PROJECT LOGBOOK

TABLE OF CONTENTS

IDENTIFYING AND UNDERSTANDING

Problem Statement

The Federal Trade Commission received over 2 million consumer complaints in the last year alone relating to fraud and identity theft. Of those complaints, 40% were government document or bank document fraud, and over 14% were reported as identity theft, many due to forged signatures or improperly signed paperwork. This can negatively impact consumers, corporations, and/or law firms as they have to deal with the consequences of creating and/or receiving these fraudulent documents. To solve the problem of fraudulent signatures and documents, a device is needed that can serve as a verification tool for physical signatures on papers, so that it can be verified that the intended signator is the one who actually signed.

Research

- There are pens on the market that claim to reduce fraudulent activity by utilizing water and fade resistant ink
    - We can utilize a similar type of ink in our pen to add additional security; however, this solution does not verify the identity of the signator, which is something we want our pen to do
- This article identifies the signs of a forged signature, including tremor lines and hesitation marks which are both caused by a slowly moving pen. However, it also notes that there's no sure fire way to verify if a signature is authentic, which validates our problem statement.
- According to this article, QR codes are able to hold more data than conventional barcodes. Additionally, conventional barcodes are not unique (more than one item can have the same barcode) which could cause significant problems in our pens.
- In our research we also found out that not all phones are able to scan barcodes with their camera, while some require a specialized app to do so. However, most phones are able to scan QR codes with their built in cameras.
- We also researched existing QR stamps, and found that there are many existing customizable stamps (although none that are part of a pen).
- However, all the existing variations were relatively large (usually around 2 inches by 2 inches) which would be too big to fit on a signature line.
- Additionally, all of the existing stamps we researched combine the ink pad with the indented stamp itself, which wouldn't work for a stamp as small as the kind we want as

the ink would probably clog up the smaller gaps between the squares and make the imprint illegible.

Research Sources

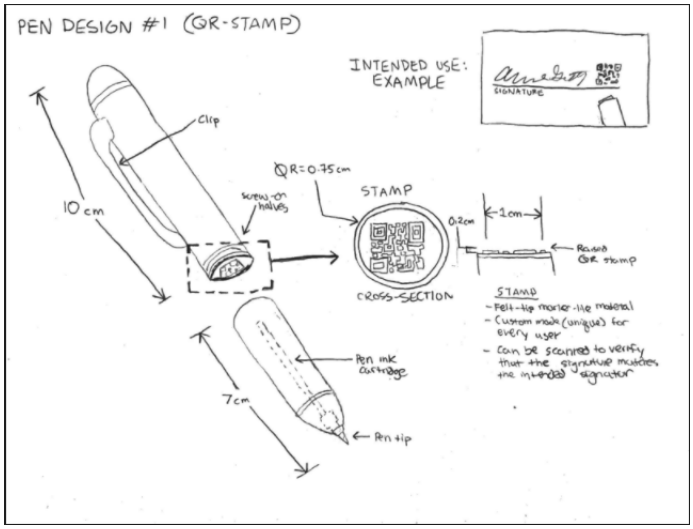
- “Facts + Statistics: Identity Theft and Cybercrime.” Insurance Information Institute, I.I.I, 2019, www.iii.org/fact-statistic/facts-statistics-identity-theft-and-cybercrime
- Amo, Tina. “How to Tell If a Signature Is Forged.” Bizfluent, Leaf Group Media, 11 Feb. 2019, bizfluent.com/how-7599353-tell-signature-forged
- Walker, Ben. “QR Codes Vs. Barcodes: Which Is Best for Asset Tracking and Inventory?” Itemit, 12 Feb. 2021, itemit.com/qr-codes-vs-barcodes-which-is-best.
- H, Katie. “The Best Pens for Your Writing Task.” Best Pens for Writing Anything - Notes, Checks & More | National Pen, National Pen, 27 Feb. 2020, www.pens.com/blog/the-best-pens-for-writing/
- Court, David. “How to Scan Codes with Your Smartphone.” Tech Advisor, 23 Apr. 2018, www.techadvisor.co.uk.

