

Image acquisition using Raspberry pi

1.1. Raspberry pi connection from a PC using PuTTY

First, run PuTTY in a windows terminal ("cmd").

PuTTY: <https://www.ssh.com/ssh/putty/windows>

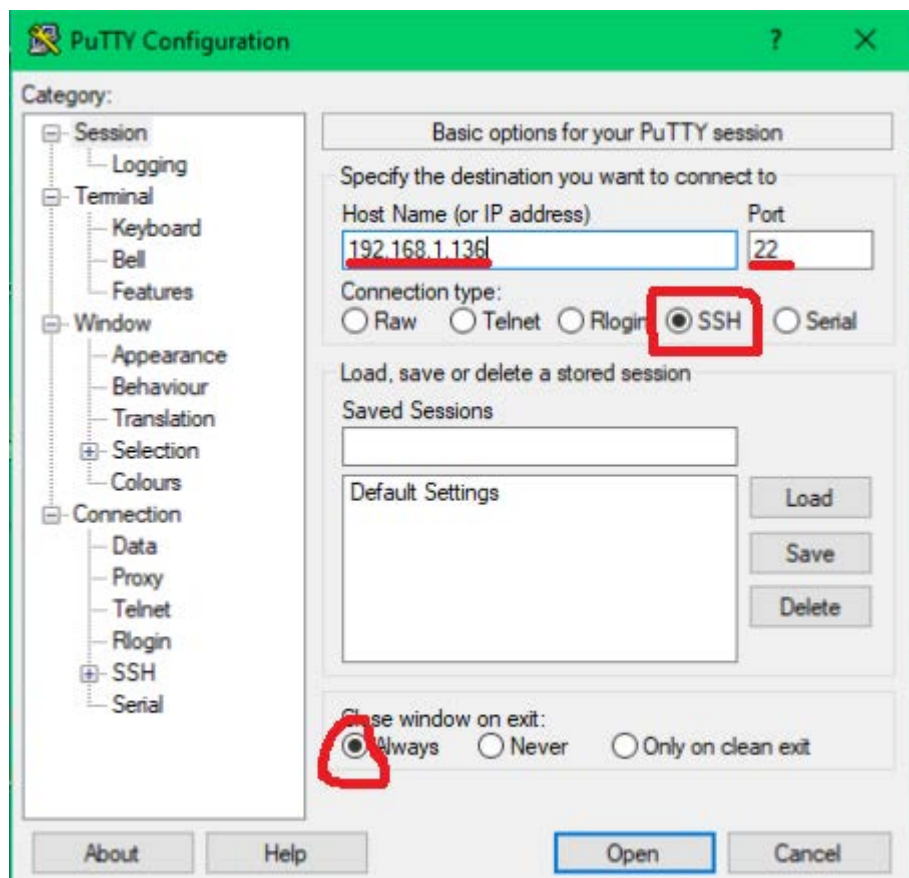


FIGURE 1. PUTTY™ CONFIGURATION

As you can see in figure 1, you have to enter the IP address of the machine you want to connect, in this case 192.168.1.136, selecting port 22 (Normally reserved for remote access to a server). It is very important to select SSH as the connection type. All the options that appear in the tree on the left can be maintained without changes. For the behavior to wait for the window to close, select "Always". Then, click Open and if it is the first time we connect to that IP, the program will launch the following warning (fig. 2):

