Prototype A - SALS

By the groovier than grooviest group:
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Spectrophotometer for **A**nalysing **L**iquid **S**amples

Convocation

User Needs:

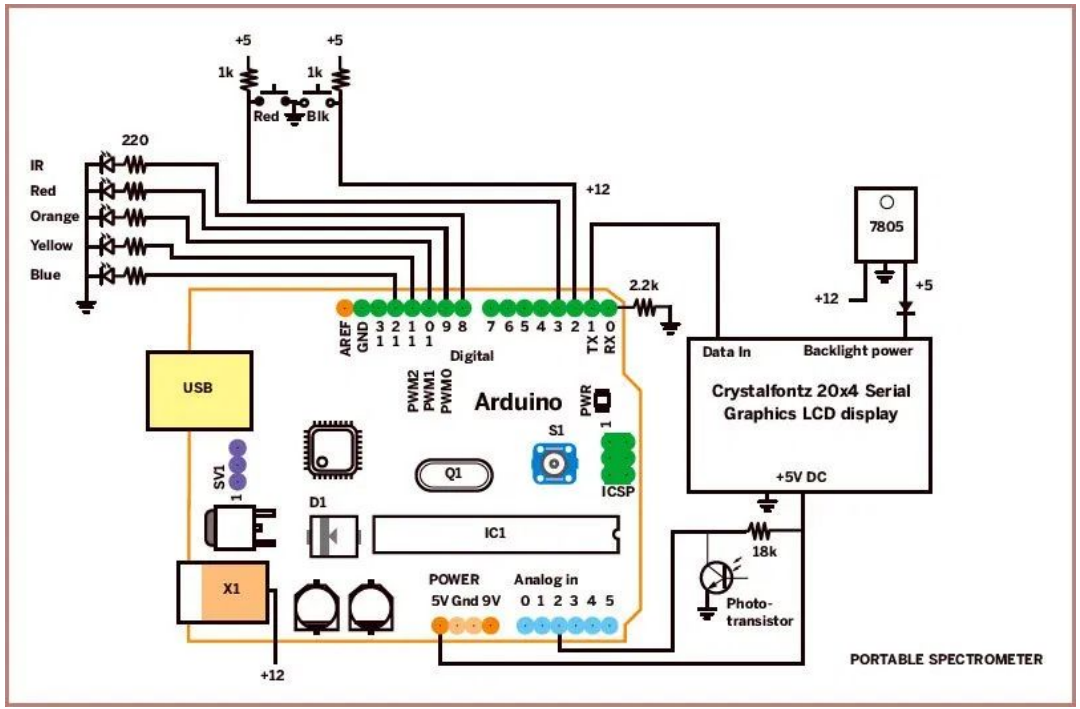
- Test properties of a liquid by scanning it with a device
- Identify a liquid based on its properties
- Test the color result of a paper dipstick
- Receive results quickly and easily

Description

- Requirements
  - Analyze the turbidity of a liquid (i.e. water)
  - Analyze a liquid's chemical composition based on its spectral distribution
  - Identify a liquid by comparing its spectral distribution to a predefined or user-defined database with 'percent likeness'
  - Test the color result of a paper dipstick
  - Hold a predefined database of spectral distributions of liquids for comparison
  - Ability to create a user-defined database of spectral distributions of liquids
- Purpose
  - To identify liquids and their chemical compositions
  - May be used for testing water potability based on turbidity and chemical composition
  - To display a numerical or verbal result based on a used paper dipstick's color

