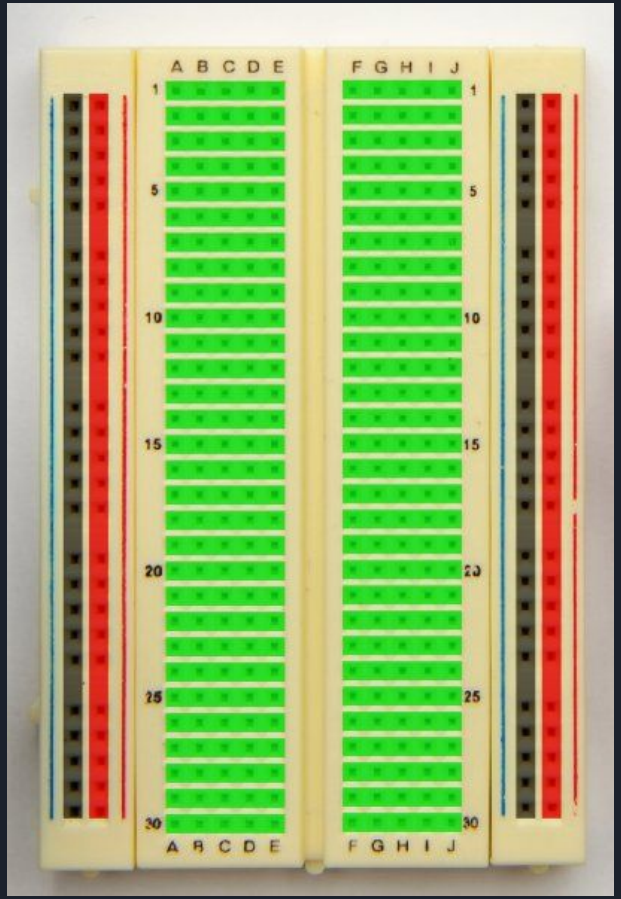
IOT Lab Assignment 2

GPIO - Button and leds

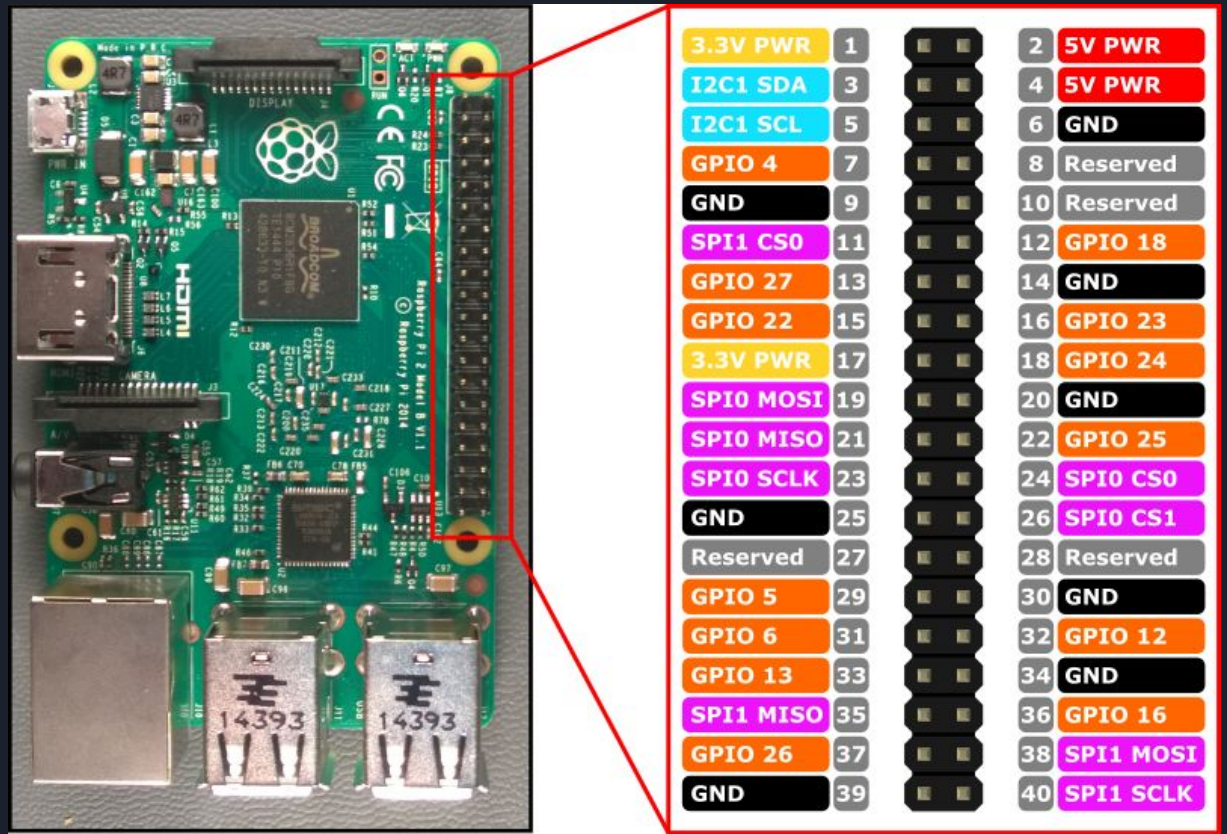
What is GPIO

- GPIO is a signal pin on an integrated circuit or board that can be used to perform digital input or output functions. By design it has no predefined purpose and can be used by the hardware or software developer to perform the functions they choose. Typical applications include controlling LEDs, reading switches and controlling various types of sensors.
- If you are new to hardware, a few words on basic safety are in order. Since the voltages on a Raspberry Pi and similar boards are low (5 volts or less), the risk of electric shock is minimal. The most likely accident is to inadvertently damage your Raspberry Pi or other device. Connecting a GPIO or other pin to the wrong voltage can easily damage the board and render it unusable. Also be aware that many devices, including the Raspberry Pi, use 3.3 volt logic levels and can be damaged if connected to 5 volts, which is used by many other devices like Arduino and is present on the GPIO connector

