Introduction to Arduino Programming
these notes borrow from . . .

– Arduino web site
  • 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

Arduino interacts with its environment

Serial communication back to host
Run Arduino in stand alone mode

Arduino interacts with its environment and runs on battery power.
Arduino IDE

IDE = Integrated Development Environment

code structure: header

header provides information and can also contain code
code structure: setup function

```c
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
}
```

setup function is executed only once at the start
code structure: loop function

```c
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
}
```

loop function is repeated indefinitely
code

```cpp
/**
 * Blink
 * Turns on an LED on for one second, then off.
 * 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
}
```

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

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

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

delay(1000);

tells microcontroller to do nothing for 1000 ms = 1 s

digital I/O functions:
  • pinMode
  • digitalWrite
  • digitalRead
code

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

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