Arduino Programming Part 1

ME 120
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ME 120: Arduino Programming

Overview

Arduino Environment
Basic code components
- Two required functions: startup() and loop()
- Variables
- Calling built-in functions

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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

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Arduino Web Site References

Overview of the development environment
- http://www.arduino.cc/en/Guide/Environment

Language reference
- http://arduino.cc/en/Reference/HomePage

Code tutorials
- http://arduino.cc/en/Tutorial/HomePage

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Basic Process

Design the circuit:
- What are electrical requirements of the sensors or actuators?
- Identify analog inputs (sensors)
- Identify digital inputs & outputs (buttons, LEDs, relays)

Write the code
- Build incrementally
  ‣ Get the simplest piece to work first
  ‣ Add complexity and test at each stage
  ‣ Save and Backup frequently
- Use variables, not constants
- Comment liberally
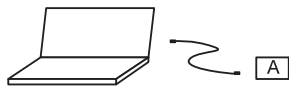
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Writing and Downloading Code

Write sketch on PC

Download sketch to Arduino

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Running Code While Tethered

Run sketch on Arduino
and send data back to PC

Arduino interacts
with its environment

A

Serial communication
back to host

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Running Code Stand-Alone

Run Arduino in stand alone mode

A

Arduino interacts with
its environment and
runs on battery power

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Open the example sketch, blink.ino

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Load "Blink" from the built-in examples

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Arduino IDE

New sketch
Open sketch
Upload to Arduino
Save sketch
Serial monitor
Verify/Compile
Tabs

Blink | Arduino 1.0.5

Blink

IDE = Integrated
Development
Environment

http://www.ardu.no.cc/
en/Guide/Environment

Code pane

Message pane

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Common Code Structure

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Code Structure: Header

Header provides information. Can also contain code

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Code Structure: setup function

setup function is executed only once at the start

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Code Structure: loop function

loop function is repeated indefinitely

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Details of the Blink Code

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Code


```
int led = 13;
```
creates a variable named "led" and stores 13 in that variable

```
pinMode(led, Output)
```
prepare pin number "led" for outputs of voltage
"led" is a variable

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Code


```
digitalWrite(led, HIGH)
```
Sets pin "led" to a value that means the voltage is "on"

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

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Code

digitalWrite(led, LOW)
Sets pin "led" to a value that means the voltage is "off"

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

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