

JENNELLE WONG

PORTFOLIO 2016

Hi, I'm Jennelle...

I'm a recent graduate of Mechatronics Engineering at University of Waterloo. I like to build and tinker and I'm looking for a full-time position.

During my undergraduate, I've worked a total of 6 co-op placements at a number of tech companies in Toronto and San Francisco.

I am now looking to pivot from my UX and software experience to bring my passion to product design and solutions.

SKILLS

design

Wireframing
Rhino
Keyshot
SolidWorks
AutoDesk Inventor
AutoCAD
Cadence
InDesign
Illustrator

embedded

SMT Soldering
PCB Layout
PLC

development

Java (Android)
C
Ruby
HTML CSS JS
PHP

HOBBIES + INTERESTS



tinkering
+ diy



software
development



design



woodworking



adventurous
eater

EDUCATION

BACHELOR OF APPLIED SCIENCE HONOURS MECHATRONICS ENGINEERING (CO-OP)

University of Waterloo
Sept 2010 - June 2015

EXPERIENCE

ANDROID DEVELOPER

Wattpad | Toronto, Ontario | Sept 2014 - Dec 2014

SOFTWARE ENGINEER INTERN (ANDROID)

if(we) - formerly Tagged | San Francisco, California | Sept 2013 - Dec 2013

MOBILE PAYMENTS SOFTWARE ENGINEER INTERN

Visa Inc. | Foster City, California | Jan 2013 - Apr 2013

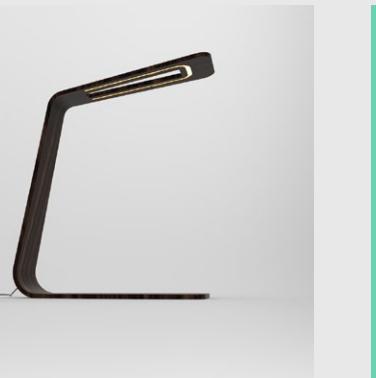
JR. PRODUCT MANAGER / UX DESIGNER

Communitech | Kitchener, Ontario | May 2012 - Aug 2012

AGILE DEVELOPER

points.com | Toronto, Ontario | Aug 2011 - Dec 2011

...and this is **some** of
my work



Lära

A personal study on using
bent lamination technique



ANNEX.

Monitor your garage -
anytime, anywhere



tag'd

A portable laser tag system
with a textile twist.



Laptop Prop

An exercise in 3D-printing
and entrepreneurship



Wattpad Logger

Graphic tool for user-
submitted error reports



Kumquat

An alternative approach to
2-step verification

01



Lära

A current work in progress to learn more about bent lamination

The name comes from the Swedish verb **lära sig** which means to learn or to study.

I have always been interested in Lighting and Furniture Design and I wanted to try a more contemporary woodworking technique.

This is a current work-in-progress in designing and building my own desk lamp.

When I think of bent lamination, I am immediately drawn to the POÄNG armchair by IKEA, which was a staple of my childhood.

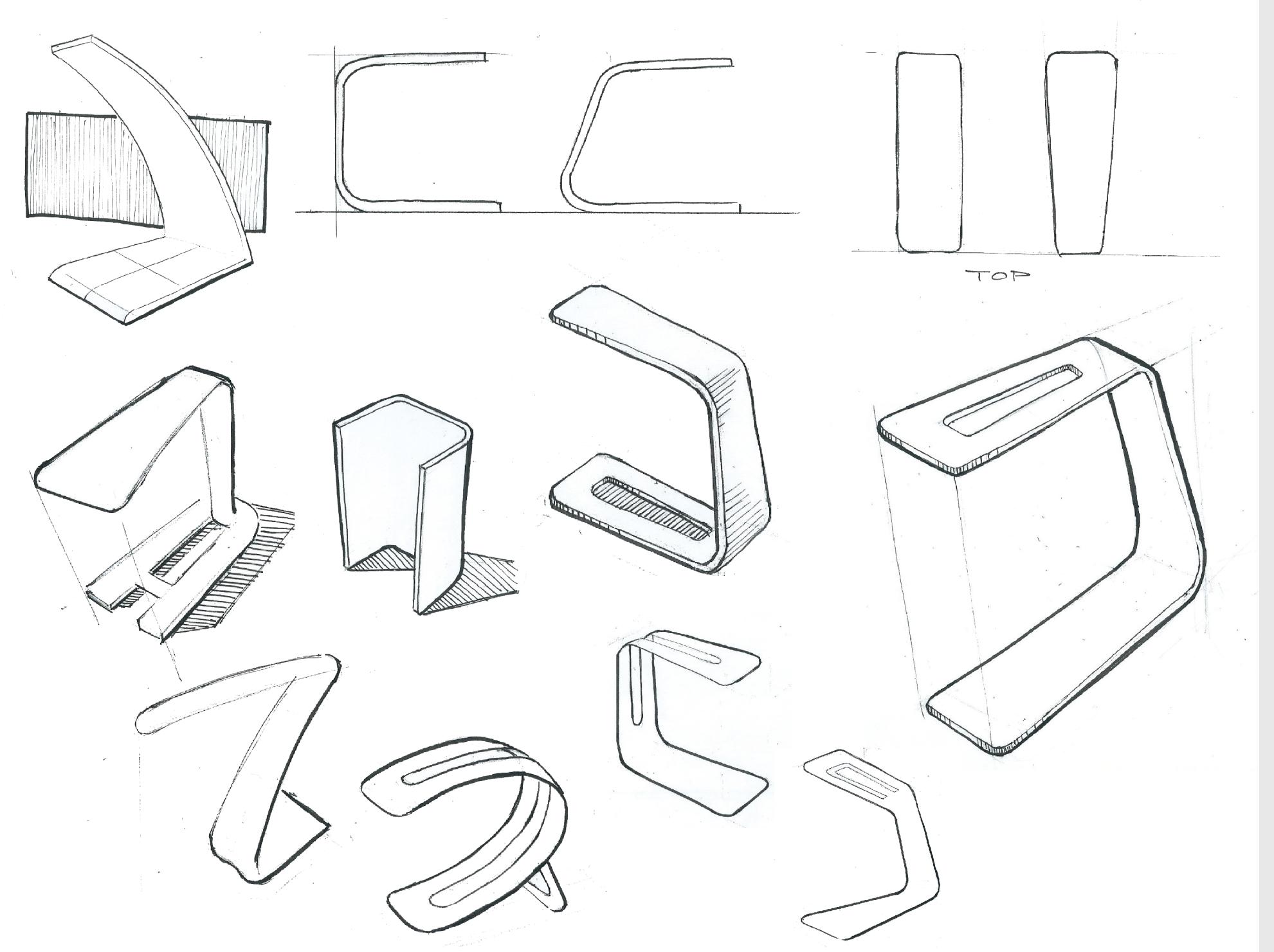
In fact, my parents still own a pair of POÄNGs that they built together when they met.



I knew I wanted to pursue a unibody construction that looked clean, elegant and inspired by Scandinavian design.

02

03

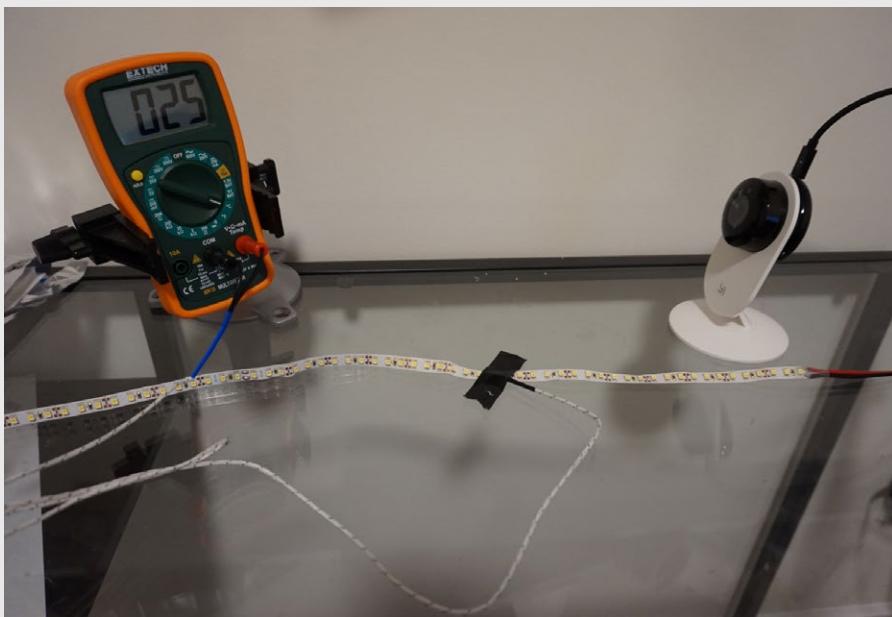


After acquiring all the electronic components, I opened up the power switch to check if there was sufficient circuit protection.

