Arduino Platform Part II

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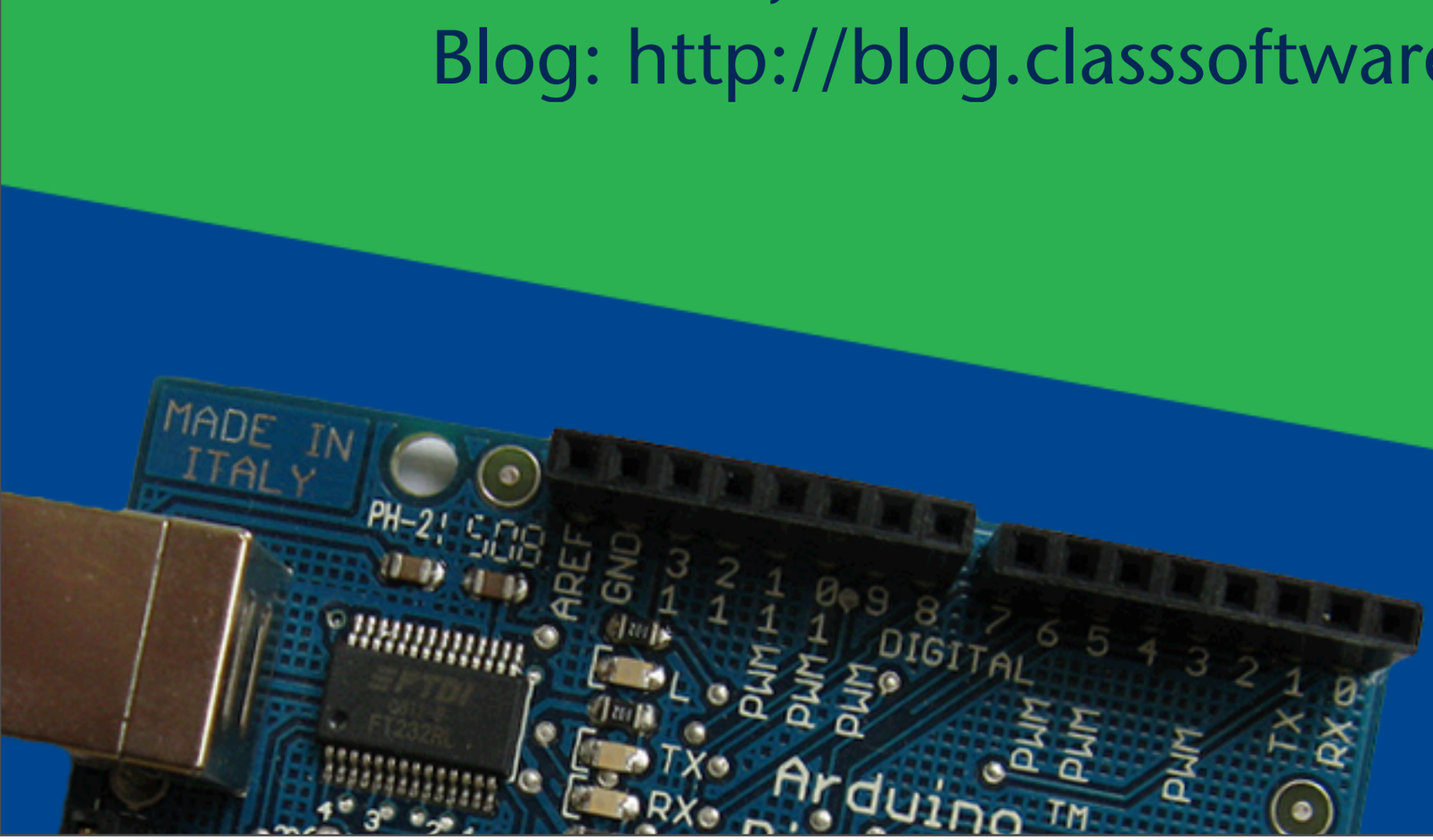


asdevs

Who am I?