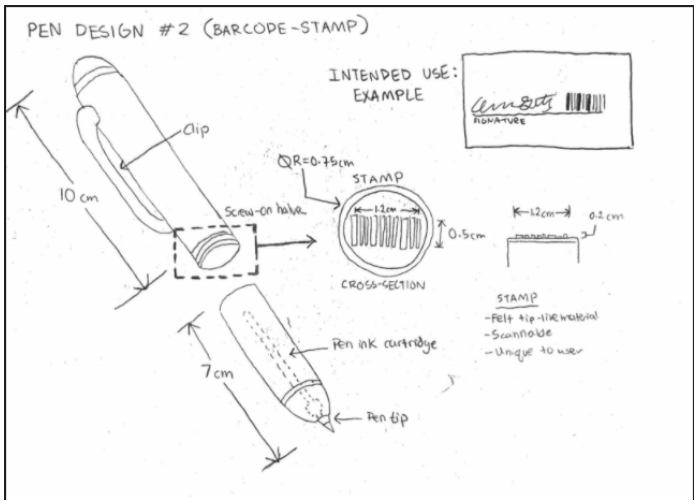
Originality

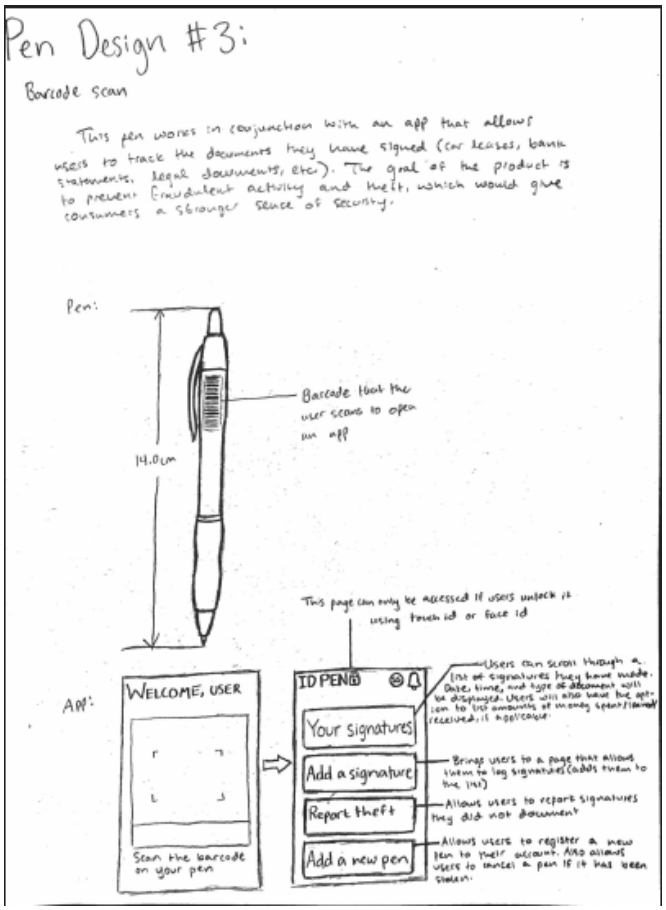
- From our research, we found some solutions to the problem of identity fraud.
    - However, most of the solutions were preventative measures rather than a product that specifically and effectively targets the problem. An example of this is a pen with fade and water-resistant ink. Though this can prevent fraud, it does not specifically target it.
    - Products like QR stamps exist, but they are not utilized for fraud prevention purposes.
    - Additionally, existing methods such as examining signatures or IDs visually are subject to human error and are not foolproof.

