Crista Falk
Period A2
Semester 2

Independent Study Progress

Week One

Day 1:

- **Took notes on Structure, Values, and Functions, etc. of the C Arduino Library**

Day 2:

- **Opened Arduino Starter Kit**
- **Familiarized self with parts/components = NOTES**
- **Went through Projects Book (flagged important pages)**
- **Made this progress chart and shared it with Mr. Jacobson**
- **Setup Hardware**

Day 3:

- **Located Software**
- **Continued learning how dev. board works/electricity (using project book) = NOTES**
- **Completed first Tutorial (using a switch to turn an LED on and off without code)** Level ⅕

Week Two

Day 1:

- **Tutorial Two, start writing C++ code** Level ⅕
- ***Tried* to find out how to sync the dev. board to my written program**

Day 2:

- **Decided subsequent to more trial and error to contact the tech guy**
- **Made dev. board setup/ code for tutorial 3** Level ⅕

Week Three

Presidents' Day

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Day 2:

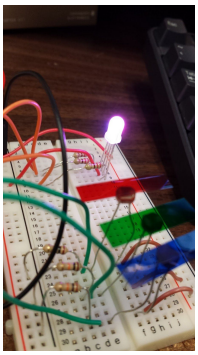
- **Fix errors in last week's code**
- **Moved to a new (old) computer**

Day 3:

- **Discovered that the previous Uno board was broken**
  - **Ordered new board**
- **Wired Tutorial 3 project onto borrowed board**
- **Recoded project on new computer**
  - **Project used a temperature sensor, and Serial printing**
  - **Calibrated code to room temperature**
- **Tutorial 4 Code, Notes on PWM and Photoresistor**
- **Reviewed Transducers (sensors vs. actuators)**
- **Jacobson bought cookies :)**

Week Four

Day 1:



- **Wired board for tutorial 4** Level ⅝
- **Ran color mixing light:**
- **Started putting together a sheet of reference URLs**
- **Organized all files in Google Drive into folders by individual class**
  - **Created folder for this class to store materials in**

The purple predominance seen in this common cathode LED shows that the lighting in Mr. Jacobson's classroom is more so red than green or blue. In the video entitled, "Video of Tutorial 4.mp4," one is able to see the effects of flashing a light over the Arduino's photoresistors. Instead of detecting the classroom's prevalence of red light, the three sensors are exposed to white light, an even mix of R, G, and B. This results in the LED emitting a more perfect white light when shined upon by a flashlight.

Day 2:

- **Reviewed servo motors, potentiometers, libraries**
- **Wired board for Tutorial 5**
- **Coded Tutorial 5** Level ⅝

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Week Five

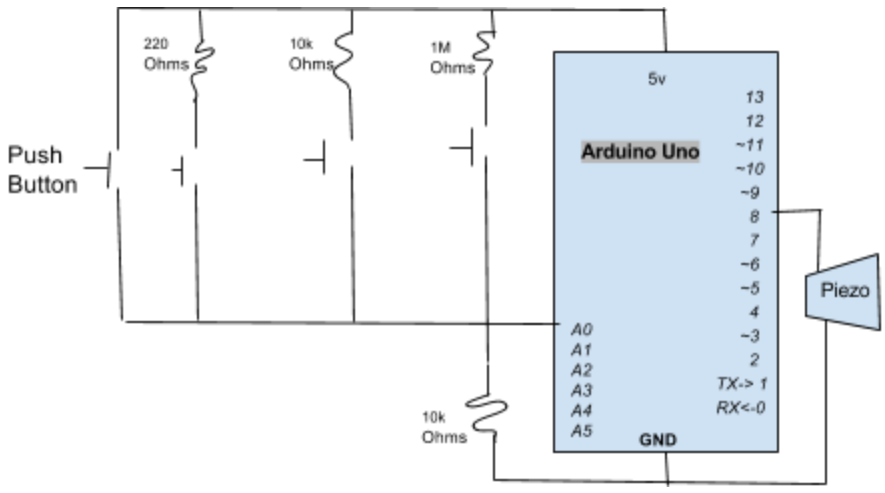
Day 1:

- **Tested, debugged, and finished Tutorial 5**
  - **See video in folder**
- **Received first project grade in Skyward**
- **Wired Tutorial 6** Level ⅘
- **Coded and debugged for Tutorial 6**
- **See video called Tutorial 6**

Day 2:

- **Started Tutorial 7** Level ⅘
- **Notes on resistor ladders**
- **Wired dev. board**
- **Started Coding**

