Certus Engineering

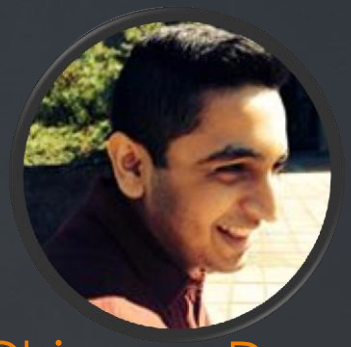
Capstone Project | ENSC 440/305W

Farshadi | Desai | Sabau | Bertsch | Petrouchtchak | Bashi

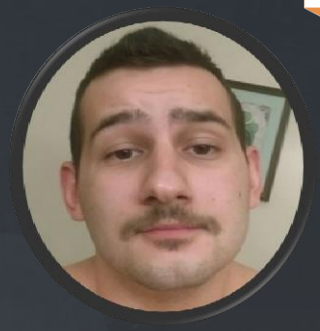
Outline

- Team Roles
- Goals
- Background
  - Competitors
- System Overview
  - Motivation
  - Main Features
- Project Schedule
  - Delays
- Budget/Finances
- Reliability & Sustainability
- Conclusion
  - Learning Outcomes
  - Future Endavours
  - Acknowledgments

Farshad Farshadi
Chief Executive Officer

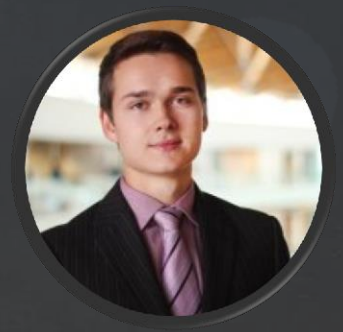


Chinmay Desai
Chief Operations Officer



Kevin Sabau
Chief Technology Officer

Paniz Bertsch
Chief Controls Officer



Juri Petrouchtchak
Chief Financial Officer

Amir Bashi
VP Manufacturing

Team Roles

- Farshad Farshadi
  - Software Co-Head (Optical Character Recognition)
- Chinmay Desai
  - Documentation & Hardware Co-Head
- Kevin Sabau
  - Hardware Co-Head
- Paniz Bertsch
  - Software Co-Head (Radio Frequency Identification)
- Juri Petrouchtchak
  - Marketing & Finance
- Amir Bashi
  - Production & Testing

Goals

- Create a unit that would expedite parts distribution for lab courses
- Allow the system the to record various personnel information
- Unit should be used as an attendance tracking system for school & businesses
- Create a reliable unit that can be used over and over again without failure
- All of this should be done via a unit that's cost effective & has a user friendly interface

Background

- Parts distribution for lab courses can take up to several days & is an inefficient system
- Even manually taking attendance for courses/business meetings is inefficient
- There needs to be a faster way of doing all this without overcomplicating the new system

Closest Competitor

- Handheld barcode scanner can cost anywhere from $100 – $600 and even up to few thousand dollars

Honeywell $506.63

IDVisor 310 $1,395

Wasp WLS 9600 $417.19

Prices taken from www.staples.ca

Other Competitor

- Tricom Card Technologies & Treoscope development of age and identity verification systems
- Limited capabilities to barcode scans only, and software provides limited interface options

TREOSCOPE
Technologies Inc.

Motivation

- Similar products are very expensive & have a steep learning curve in terms of software
- Competitors' products only read the barcode, but what if an ID doesn't have one?
- Need a simple user friendly design that's cost effective
- Use this device here in Lab 1 to make Fred's life a little easier

Main Features

- Device will read barcode, identification number, and the RFID value
- It will also take a picture of the user and store it in the database to prevent anyone else using their card
- This system has four main stages: Detection, Authentication, Distribution, & Collection

System Overview

Stage One: Detection

- User is given an identification card with an RFID tag embedded and then the card is read by the unit

Stage Two: Authentication

- The unit will read the RFID/barcode/ID number and match it with that in the database