IDEATING

Sketches



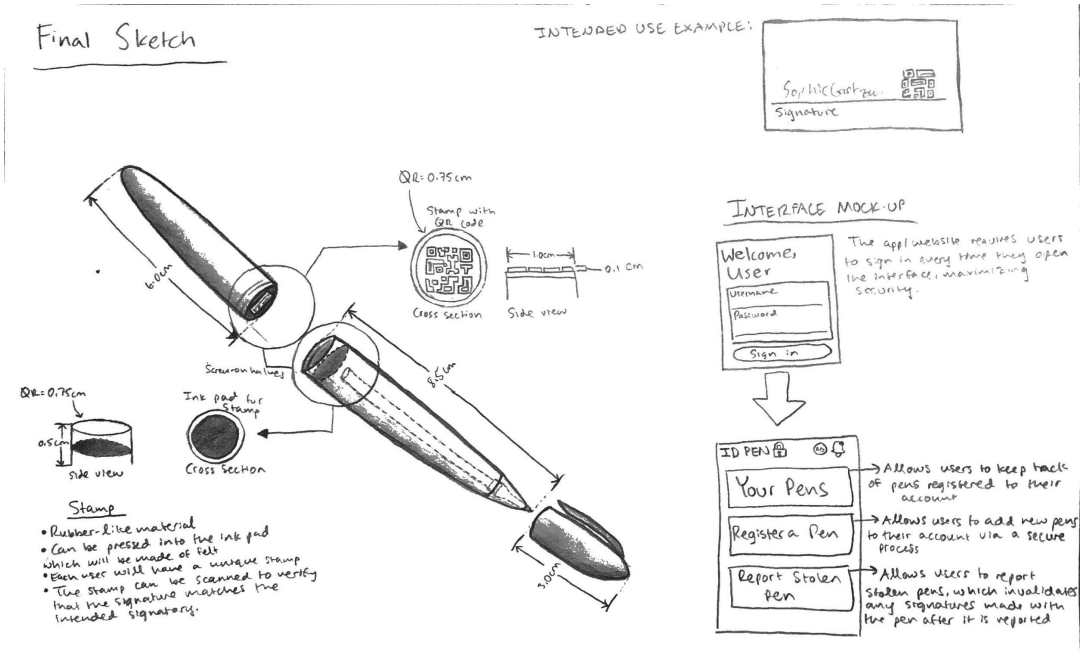




Decision Matrix

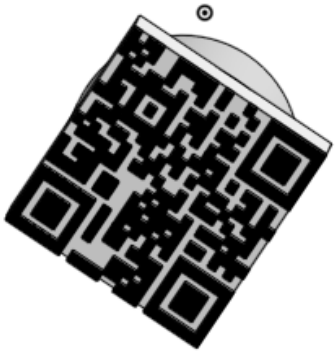
Decision Matrix						
Design	**Criterion 1**	**Criterion 2**	**Criterion 3**	**Criterion 4**	**Criterion 5**	**Total**
Pen #1	2	3	3	2	3	13
Pen #2	3	1	3	3	2	12
Graded using ranked grading, where ties round up to the highest place and 3 is the highest value						
Criterion 1:	Low consumer price (affordable)					
Criterion 2:	Product effectively creates verification net for signatures					
Criterion 3:	Compatible with app/external site to keep track of security information					
Criterion 4:	Manufacturing process (cost and simplicity)					
Criterion 5:	Focuses on third party versus signatory verification*					