04



The rocker switch has no built-in protection, so I built one to be soldered into the lamp during final construction.



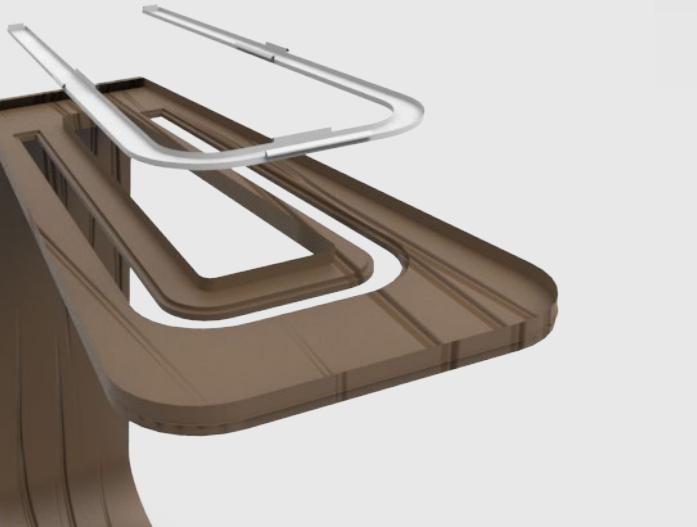
Next, I set up a 24-hour test run to determine expected temperatures and/or if I need to make some changes to deal with the heat output.



To construct the body, I will be doing it in two parts - an outer and inner half.

A slot has to be routed out to run the wiring up the body.

The inner half will then be glued to enclose the wiring.



The recessed cavity in where the LED strip sits will also be routed out. This include a ledge for the plastic diffuser to snap into.

The diffuser for the lamp be 3-D printed, likely sanded and epoxied for a polished finish.

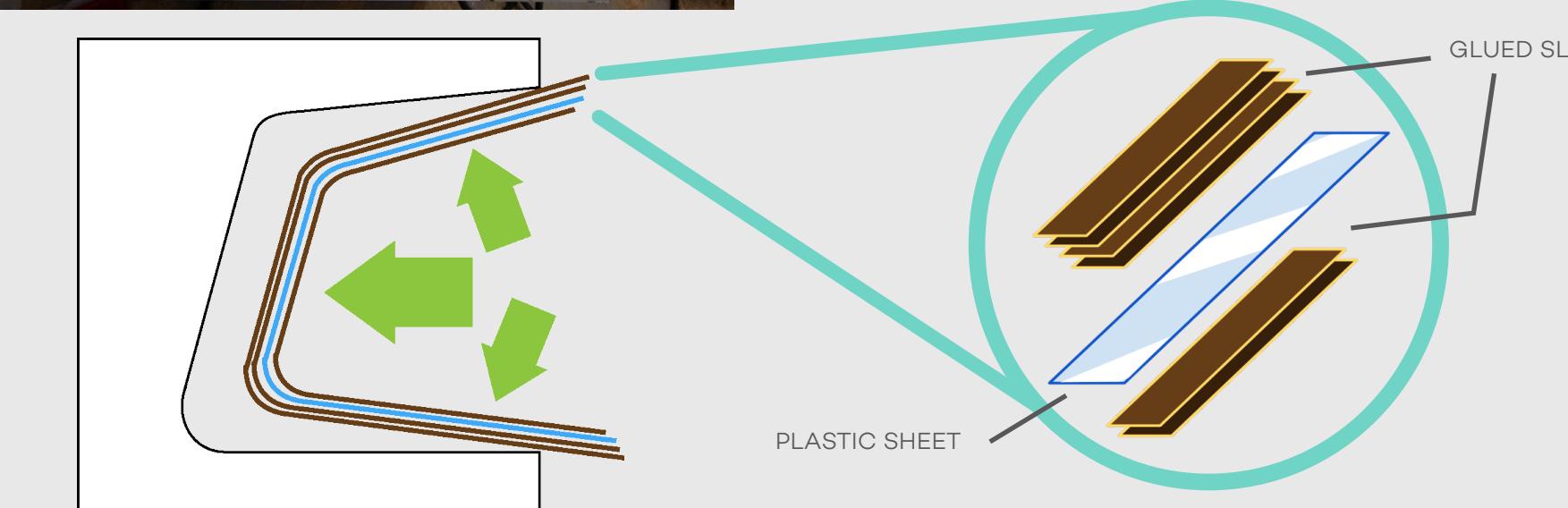
Before ripping any lumber into thin slats, I needed a zero clearance insert for my table saw.

This will prevent any tearout when ripping wood slats for lamination.



Currently, I am working on the bending form - I saved both portions in case I want a two-part bending form.

The glued slats will be separated by a plastic sheet to form the inner and outer half for construction.



ANNEX.

