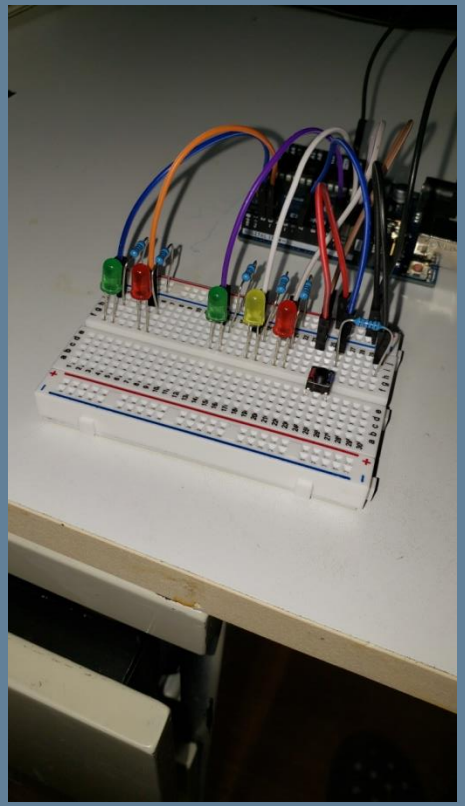
ARDUINO PHASE II



LET'S BUILD SOMETHING

Andrew Smith, MSEE
Industrial Control Consultants

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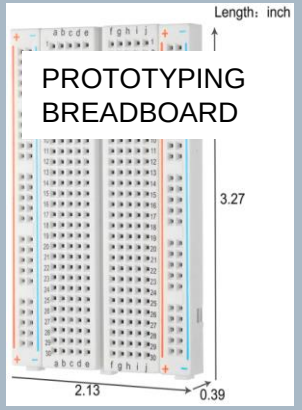
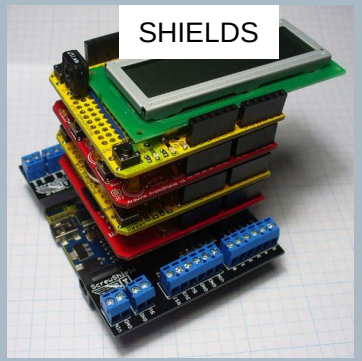
REMEMBER LAST TIME?





SENSORS,
LIGHTS,
READOUTS,
INPUTS

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INTEGRATED DEVELOPMENT ENVIRONMENT

- Lode the IDE on a computer.
- Start the IDE.
- Connect the Arduino Uno.
- Configure the IDE to the particular Arduino hardware
- Configure the COMMS with the Arduino.
- Load and test a sample Sketch (Blink).

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INTEGRATED DEVELOPMENT ENVIRONMENT

You have all loaded software before. Look in your packet for

"ARDUINO IDE"

handout.

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INTEGRATED DEVELOPMENT ENVIRONMENT

Arduino IDE

As an open source software,Arduino IDE, based on ongoing Processing IDE development is an integrated development environment officially launched by Arduino.

By using Arduino IDE, you just write the program code in the IDE and upload it to the Arduino circuit board. The program will tell the Arduino circuit board what to do.

So,Where can we download Arduino IDE?

STEP 1:

- Go to https://www.arduino.cc/en/Main/Software and you will see the following page.
  The version available at this website is usually the latest version, and the actual version may be newer than the version in the picture.

STEP 2:

- Download the development software that is suited for the operating system of your computer. Take Windows as an example here.

  If you are MacOS, please open 04 For Mac Setting up development environment

  You can install it using the EXE installation package or the green package.
  The following is the exe implementation of the installation procedures. Press the option "Windows Installer".

STEP 3:

- Press the button "JUST DOWNLOAD" to download the software.

  The download file:

  arduino-1.8.9-windows

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INTEGRATED DEVELOPMENT ENVIRONMENT

- Instead of going out to the internet, look on your thumb drive for **arduino-1.8.19-windows.exe**
- Double-click and install.
- Connect your Arduino Uno to an unused USB 2.0 port.

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INTEGRATED DEVELOPMENT ENVIRONMENT

Two MUST HAVES

- Step 6 – must have COM port chosen

- Step 9 – must have proper board chosen – Arduino/Genuino UNO

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Let’s test this Arduino

- In your IDE, click

  File -> Examples -> 01. Basics -> Blink (Click)

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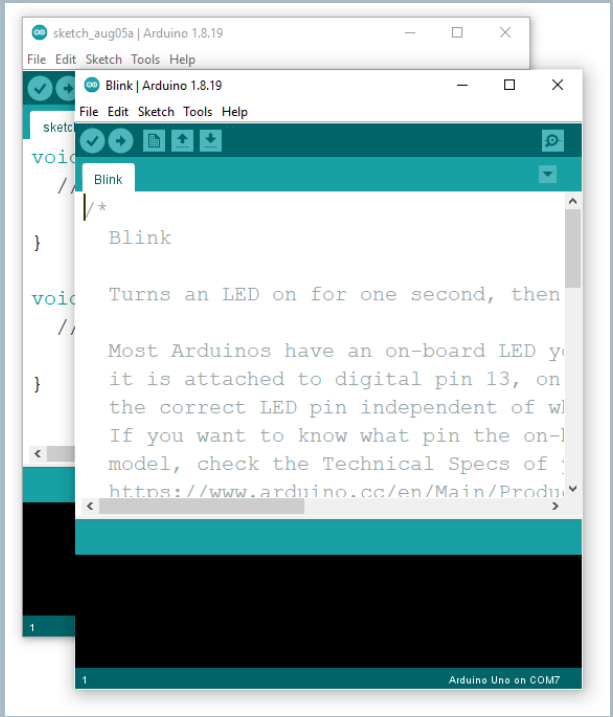
BLINK