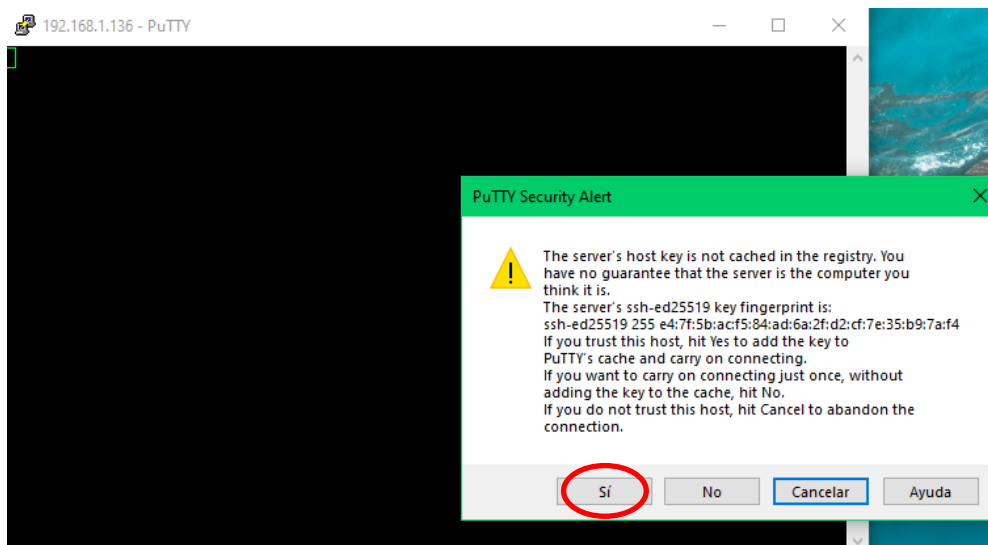


FIGURE 2. FIRST CONNECTION ALERT

We accept (click “Sí”) and write the user and password in the terminal that PUTTY™ has opened, as we can see in figure 3:

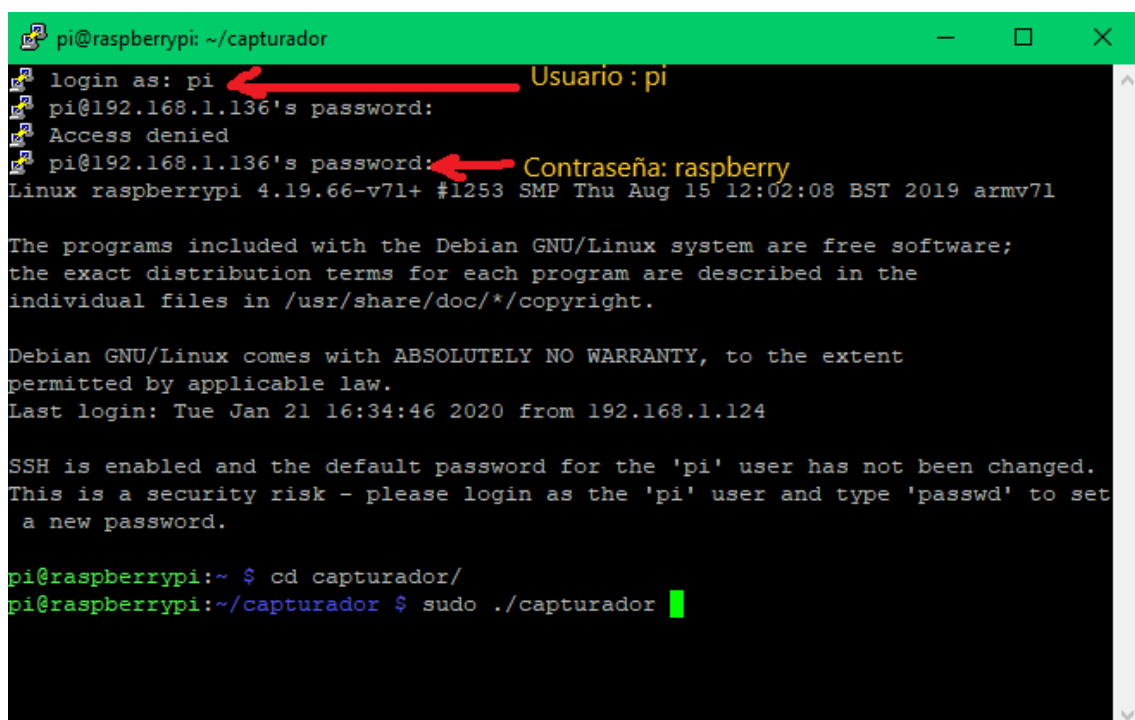


FIGURE 3. RASPBERRY IDENTIFICATION

In this terminal, you need to enter the username and password, which are pi and raspberry respectively. Once connected, the following commands are executed to activate the image acquisition system: **cd capturador/** and **sudo ./capturador**

