MODULE 9: VLC Applications

SUMMER CHALLENGE

Electrical Engineering: Smart Lighting

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Overview

- Arduinos
- Experiment
  - VLC Texting!
- Course Review
- Finalize Presentations

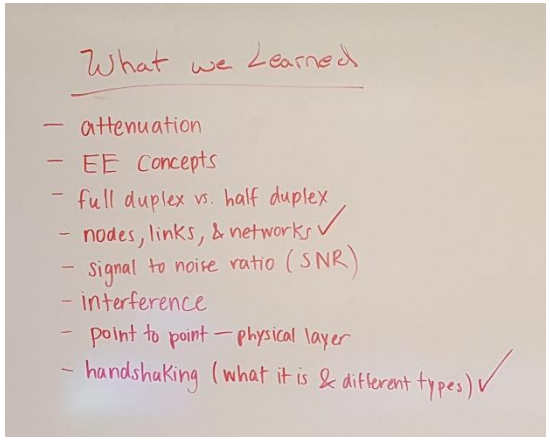
Arduino

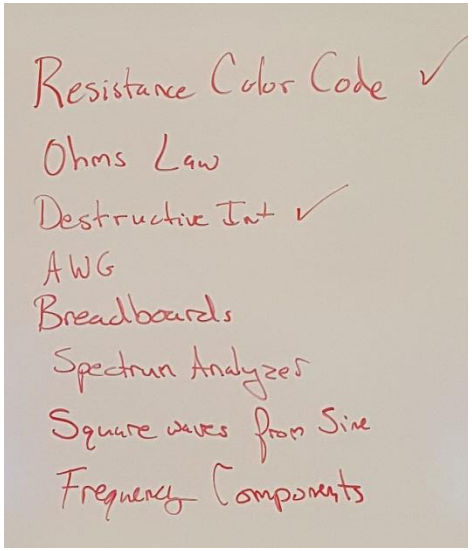
- It is a microcontroller
- We can write code to tell it what to do and how to react to input
- It can communicate with other devices and peripherals
- Communication is serial
  - Serial ports: USB, Rx and Tx pins of the Arduino (Pins 0 and 1)
  - Write/read from these ports is serial (i.e., 1 bit at a time)

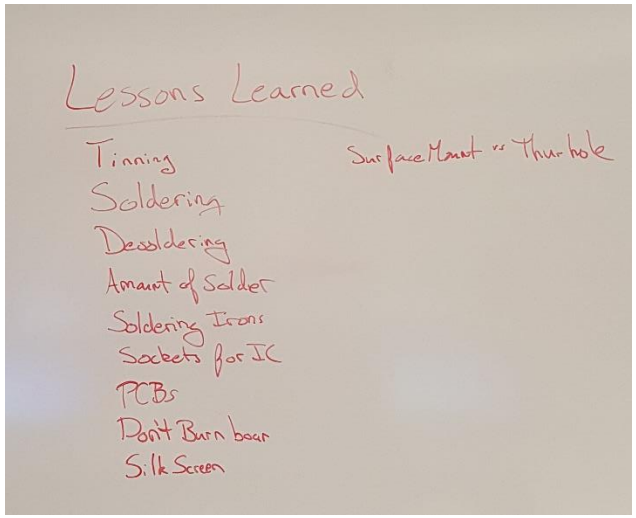
Experiment

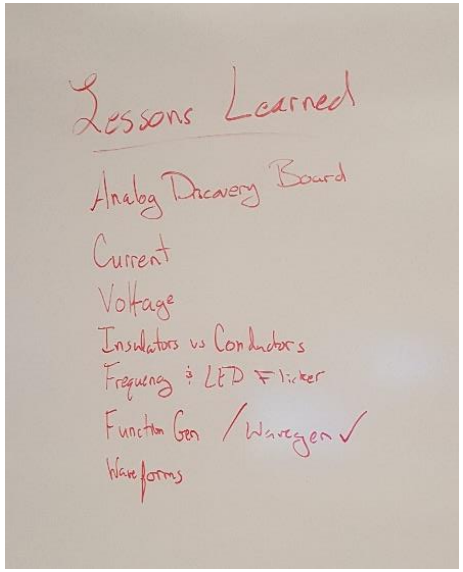
- Arduino
  - Serial port and LEDs
- VLC Texting
  - Send text messages to your partner via VLC!

