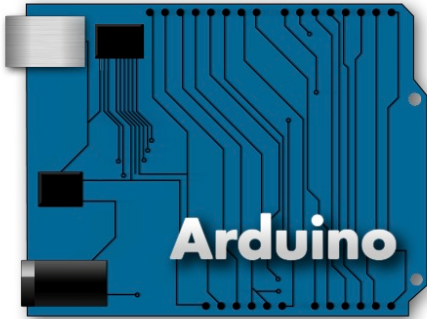




living with the lab



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gerry@me.pdx.edu



arduino.cc

Introduction to Arduino Programming



references

these notes borrow from . . .

– Arduino web site

- <http://arduino.cc/en/Guide/Environment>
- <http://arduino.cc/en/Tutorial/HomePage>

– Adafruit tutorial #1 and 2

- <http://www.ladyada.net/learn/arduino/lesson2.html>

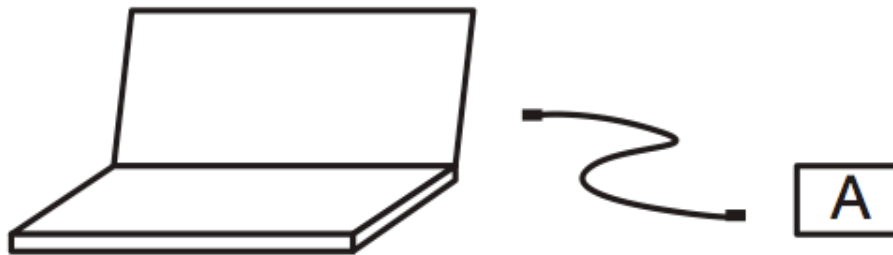
– Leah Buechley's Introduction to Arduino