- Director of Class Software for almost 15 years
- Developing and creating web applications for 15 years
- Programming for 25 years
- Adobe certified developer and trainer in Flex and ColdFusion
- Adobe Community Champion
- Based in Sydney Australia

Arduino

Review of last session

Arduino

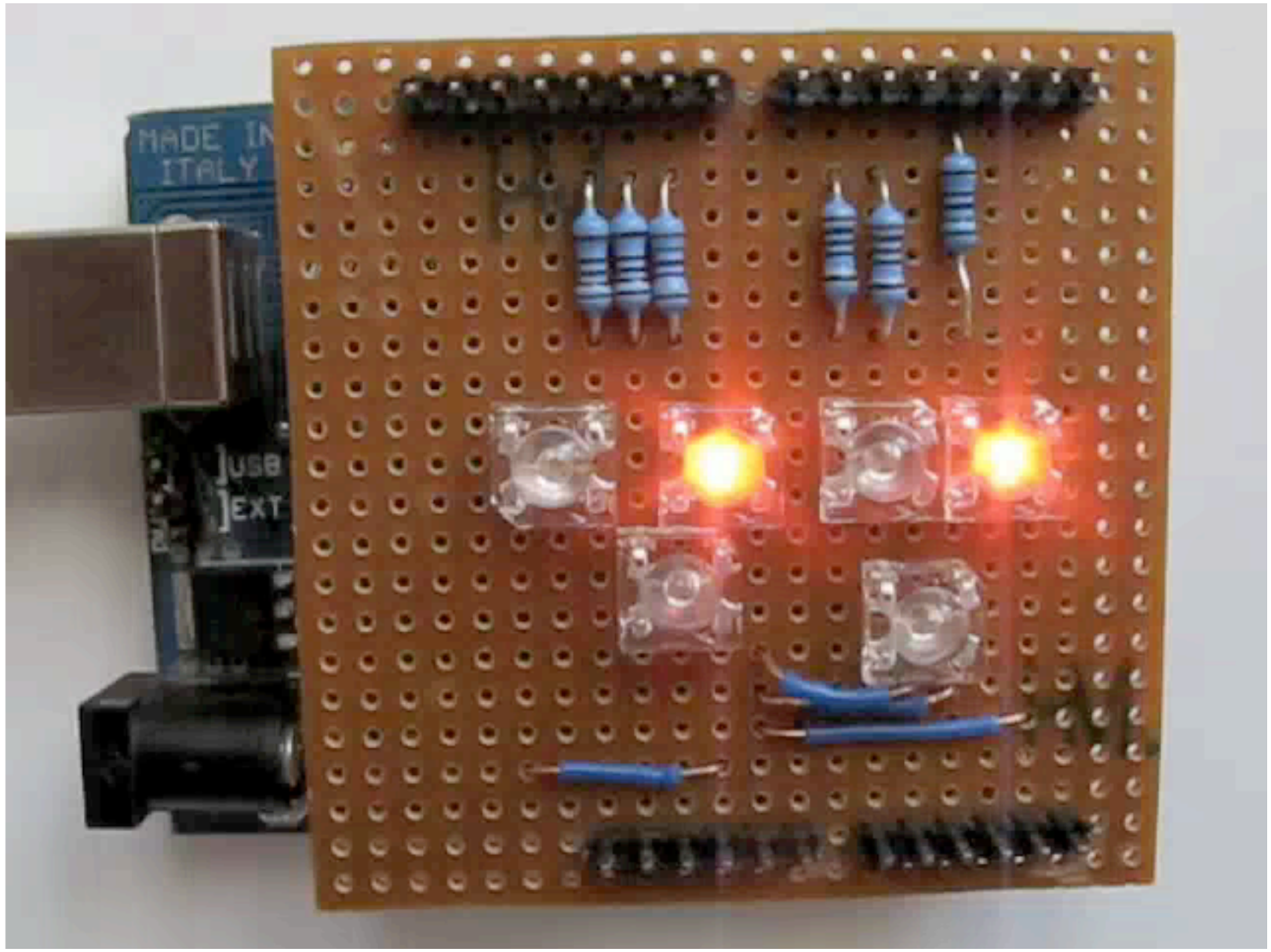
- Open source hardware and software platform
- Free software
- Easy to program
- Low cost hardware
- Several physical form factors

Shields

- Plug on top of Arduino
- Many available
- Can make your own
- Can be stacked

Led Shield Demo

Led Shield Demo



Programming

- C/C++ language based on wiring
- GCC under the hood
- Write code and compile in IDE
- Upload compiled code via USB
- Can monitor serial port
- Uploaded program is in non volatile memory
- Setup and Loop functions

Digital Inputs/Outputs

- Digital pins on Arduino are dual purpose
- Digital logic and voltage on = 5V off = 0V
- Can be set to be input or output via pinMode