Your screen should look something like this:



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RUN

- To see what will transpire, maximize the BLINK screen.
- Expand the size of the Information Bar
- Click Upload button

[See picture for Step 5 handout]

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LOOK AT THE CODE for BLINK

[HANDOUT or Your Screen]

BLINK.ino

```
// the setup function runs once when you press reset or power the board
void setup() {
  // initialize digital pin LED_BUILTIN as an output.
  pinMode(LED_BUILTIN, OUTPUT);
}

// the loop function runs over and over again forever
void loop() {
  digitalWrite(LED_BUILTIN, HIGH);   // turn the LED on (HIGH is the voltage level)
  delay(1000);                       // wait for a second
  digitalWrite(LED_BUILTIN, LOW);    // turn the LED off by making the voltage LOW
  delay(1000);                       // wait for a second
}
```

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SKETCHES - Basics

- Structure
- Setup()
- Loop()
- Functions()
- {} Curly Braces
- ; Semicolon
- /*… */ Block Comments
- // Line Comments

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Structure

- The basic structure of the Arduino programming language is fairly simple and runs in at least two parts. These two required parts, or functions, enclose blocks of statements.
- **void** setup()
- {
- statements;
- }
- **void** loop()
- {
- statements;
- }
- Where setup() is the preparation, loop() is the execution. Both functions are required for the program to work.
- *The setup function should follow the declaration of any variables at the very beginning of the program.* It is the first function to run in the program, is run only once, and is used to set pinMode or initialize serial communication.

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BUILD A NEW OBJECT FROM SPEC

Find Pedestrian Demand Crossing Traffic Light SOW
in your handout packet

- What it is to be done
- Using what tools equipment and resources
- To what precision

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Code to Hardware

- From your thumb drive,
- Open folder Pedestrian_Cross
- Double click Pedestrian_Cross.ino
- It should open in a new IDE window
- Expand the window to full screen

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Code to Hardware

Breadboard the hardware

- redCar LED anode to Pin 13
- yellowCar LED anode to Pin 12
- greenCar LED anode to Pin 11
- greenPed LED anode to Pin 2
- redPed LED anode to Pin 3
- One side of button to Pin 7

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Code to Hardware

Breadboard the hardware

- 5 x 2200Ω resistor from each LED cathode to NEG rail
- 10KΩ resistor from Button Pin 7 side to NEG rail (pull down)
- Wire lead from Arduino Power 5V to POS rail.
- Wire lead from Arduino GND to NEG rail

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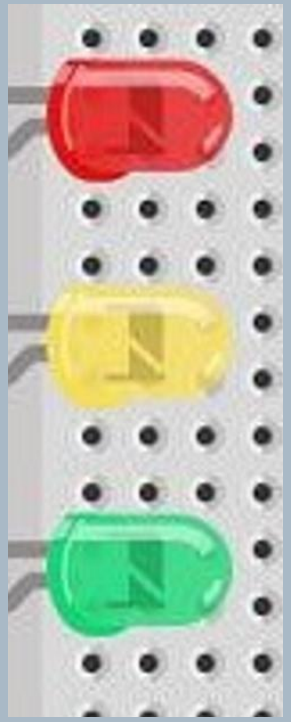
A little bit about LEDs



The connection with the pointy end is the ANODE + . If you are reusing an LED with clipped leads and no “flat” side, use a glass and identify the pointy end lead.

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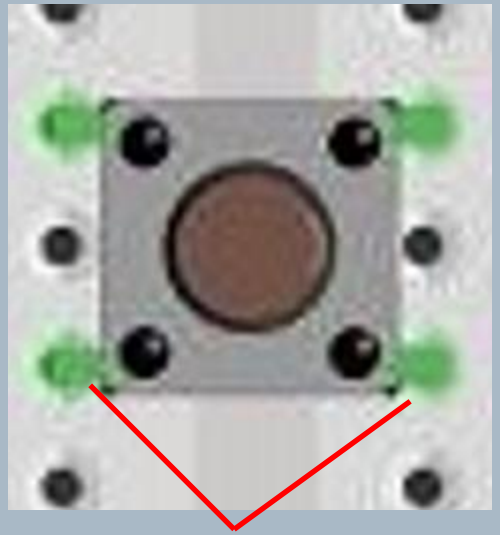
A little bit about buttons



Connected internally.
Same on other side.

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One More Step

- On your IDE, open the Serial Communications with button in upper right-hand corner
- Adjust window sizes
- Press LOAD – should have redPed and greenCar lit.
- **Press the button**

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- Examine the code for Pedestrian_Cross.
- When you can explain it to someone else, you have mastered it.
- All resources will be available on Drop Box

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