Introduction to Arduino

by Barry van Kampen
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Who?

- Fish_ aka Barry?
- Proud to be a Nerd at ITQ
- Founder of Randomdata
- HiTB 2010 Amsterdam
- 0xThinker!
- The sky is NOT the limit
Agenda

• What you can and what we do
• Introduction to Arduino hardware
• Arduino 1-2-3
• HandsOn!
Experience?
Blinky!
Blinky!
#include <Ethernet.h>
byte mac[] = { 0x88, 0x8E, 0x8E, 0x8E, 0x8E, 0x8E }; // the arduino's mac address
byte ip[] = { 87, 75, 53, 182 }; // the arduino's ip address
byte server[] = { 0, 0, 0, 0 }; // ip address of server to get the characters
byte gateway[] = { 87, 76, 52, 1 }; // ip address of the gateway
byte subnet[] = { 255, 255, 255, 0 }; // subnetmask

Client client(server, 80); // Define the connect to the webserver

int ledPin1 = 18; // LED connected to digital pin 1
int ledPin2 = 19; // LED connected to digital pin 2
int ledPin3 = 4;  // LED connected to digital pin4
int ledPin4 = 3;  // LED connected to digital pin 5
int ledPin5 = 5;  // LED connected to digital pin 6
int ledPin7 = 6;  // LED connected to digital pin 7
int ledPin8 = 7;  // LED connected to digital pin 8
int ledPin9 = 8;  // LED connected to digital pin 9
int ledPin10 = 9; // LED connected to digital pin 10
int ledPin11 = 14; // LED connected to digital pin 11
int ledPin12 = 15; // LED connected to digital pin 12
int ledPin13 = 16; // LED connected to digital pin 13
int ledPin14 = 17; // LED connected to digital pin 14
int time = 500; // the time a segment should be on
int timeshort = 200; // time of lights off
int timebreak = 40; // time to remove all the lights

void setup() // run once, when the sketch starts
{
  Ethernet.begin(mac, ip, gateway, subnet); // starting the ethernet
delay(1000);

  Serial.begin(9600); // for debug you can open a serial connection
Blinky!

- Website: http://www.randomdata.nl/blinky/
- Twitter: http://www.twitter.com/randomblinky
- Details & code:
Garduino
Garduino
Garduino

• Stats:

• Details & code:

http://www.randomdata.nl/wiki/index.php/Garduino
Other projects

• Blinky 2.0
• Garduino extentions
• Beer/barduino (Brucon)
• Space automation
Arduino

The serial single sided
Arduino

The serial
Arduino

The pro mini
Arduino

The pro
Arduino

The Lilypad
Arduino

Arduino BT
Arduino

The Diecimila
Arduino

The Duemilanove
Arduino

The boarduino
Arduino

The mega
Arduino’s
Shields

- A shield extends your Arduino functionality
- Shields come in much variety
- Shields are usual compatible with the “classic” arduino’s
Shields

Protoshield
Shields

Ethernetshield
Shields

Motorshield
Shields

RFiDuino
Shields

GPS shield
Shields

Optoshield
Shields

Waveshield
Shields

USB shield:
http://www.circuitsathome.com/category/mcu/arduino/usb-shield
The GUI

• Multi platform
• OSX
• Windows
• Linux
• Easy to use
• Examples to start
The GUI

```c
int ledPin = 13; // LED connected to digital pin 13

void setup() {
    // initialize the digital pin as an output:
    pinMode(ledPin, OUTPUT);
}

// the loop() method runs over and over again,
// as long as the Arduino has power
void loop() {
}
```

Blink

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

The circuit:
* LED connected from digital pin 13 to ground.
* Note: On most Arduino boards, there is already an LED on the board connected to pin 13, so you don’t need any extra components for this example.

Created 1 June 2005
By David Cuartielles
http://arduino.cc/en/Tutorial/Blink

based on an orginal by H. Barragan for the Wiring i/o board

 */
The Code

- C-like language
- Examples :-)
- setup “routine”
- loop “routine”
Practice

- Install the gui
- Hookup
- First code: hello world
- Play around with Arduino
Install the GUI

1. Download the arduino software:
   http://arduino.cc/en/Main/Software

2. Install the USB drivers
Hello World Arduino

1. Connect the Arduino
2. Start the Arduino software
3. You’re ready to code
Practice 1
Practice 1

• Insert a LED in pin 13* and the ground next to it.

• Open the Arduino programm

• Connect the Arduino to your laptop with USB

* pin 13 has an on board resistor, the rest do
Practice 1

- Open an example:
Practice 1

- Select your serial port
Practice 1

- Upload the code

```c
/*
  Blink

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  */

  int ledPin = 13;    // LED connected to digital pin 13

  // The setup() method runs once, when the sketch starts
  void setup() {
    // initialize the digital pin as an output:
```
Watch the LED
0xTHINK3R
0xTHINK3R

- shields: ethernetshield, datashield, rfidshield
- LEDwar? Knight-rider, randomblink,