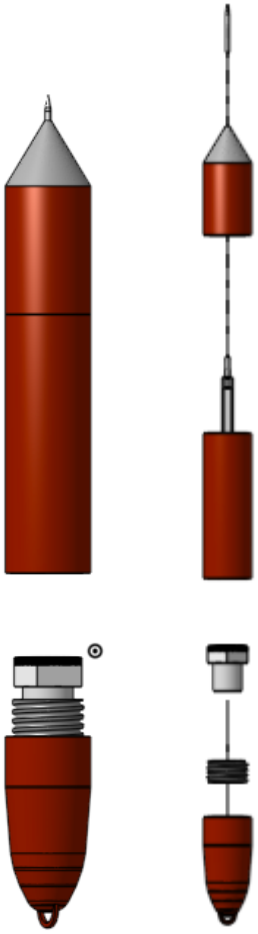
Final Sketch



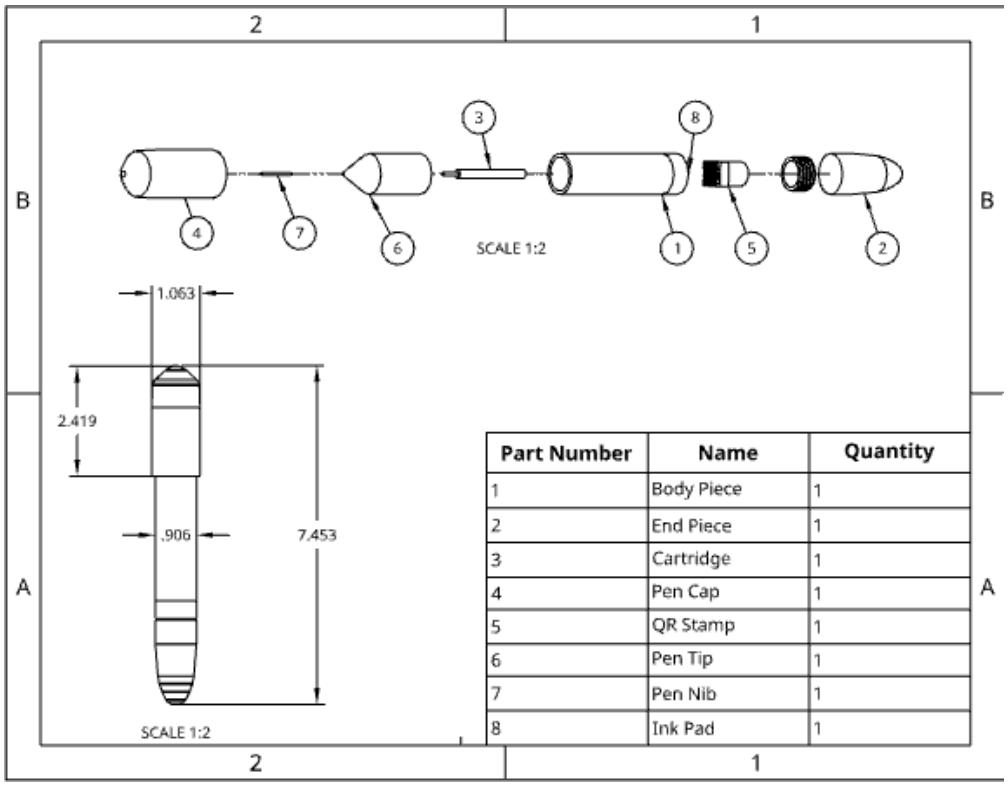
DESIGNING AND BUILDING

CAD Design:

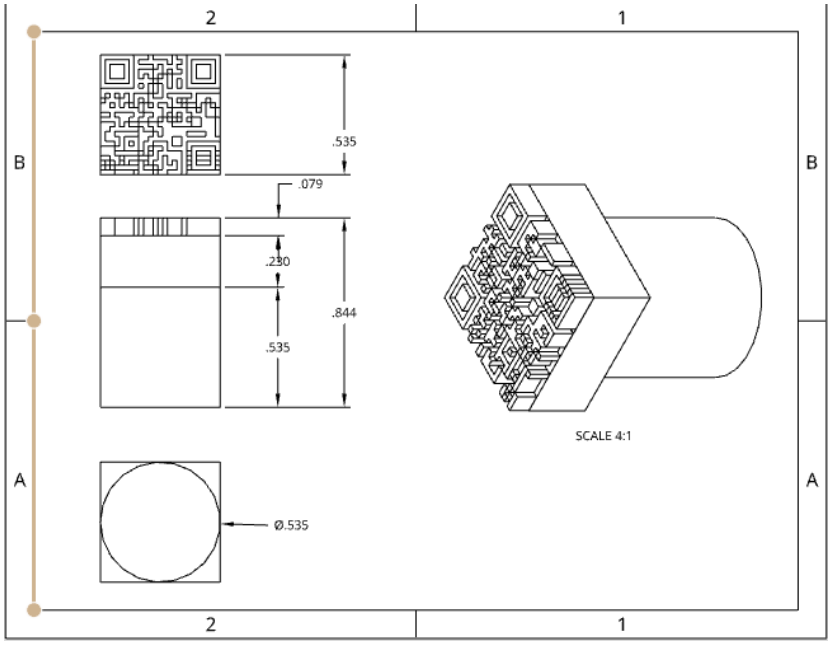




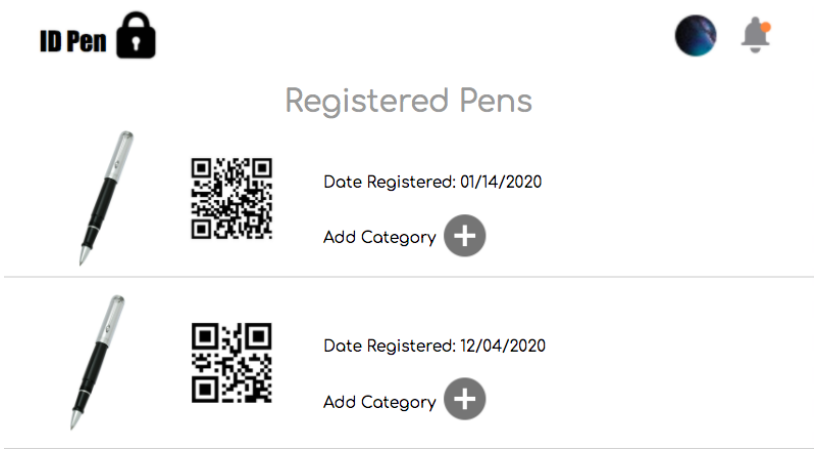
CAD Drawing Files



Part Number	Name	Quantity
1	Body Piece	1
2	End Piece	1
3	Cartridge	1
4	Pen Cap	1
5	QR Stamp	1
6	Pen Tip	1
7	Pen Nib	1
8	Ink Pad	1