I spent a large portion of this period learning how to create and read schematics. I made the one below on Google Drawings:



Day 3:

- **Tested Project 7 (see video) and played around with pitch (tone) Wired board for Tutorial 8** Level ⅗
- **Took notes on functions delay() vs. millis() as well as the datatypes long, unsigned, and unsigned long**

- **Wrote code/ adjusted 10 minute intervals to 10 second, to correspond with class time**

Week Six

Day 1:

- **Finished and played around with Tutorial 8**
- **Researched motors and took notes**
- **Wired Tutorial 9**
- **Coded Tutorial 9** Level ⅗
- **Need to bring in a 9 volt battery next class**

Day 2:

- **Got 9 V. Battery from Jacobson**
- **Completed Tutorial 9**
- **Began Tutorial 10** Level 5/5

Week Seven

Day 1:

- **Finished wiring tutorial 10**
- **Finished coding tutorial 10**
- **Couldn't resolve compiling error, despite code being the same as another downloaded (functioning) one**
- **Board wouldn't work when tested (battery potentially dead)**
- **Internet is insufficient (next class period, I will try to resolve)**

Day 2:

- **(Excused) Absence for Large Group Music Festival**

Day 3:

- **Moved on to Tutorial 11** Level 5/5
- **Wired board**
- **Wrote code**
- **Decided that next week I will test the Liquid Crystal to see if mine functions properly**

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Week Eight

Day 1:

- **Rewired board and got Liquid Crystal Display Display to Display to light up**
- **Replaced potentiometer with a switch (was able to turn entire screen on a blend off)**
- **Decided that the issue is with the potentiometer (doesn't change contrast of screen brightness, which hides the characters from being visible)**
- **Other than being invisible, the code works**
- **Moved on to Tutorial 12** Level 5/5

Day 2:

- **Finished wiring board**
- **Coded and added comments to explain**

(Note: By disconnecting then reconnecting to the BYOD WIFI network, the internet connection should work.)

Spring Break

Week Nine

Day 1:

- **Formatted my USB to dinosaur computer**
- **Install the Capacitance Sensor library**
- **Wired and coded Tutorial 13** Level ⅝

Day 2:

- **Downloaded the latest version of the programming environment Processing**
- **Plan to learn Processing (may take a full week or so)**
- **Tutorial 14** Level 5/5
    - Tweaking a program on my computer using Arduino

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Week Ten

Day 1:

- **Attempt at installing Java using Firefox (because Chrome doesn't support it)**
- **Decided to look over Tutorial 14, but move on (if there is time at the end of the semester, I can return to it)**
- **Researched future careers in CompSci as well as colleges**
    - **Decided that the dream is MIT with a major in 6-7 (CompSci and Molecular Biology)**
    - **Will keep this in mind as I continue my studies (maybe a future Ind. Study?)**

Day 2:

- **Thinking about final project**
    - **Will be a variation of Tut. 15**
    - **Controlling another electrical device like an MP3 or TV using Arduino**
    - **Will have to start with modifying invaluable devices before I move up or else I may damage something.**
- **Received an electronic kit from Jacobson with potential**
- **Began creating Arduino/Electrical CS vocab test**

Week Eleven

Day 1:

- **Continued second half of comprehensive Arduino vocabulary test**

Day 2:

- **Met with Zach Holbrook, 2016 LCHS valedictorian**
    - **Talked about what track to be on for college**
    - **How to study for SATS and get accepted into MIT**
    - **Took notes**
- **Finished test, downloaded as HTML file**

- **Internet connection timed out, have to redo vocabulary I-V**

Day 3:

- **Redid second part of vocab. Test**
- **Saved important files to flash drive**
- **Revised firewall, so I can access necessary resources**

Week Twelve

Day 1:

- **Took a french Test in preparation for being Absent on the 28th-29th**
- **Finished saving vocab**
  http://www.poll-maker.com/Account-Home#tab-2
- **Started coming up with ideas for final project**
  - **http://www.instructables.com/id/Arduino-Water-Pollution-Monitor/**
  - **http://www.instructables.com/id/Arduino-Nano-Segway/**
  - **http://www.instructables.com/id/Arduino-Thermometer-LCD-I2C/**

Water Pollution Monitor

PROS	CONS
Provides helpful environmental data, Does humanity good, Scientifically relevant,	Takes skill to operate/ understand, Not appealing to all audiences, Requires thorough calibration and access to both polluted and clean water, Missing many expensive components