- http://web.media.mit.edu/~leah/LilyPad/03_arduino_intro.html



writing and downloading code

Write sketch on PC



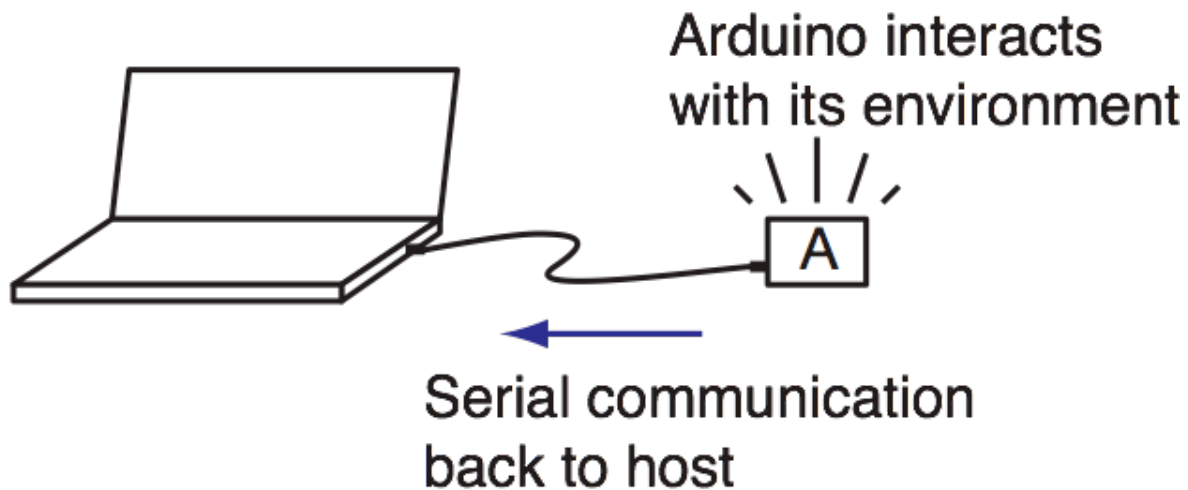
Download sketch to Arduino





running Code while tethered

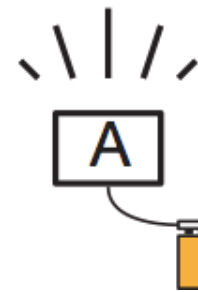
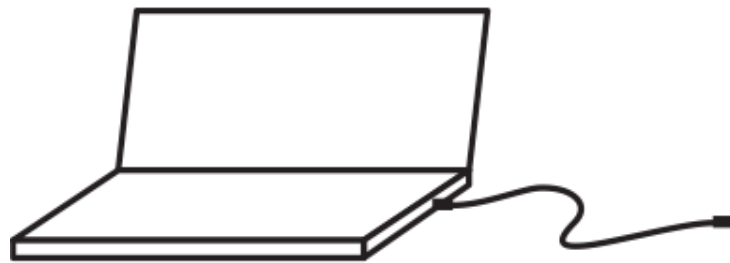
Run sketch on Arduino
and send data back to PC