Debugging via Serial Port

- Use Serial.begin to set speed
- Use Serial.print or Serial.println to output
- Use serial monitor in IDE to view

Reading Inputs

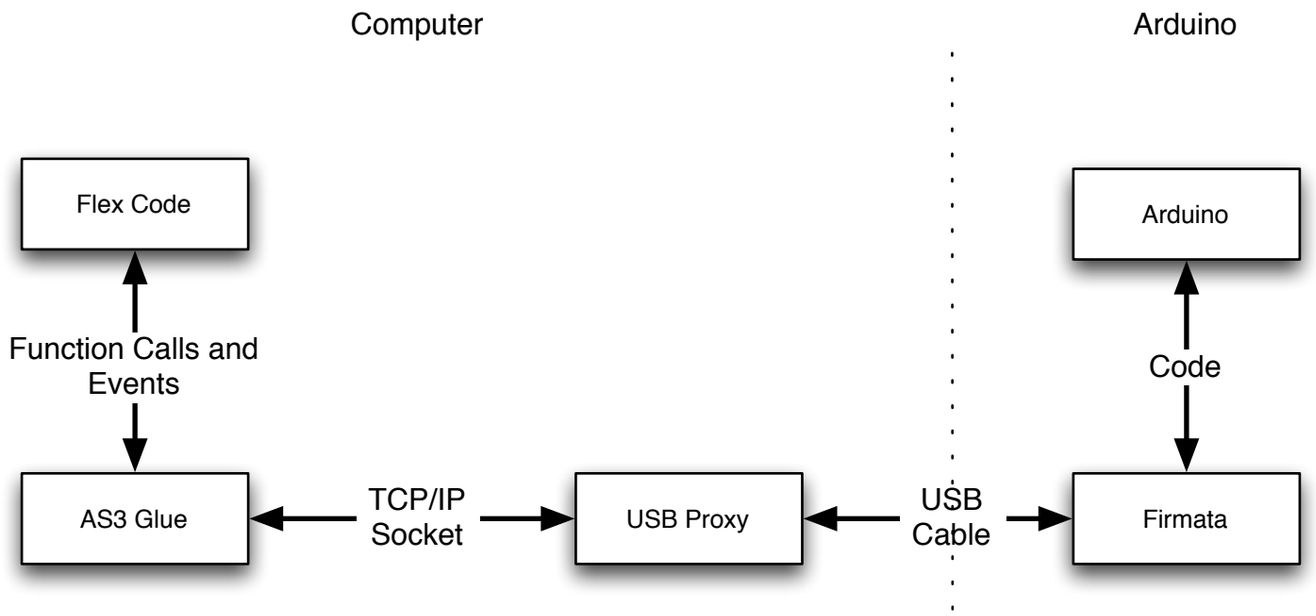
- Can read values via analogRead
- Result is in range 0 to 1023 (10 bits)
- 0V = 0 and 5V =1023

Flex

Communication between Flex and Arduino

Flex Communication

- Software on Arduino (Firmata)
- USB serial to socket proxy
- Flex event based library to talk to socket (as3Glue)



Flex Communications

Firmata

- Arduino library
- Binary protocol over serial interface
- Bi-directional
- Can use standard program or write your own
- Extendable

Standard Firmata

- Open Firmata
- Compile and upload to Arduino

USB Proxy

- USB socket proxy - Serproxy
- Configuration file (serproxy.cfg)
- Communicates between Arduino and Flex

Flex Socket Library

- as3Glue library
- API to set digital outputs and reporting
- Communicates via TCP/IP socket interface
- Receive events on change of digital inputs and analogue inputs