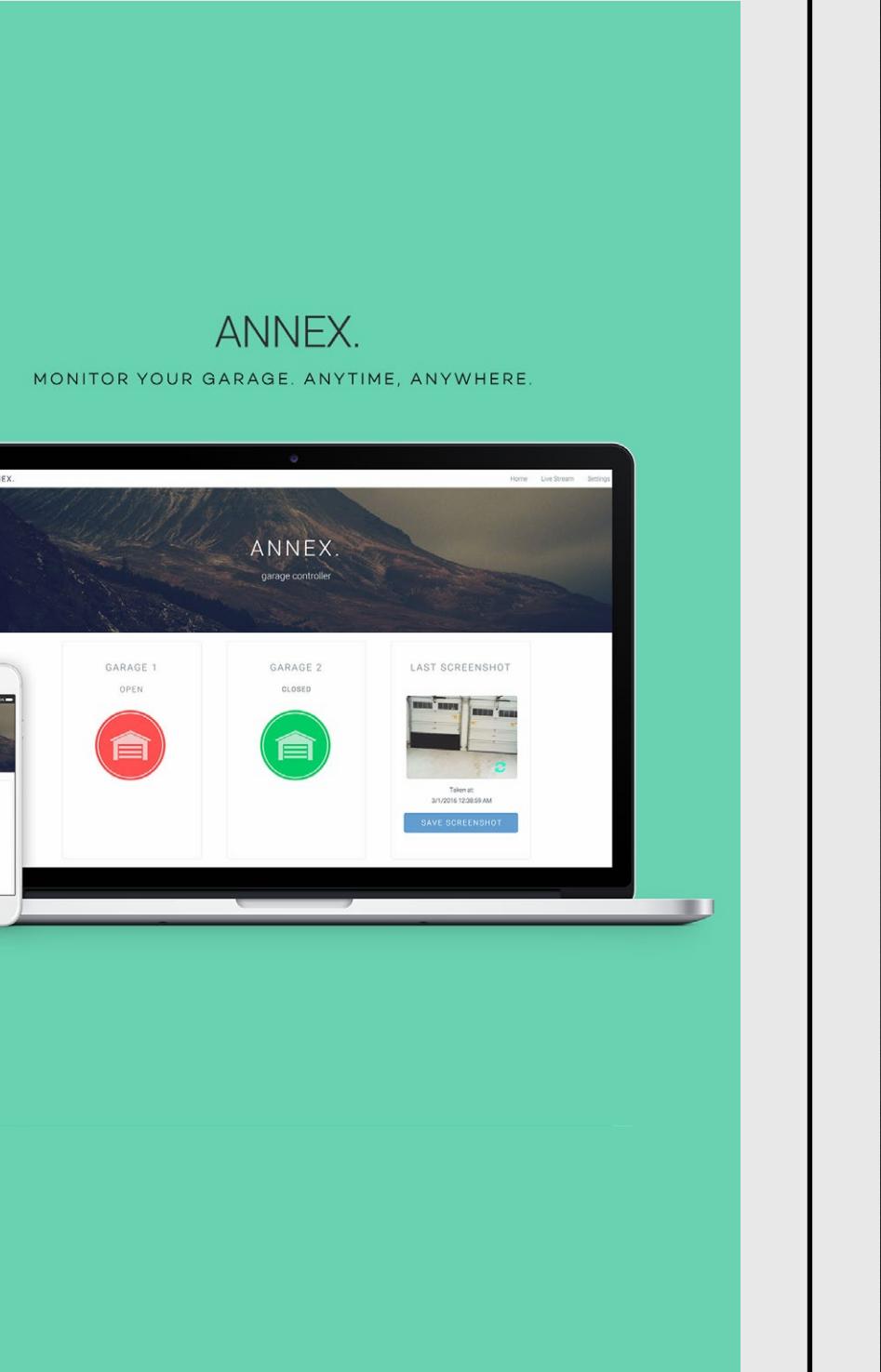
An open-sourced Arduino garage monitor

Left home and not sure if you've left your garage open? With ANNEX, you can monitor your garage - anytime, anywhere.

Version 2 is currently in the works to improve security through PIN verification and will include the addition of text notifications.

Visit the link below for the Instructables **community featured** tutorial!

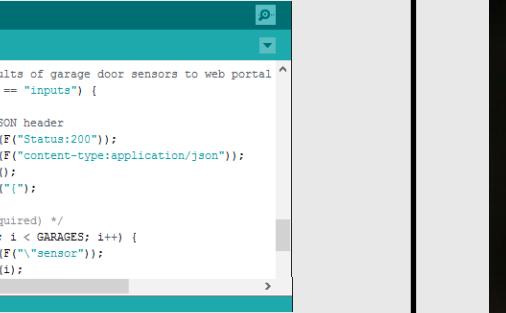
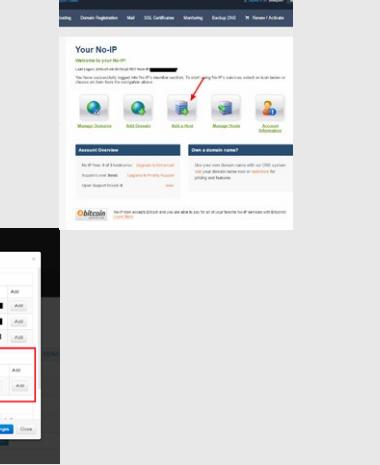
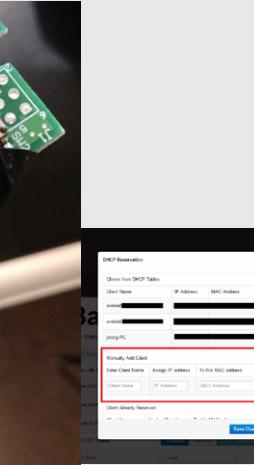
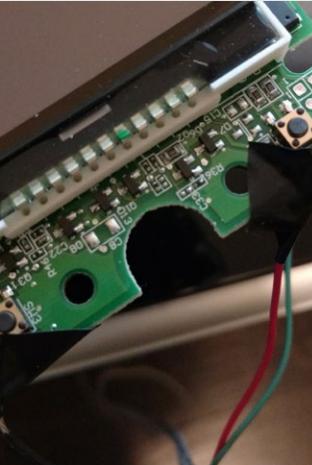
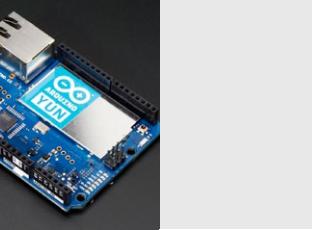
www.instructables.com/id/Annex-an-Arduino-Yun-Garage-Monitor/



My parents often leave the house only to pull back into their driveway to check if they left their garage open.

I wanted to create a solution for my parents to monitor and control their garage wherever they are.





```
garage.js
1 var interval;
2
3 // EDIT NUMBER OF GARAGES HERE
4 var GARAGES = 2;
5
6
7 function garageClick(obj) {
8     // Grey out icon and disable click - see css for .disabled
9     $(obj).addClass("disabled");
10
11     $.ajax({
12         url: "/arduino/motor/" + obj.id.slice(1),
13         dataType: "json",
14         error: function() {
15             alert("Cannot reach garage monitor. Please try again.");
16             $(obj).removeClass("disabled");
17         }
18         success: function() {
19             // Set icon to yellow to indicate motor is running
20             $(obj).removeClass("disabled").addClass("running");
21
22             // After 10 seconds (motor finished running), re-enable icon
23             setTimeout(function() {
24                 $(obj).removeClass("running");
25             }, 10000);
26
27             timeout: 30000
28         }
29     });
30 }
31
32 function setGarageStatus(label, val) {
33     var selector = "#" + label;
34
35     if (val === 0) {
36         $(selector + '> .garage').removeClass("open").addClass("closed");
37         $(selector + '> h3').text("closed");
38     } else {
39         $(selector + '> .garage').removeClass("closed").addClass("open");
40     }
41 }
```

```
garage.ino
1 //include libraries
2 #include <SoftwareSerial.h>
3 #include <HTTPClient.h>
4
5 //set pins
6 const int D1 = 11;
7 const int D2 = 12;
8 const int D3 = 13;
9 const int D4 = 14;
10
11 //set pins for limit switches
12 const int SW1 = 2;
13 const int SW2 = 3;
14 const int SW3 = 4;
15 const int SW4 = 5;
16
17 //set pins for motor driver
18 const int ENA = 6;
19 const int IN1 = 7;
20 const int IN2 = 8;
21 const int IN3 = 9;
22 const int IN4 = 10;
23
24 //set pins for relay
25 const int RELAY = 15;
26
27 //set pins for LED
28 const int LED = 16;
```

```
garage.pde
1 //include libraries
2 #include <SoftwareSerial.h>
3 #include <HTTPClient.h>
4
5 //set pins
6 const int D1 = 11;
7 const int D2 = 12;
8 const int D3 = 13;
9 const int D4 = 14;
10
11 //set pins for limit switches
12 const int SW1 = 2;
13 const int SW2 = 3;
14 const int SW3 = 4;
15 const int SW4 = 5;
16
17 //set pins for motor driver
18 const int ENA = 6;
19 const int IN1 = 7;
20 const int IN2 = 8;
21 const int IN3 = 9;
22 const int IN4 = 10;
23
24 //set pins for relay
25 const int RELAY = 15;
26
27 //set pins for LED
28 const int LED = 16;
```



tag'd

A portable laser tag system designed with a textile twist

Initially developed for combat training, laser tag has long been limited to the indoor arena experience. Its equipment is bulky and heavy, detracting from the overall gameplay experience.

tag'd aims to redesign and bring the key elements of laser tag to players everywhere.

I was the Hardware Lead and Lead Designer; I was responsible for the R&D, construction and software integration with custom sensors in our play vest and “shooter” glove combo.

This project was the culmination of Waterloo Engineering Capstone Project and was showcased at the **ECE Design Symposium 2015**.