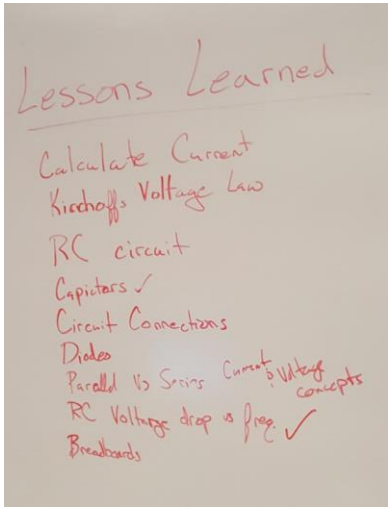
What did we learn here??

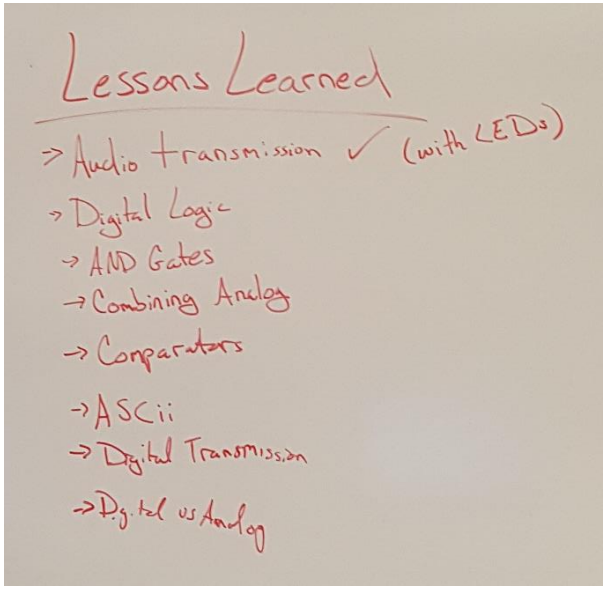












What did we learn here????

- How does the signal travel on the cup & strings phone?
- What is the purpose of: (i) scope, (ii) spectrum analyzer, and (iii) the wave generator?
- What is Nyquist's sampling theorem?
- Define: Signal-to-noise ratio (SNR) and Ohm's law
- What is the difference between series and parallel circuits?
- What is a PCB and how are PCBs different from breadboards?
- What is the decimal equivalent of the binary value 1011001?
- What is the truth table for an AND logic gate?

Bonus: What is the maximum audio frequency recognizable to humans?

Reference Websites

- Physics Classroom: www.physicsclassroom.com
- All About Circuits: www.allaboutcircuits.com
- Khan Academy: www.khanacademy.org
- Code Academy: www.codecademy.com
- Arduino: www.arduino.cc/
- Digilent Course:

  www.digilentinc.com/Classroom/RealAnalog

Other Items

- Group Photo!
- Course Evaluations
- Finalize Presentations
  - Please email your slides (power point/ google slides) to prachis@bu.edu by tonight.
  - Note: 5-6 minute presentation per group and both the team members should present (~2.5 minutes each)

Finalize Presentations

- Presentation Order
  - **Team 6** (Krish and Mark) — Soldering
  - **Team 1** (Ricky and Sean) — Visual Light Communication
  - **Team 3** (Charlotte and Genie) — LEDs
  - **Team 5** (Tucker and William) — Analog signals
  - **Team 4** (Eliza and Madeline) — Resistors
  - **Team 7** (Bing and Ethan) — Parallel and series circuits
  - **Team 8** (Ian and Youtai) — Photo-diodes
  - **Team 2** (Becca and Yutong) — Resistors and Capacitors