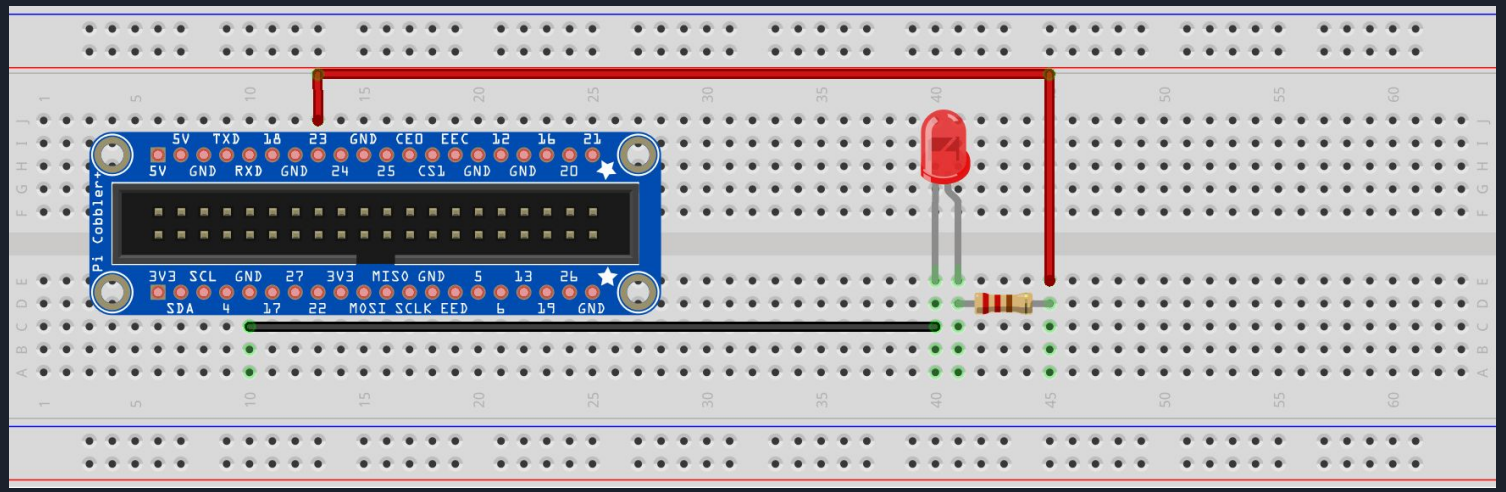
Bread Board



Raspberry PI pinout



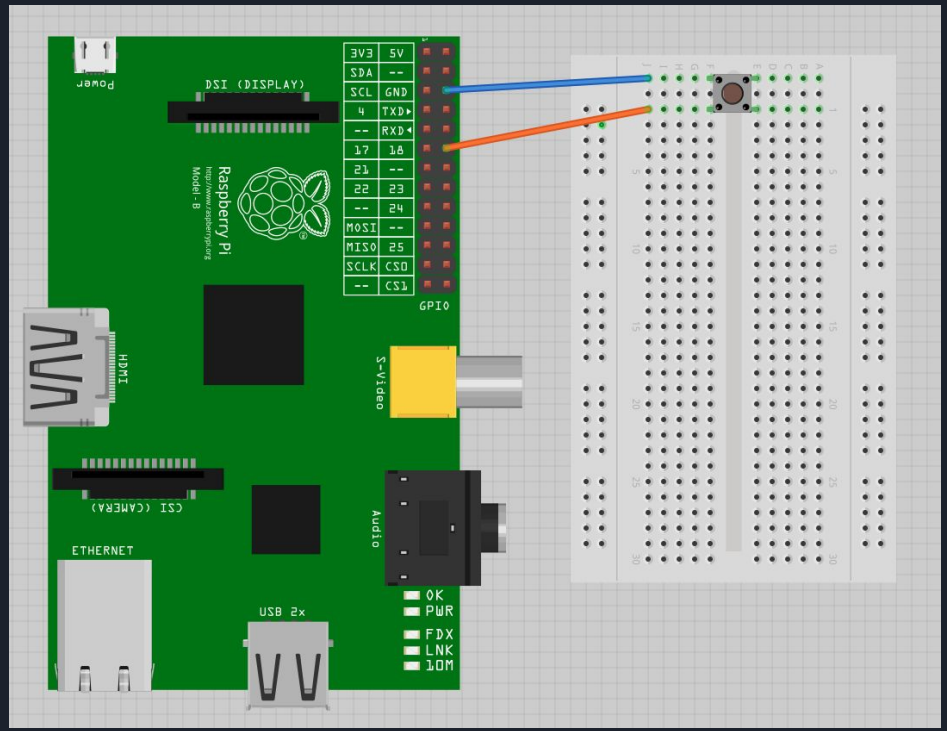
LED Wiring


5V TXD 18 23 GND CE0 EEC 12 16 21
5V GND RXD GND 24 25 CS1 GND GND 20
Pi Cobbler
3V3 SCL GND 27 3V3 MISO GND 5 13 26
SDA 4 17 22 MOSI SCLK EED 6 19 GND