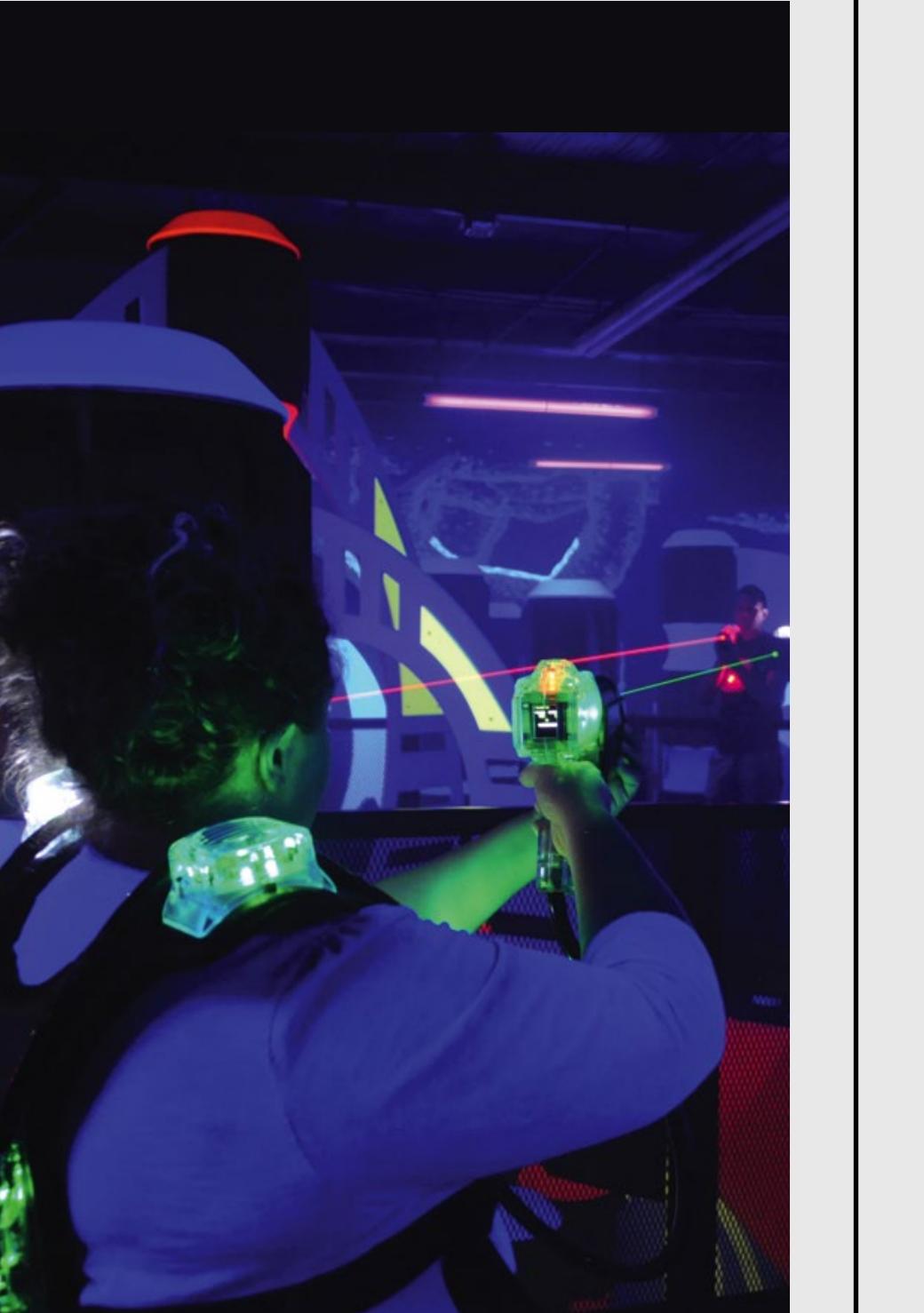


Image provided by Laser-Tron



“I’m uncomfortable when I see kids running with shooters **resembling firearms**.”



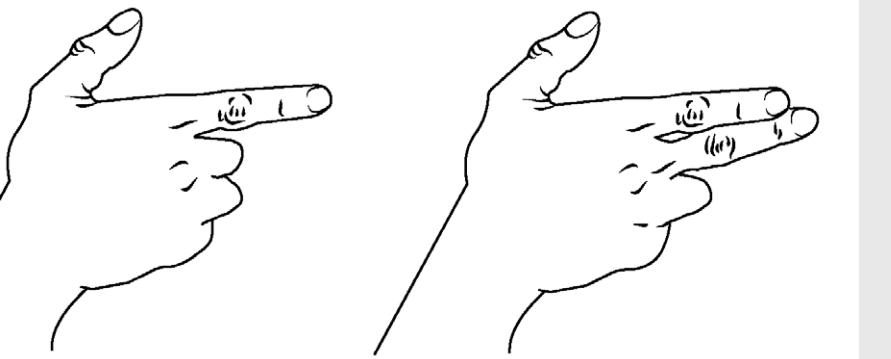
“It’d be nice to bring back the **nostalgia** of running around.”



“We want something **convenient** and **easy** to **set up**.”



ONE-HANDED SHOOTING GESTURES

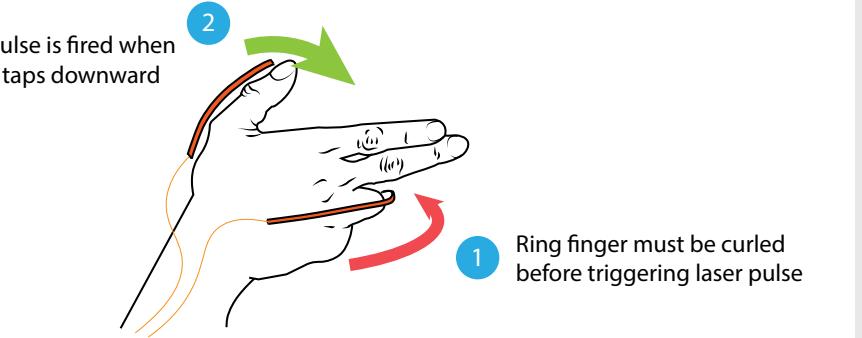


In place of the typical bulky shooter, tag'd uses a glove that detects a "trigger" action to shoot off a laser pulse.

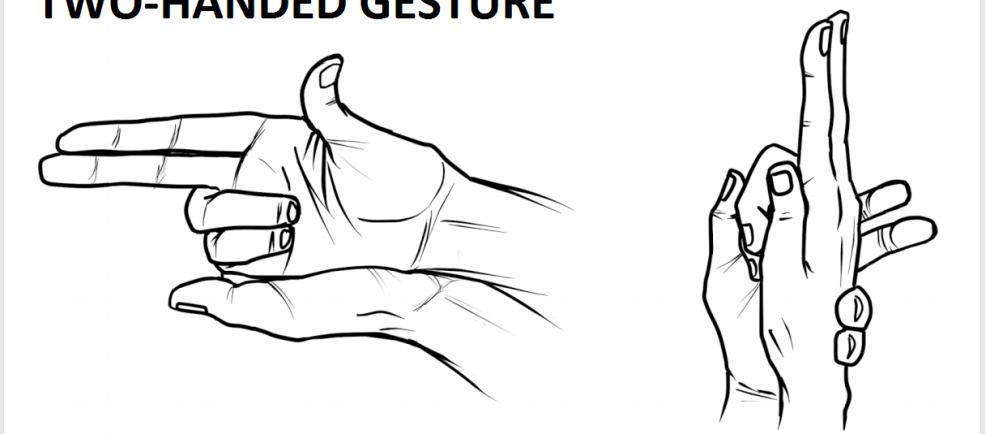
The first couple designs looked at flex and pressure sensors. They can be easily embedded into textiles, making them ideal for the application.

Unfortunately, preliminary testing proved response time was a debilitating issue.