After executing them, the lighting system should appear white and the following options appears in the terminal:

```
pi@raspberrypi: ~/capturador
40:program:
Created program id 41 from vs 1 and fs 21
41:program:
Created program id 42 from vs 2 and fs 16
42:program:
Opening Camera...
DISPLAY CREAT: 0xbe8ad898
NUM_DISPLAYS -> 1
Please place the object on display, then:
- Press 'd' to set color: (255,255,255)
- Press 'c' to set camera (2 or 4): (2)
- Press 'f' to set folder: (./Experiment/)
- Press 's' to start capture
- Press 'e' to exit
>> d
- Intro red (0-255) >>
>> 255
- Intro green (0-255) >>
>> 255
- Intro blue (0-255) >>
>> 0
```

FIGURE 4. ACQUISITION SYSTEM CONFIGURATION.

If we press 'd' we can change the color of the lighting system, as you can see it asks us for the color in RGB format. In the example, yellow has been chosen, but it is recommended to leave the default color (white), that is, the three values at 255. The current values are shown in parentheses on the right in each of the options that can be modified, which are the lighting color of the screen, the camera and the folder where we are going to save our images.

As seen in figure 5, the next step is to select the folder where we want to save the captured images. For security, they cannot be saved outside of the folder where the “capturador” program is located. If the folder does not exist, it will be created. To change the folder, press 'f' and 'Enter' and write the new folder.

```
pi@raspberrypi: ~/capturador
- Press 'd' to set color: (255,255,255)
- Press 'c' to set camera (2 or 4): (2)
- Press 'f' to set folder: (./Experiments/Llegums/dia_1/cond_A/Placal)
- Press 's' to start capture
- Press 'e' to exit
>> f
- Intro a new folder >> ./Experiments/Llegums/dia_1/cond_A/Placal
Please place the object on display, then:
- Press 'd' to set color: (255,255,255)
- Press 'c' to set camera (2 or 4): (2)
- Press 'f' to set folder: (./Experiments/Llegums/dia_1/cond_A/Placal)
- Press 's' to start capture
- Press 'e' to exit
>> c
- Intro a camera (2 or 4):
>> 4
Please place the object on display, then:
- Press 'd' to set color: (255,255,255)
- Press 'c' to set camera (2 or 4): (4)
- Press 'f' to set folder: (./Experiments/Llegums/dia_1/cond_A/Placal)
- Press 's' to start capture
- Press 'e' to exit
>>
```

FIGURE 5. FOLDER AND CAMERA SELECTION

Next, select the camera with which we are going to capture the images, with 2 being the one on the left looking towards the box, and 4 the one on the right.

When the scene is prepared, press 's' to start capturing with the selected camera. To change cameras you must press 'c' and 'Enter' and enter 2 or 4. Once you have captured all the images, press 'e' to exit the program. Without closing the terminal, we open WinSCP.

WinSCP: <https://winscp.net/eng/docs/introduction>

We open winSCP and the following screen appears:

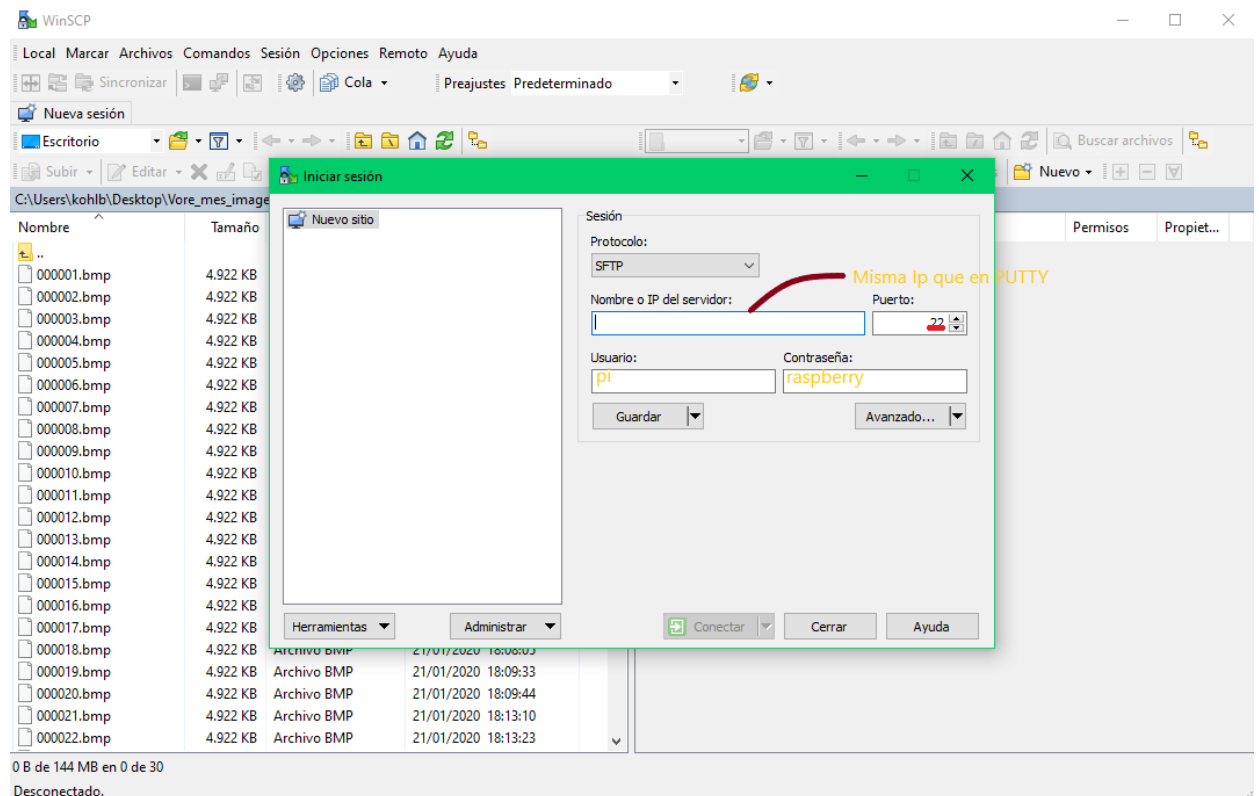


FIGURE 6. WINSCP

We input the same IP as in the PUTTY™ program, the same port (22), and as username and password, **pi** and **raspberry**, respectively. But before connecting, you must select the SCP protocol, so we get into the drop-down menu as the following screenshot shows us.

