Pulse Oximetry & Microcontrollers

D-Lab: Health

5 March 2010

Pulse Oximetry Purpose

- Detect oxygen saturation of a patient's blood.
- While you're at it, detect pulse rate.

Image of pulse oximeter with handheld digital device removed due to copyright restrictions.

How It's Done

- Red Blood Cells carry oxygen using hemoglobin
- Hemoglobin changes shape when it picks up oxygen
- This shape changes how the protein absorbs light

Images of oxyhemoglobin and deoxyhemoglobin removed due to copyright restrictions.

How It's Done

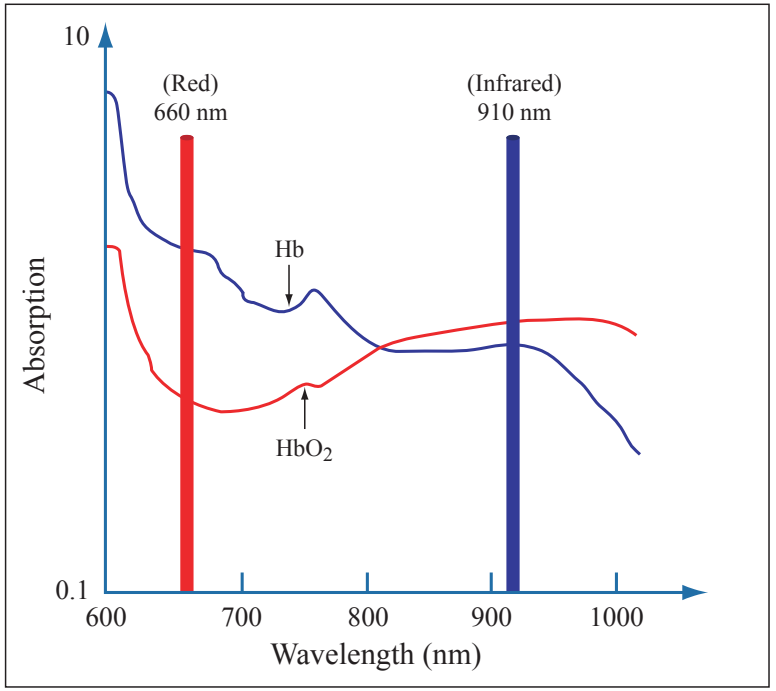
- A PulseOx transmits two different wavelengths of light through a thin part of the body and measures the difference in intensity.
- Calibrated curves

translate this to O2Sat.

- Detect pulse by seeing

periodic changes in

intensity



Microcontrollers

- Small computers built on integrated circuits.
- Take inputs, do processing, create outputs.

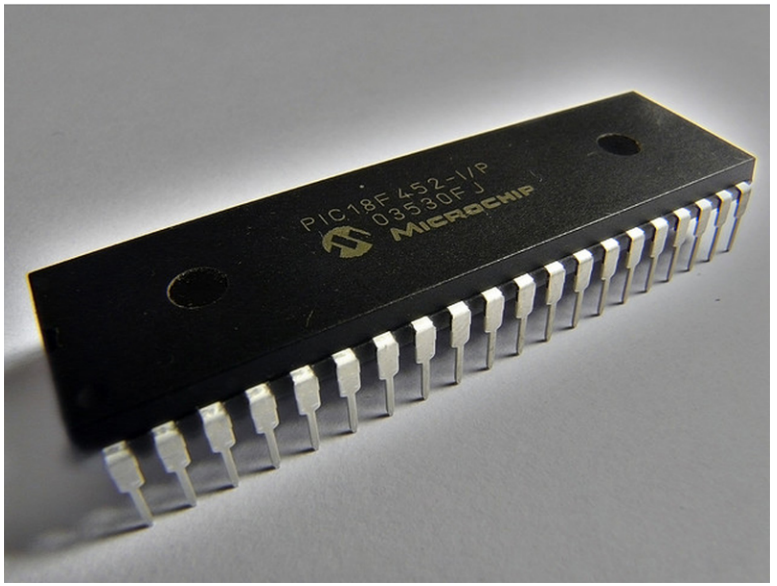


Image by marzzelo from Flickr.

Arduino

- A single-board microprocessor system.