FLEX SENSORS

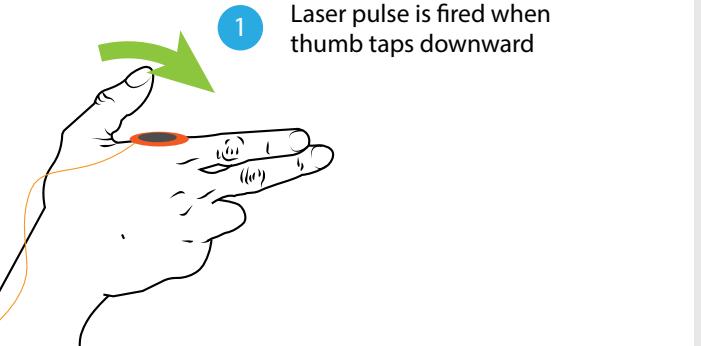


TWO-HANDED GESTURE



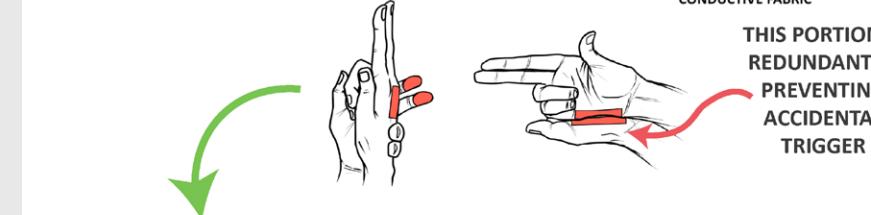
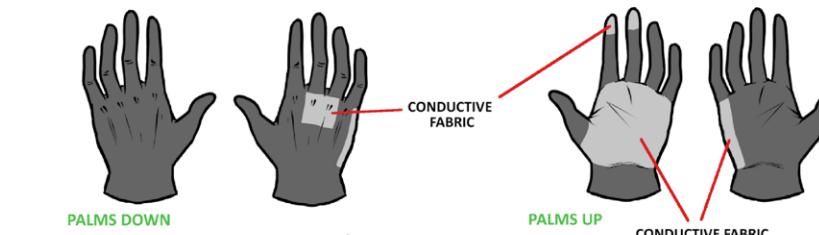
After some further brainstorming, the team explored the idea of a two-handed gesture. For those who wanted stability when aiming, it was natural to gravitate to a two-handed pose.

PRESSURE SENSOR

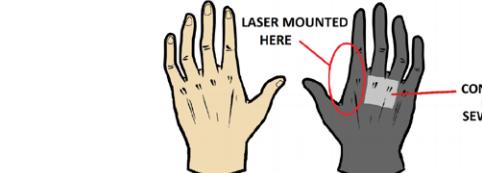


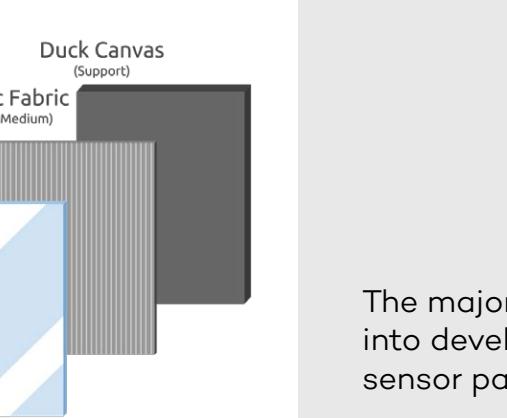
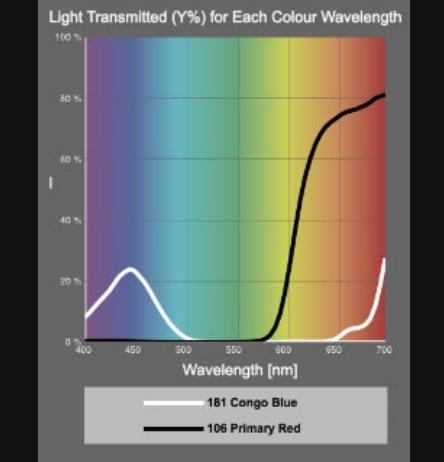
ITERATION 2 - CONDUCTIVE FABRIC

ORIGINAL DESIGN - "COMPLETE-THE-CIRCUIT"



REDESIGN - TEXTILE CAPACITIVE SENSOR



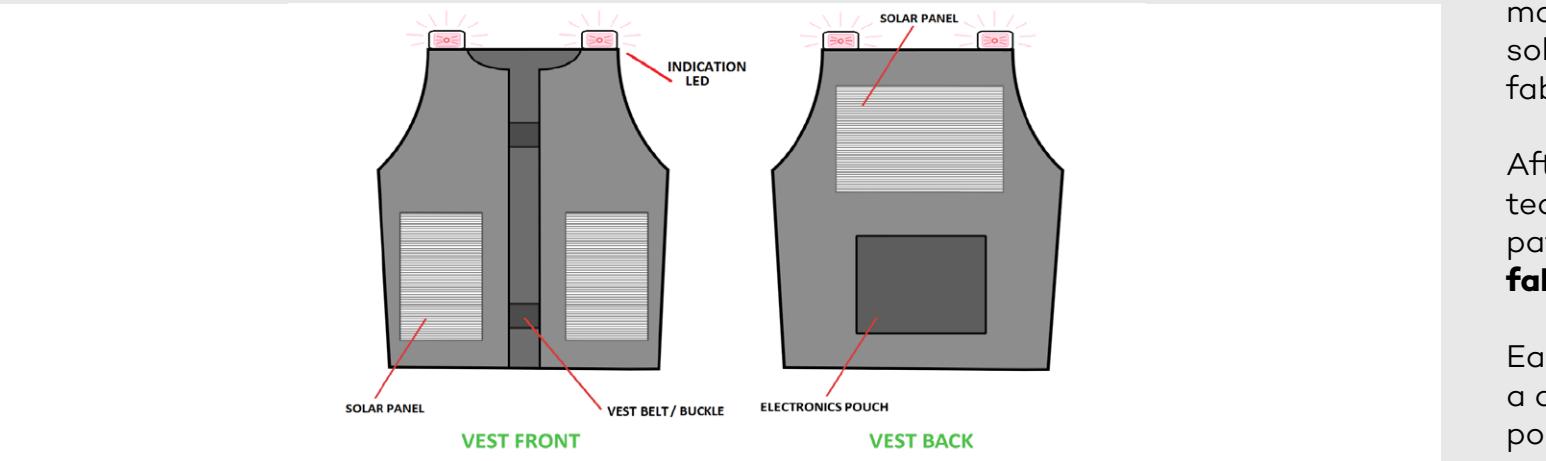


The majority of R&D went into developing an **all-textile** sensor patch.

The team tested a number of materials including: flexible solar panels, reflective fabrics and light filters.

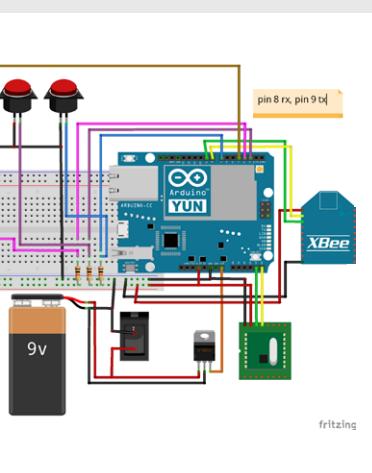
After months of testing, the team developed a sensor patch using **fibre optic fabric**.

Each individual vest has a dedicated electronics pouch that handles all the processing, communication with the base station and a battery to provide hours of endless gameplay.



The base station is the heart of tag'd.

From any Wifi-enabled device, users can configure the gameplay (Capture the Flag or Free-For-All), view score breakdowns and manage other settings.



TAGGED

Settings

GAME DURATION: 10:00

GAMEPLAY MODE: Free for All

Roster

TEAM A PLAYERS: 1, 3

TEAM B PLAYERS: 2, 4

Roster

PLAYER POINTS: 1, 2, 2, 1

TIME REMAINING: 09:30

» ADD PLAYERS

» START GAME

» STOP GAME



tag'd
YOUR GAME. ANYWHERE. ANY TIME.

BACKGROUND
We just wanted to be able to take the fun with us wherever we went. What better way than to make a lightweight, flexible and durable laser tag system? Go ahead — toss it in your suitcase and take it to the arena of your choice.