Basic pi gpio programing examples

output.py

Button Wiring

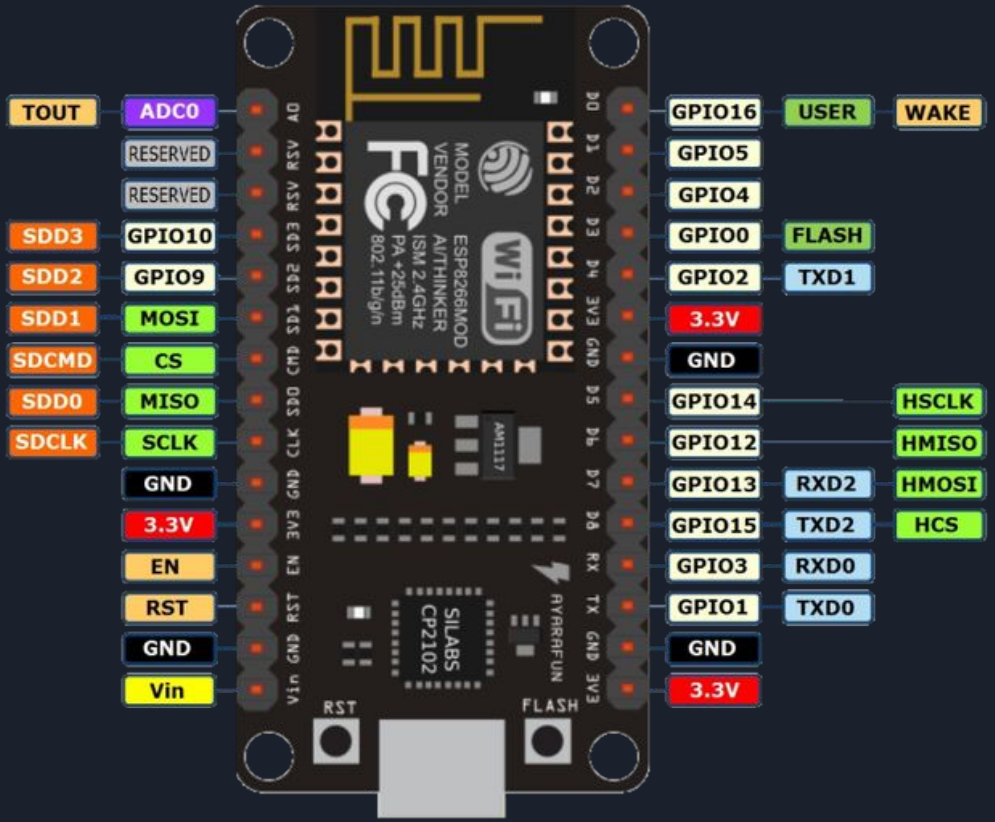


endlessbutton.py

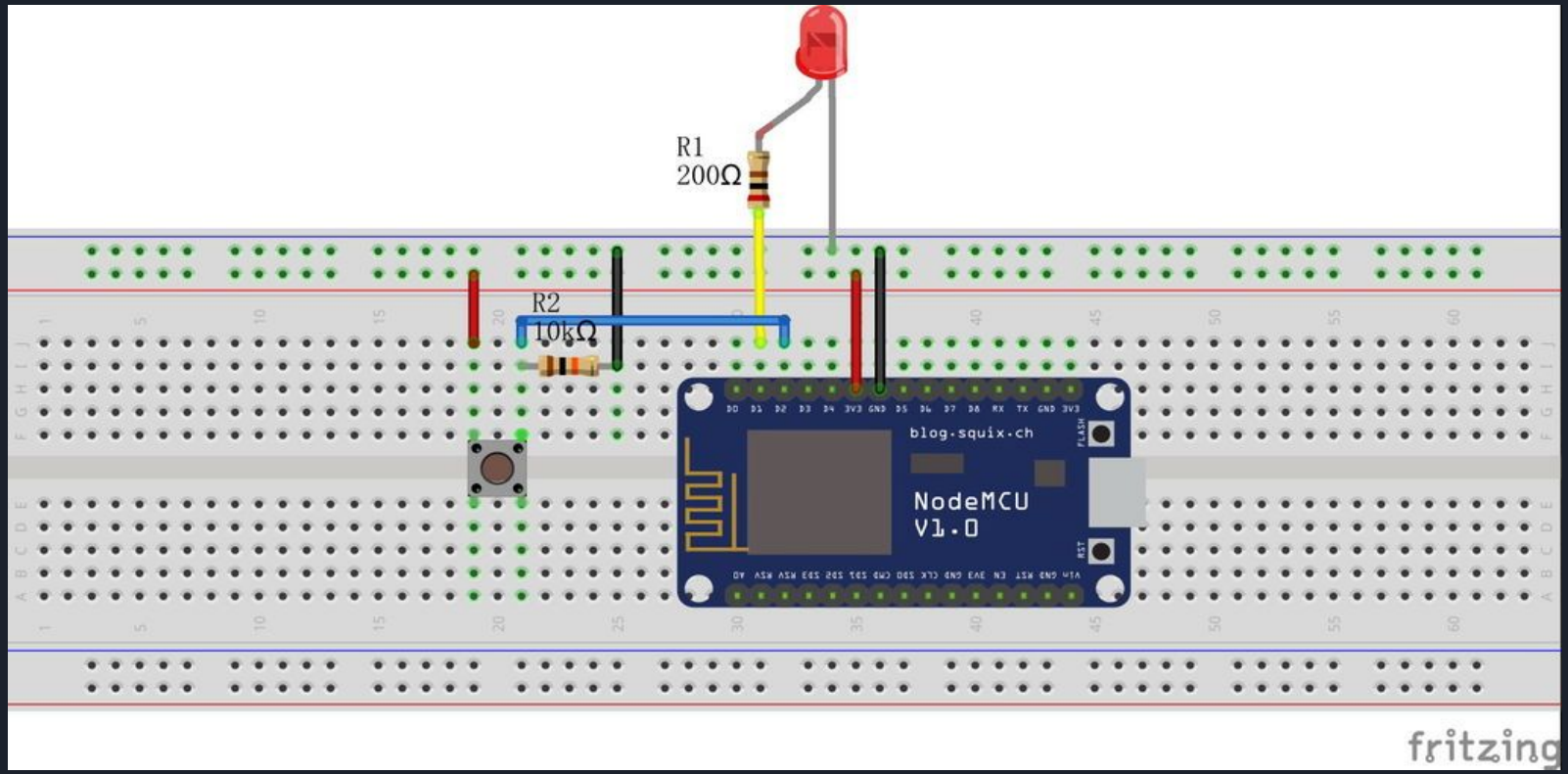
buttonprint.py

bouncebutton.py

Esp8266 pinout



Button and LED wiring to the esp8266



Basic Arduino Programing

Setup:

- Function runs at boot once then falls into loop function
- Good place to setup gpio pins, wifi settings, initialize variables

Loop:

- Function runs repeatedly
- Do the main work of your program here

General arduino programming guide here

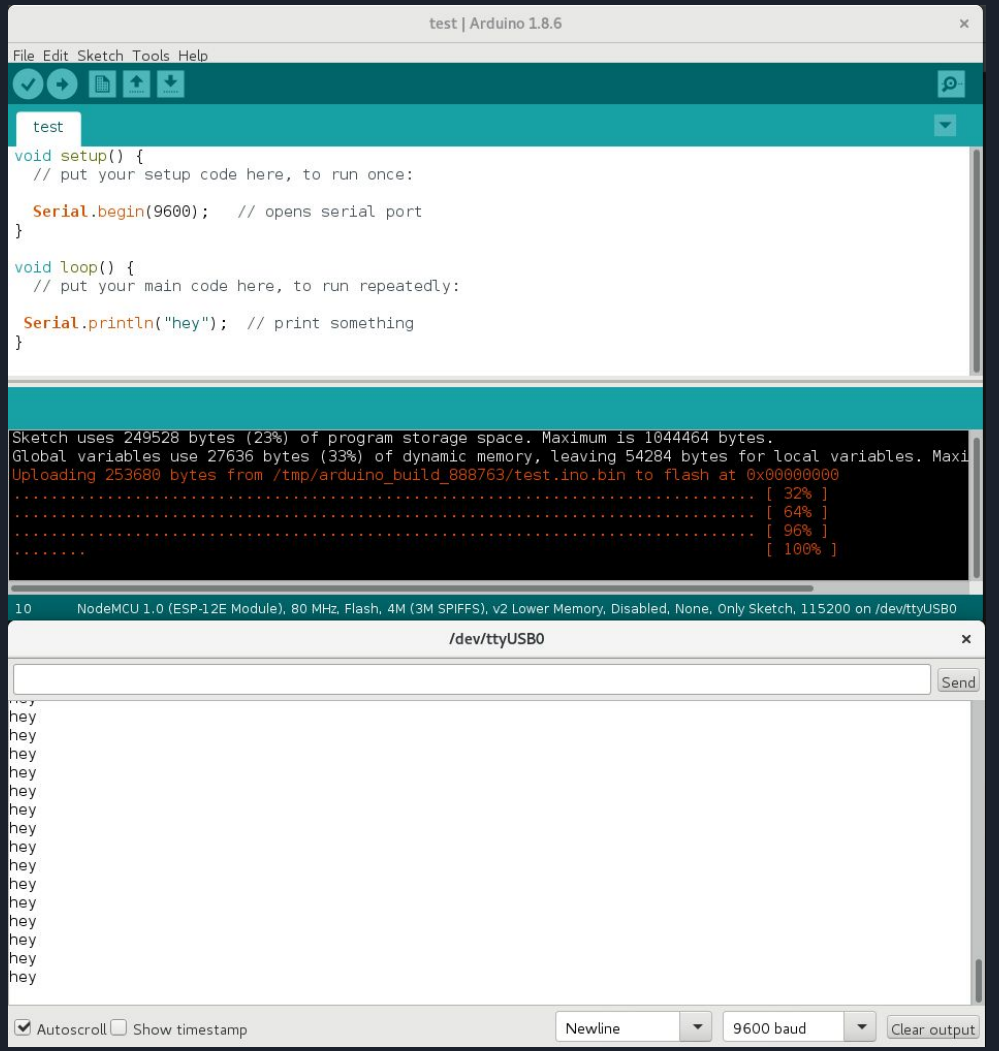
Serial printing

Serial.begin(9600);

- Setup serial port

Serial.println("hey");

- Print statement just like C



print

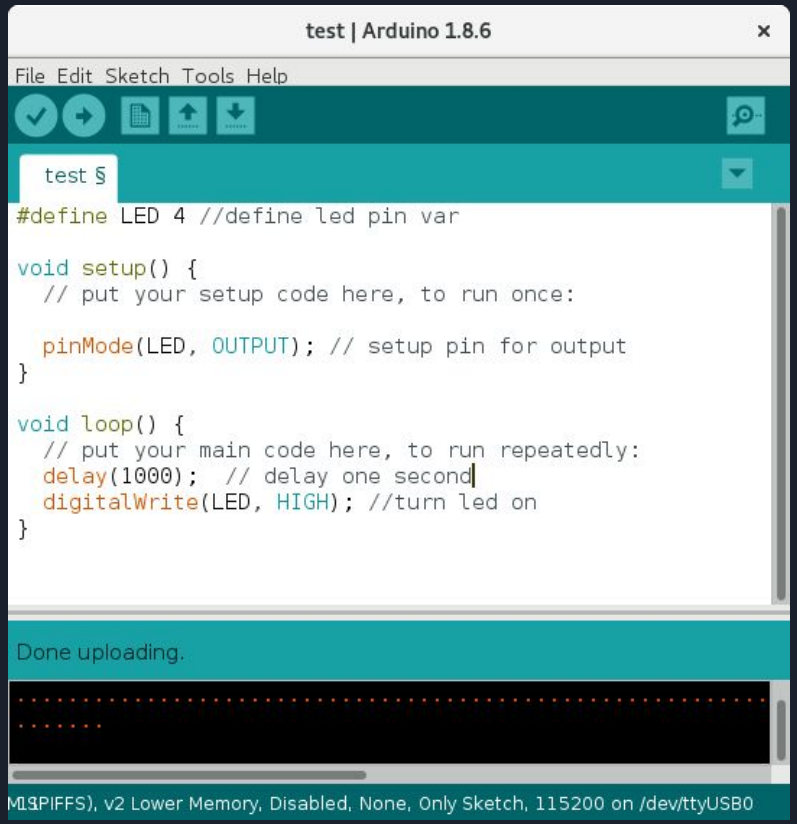
GPIO (General Purpose Input Output)