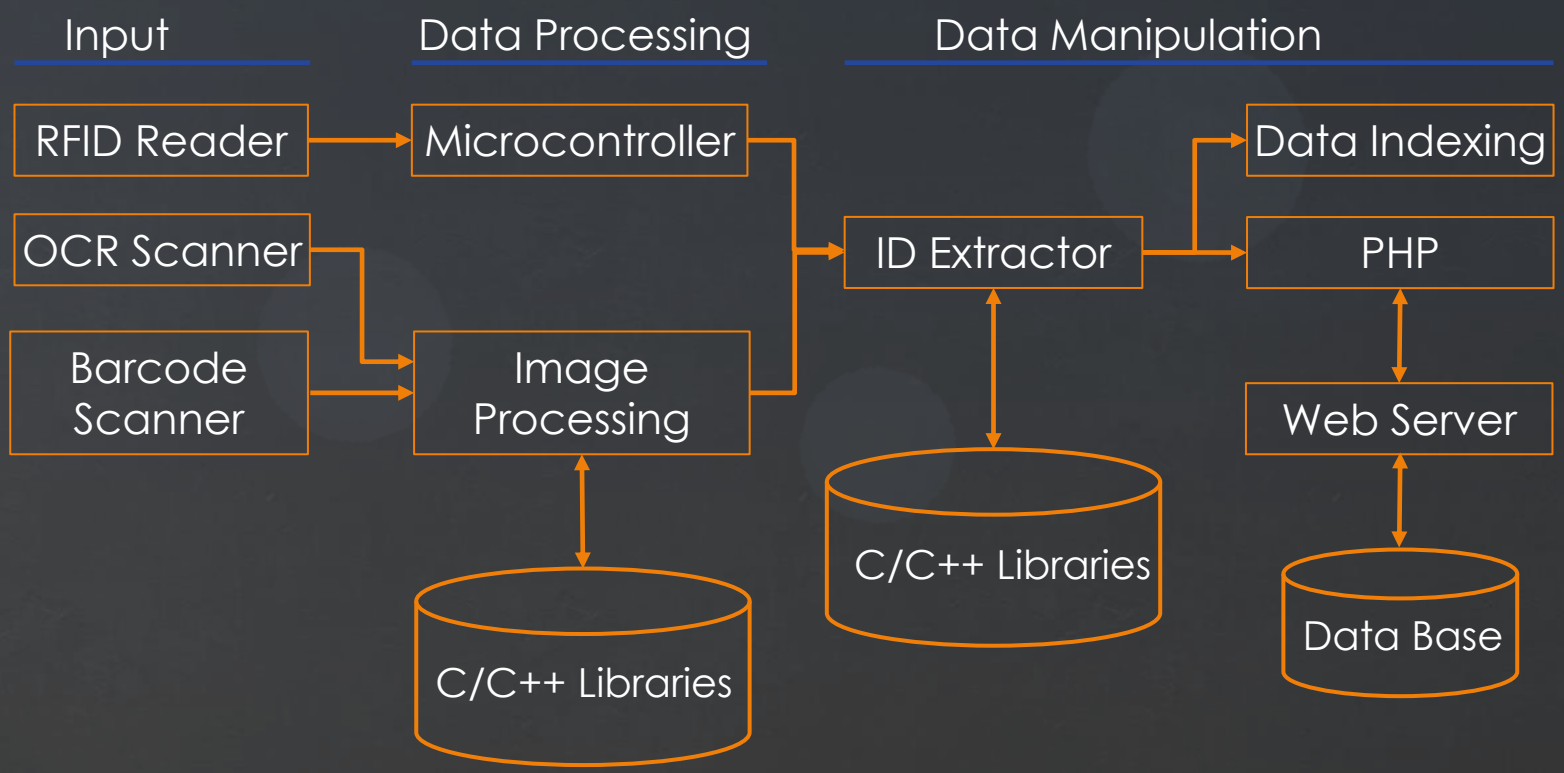
Stage Three: Distribution

- Allows the operator to efficiently distribute any tools or parts through a friendly user interface