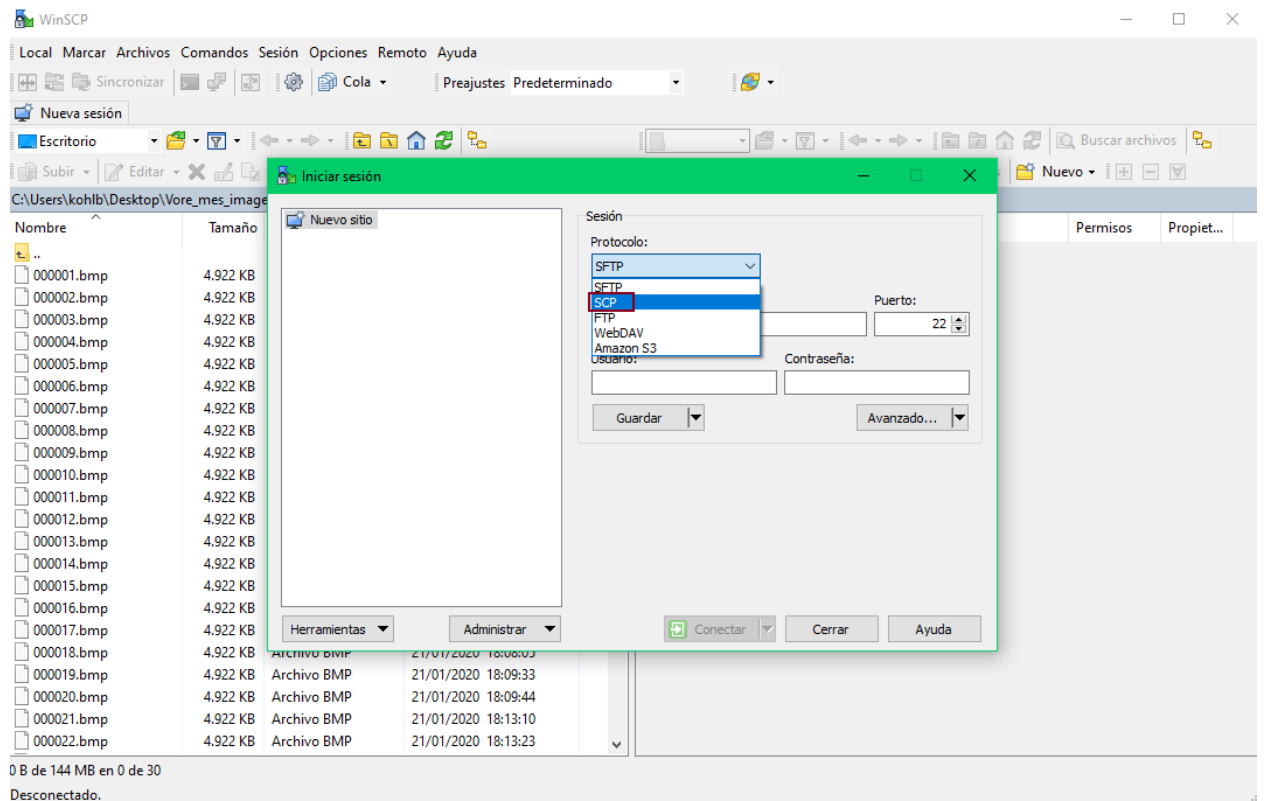


FIGURE 7. PROTOCOL SELECTION

Select SCP. When pressing 'Connect' we will get the following notice:

