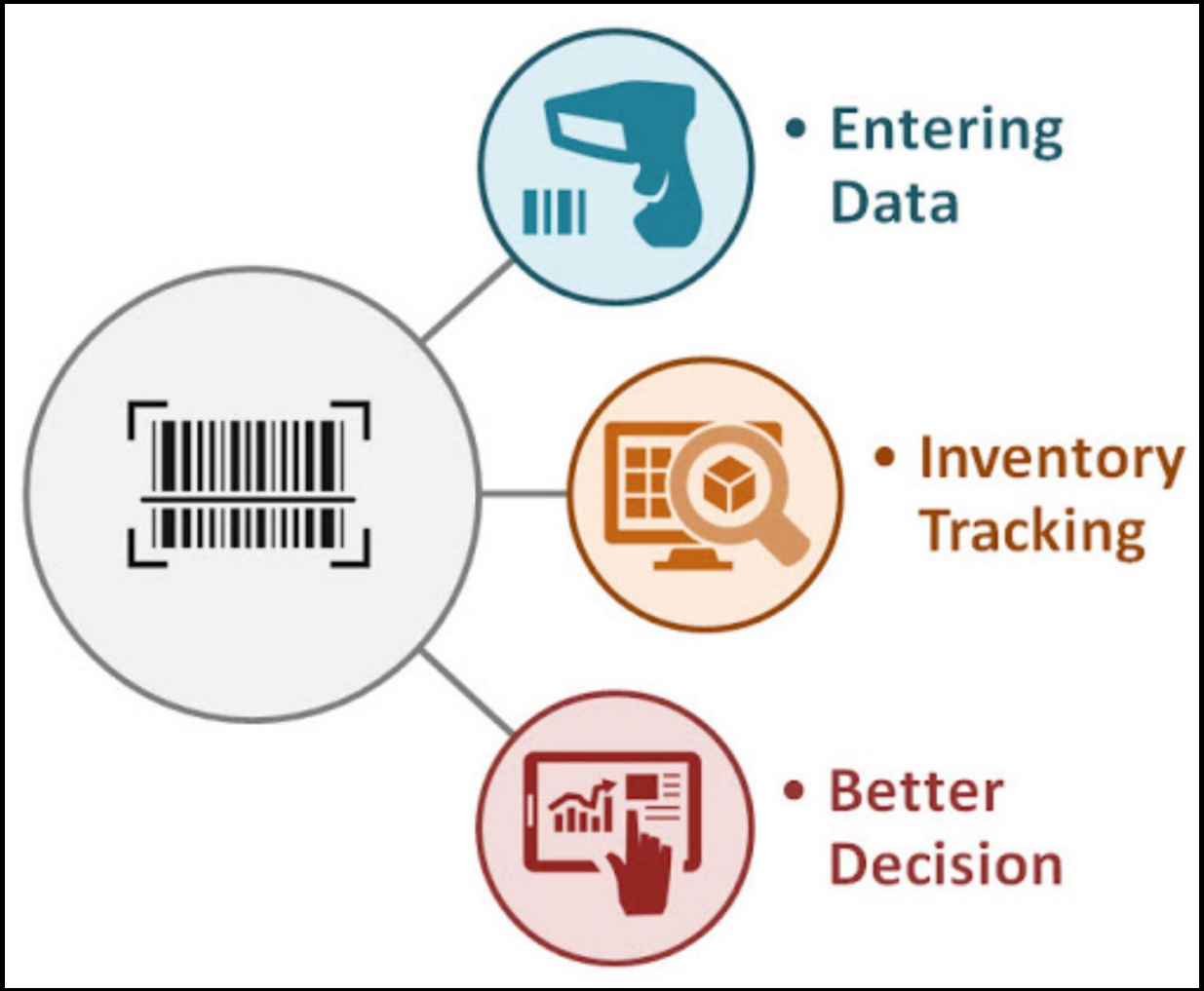
Gaspar Dantas
Sonu Thummar
Justin Rehg
Lody Morillo

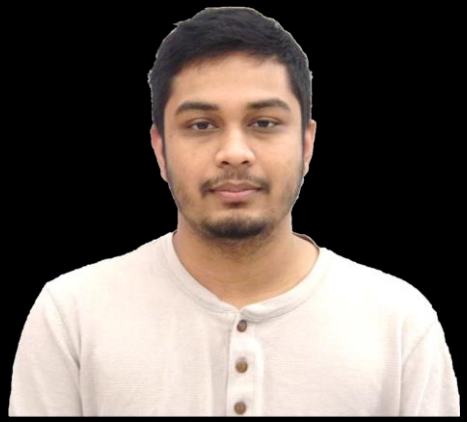
Group 24



Automated Inventory Tracking System

UCF

Meet the SW Team



Sonu Thummar
CpE - SW

Gaspar Dantas
CpE - SW

UCF

- Reduce waste within households
- Allow users to manage day-to-day shopping
- Visibility of active products in the inventory
- Reducing cost of grocery purchases
- Minimizing time expenditure creating grocery lists

Why AITS?