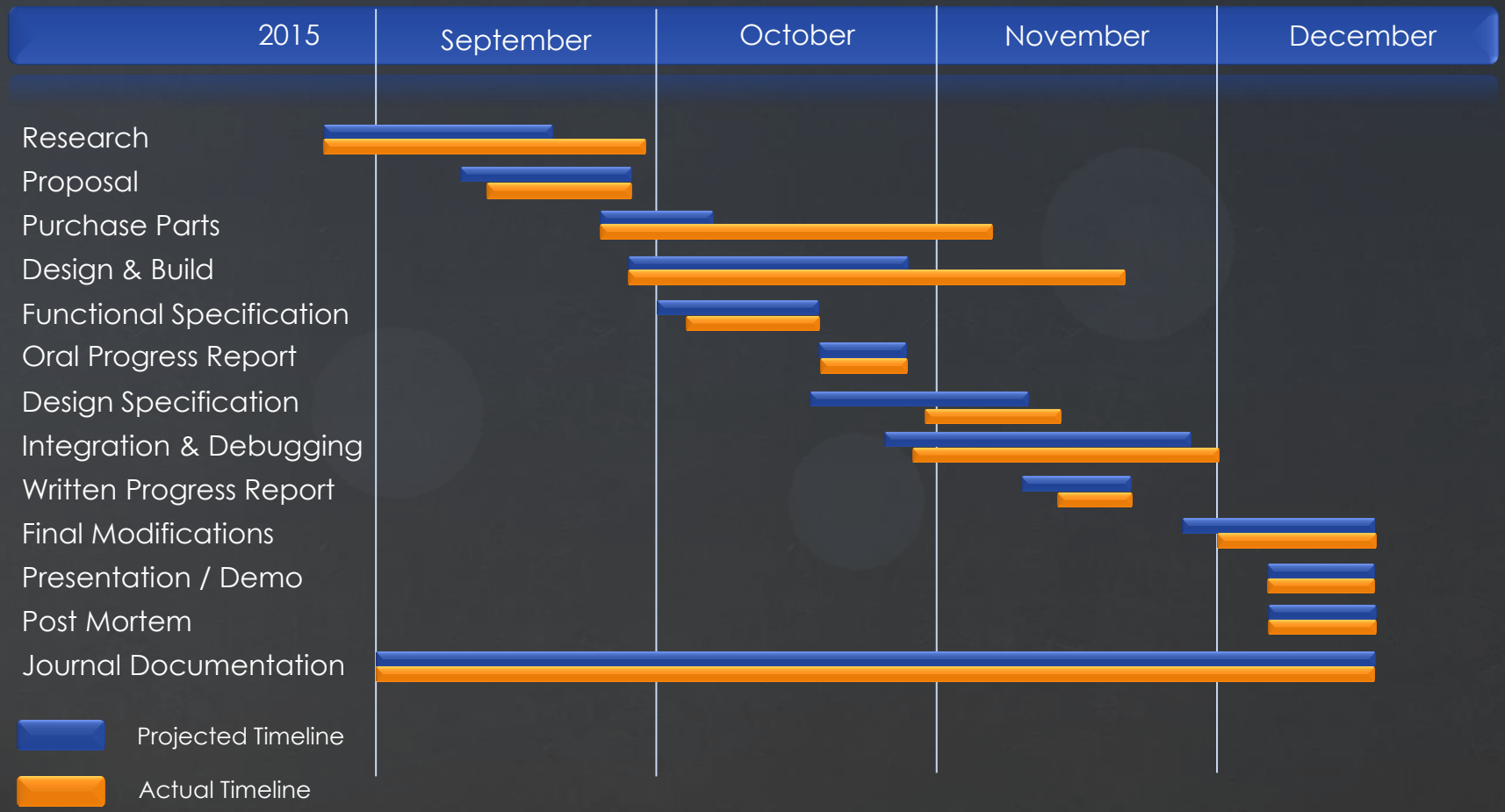
Stage Four: Collection

- Data collected will be stored as a readable file

System Overview

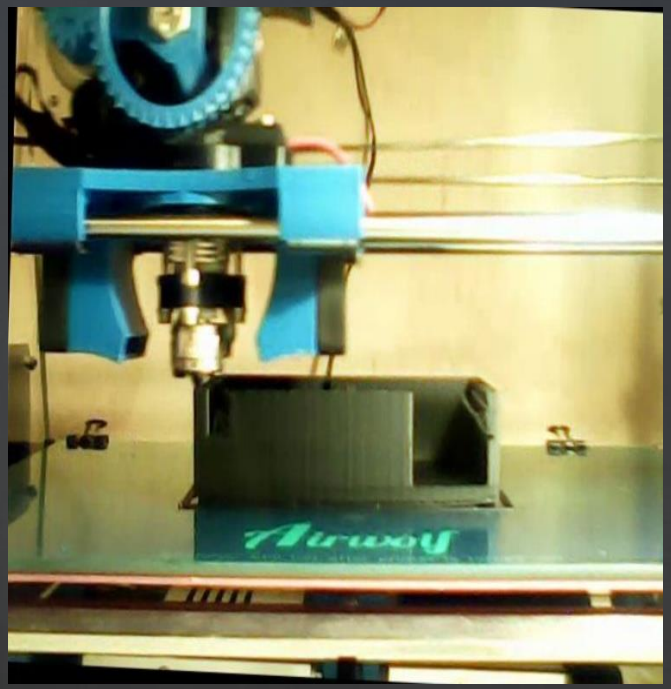


Project Schedule



Causes for Delay

- Parts often did not work properly
- Issues with the 3D printing
- Other commitments (Midterms/Finals)



Budget

- Our principal investors were *Miller Instruments* who expressed an interest in our design early on
- Dr. Ash Parameswaran was kind enough to let us use his 3D printer, thus cutting our printing cost