running code stand-alone

Run Arduino in stand alone mode



Arduino interacts with its environment and runs on battery power

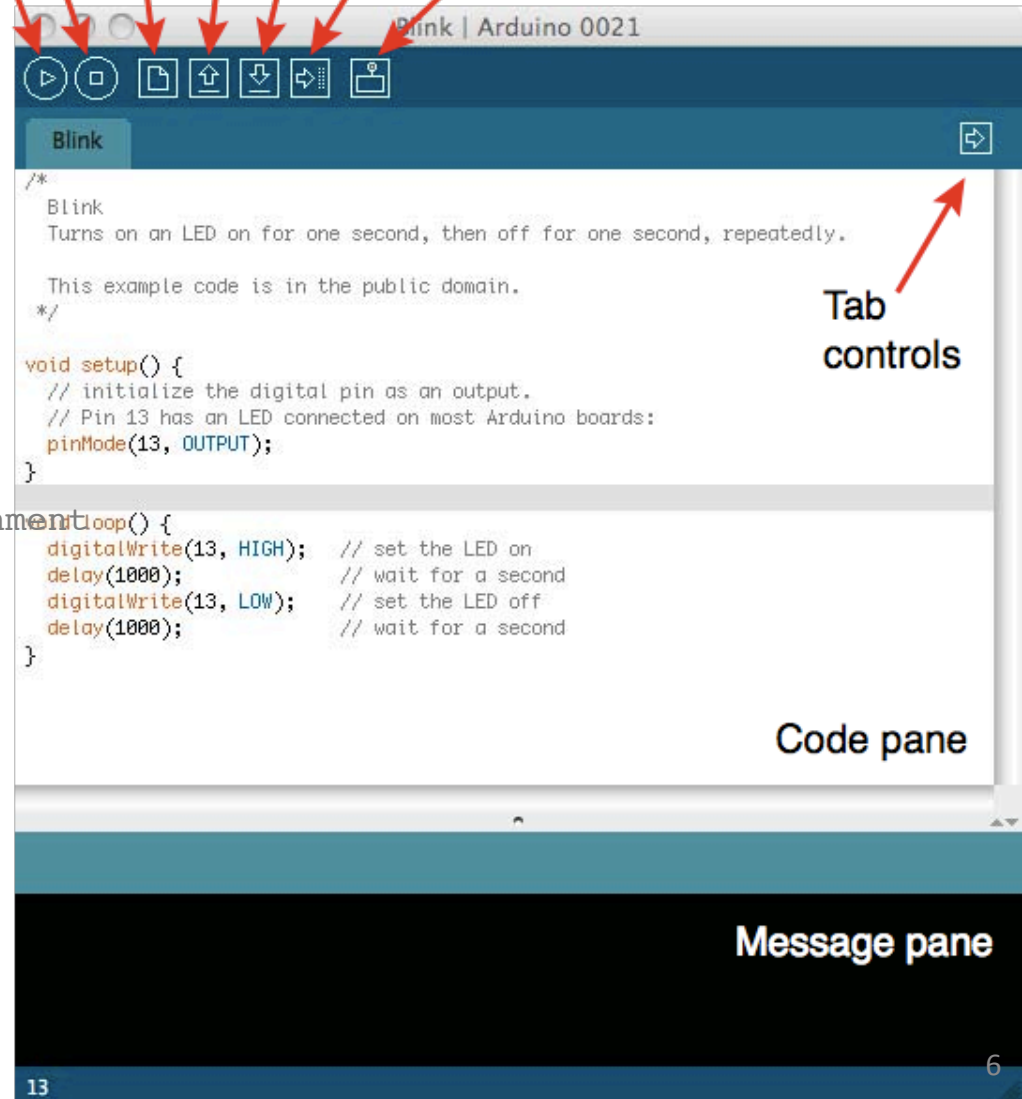


Arduino IDE

IDE = Integrated Development Environment

<http://www.arduino.cc/en/Guide/Environment>

- Open sketch
- Save sketch
- Upload sketch
- Open Serial monitor
- New sketch
- Verify/Compile
- Stop serial monitor





code structure: header

```
Blink | Arduino 0021

Blink §

/*
  Blink
  Turns on an LED on for one second, then off for one second, repeatedly.

  This example code is in the public domain.
  */

void setup() {
  // initialize the digital pin as an output.
  // Pin 13 has an LED connected on most Arduino boards:
  pinMode(13, OUTPUT);
}

void loop() {
  digitalWrite(13, HIGH); // set the LED on
  delay(1000);           // wait for a second
  digitalWrite(13, LOW); // set the LED off
  delay(1000);           // wait for a second
}
```

header provides information and can also contain code



code structure: setup function

```
Blink | Arduino 0021

Blink §

/*
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  digitalWrite(13, HIGH); // set the LED on
  delay(1000);             // wait for a second
  digitalWrite(13, LOW);  // set the LED off
  delay(1000);            // wait for a second
}
```

setup function is executed only once at the start



code structure: loop function

```
Blink | Arduino 0021  
Blink §  
/*  
  Blink  
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  // Pin 13 has an LED connected on most Arduino boards:  
  pinMode(13, OUTPUT);  
}  
  
void loop() {  
  digitalWrite(13, HIGH); // set the LED on  
  delay(1000);           // wait for a second  
  digitalWrite(13, LOW); // set the LED off  
  delay(1000);          // wait for a second  
}
```

loop function is repeated indefinitely



code

```
Blink | Arduino 0021
Blink §
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  delay(1000);           // wait for a second
  digitalWrite(13, LOW); // set the LED off
  delay(1000);          // wait for a second
}
```

pinMode(13, Output)
prepares pin 13 for
outputs of voltage

- digital I/O functions:
- pinMode
 - digitalWrite
 - digitalRead



code

```
Blink | Arduino 0021
Blink §
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  digitalWrite(13, HIGH); // set the LED on
  delay(1000);            // wait for a second
  digitalWrite(13, LOW); // set the LED off
  delay(1000);           // wait for a second
}
```

`digitalWrite(13, HIGH)` sets pin 13 to a voltage that means "on" (five volts in this case)

- digital I/O functions:
- pinMode
 - digitalWrite
 - digitalRead



code

```
Blink | Arduino 0021
Blink §
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}

void loop() {
  digitalWrite(13, HIGH); // set the LED on
  delay(1000);           // wait for a second
  digitalWrite(13, LOW); // set the LED off
  delay(1000);           // wait for a second
}
```

`delay(1000);`
tells microcontroller to do nothing for 1000 ms = 1 s

- digital I/O functions:
- pinMode
 - digitalWrite
 - digitalRead



code

```
Blink | Arduino 0021
Blink §
/*
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}

void loop() {
  digitalWrite(13, HIGH); // set the LED on
  delay(1000);           // wait for a second
  digitalWrite(13, LOW); // set the LED off
  delay(1000);          // wait for a second
}
```

digitalWrite(13, LOW)
sets pin 13 to voltage
that means "off" or zero volts

- digital I/O functions:
- pinMode
 - digitalWrite
 - digitalRead