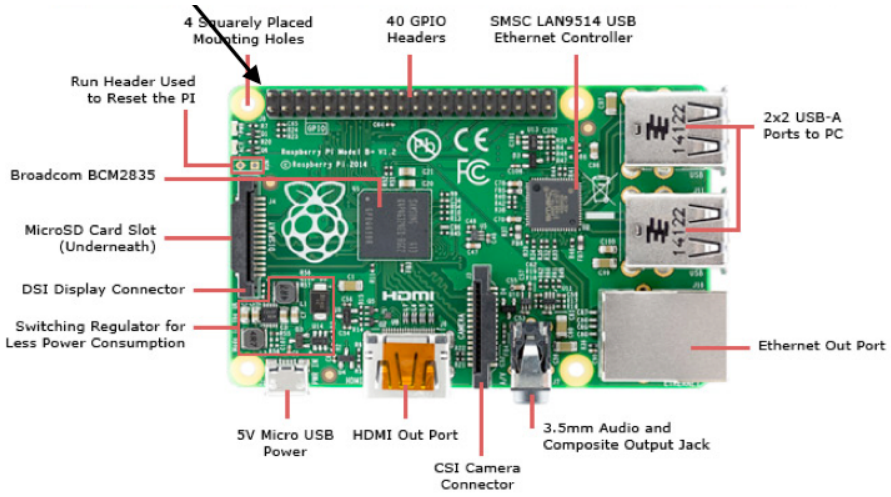
RASPBERRY PI2 DEMO

RasPi Video Camera

In this demonstration we will learn how to:
1) use a Raspberry Pi remotely
2) connect simple hardware to the Pi
3) Write Python programs to make the hardware do something

This demo will use the standard video camera module designed to work with the Raspberry Pi. The module plugs into the “CSI Camera Connector” shown below, but since it’s already inside the case, I have plugged it in for you already.

We have only one of these units for the class because using it for a demo requires a monitor of some sort, and I have only one projector set up. For this reason, you can just run this demo immediately from your seat. Leave the RasPi plugged in where it is.



Step 1 - Talking to the Raspberry Pi

Normally when using a RasPi, you would connect its HDMI output port to a monitor, and plug in a USB keyboard and mouse. This RasPi is, indeed, plugged into a projector, but we won’t be using a KB/ Mouse. Each of the Raspberry Pi units in the lecture hall today have a WiFi adaptor on them, and they have been programmed to connect to the “IP” WiFi network we used in the networking demo.

For this to work, you need to have an SSH client installed on your computer. On Mac/Linux this should be part of the operating system. On Windows, I suggest you install a free program called “Putty”.

1) Each of the Raspberry Pis we are using has a number on it. This set of instructions is for RasPi #8. The address of each RasPi will be 192.168.5.# where # is the number on the unit.
2) Switch your laptop from the BCM network to the “IP5 or “IP” WiFi networks.
3) Now (mac/linux) type: ssh pi@192.168.5.8
4) or (windows) launch Putty and connect to 192.168.5.8 with the username “pi”
5) The password is “hardware2”
6) You should now have a linux command prompt, like:

pi@raspberrypi:~ $

7) If you don’t get this, please ask for help. Don’t continue with the next step until you have this prompt.

Step 2 - Using the Camera

Unlike the NeoPixel demo, you do not need administrative privileges to use the video camera, so ‘sudo’ isn’t required.

1) ipython
2) import picamera
3) camera = picamera.PiCamera()
4) This will cause the camera to display a live image on the display (projector):

camera.start_preview()

5) opaThis will (obviously) stop the preview:
6) camera.stop_preview()
7) There are many other possibilities:
8) camera.capture(‘image.jpg') # captures straight to a file
9) There are a wide range of settings:

camera.sharpness = 0
camera.contrast = 0
camera.brightness = 50
camera.saturation = 0
camera.ISO = 0
camera.video_stabilization = False
camera.exposure_compensation = 0
camera.exposure_mode = 'auto'
camera.meter_mode = 'average'
camera.awb_mode = 'auto'
camera.image_effect = 'none'
camera.color_effects = None
camera.rotation = 0
camera.hflip = False
camera.vflip = False
camera.crop = (0.0, 0.0, 1.0, 1.0)

10) PIL is also installed on this RasPi if you want to play with it
11) Note that you can transfer files to/from the Pi using the “scp” or “sftp” commands (or via menus in Putty)

Do something interesting…