**Remote Access for Raspberry Pi**

Remote access will allow you to control your Raspberry Pi without plugging in a monitor, keyboard, or mouse by controlling it through another computer. Note that both the Raspberry Pi and the computer used to control the Pi must be on the same internet.

1. **Find your IP Address:** On the command line in your Raspberry Pi, type “hostname -I”. The command line will print your IP Address which should be four numbers separated by periods and should begin with **192**. Copy this number for later use.
2. **Enable SSH and VNC:** On the command line in your Raspberry Pi, type

“sudo raspi-config”. Select to **Interfacing Options** and navigate and select **SSH.** Choose **Yes** and select **Ok**. Do the same for **VNC** and then select **Finish**. This step will enable your Raspberry Pi to be controlled through another computer.

1. **Download PuTTY:** On the computer you wish to control your Raspberry Pi with, go to this [**link**](https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html) to download PuTTY. Download and install one of the installers under **MSI(‘Windows Installer’)**. This software will allow you to control your Raspberry Pi through the command line only. Using this, we can start a VNC which will allow us to use the Pi’s GUI.
2. **Add your Pi to PuTTY:** Run PuTTY and type the **IP Address** copied earlier into the **Host Name(or IP address)** field and click **Open**. If you see a prompt that says **Network error: Connection timed out**, you have entered the IP Address incorrectly or SSH is not enabled on your Pi. If the IP Address is correct, you will see a warning, click **Yes**. This prompt will only be shown the first time you connect to your Pi.
3. **Login:** PuTTY will now ask you for your **username** and **password** to login to your Pi. The username and password should be the same as the username and password you use to login to your Pi. The **Default** username and password will be **pi** and **raspberry** respectively.
4. **Install VNC on your Raspberry Pi:** On your Pi, through PuTTY if you wish, type

“sudo apt-get install realvnc-vnc-server realvnc-vnc-viewer”. Wait for the install to complete. This will allow you to use the GUI of your Pi on the remote computer.

1. **Start a VNC Server on your Pi:** On the command line of your Pi, type

“vncserver” and take note of the **IP Address,** including the number after the colon, on the last line of the return statement.

1. **Install RealVNC Viewer on your Computer:** On the computer you will control your Pi with, go to this [**link**](https://www.realvnc.com/en/connect/download/viewer/)and download and install VNC Viewer. This will allow you to connect to the server created in **Step 7** to control your Pi.
2. **Connect your Pi to VNC Viewer:** Run VNC Viewer on your computer and enter the **IP Address** found at **Step 7**. You will again be asked to **login**, the credentials are the same as those used to login to PuTTY.
3. **Congratulations:** You can now control your Raspberry Pi through another computer.

**Troubleshooting**

* **The screen resolution is too low:** 
  + When starting a VNC server through PuTTY, type “vncserver -randr 1920x1080”. You can change the resolution to any you see fit.
* **How do I stop a VNC server**
  + To stop, or kill, a VNC server, in the command line, type

“vncserver -kill :<displaynumber>”. The display number will be the number after the colon in the IP address when you start a VNC server. **Note that there is a colon before <displaynumber>**

* **Do I need to start a VNC server every time I restart my Pi**
  + Yes. There is a way to start a VNC Server on startup, but you will need to Google that and find a way.

**Note that the default username and password for the Raspberry Pi is the same for all Pis. Therefore, it is recommended that you change the username and password to make sure no one connects to your Pi.**