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- User friendly interface
- Reusability across platforms
- Notification systems
- Bluetooth connection for SW – HW communication
- Lightweight HW Design

Project Goals

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Index	Requirement
1	The software should be able to store items from the inventory in a database
2	The software should have an API service to retrieve product details.
3	The software should be able to insert records directly from the scan and allow users to add inventory items.
4	The software should be able to delete the data
5	The software should be able to link to the scanner through bluetooth
6	The software should be able to send notifications to the user regarding item expiration date
7	The software should allow the user to add/remove expiration dates through datetime pickers
8	The application should be reusable across different platforms

SW Requirements

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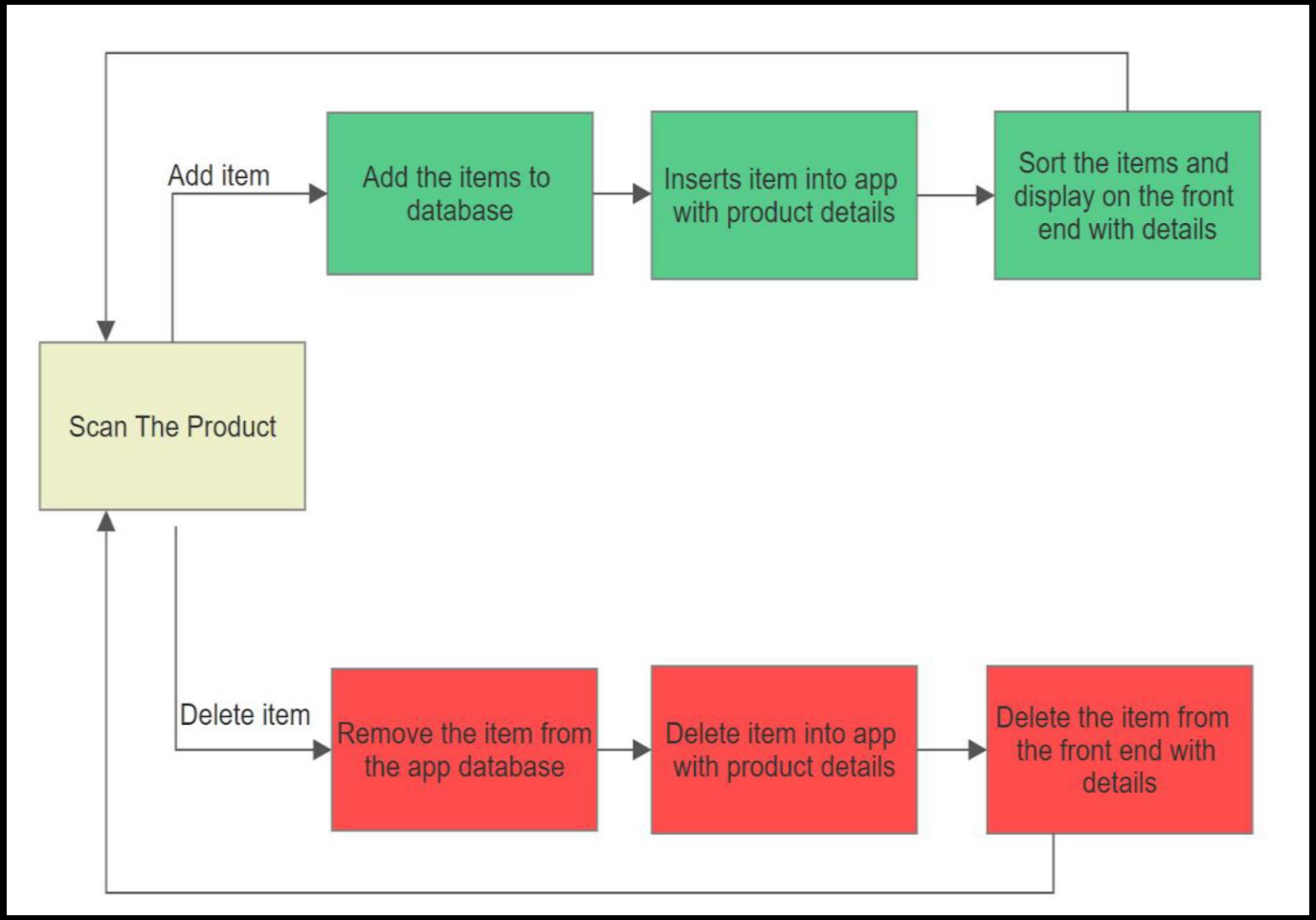