GAMEPLAY
Team Mode (Capture the Flag)
Teams compete by trying to capture each other's flags.

Free-for-All Mode
Players attempt to scan the maximum number of flags.

Laptop Prop

A simple, economical option to improve ventilation and ergonomics of laptops

Design a product and provide an analysis on customer needs, marketing strategies, the product's market segment and risks.

This project was a 2-week group exercise in developing experience with 3D printing, prototyping and roadmapping the development and bringing a product to market.

I was responsible for conducting market research, providing a marketing strategy and designing our product.



Laptop Prop

HIGH COST



Laptop stands on the market cater to workstation set-ups or fixed height, portable solutions.

There is an opportunity to create a **low-cost** product aimed at **portability**.



One of the proposed marketing strategy is to offer LaptopProp as custom branded merchandise.

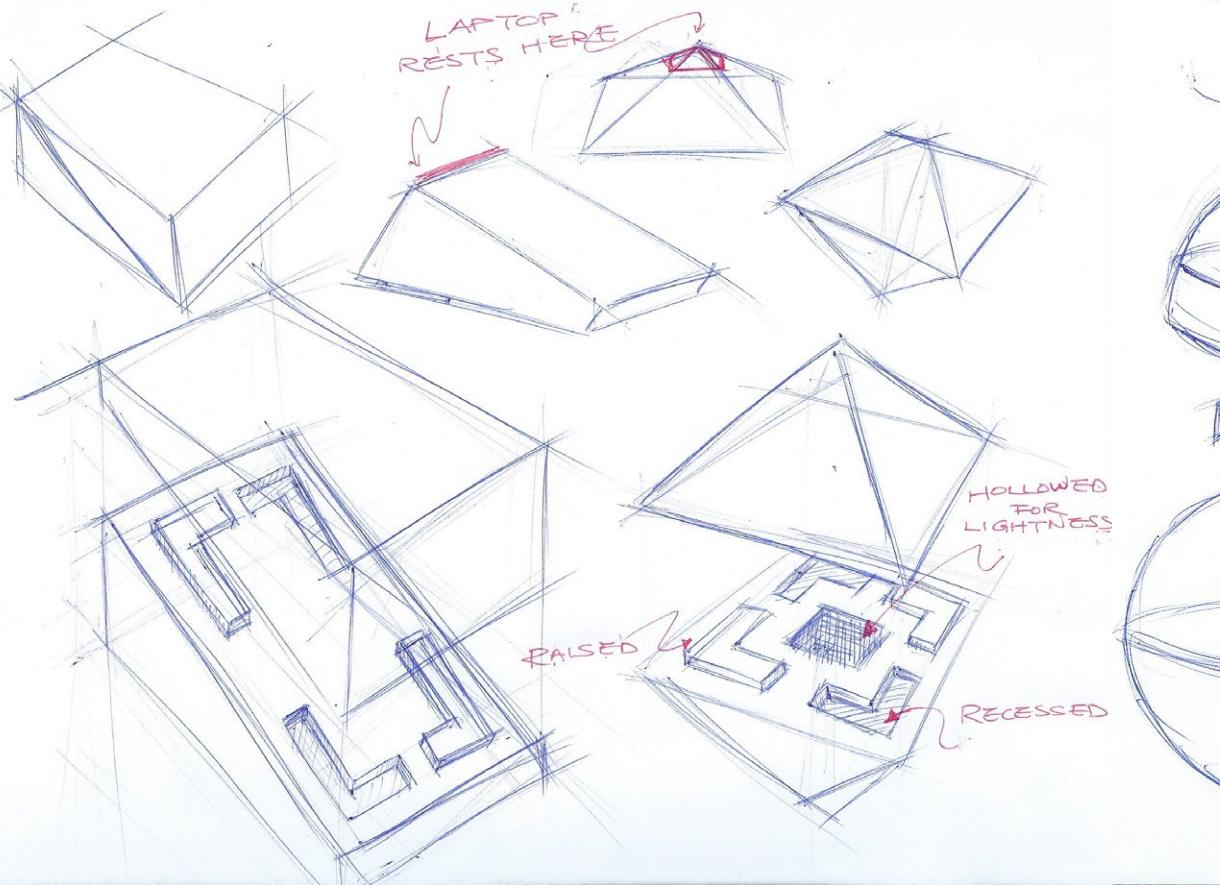
In place of branded pens, lanyards and mugs, LaptopProp could be a great alternative for tech companies as part of their marketing effort.

The intention is to enter the young tech market, such as hackathons and technology conferences, where laptop use is crucial.



After consulting some literature on ergonomic workspaces, keyboards should be inclined at an angle of 20° or less.

This information provided a basic metric for the product's height.



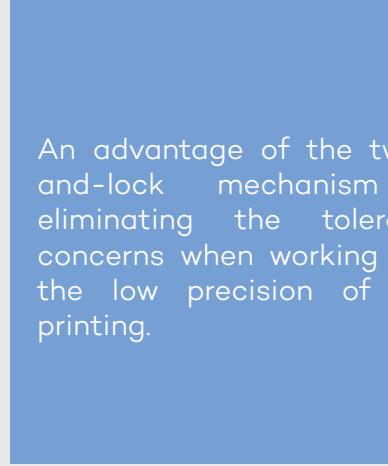
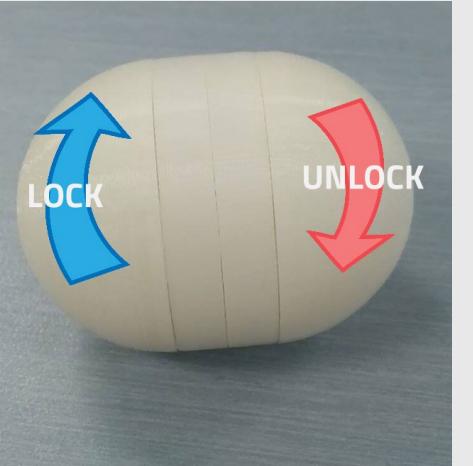
To drive the ideation phase, I decided to consider interlocking parts so the product could be stored away easily. I explored some simple geometric forms, keeping in mind that the final product was to be 3-D printed.



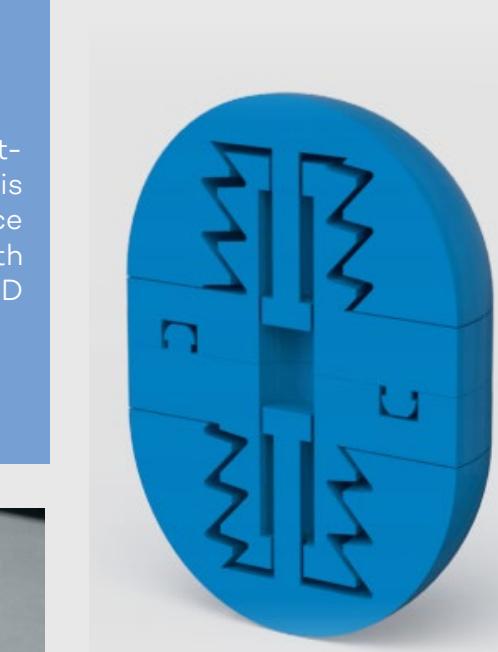
The group liked the idea of adjustable height and found the round design is snag-free when stowed away.



While modeling, the team member responsible for the CAD proposed a twist-to-lock action. We all agreed it was a great alternative and incorporated it into the final design.



An advantage of the twist-and-lock mechanism is eliminating the tolerance concerns when working with the low precision of 3-D printing.



If I were to revisit the idea, rubber grips would be added to the domed top and feet of LaptopProp to provide better traction.

Wattpad Logger

A low-resource, asynchronous logger for user-submitted bug reports.

Wattpad is a social story sharing platform that relies on its mobile platform heavily.

Revamp the current logging system in Wattpad's Android app so that developers can get more meaningful information out of user-submitted bug reports.

This was completed in the last two weeks of my co-op placement at Wattpad as a developer on the Android team.