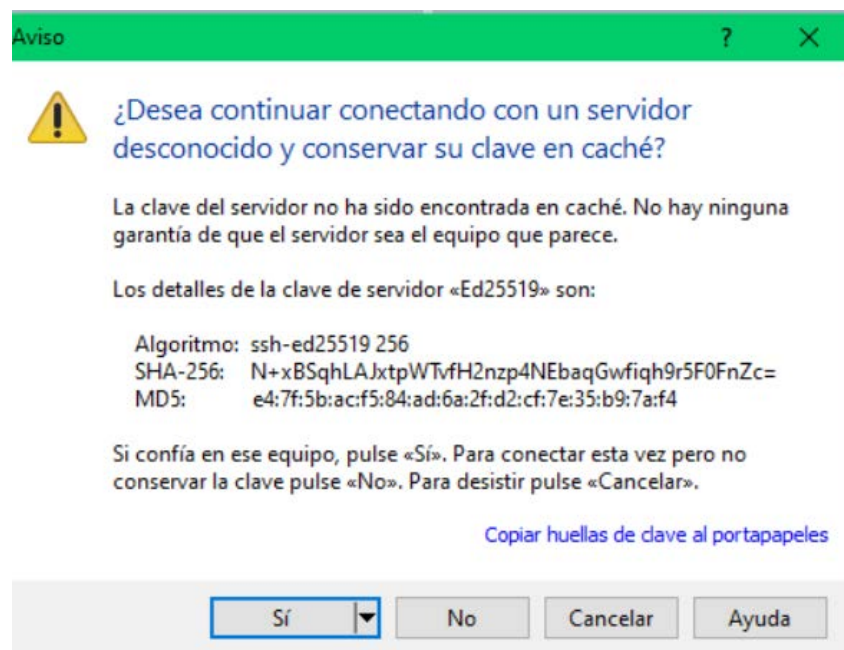


FIGURE 8. FIRST CONNECTION WARNING

We accept and we should get the following:

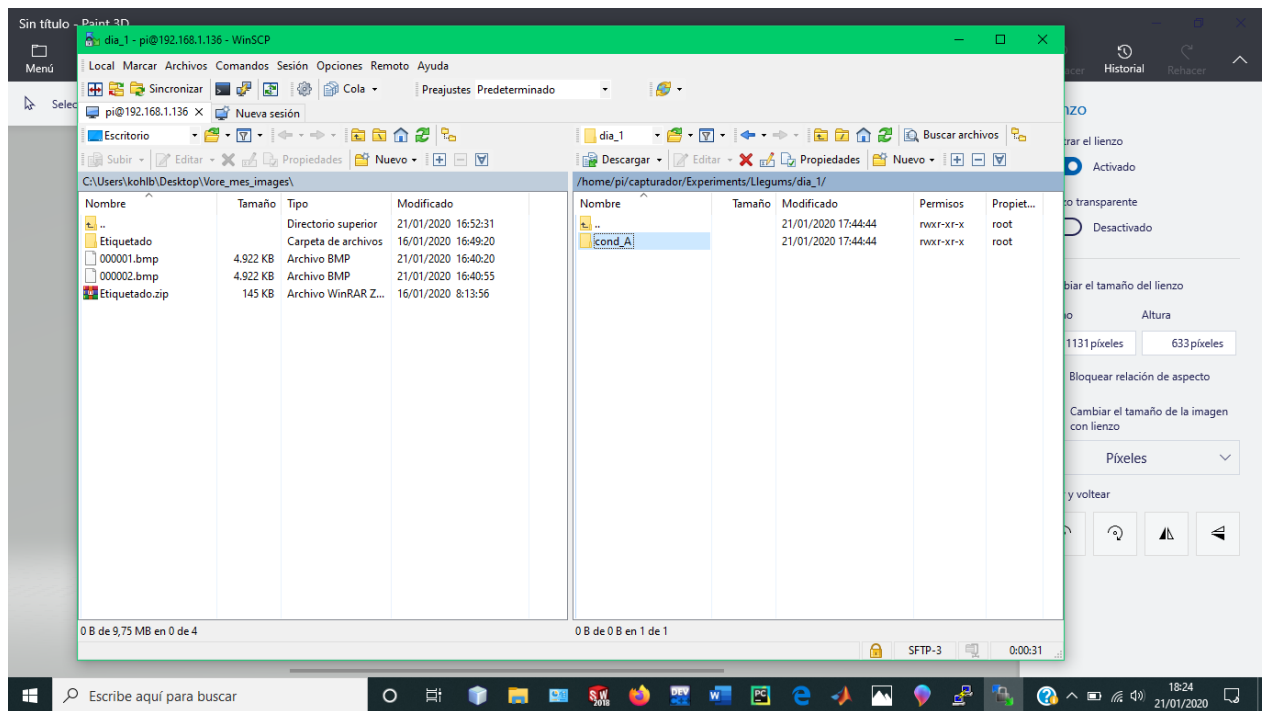


FIGURE 9. WINSCP SCREEN

In figure 9, the window on the left corresponds to the client computer and the window on the right to the remote server.

We must navigate to the folder where we have the images (window on the right) and to the folder where we want to save the images (window on the left).

The files can be dragged from one machine to the other and once the images are transferred we can close the program.