Nano Segway

PROS	CONS
Awesome toy, Shows that science can be fun, Would be used often,	Intended for a smaller segway, More of a toy than an instrument, Would need to collect some more components

Thermometer Display

PROS	CONS
Used daily, Accessible to most people, Provides information that is variable and useful,	Not a fun toy, Requires constant connection, My Liquid Display Monitor might not work, Do not have all necessary components (thermistor)

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Day 2:

- **ABSENT FOR HERITAGE MUSICAL FESTIVAL IN SEATTLE (band trip)**

Week Thirteen

Day 1:

- **Begin end of semester project**
- **Reviewed computer terms (e.g. hardware/software, RAM/ROM, electrical components on dev. board)**
- **Shopping list for final project**

Arduino Uno/Nano, whatever

Some breadboard wires

A 10K resistor

A thermistor (I got it from my first Arduino kit)

If you want to make it look more fancy, you can add:

LCD

I2C LCD adapter

Thermistors, derived from the term THERMally sensitive reslSTORS, are a very accurate and cost- effective sensor for measuring temperature. Available in 2 types, NTC (negative temperature coefficient) and PTC (positive temperature coefficient), it is the NTC **thermistor** that is commonly used to measure temperature.

Day 2:

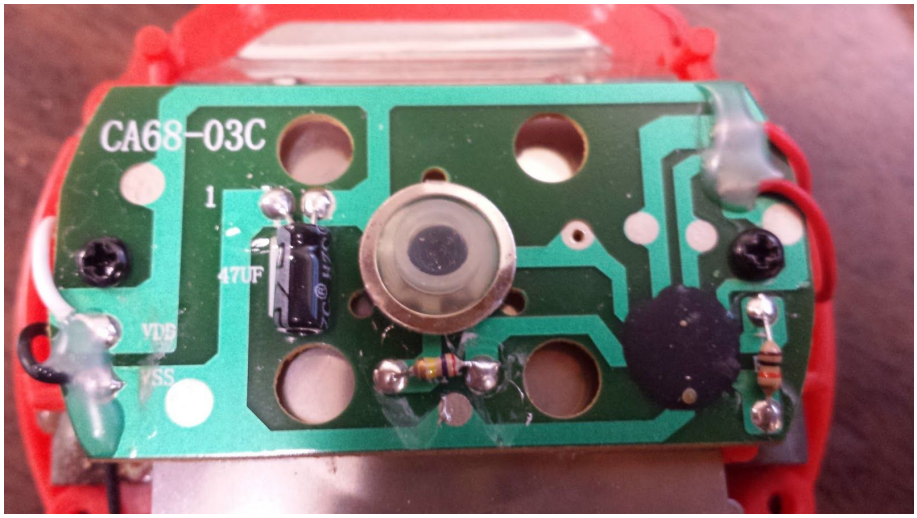
- More research on Arduino projects for EOCA (final project)
- Need to buy thermistor
- Took a few online Computer science quizzes

Day 3:

- **Maybe design my own final project**
- **Theremin project using capacitive sensor? Started playing around with dev. board and code**
- **Hacking another device and adapting it using Arduino**