- With help from both of them, we were able to complete our product while staying under budget
- The surplus was used on food/drinks for this presentation

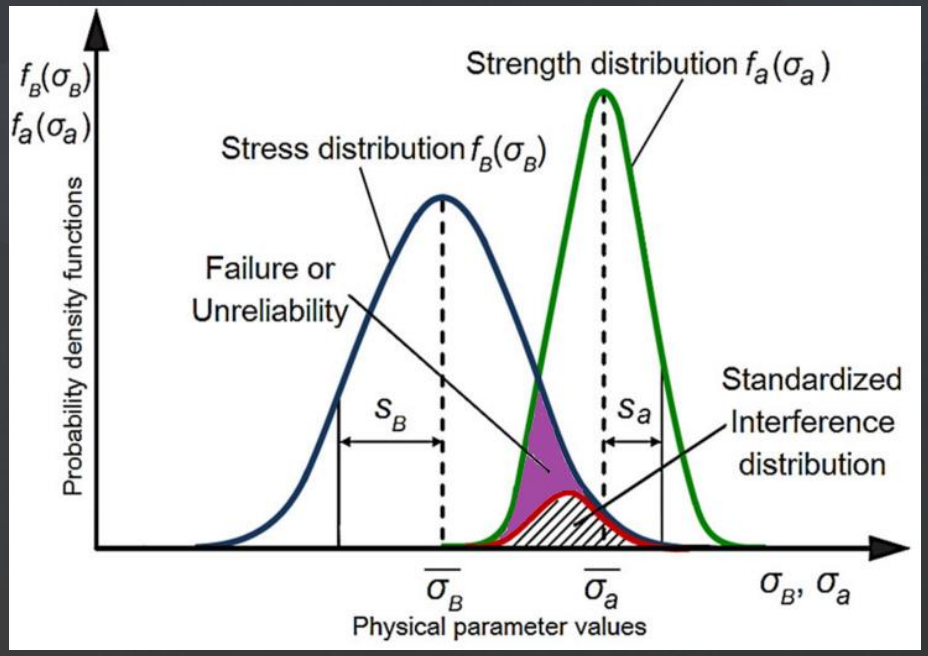
Budget

- Stuff

Item Name	Project Costs	Actual Costs	Difference
RFID Reader Base/Chip (13.56 MHz)	$25	$4 x 3	- $13
Additional RFID Tags (~5)	$3 / each	$3	- $12
Arduino Nano	$45	$10 x 3	- $15
Electrical components	$10	$12	+$2
Housing Unit	$25	$9 x 4	+$11
Contingency (15%)	$18	$20	+$2
Grand Total	$138	$113 for 4 units	- $25