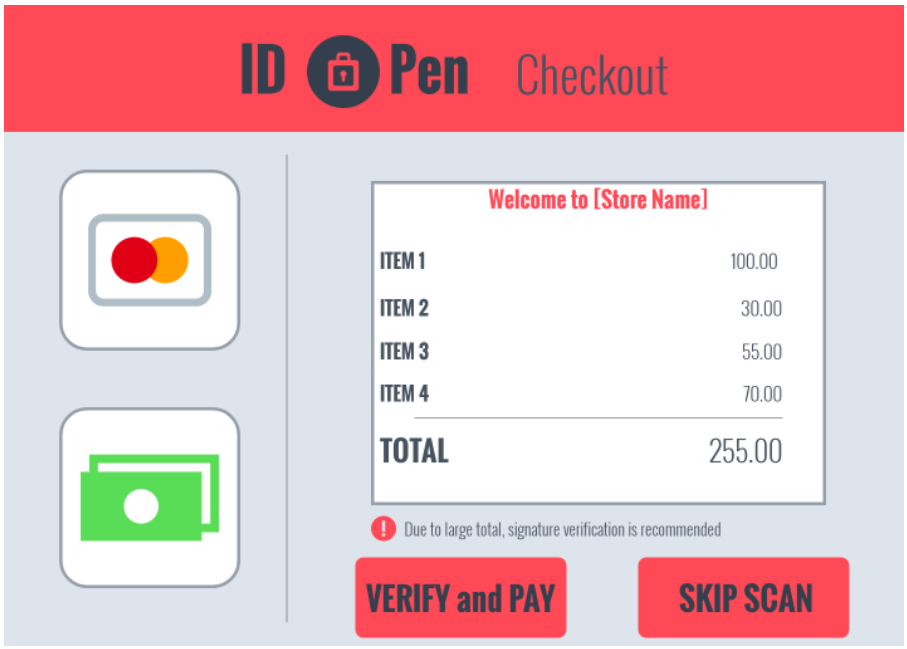


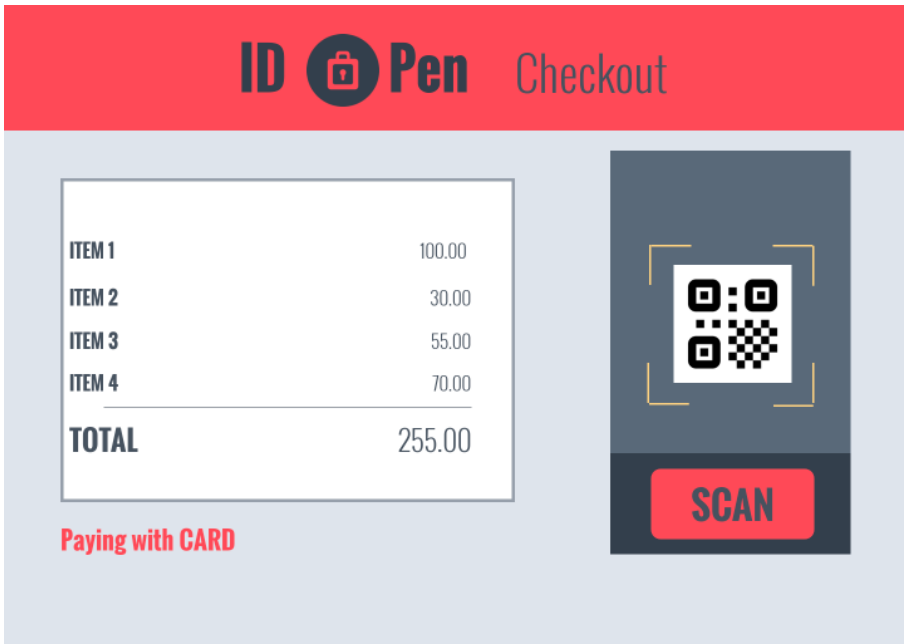
Working Illusion #1 Images

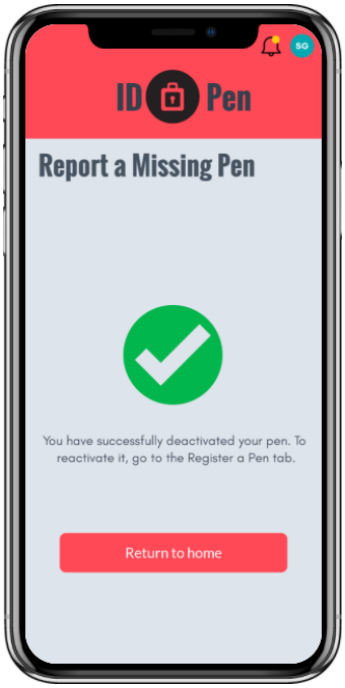


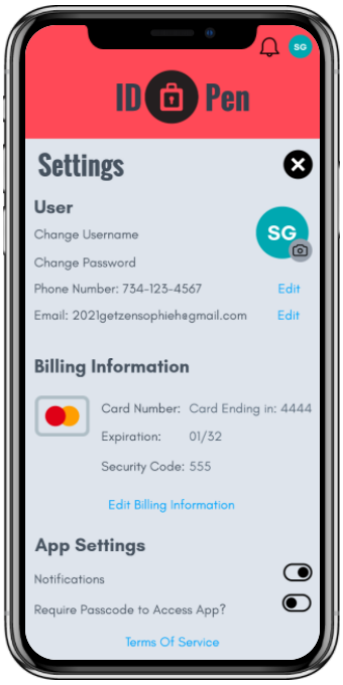
Working Illusion #2 Images

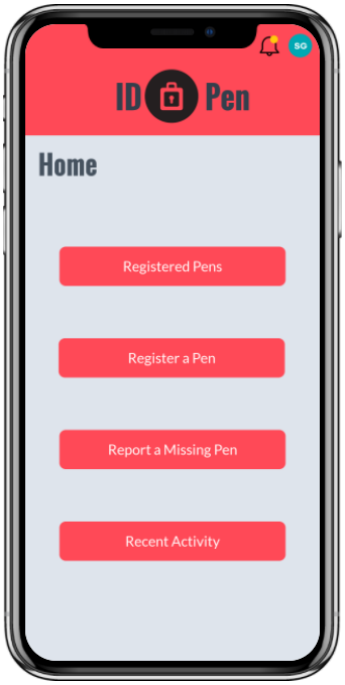
Prototype Mockup Images:

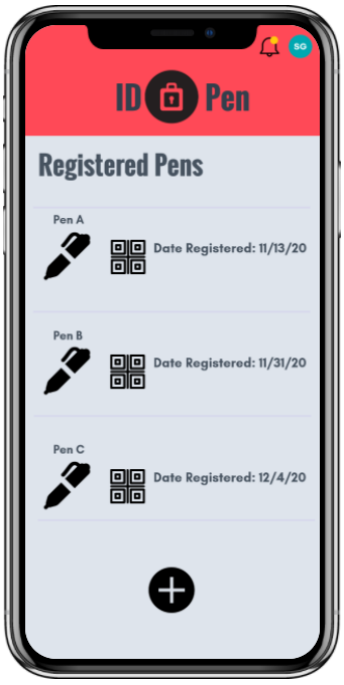


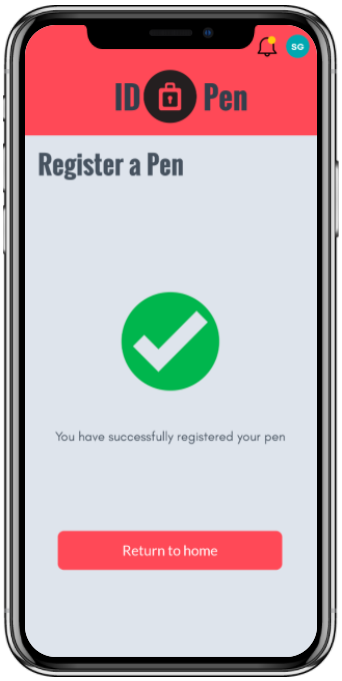



ID Pen
Report a Missing Pen
You have successfully deactivated your pen. To reactivate it, go to the Register a Pen tab.
Return to home


ID Pen
Settings
User
Change Username
Change Password
Phone Number: 734-123-4567 Edit
Email: 2021getzensophieh@gmail.com Edit
Billing Information
Card Number: Card Ending in: 4444
Expiration: 01/32
Security Code: 555
Edit Billing Information
App Settings
Notifications
Require Passcode to Access App?
Terms Of Service


ID Pen
Home
Registered Pens
Register a Pen
Report a Missing Pen
Recent Activity


ID Pen
Registered Pens
Pen A
Date Registered: 11/13/20
Pen B
Date Registered: 11/31/20
Pen C
Date Registered: 12/4/20


ID Pen
Register a Pen
You have successfully registered your pen
Return to home

TESTING AND REFINING

- In order to test our design, we tested the stamp and attempted to scan the QR codes it created.
- We found that the stamp was inconsistent, as smudges or ink dripping made for unreadable QR codes on paper.
- This was likely due to the small size of the stamp, which made it hard for a 3D printer to precisely map out the bits of the code.

Stamp Trial Scans										
Trial	1	2	3	4	5	6	7	8	9	10
QR Code Scanned?	No	No	No	No	No	No	No	No	No	No

Modified Prototype Pen Images:

INVENTION IMPACT

Value Proposition

The pen would be bought by consumers who wish to protect their identity when making purchases, and the digital part would be used by businesses and various agencies so that they can verify buyer identity, as well as users to create unique identifiers.

While there are some verification methods that already exist, like handwritten signatures or IDs, the QR scan would allow for a much more convenient process that is less susceptible to human error, as the scanner itself does all the actual identifying.

This would make our product much more appealing than existing solutions, as there are no consumer products that work to identify purchase fraud in real time as transactions are being made.

Market Potential

Our product would likely appeal to consumers because it addresses the common issue of purchase fraud; in addition, it would be relatively inexpensive because the materials used (mostly PLA plastic) are cheap.

We believe that there is a large market for a device that could help prevent identity fraud in real time, as over 2 million consumer complaints are filed every year and over 4 million people use some sort of Identity Protection Plan.

Social Value

This product would prevent fraud and theft, especially with large transactions, saving both consumers and businesses money.

The product is also minimal in material use and is meant to be used indefinitely, so it is not environmentally straining.

However, if our product became more widespread, it could become something that people have to carry with them (like a wallet, car keys, ID, etc) which would be inconvenient for some.