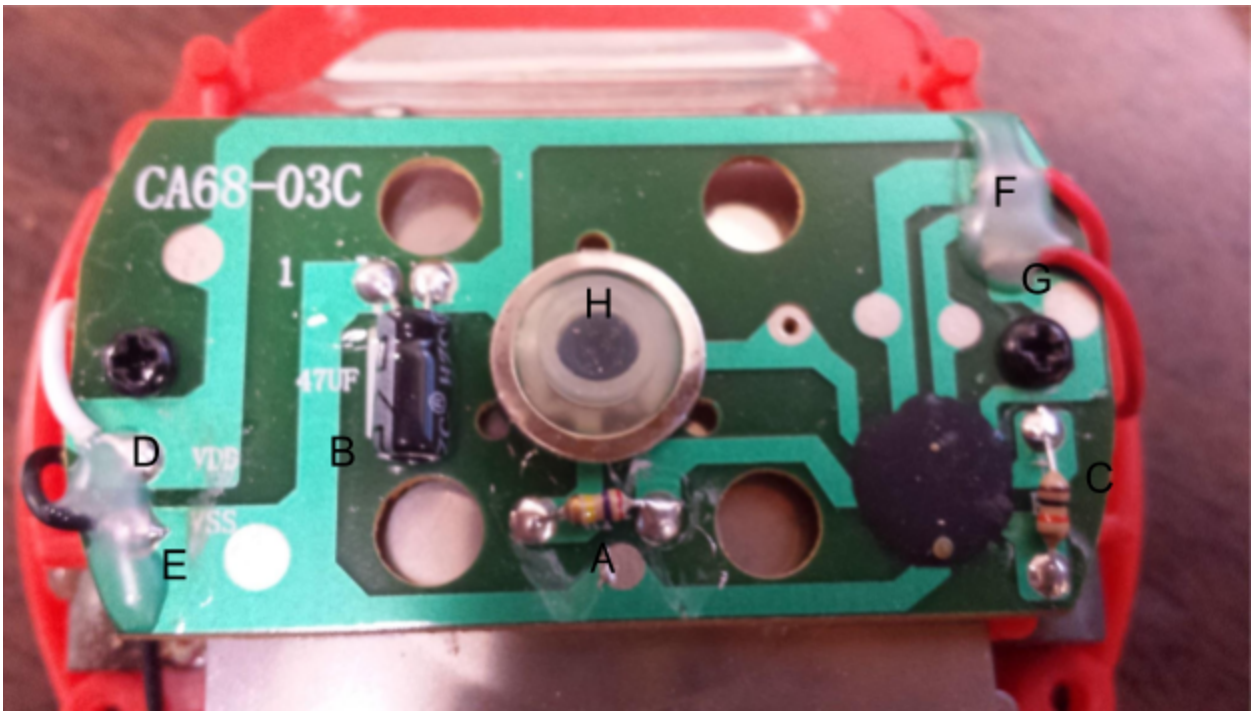
Week Fourteen

Day 1:

- **Brought two electronic devices (A miniature water fountain and a Staples "easy" button**
- **Began Dismantling the button**
  - **Circuit board type: CA68-03C**
    - 

    - "A printed circuit board (PCB) is the board base for physically supporting and wiring the surface-mounted and socketed components in most electronics." http://whatis.techtarget.com/definition/printed-circuit-board-PCB
    - "Photolithography is the standard method of printed circuit board (PCB) and microprocessor fabrication. The process uses light to make the conductive paths of a PCB layer and the paths and electronic components in the silicon wafer of microprocessors (logic chip/microchip)." http://whatis.techtarget.com/definition/photolithography
    - Single layer PCB for simple machines; computer graphics card/motherboards may contain up to 12 layers
    - Electronic components are typically soldered into place

- **Electronic components**



  - A = Resistor 200 kΩ += 5%
  - B = 47UF 25V Electrolytic Capacitor
  - C = Resistor 10 kΩ += 5%
  - D = Wire Connected to + Side of Battery (Positive terminal where electrons are received)
  - E = Wire connected to - Side of Battery (Negative terminal where electrons are ejected)
  - F/G = Wire sending electricity to the speaker below
  - H = Pushbutton switch
- Remove the pushbutton to reveal the forks underneath (leftmost fork as in picture, is power; right fork is ground)

Day 2:

- **Got button to work using multimeter then programed Arduino**
- **Next step is to control it further on Arduino with switches and sensors**

Week Fifteen

Day 1:

- **Added a switch to Arduino board which controls when "Easy" device goes off (code not necessary at this point, but I will add some along with a few more components later on)**
- **Soldered wires connecting Integrated Circuit to the PCB of "Easy" device**

Day 2:

- **Finished wired device to function without any code (i.e. with only the power provided by a USB connection to the computer)** ***See "Codeless_Final_Project.mp4" in Final Project folder***
- **Added more components (Servo motor)**
- **Coded on Arduino to run servo when button is clicked**
    - **Have not tested yet**

Day 3:

- **Replaced motor with photo resistor and rgb LED**
- **Coded some: kind of functional**
    - **Color changes depending on whether it is light or dark (Day vs. Night)**

Week Sixteen

Day 1:

- **Tested out previous version of board**
- **Replaced photoresistor idea with three potentiometers to color RGB light**
- **Wrote code to detect and map the pot input data into pot values into output colors being sent to the LED**
- **The Issue:**
    - **B does not work, and only two pots work at a time for R and G**
- **Potential Causes?**
    - **The board is wired incorrectly DISPROVED**
    - **There is only enough power to have to two potentiometers going at once? DISPROVED**
    - **Blue in the LED just doesn't work**

Day 2:

- **Went over the notes I took on ComSci throughout the semester**

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Monday- Memorial Day

Week Seventeen

Day 1:

- **Continued note review**

Day 2:

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Week Eighteen

Day 1:

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Day 2:

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