Review of Flex Events

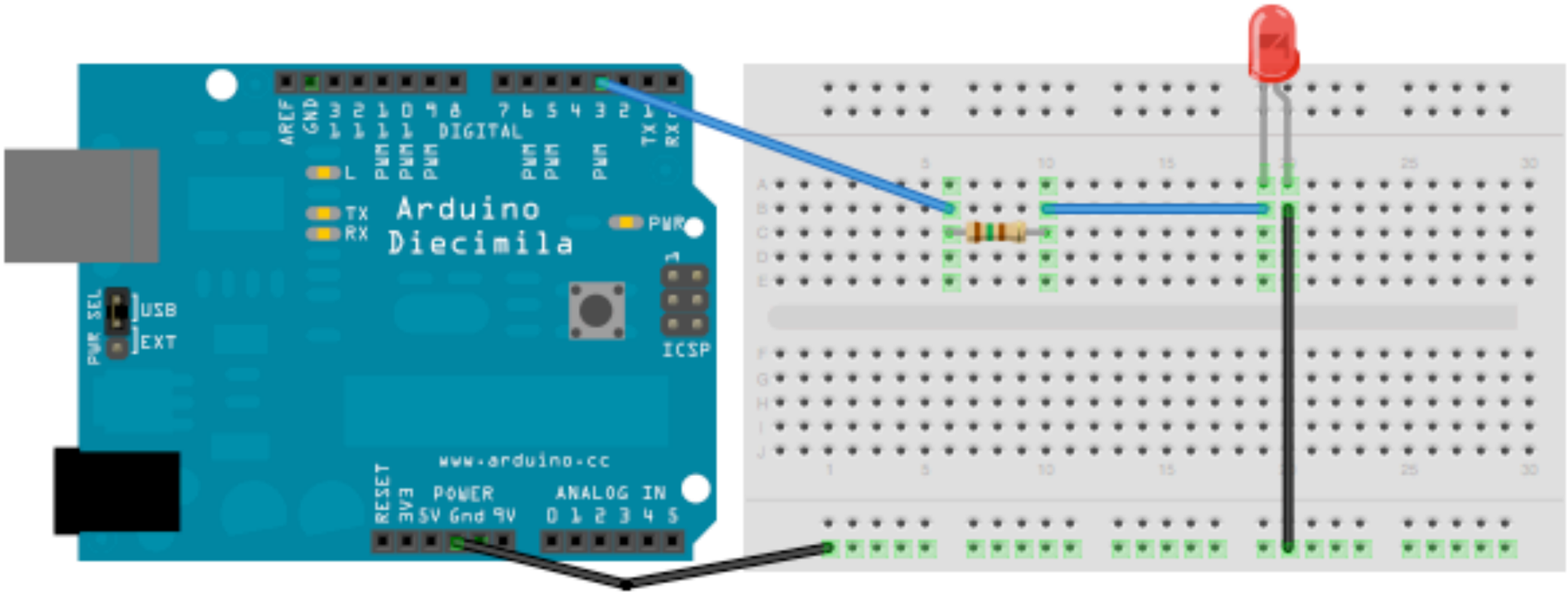
- Listening for events
- Event handlers
- Event bubbling

