Introduction to the Arduino

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2-4 PM
Today we'll be covering:

- Microcontroller Overview
- Geography of your Arduino
- What makes an arduino an arduino?
- What can it do?
- How do I use it?
- How do I write code for it?
But first ...

Drivers and IDE
What is a microcontroller?

- Miniature computer
  - Processor
  - Short term memory
  - Long term memory
- Input and Output
  - Digital
  - Analog
Microcontroller uses

- Art projects
- Robots
- Automation
- Human interface devices
- Prototyping
- Sensing
- and more!
Arduino: microcontroller and more
Your Arduino

- Runs at 16 MHz
- 32 KB Flash memory
- 2 KB RAM
- 3 counters
- 14 digital I/O pins
- 6 10-bit Analog input pins
A brand new IDE

```c
// read the pushbutton input pin:
buttonState = digitalRead(buttonPin);

// compare the buttonState to its previous state
if (buttonState != lastButtonState) {
    // if the state has changed, increment the counter
    if (buttonState == HIGH) {
        // if the current state is HIGH then the button
        // went from off to on:
        buttonPushCounter++;
        Serial.println("on");
        Serial.print("number of button pushes: ");
        Serial.println(buttonPushCounter, DEC);
    }
    else {
        // if the current state is LOW then the button
        // went from on to off:
        Serial.println("off");
    }

    // save the current state as the last state,
    // for next time through the loop
    lastButtonState = buttonState;
}

// turns on the LED every four button pushes by
// checking the modulo of the button push counter.
```
Talking to the Arduino

```cpp
void setup() {
    Serial.begin(9600);
}

void loop() {
    Serial.println("success!");
}
```
Digital Output
Digital Output

```cpp
void setup() {
  pinMode(3, OUTPUT);
}

void loop() {
  digitalWrite(3, HIGH);
  delay(500);
  digitalWrite(3, LOW);
  delay(500);
}
```
Digital Input
Digital Input

```c
void setup() {
    pinMode(3, OUTPUT);
    pinMode(2, INPUT);
}

void loop() {
    if (digitalRead(2) == HIGH)
    {
        digitalWrite(3, HIGH);
    } else
    {
        digitalWrite(3, LOW);
    }
}
```