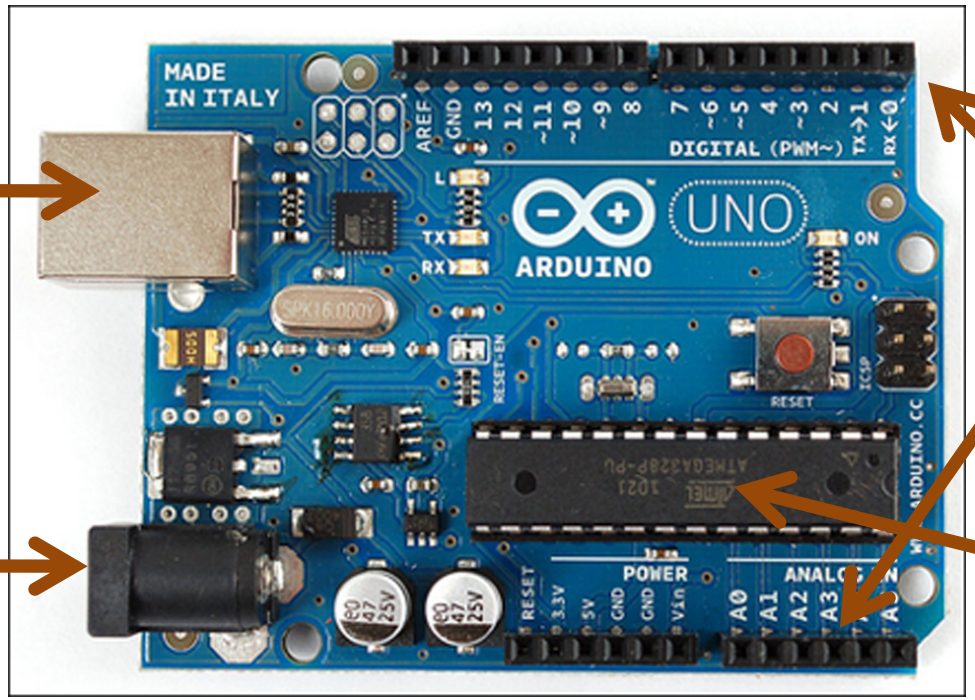
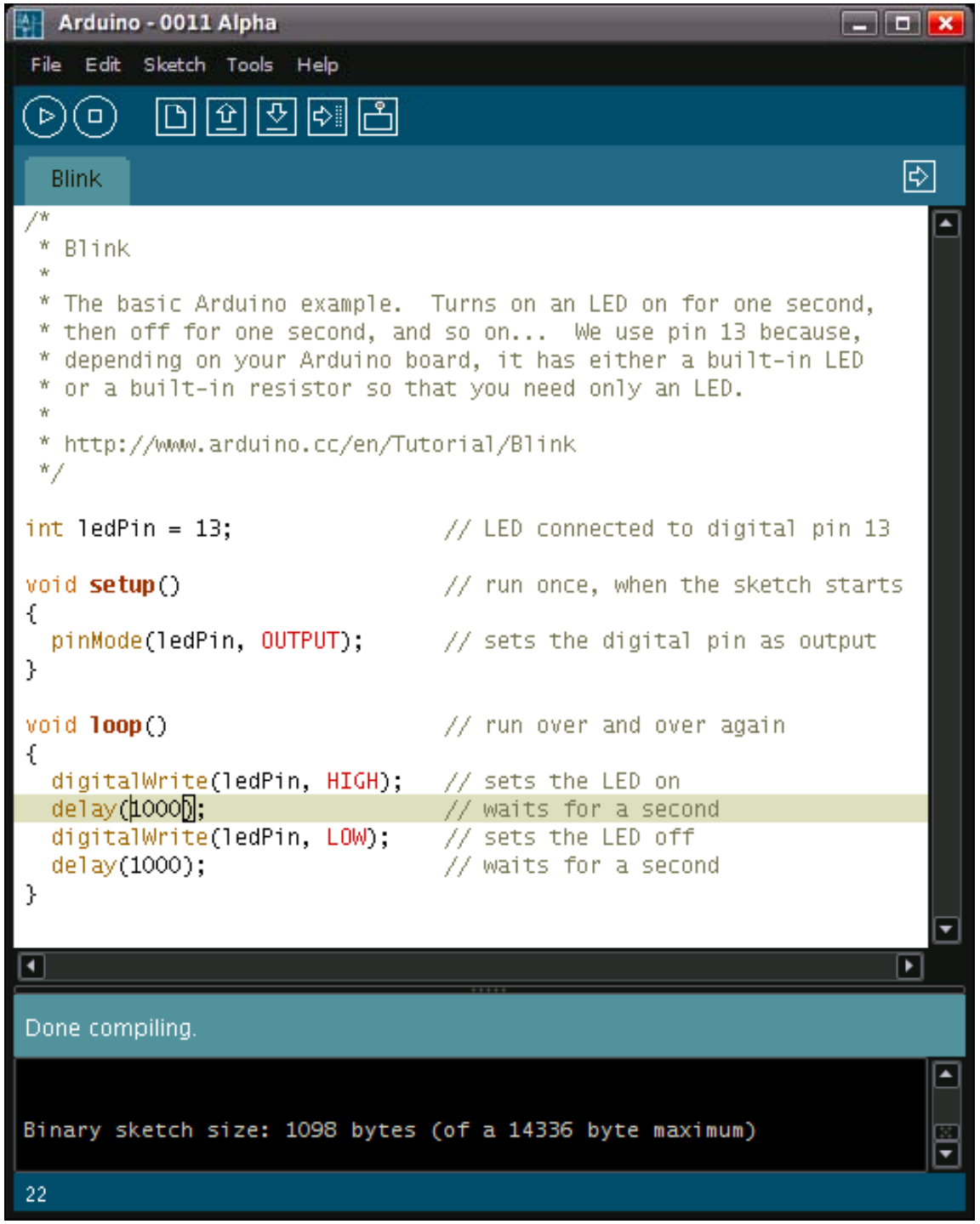


Image by adafruit on Flickr.

Programming Arduino

- A lot like C++
- Program on your computer, then load software onto microcontroller, which runs in a loop



More on Arduinos

- Arduino plug-in expansion “shields”: http://www.sparkfun.com/commerce/categories.php?c=103
- Arduino Project Examples

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