as3Glue Library

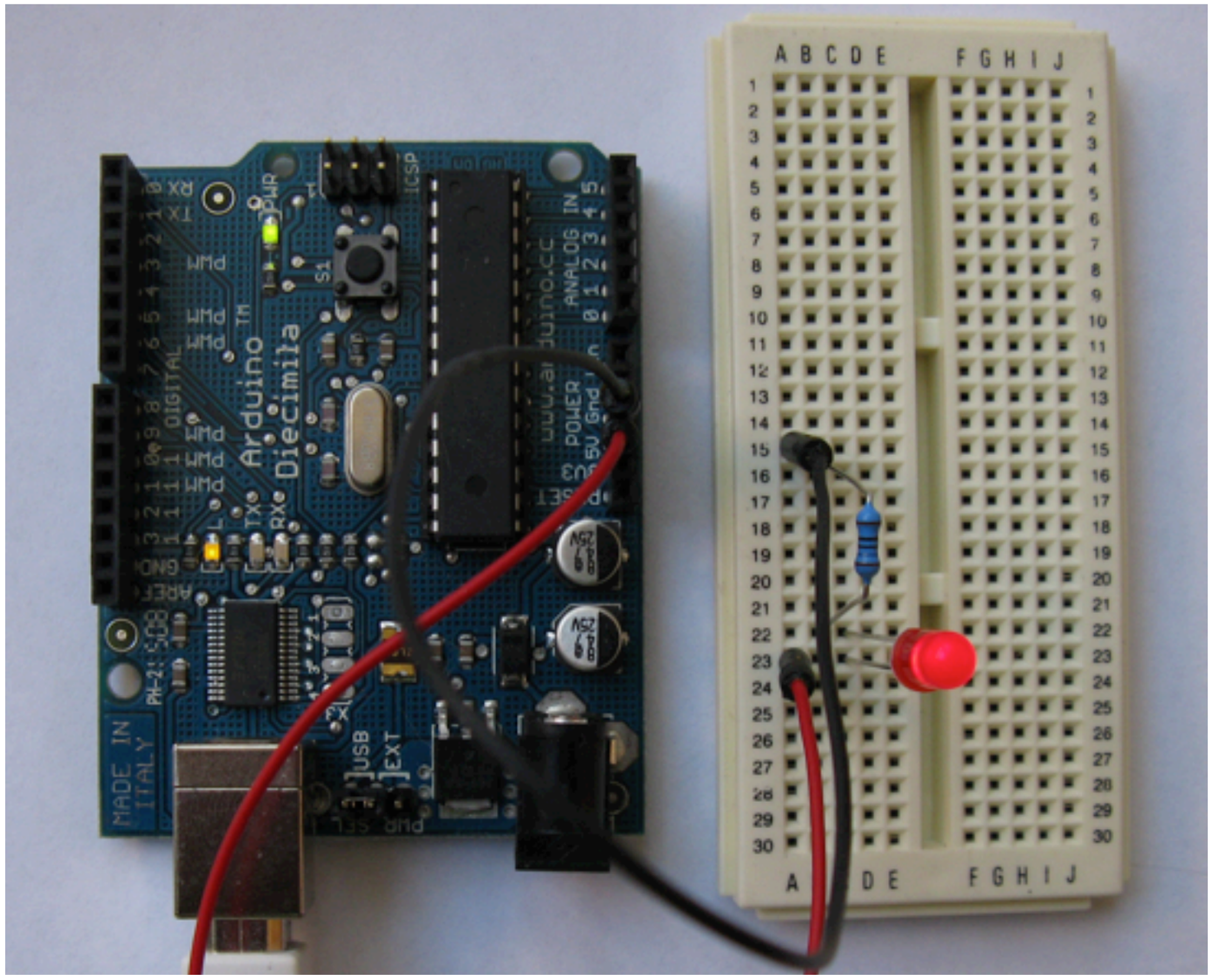
- Arduino class
- To set values call getDigitalData and getAnalogData
- To read values:
    - Turn on pin reporting
    - Listen for ANALOG_DATA or DIGITAL_DATA events

Flex Digital Outputs

- Open Flex IDE and create new project
- Add glue library
- Create a button that turns on digital output 3


AREF GND 13 12 11 10 9 8 7 6 5 4 3 2 1 0
DIGITAL
PWM
L
TX
RX
Arduino
Diecimila
PWR
PWR SEL
USB
EXT
ICSP
www.arduino.cc
RESET 3V3 5V Gnd Vin
POWER
ANALOG IN
0 1 2 3 4 5