pinMode(LED, OUTPUT);

- Setup pin as output

digitalWrite(LED, HIGH);

- Set pin to high (on)
- Can also be set to LOW (off)



ledon

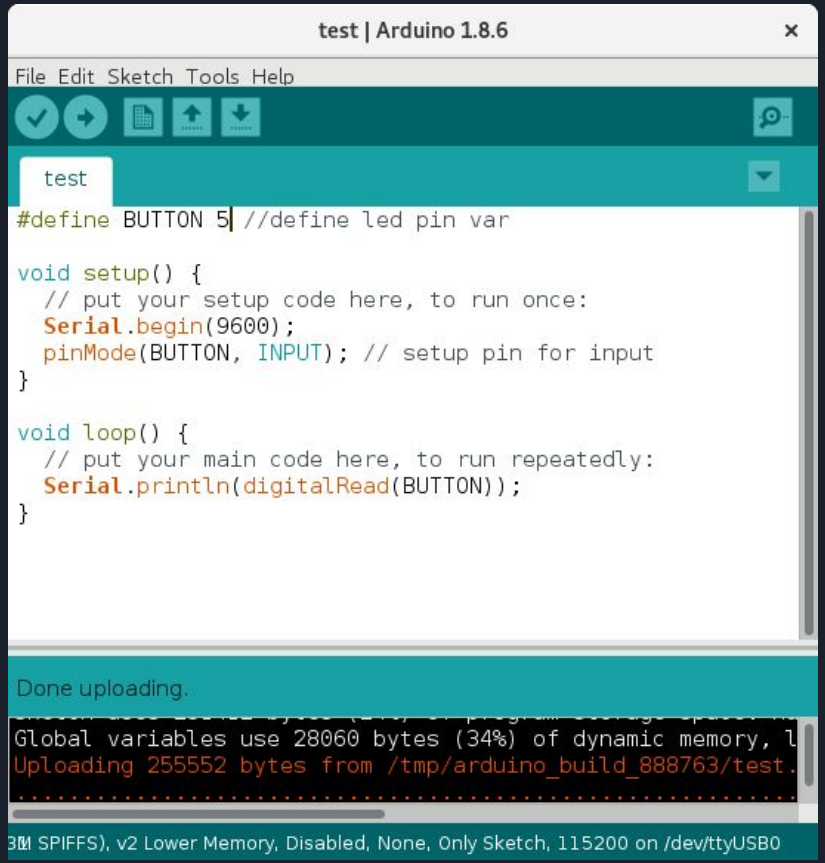
GPIO (General Purpose Input Output)

pinMode(BUTTON, INPUT);

- Set pin as input

digitalRead(BUTTON);

- Read the value of the pin
- Will equal HIGH or LOW (0/1)



butonstate

buttonbounce

Assignment

- Wire up the button and led for the pi and arduino
- Create a program on each device that will toggle the state of the led when the button is clicked (each click changes the current state of the led)

Take a video of both devices functioning

Email me the video and your code before the start of next class for credit

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