About Wattpad



Infographic provided by Wattpad



of the top 100 free apps have a rating of 4+ stars



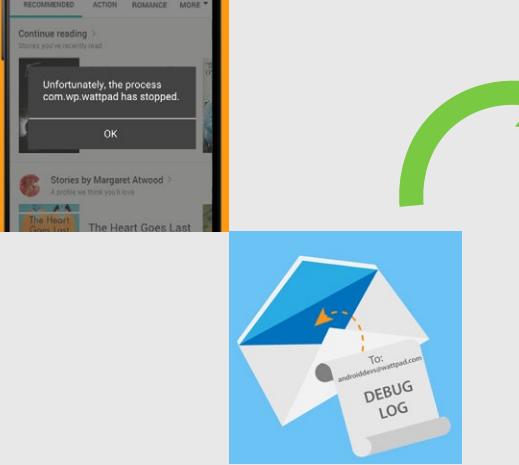
will not download an app rated lower than 3 stars



leave a rating or review after a negative experience

To maintain Wattpad's momentum in mobile growth, it is crucial to address and fix debilitating bugs.

The largest resource stem from user-submitted reports. However, the original implementation makes it difficult to understand.



```

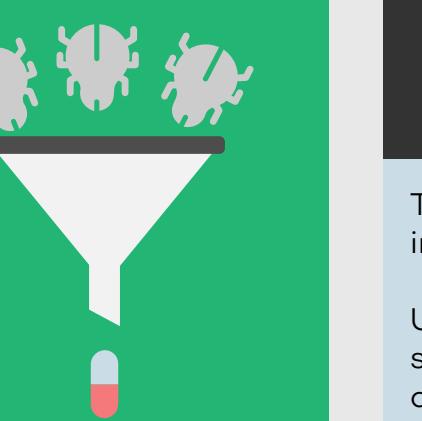
1 [[ImageUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
Setting image http://a.wattpad.com/
[REDACTED]
2 [ImageUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
Setting image http://a.wattpad.com/
[REDACTED]
3 [ConnectionUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
makeHttpRequest url: http://a.wattpad.com/
[REDACTED]
4 [ImageUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
Setting image http://a.wattpad.com/cover/
[REDACTED]
5 [ConnectionUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
makeHttpRequest url:
[REDACTED]
6 [ConnectionUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
not in cache http://www.wattpad.com/api/

```

There is an abundance of information, but not very helpful when trying to find where bugs occurred.

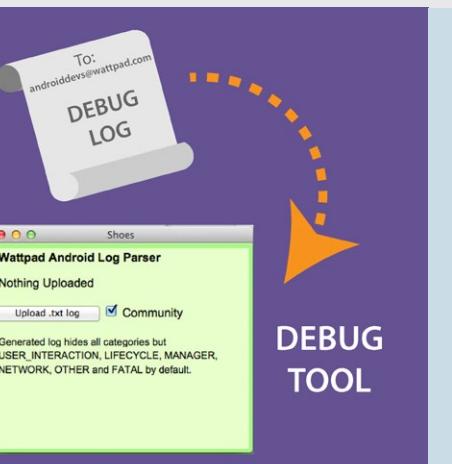
Often, developers would have to contact the user in order to recreate the bug.

This was a major bottleneck and has delayed the team on releasing a fix.



To address this, I drafted a standardized logging format to improve granularity.

Using feedback from my team and iOS devs, I refined my template so it could be implemented across both platforms and maintain a consistent design language.



As a bonus, I wrote a tool to generate a more visually appealing log for both developers and support specialists.

The tool colour-codes and provides filters, allowing developers to drill down to the source of a bug and reducing the amount of follow-up with users to resolve the issue.

ORIGINAL LOGS

```

1 [ImageUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
Setting image http://a.wattpad.com/
[REDACTED]
2 [ImageUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
Setting image http://a.wattpad.com/
[REDACTED]
3 [ConnectionUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
makeHttpRequest url: http://a.wattpad.com/
[REDACTED]
4 [ImageUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
Setting image http://a.wattpad.com/cover/
[REDACTED]
5 [ConnectionUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
makeHttpRequest url:
[REDACTED]
6 [ConnectionUtils] : (Wed Dec 17 16:27:01 GMT-05:00 2014):
not in cache http://www.wattpad.com/api/

```

Though not shown, logger was bottlenecked by lack of concurrency (all logging occurring on main thread).
To the user, this may cause app to appear unresponsive.

No indication of priority
(info, warn, error)

Timestamp unnecessarily long

Difficult to read - relevant info easily missed or buried

Difficult to read - relevant info easily missed or buried

NEW LOGS

Timestamp up to 25% shorter

Improved granularity with new categories and priority levels

Timestamp converted to same timezone as servers to provide an accurate timeline of events

Logger given a dedicated thread to handle all logging tasks.

```

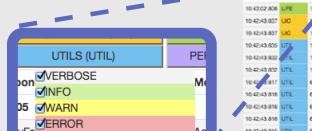
2015-01-05 10:42:06:655|1|UTIL|V|ImageUtils|Setting image http://a.wattpad.com/
2015-01-05 10:42:06:655|6918|MNGR|V|BaseStoriesManager|saveStoryToDb()
2015-01-05 10:42:06:655|1|UIC|I|SmartImageView|checkBitmapRecycled() onDraw()
IMAGE HAS BEEN RECYCLED SETTING FALBACK IMAGE -1, http://a.wattpad.com/
2015-01-05 10:42:06:652|6914|UTIL|V|BitmapMemoryCache|put() item into cache:
2015-01-05 10:42:06:648|6918|MNGR|V|BaseStoriesManager|saveStoryToDb() part
exists. Updating

```

Smaller memory footprint, can hold 15% more lines

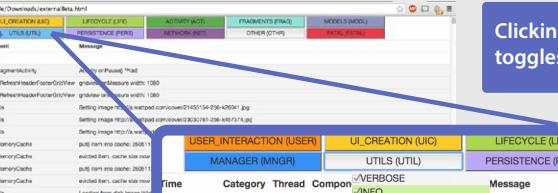
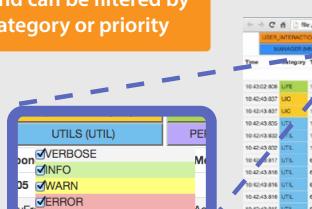
DEBUG TOOL

Logs are colour-coded and can be filtered by category or priority



When hovering over a category, user may filter by priority

HTML OUTPUT



Clicking on category toggles visibility

Kumquat

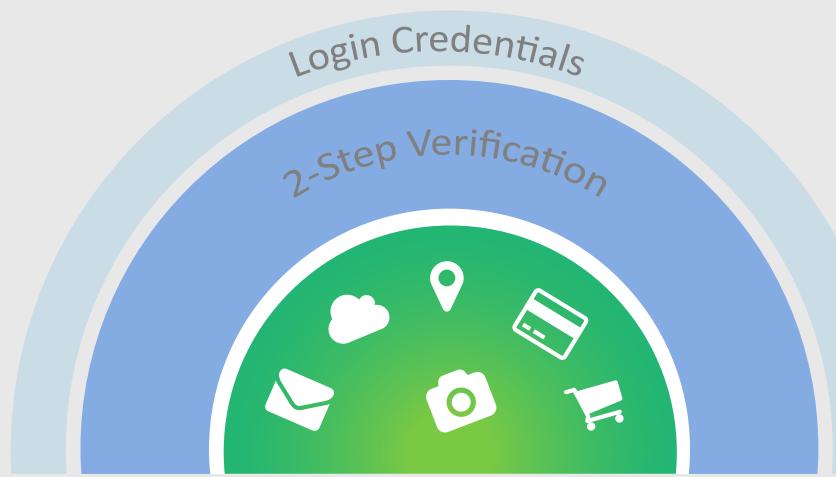
**Rethinking the traditional approach towards
2-step verification**

Identify a security problem. Propose a solution that considers the end-to-end security point of view.