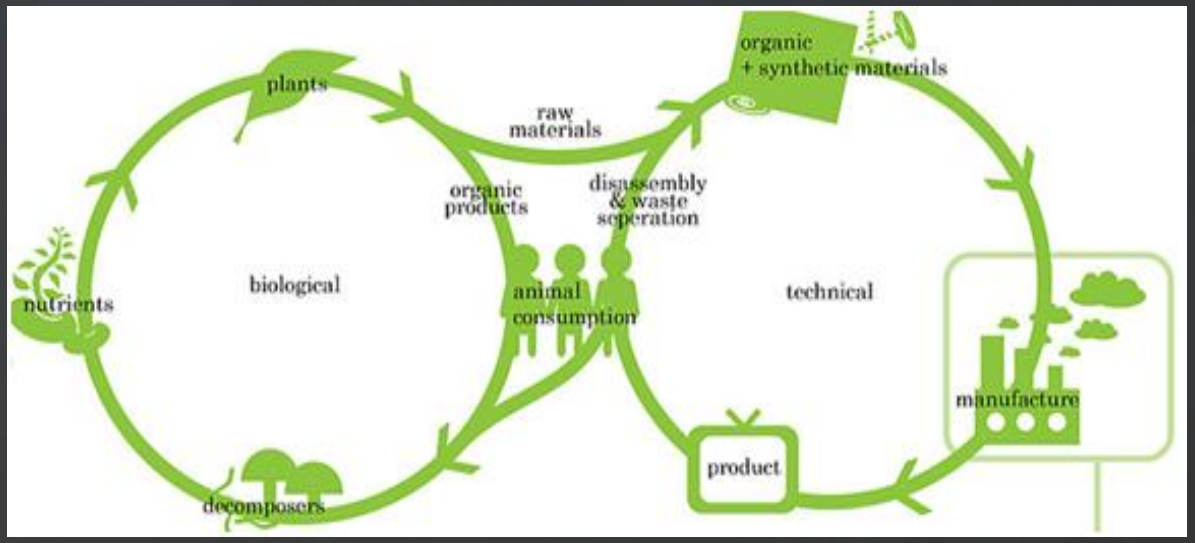
Reliability

- Failure testing must be performed to ensure a safe & dependable unit
- Load versus resistance will be analyzed to produce a unit that has less than 0.1 probability of failure