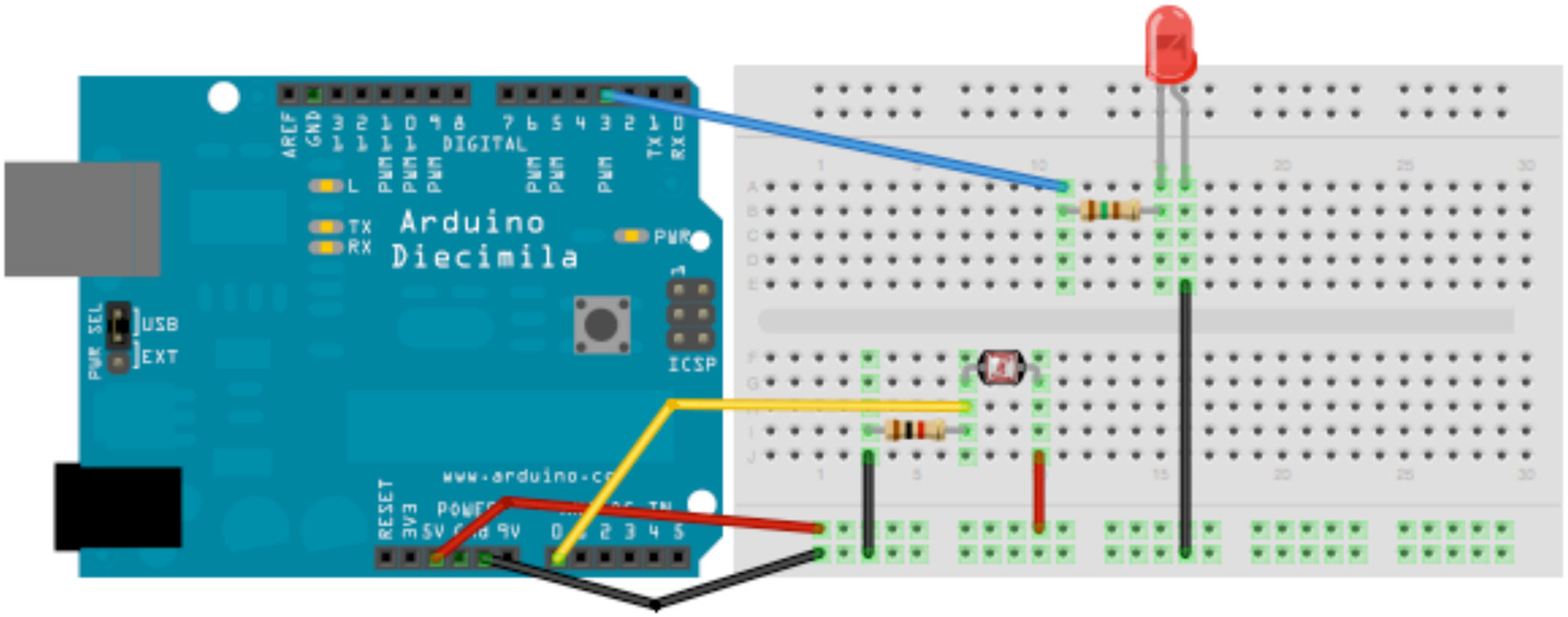
LED Circuit


A B C D E F G H I J
Arduino Diecimila
DIGITAL
ANALOG IN
POWER
MADE IN ITALY

LED Circuit

Flex Analogue Inputs