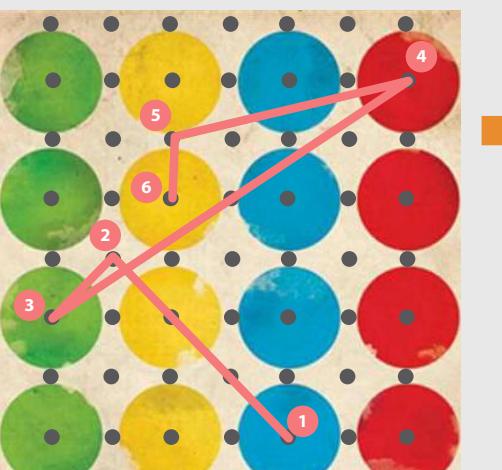
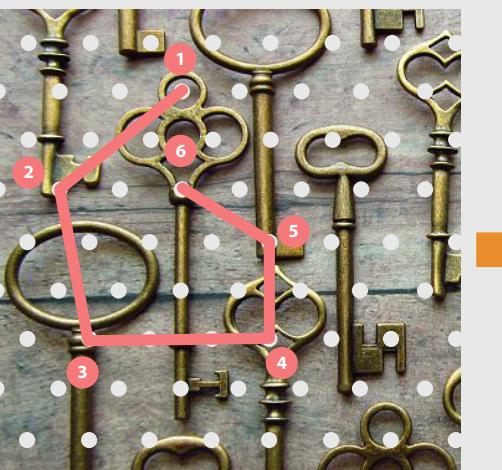
This was completed as the final project for ECE 458: Computer Security with a partner. In addition to a white paper, a proof-of-concept demo was created using Ruby on Rails.



2-step verification (2sv) has become the staple in providing an extra layer of online security. The traditional method usually entails answering personal security questions or sending a code via text or voice call.

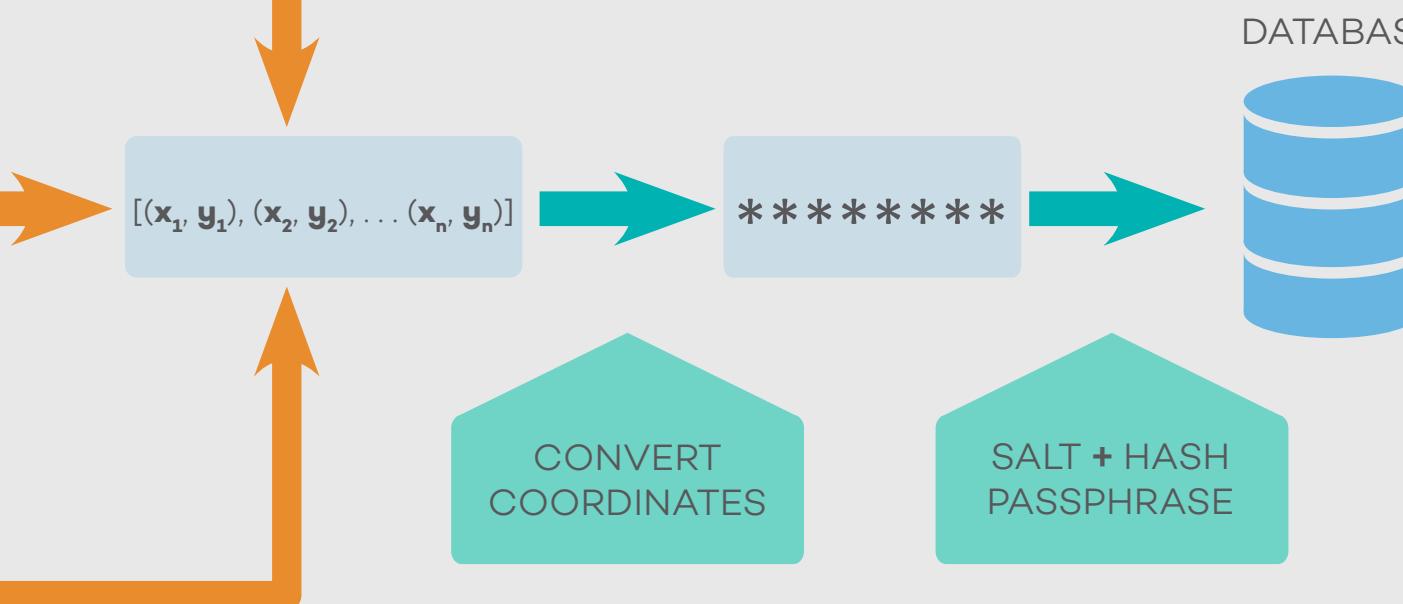


The user is typically the source of most vulnerabilities. It is not easy for a human user to create and remember a long, complex passphrase. As such, human behaviour must be anticipated when designing a user-facing security feature.



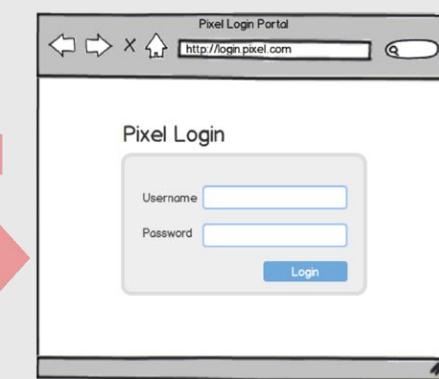
Inspired by the recent security innovations introduced on mobile platforms, Kumquat intends to bring a similar user experience to traditional web portal sign-in authentication.

Kumquat aims to combine a simplified interface that engages the visual cortex through **graphical passwords** to generate a password that would be at least equivalent in strength as a traditional password with complexity and length.

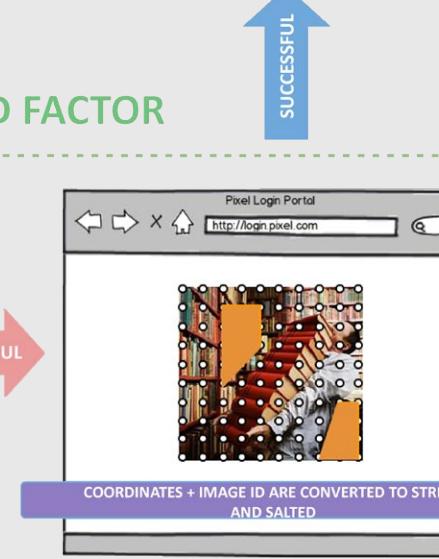
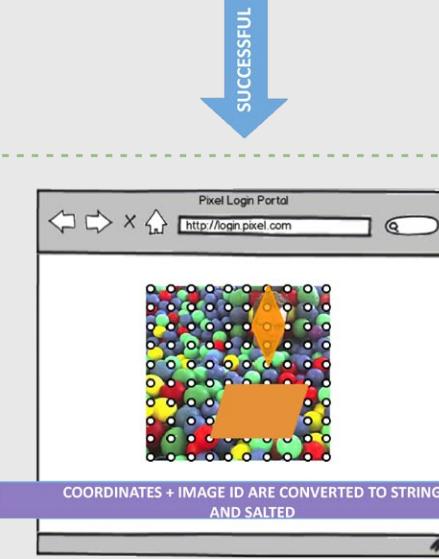


TYPICAL USER FLOW FOR LOGIN USING KUMQUAT AS 2SV

FIRST FACTOR



SECOND FACTOR



IF THE USER IS UNSUCCESSFUL AFTER 3 TRIES, THE USER WILL BE REDIRECTED TO A NEW IMAGE.

THE NEW IMAGE ARE PSEUDO-RANDOMLY PICKED FROM THE USER'S PRE-SELECTED BANK OF IMAGE PASSWORDS.

Using bits of entropy as the basis of analysis, it is proven that a password generated by Kumquat through selecting 6 points on a 11x11 grid is **equivalent** to a 10 character ASCII password with high complexity (letters, numbers and symbols).

The bits of entropy scale exponentially against Kumquat's grid size but risk a decrease in usability.

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