Sustainability

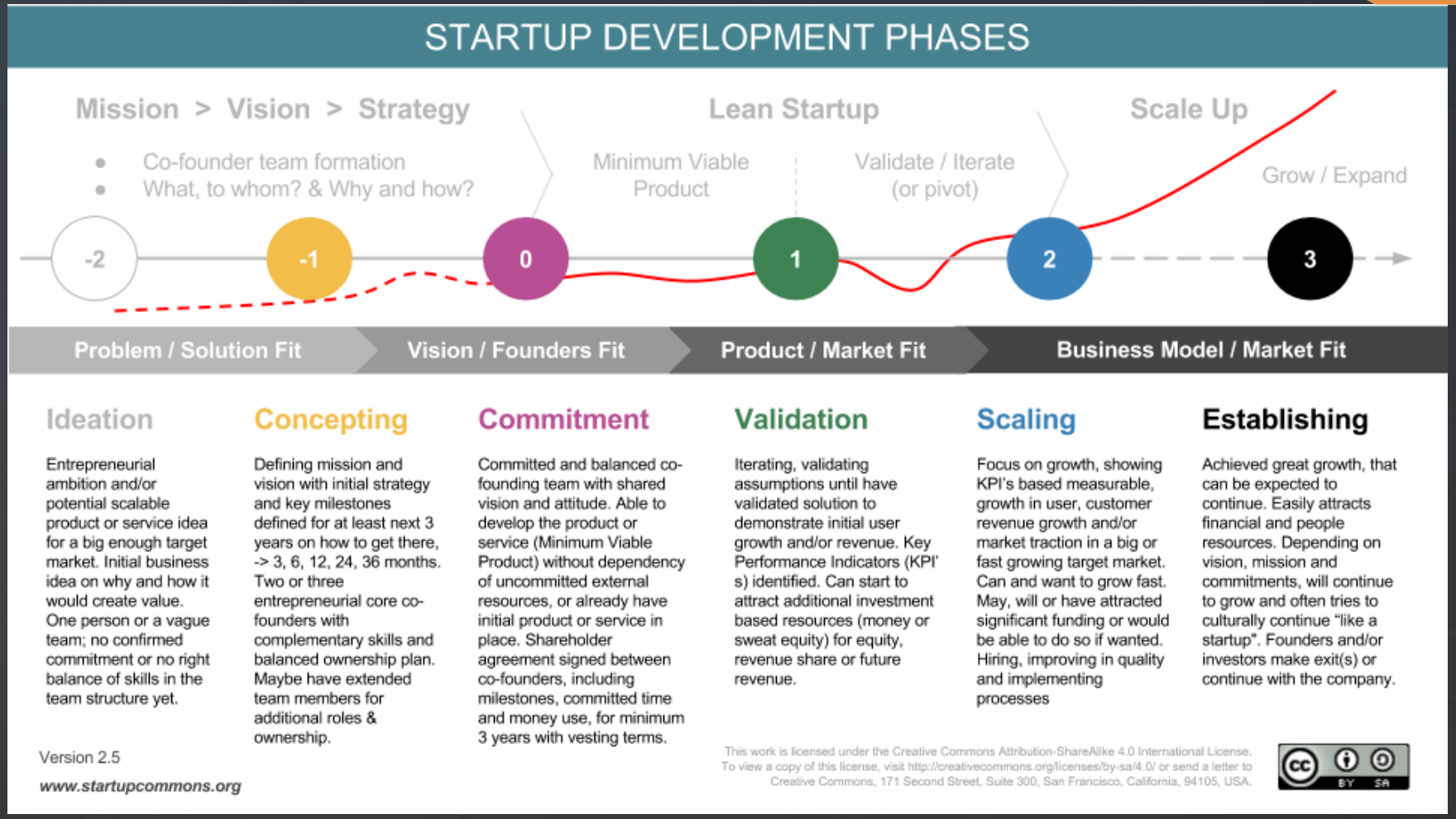
- Environmental sustainability is an issue we take very seriously & that is reflected in our design
- Using a 3D printer to house all our electrical & hardware components
- Thermoplastic polymer material used by the printer can be re-used after a printing



Future Endeavours

- Create an Android App that will replace the need for the for the physical unit
- New generation Android phones have built in RFID reader, use that to read the cards
- Can be even more portable & eliminates the need for a computer
- Order all material in bulk & acquire venture or angel capital from interested parties

Business Case



Capstone Demo Eve

- Twas the night before

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Some work was done!

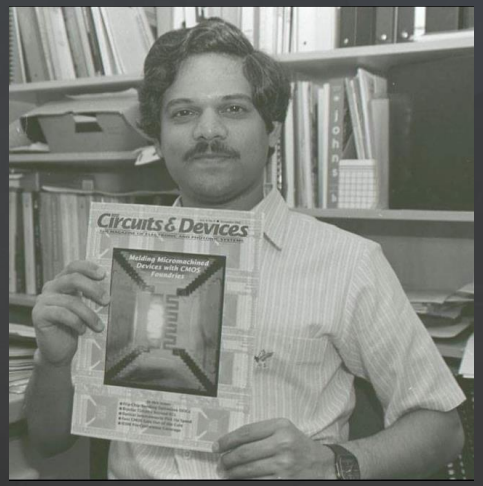
Testing in Lab 1

Summary

- We offer a cost effective solution to attendance tracking & personnel documentation
- Our system can read ID, barcode, & RFID, as well as take & record the user's picture
- We plan on developing the accompanying app in January to assist with in-class exams
- All this will be done via user friendly interface while keeping the cost at a minimum