- Use LDR to set brightness of LED


AREF
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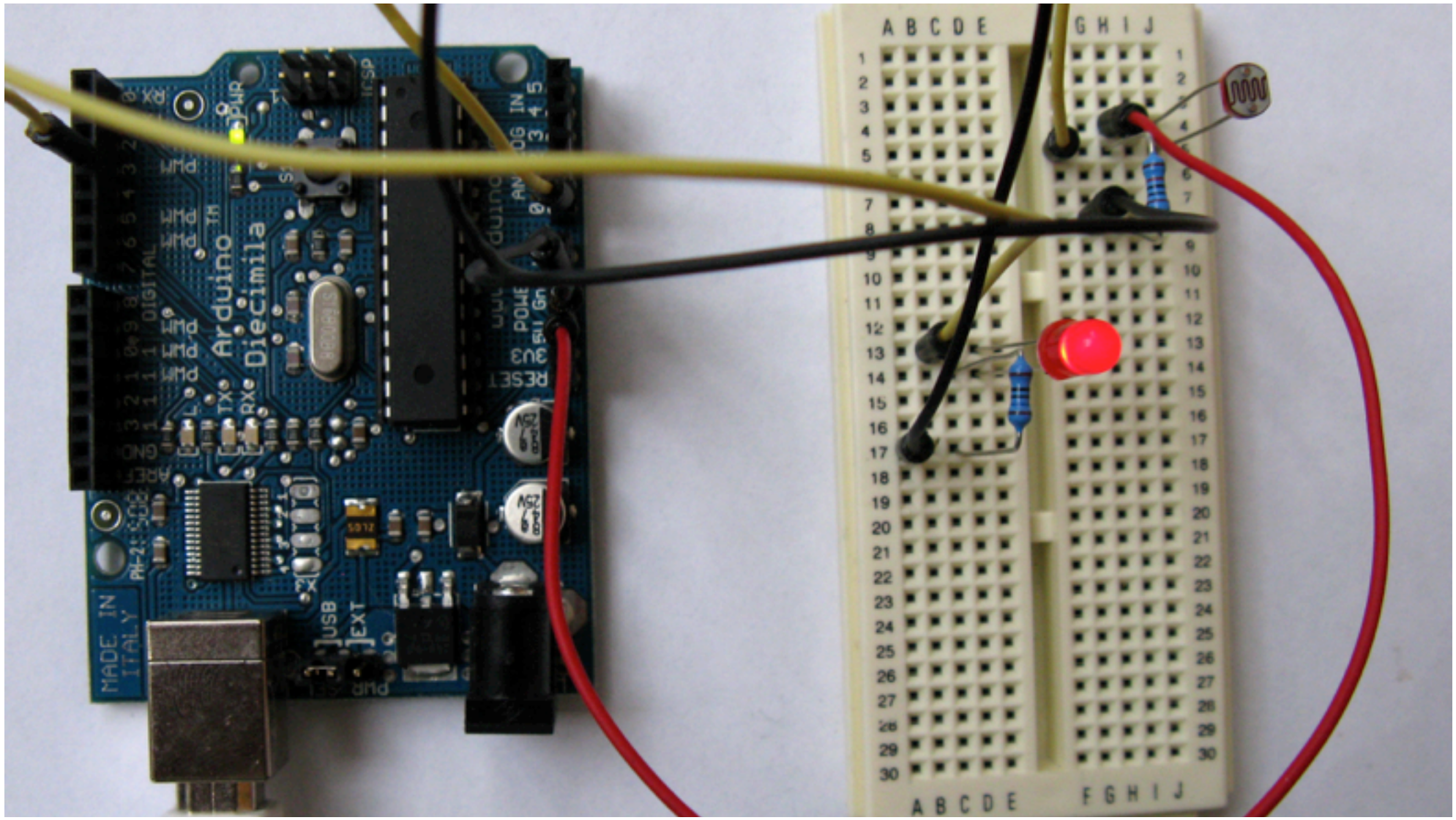
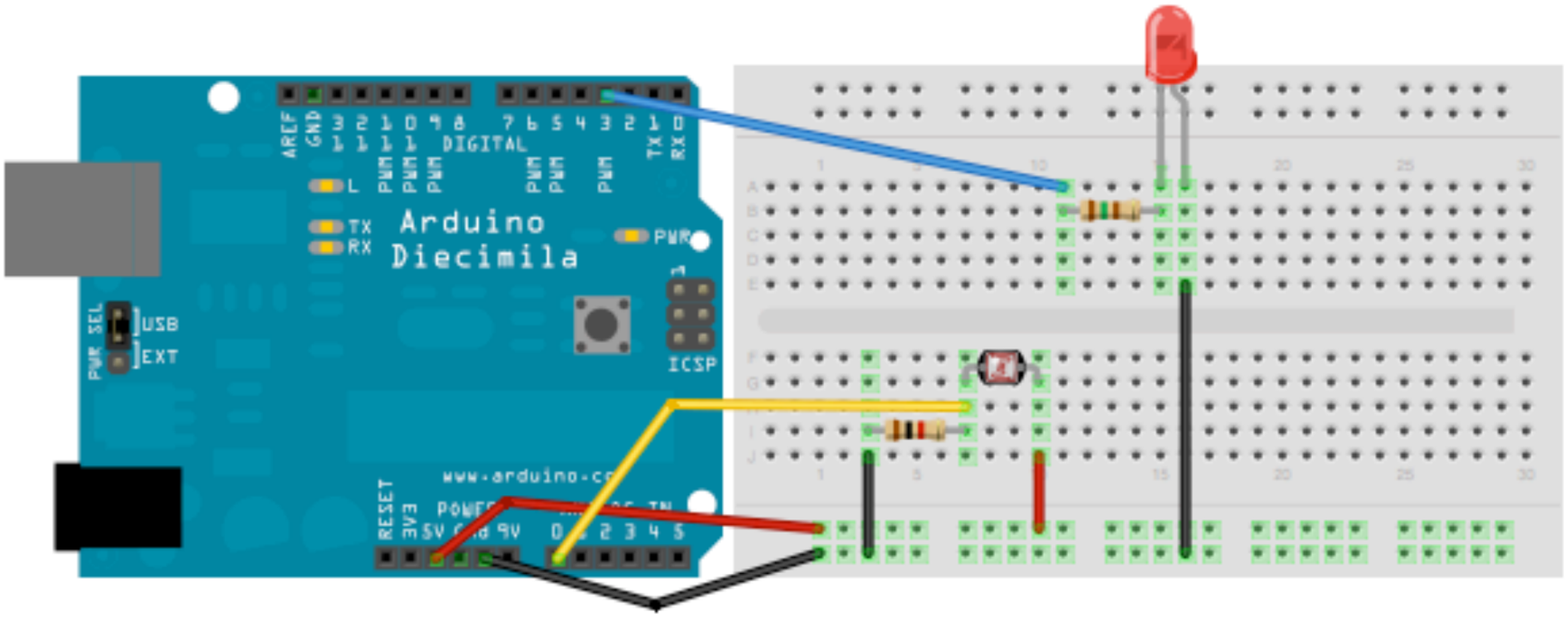
LDR Circuit