Description

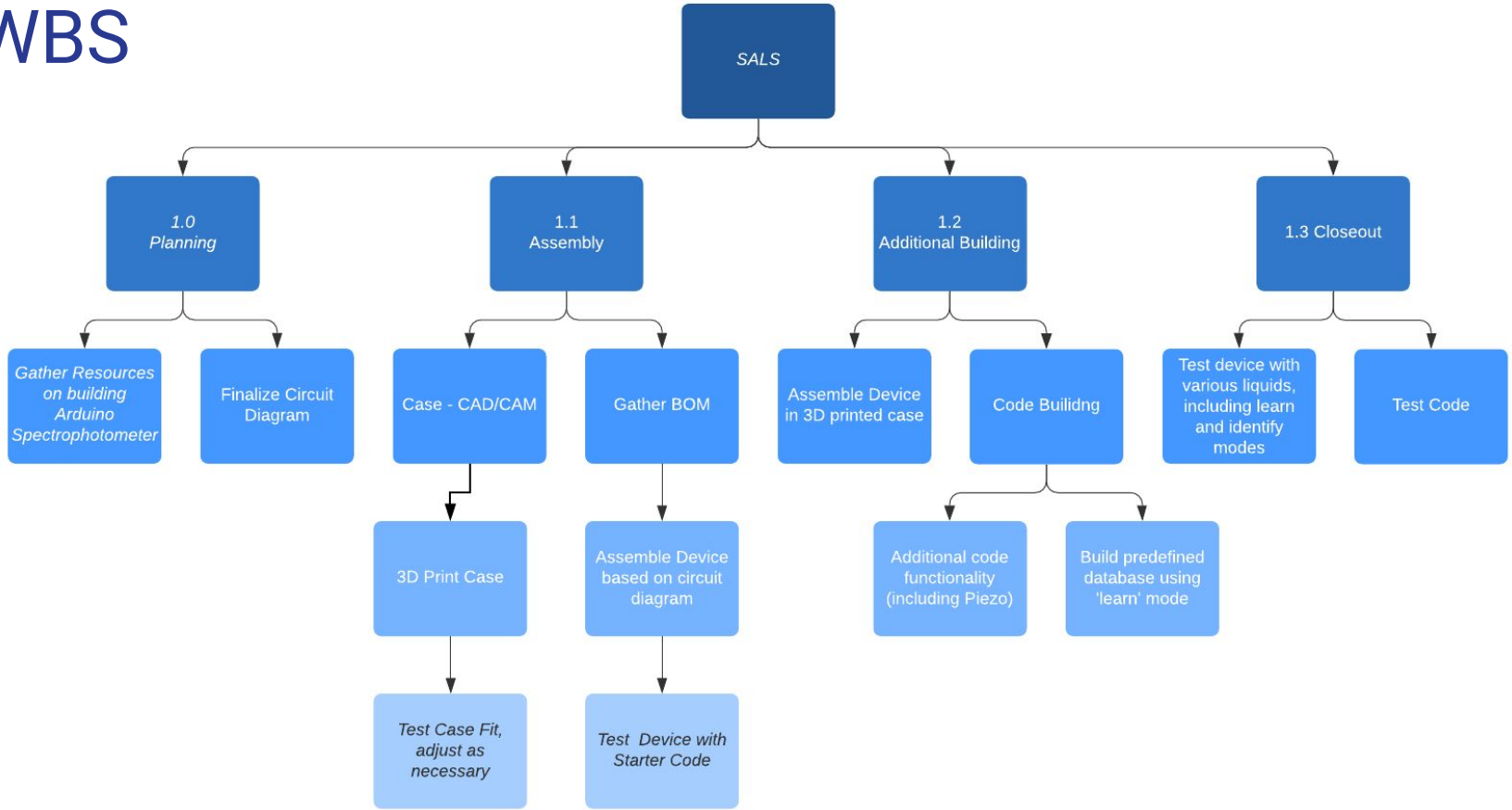
Circuit Diagram



BOM - Bill of Materials

- LEDs (5) blue, green, yellow, red, and infrared
- (IR) phototransistor
- ¼-watt resistors: 220 Ω (5), 1KΩ (2), 2.2KΩ, 18KΩ
- Serial display
- Power supply 6V–12V DC, 1A–1.5A
- 7805 5V voltage regulator and heat sink to drop the 12V to 5V for the display's backlight
- Case (3D printed)
- Push-button switches (2)
- Piezo (not shown)
- Testing strips

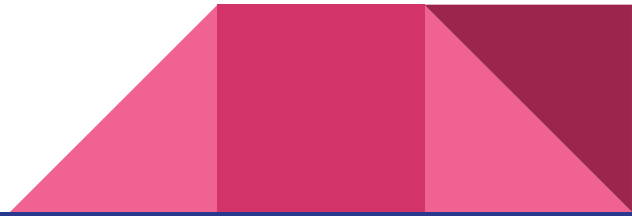
WBS


SALS
1.0 Planning
1.1 Assembly
1.2 Additional Building
1.3 Closeout
Gather Resources on building Arduino Spectrophotometer
Finalize Circuit Diagram
Case - CAD/CAM
Gather BOM
Assemble Device in 3D printed case
Code Builidng
Test device with various liquids, including learn and identify modes
Test Code
3D Print Case
Assemble Device based on circuit diagram
Additional code functionality (including Piezo)
Build predefined database using 'learn' mode
Test Case Fit, adjust as necessary
Test Device with Starter Code

Examination

Changes since the proposal:

- CAWT to SALS
- Scoured the internet for the original tutorial (bless you Wayback Machine)
- Basically redid everything except for the original water/liquid idea
- We’re still at 1.0 on our WBS



Observation

- We need to *finalize our circuit diagram* (which won't change our BOM)
- Gather everything on our BOM so we can start *breadboard testing*
- Start seeing what changes we may need to make to the starter code
- Specifications/CAD for the *3D printed case* (8.7" x 5.7" x 3.0")

Team Member Roles

- Hardware Team
  - Éowyn (esp. Piezo, 3D printing)
  - Cheldina (esp. assembly, liquid testing)
- Software(ish) Team
  - Lily (esp. starter codebase, spectroscopy)
  - Fiona (also 3D printing and assembly)

Inquisition

https://makezine.com/2008/11/18/safety-spectrometer/
ResearchGate
https://web.archive.org/web/20130129025325/http://www.creative-technology.net/MAKE_Resource.html
Case Specifications
https://gypsyware.wordpress.com/2012/07/30/espectrometro-livre/
https://engineering.tamu.edu/_files/_documents/_technical-reports/aggie-challenge_report_-_low_cost_spectrophotometer_1_.pdf