Acknowledgments

- Dr. Andrew Rawicz & Mr. Steve Whitmore
- All of the 440 TA's (Lukas, Jamal, Shaun, & Masha)
- Our friends & family for their endless support
- Dr. Wang from Lee's Electronics
- Our sincere thanks to Dr. Ash Parameswaran



Questions

- Thank you very much for your time today & for a wonderful semester
- At this time we would like to open the floor for any questions

Image References

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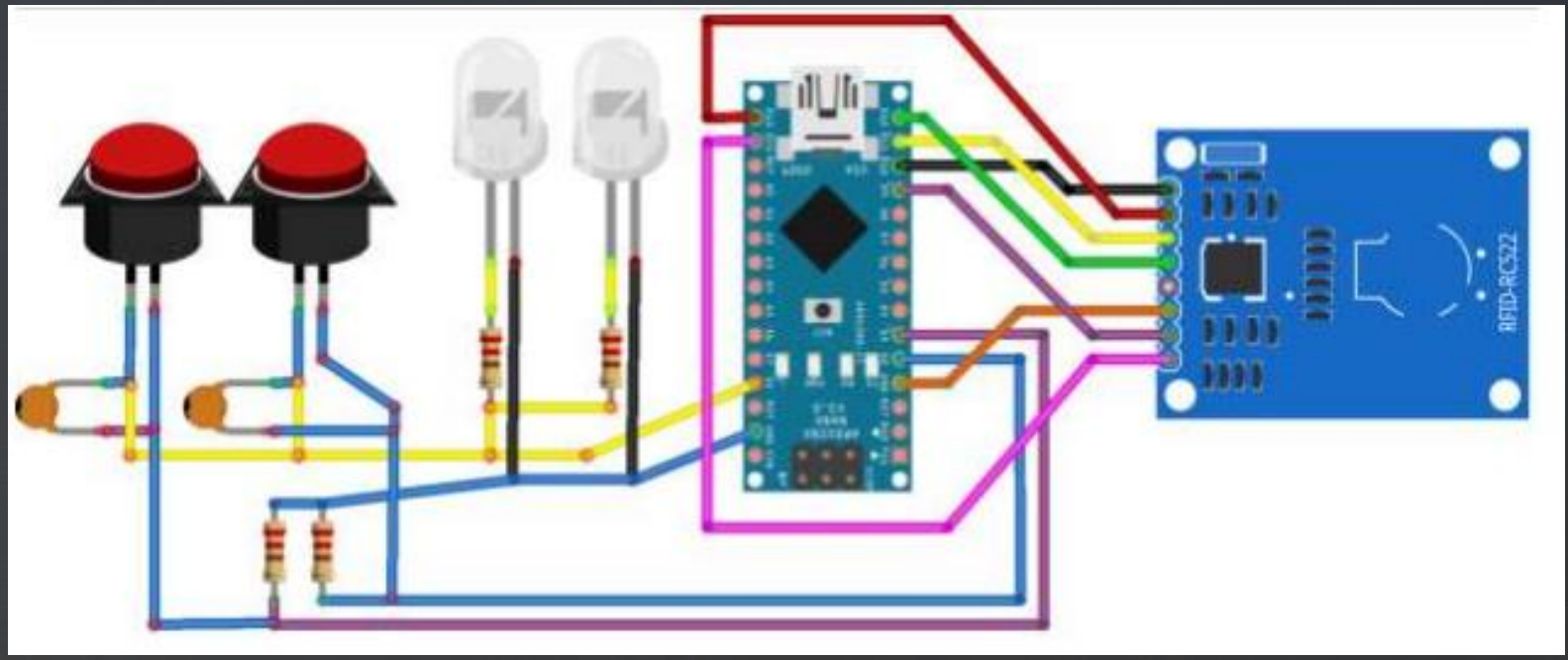
Appendix



Appendix