LDR Circuit

Web Servers

Turning an Arduino into a web server


AREF
GND
DIGITAL
TX
RX
L
TX
RX
Arduino
Diecimila
PWR
PWR SEL
USB
EXT
ICSP
RESET

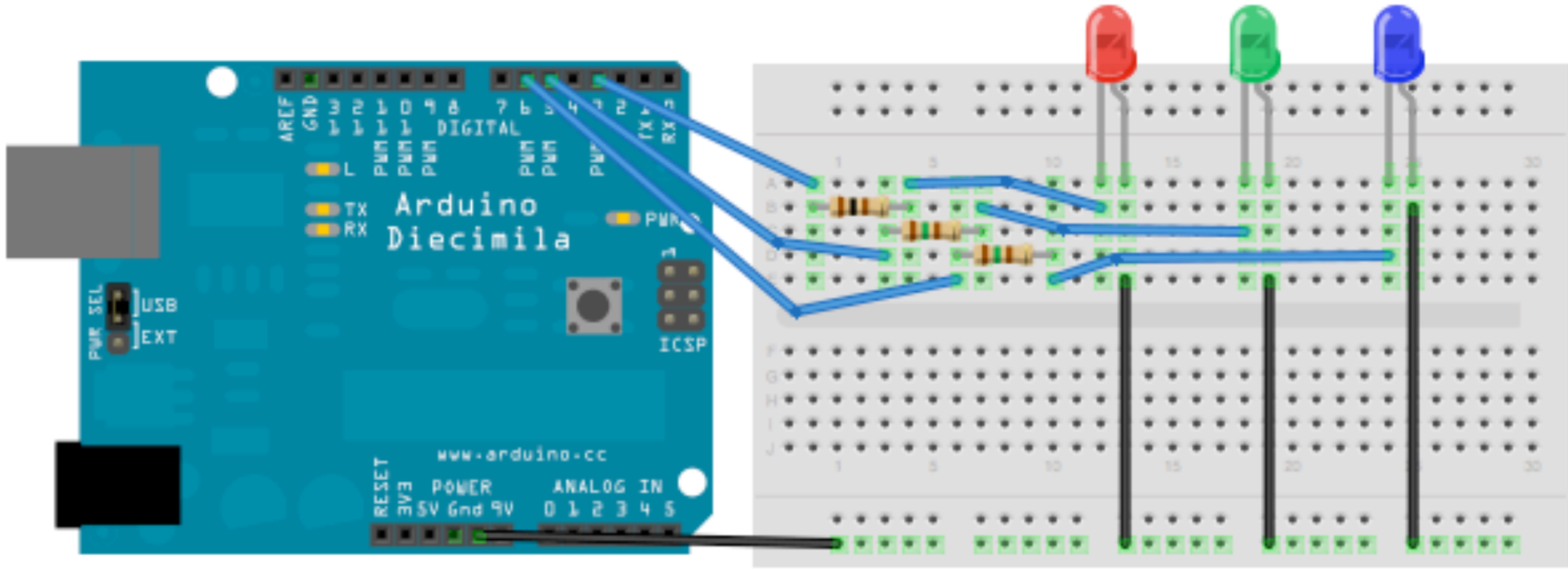
LDR Circuit

Analogue Values Flex

- Use HTTPService to set up call to web server (result type needs to be e4x)
- Use Timer to make HTTP request
- Graph values

Sending Data

- Need to parse GET command
- Buffered vs character at a time parsing
- Need to handle or ignore bad input



RGB LED Circuit

Digital Output Flex

- Use HTTPService to set up call to web server (result type needs to be e4x)
- Create parameter object to send
- Check XML results

Resources

Finding out more information

Arduino Sites

- Ardunio (http://ardunio.cc)
- Tinker It! (http://tinker.it)
- Lady Ada (http://ladyada.net)
- Seeed Studio (http://www.seeedstudio.com)
- Modern Device (http://moderndevice.com)

Electronic Components Suppliers

- Spark fun (http://www.sparkfun.com)
- Electric Goldmine (http://www.goldmine-elec-products.com/)
- Digikey (http://www.digikey.com/)
- Farnell (http://ww.farnell.com/)

Other Sites

- Make magazine (http://makezine.com/)
- Evil Mad Scientist (http://evilmadscientist.com)
- NYC Resistor (http://nycresistor.com)