireless network, we have to add a configuration file in which the we enter the wireless network credentials which enable the raspberry pi to connect with the network.

After this power up the pi. Use ‘IPscanner’ to find the IP of the raspberry pi when you don’t have display. When you get the IP address of pi, you can either use ‘PUTTY’ to use command line of pi or use ‘VNC viewer’ to operate full functions of raspberry pi.

**Question 2:**

**Describe how to use the Raspbian (The RPi’s Debian-based Linus OS) command line interface (cli) package manager. Give the commands to update the packages on your system. Give the commands to install the VIM text editor and wavemon Wi-Fi management tool.**

**Ans:**

The command line interface (cli) package manager is a great option in raspberry pi to install, upgrade and remove the software by using the APT tool. APT here is abbreviated to Advanced Packaging Tool. APT is a software present in raspberry pi OS and run in raspberry pi processor. So, in order to install any software, you need permission to become root of the computer and do modifications. In order to update or install new packages in the pi you must have ani internet connection.

For the very first time when you boot your pi and going to install new software, you first update your pi OS.APT is used to install, upgrade or delete the software. Like, if you want to install python in your raspberry pi, the command use is: **‘sudo apt install python’**. You can search about the package by entering following command: ‘**apt-cache search**’. If you want to see what inside the package before installing enter following command: ‘**apt-cache show**’.

In order to update the packages on your system enter the following command in the terminal window: **‘sudo apt-get update’.** This command updates all the package to the latest versions.

In order to install the ‘VIM text editor’ in the raspberry pi, use APT package to install this feature in your raspberry pi: **‘sudo apt install vim’**. While for the installation of wavemon Wi-fi management tool we use the following command: **‘sudo apt-get install wavemon’**.

**Question 3:**

**Give the cli commands for the following:**

**• Create a new directory in your home directory called “Projects”.**

**Ans:** mkdir projects

**• Move into the “Projects” directory.**

**Ans:** cd projects

**• Create a new file called “FirstFile”.**

**Ans:** nano FirstFile

**• Open “FirstFile” with the Nano text editor.**

**Ans:** nano FirstFile

**• Add the text, “This is a test file.”**

Ans: When you open the file in nano. You can add text by simply typing text.

**• Save the file and exit Nano.**

**Ans:**

**For saving:** ctrl + O

**For exit:** ctrl + X

**• List the contents of the “Projects” directory.**

**Ans:** ls

**• View the contents of “FirstFile” at the command line.**

**Ans:** cat FirstFile

**Question 4:**

**Give the specific cli commands to make the ACT LED flash at 10Hz.**

**Ans:** Add these commands at the end of ‘/boot/config.txt’**:**

dtparam=act\_led\_trigger=10

dtparam=act\_led\_activelow=on

**Question 5:**

**Give the specific cli commands to reboot and commands to shut down your RPi.**

**Ans:**

Use the following command to reboot your raspberry pi:

**Sudo reboot**

Use the following command to shut down you raspberry pi:

**Sudo shutdown -h now**