General Workflow

Technologies

- Platform independent
- Custom, animated UI support
- Ability to simulate/test on different devices while maintaining scalability
- Extensive Bluetooth libraries
- Widget based development
- Similar performance to native apps

Flutter

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- Clean Code
- Generic Programming
- Event Based Data Model
- Easy to debug
- Business logic oriented

Framework

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Software Architecture

businessmodels
- product
  - product_businessmodel.dart
  - product_provider.dart

datamodels
- product
  - product_dao.dart
  - product_datamodel.dart

features
- main_inventory
  - main_inventory_bloc.dart
  - main_inventory_blocevent.dar
  - main_inventory_presenter.dar
  - main_inventory_view.dart
  - main_inventory_viewevents.da
  - main_inventory_viewmodel.da
- manage_item
  - manage_item_bloc.dart
  - manage_item_blocevent.dart
  - manage_item_presenter.dart
  - manage_item_view.dart
  - manage_item_viewevents.dart
  - manage_item_viewmodel.dart

framework
- bloc.dart
- blocevent.dart
- businessmodel.dar
- codemessage.dart
- dao.dart
- dao_faunadb.dart
- datamodel.dart
- model.dart
- pipe.dart
- presenter.dart
- provider.dart
- view.dart
- viewevents.dart
- viewmodel.dart

main.dart

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- User Table – ID and email
- Product Table – ID, Name, Measure, Expiration, UPC and UserID
- User Table ID (PK) → UserID (FK)
- Fauna DB

Database

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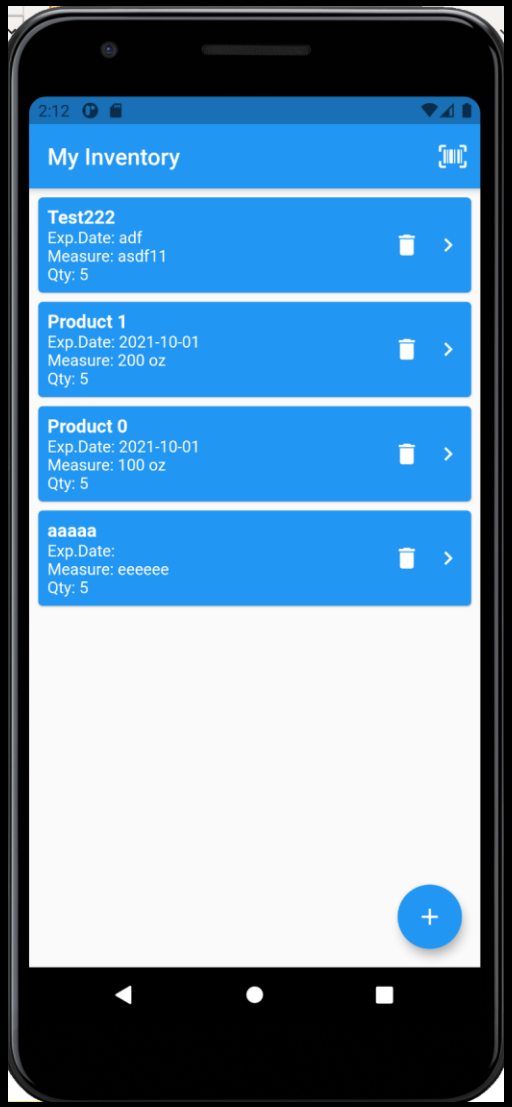
User Interface

Main Inventory



Edit Item

API

nutritionix API

API v1.1 Quickstart - UPC Scanning

Submit a UPC, and we return back nutrition data. Over 220,000 UPCs currently supported! In this example, we used UPC **49000036756** (2 Liter Bottle of Cherry Coke)

GET Request:

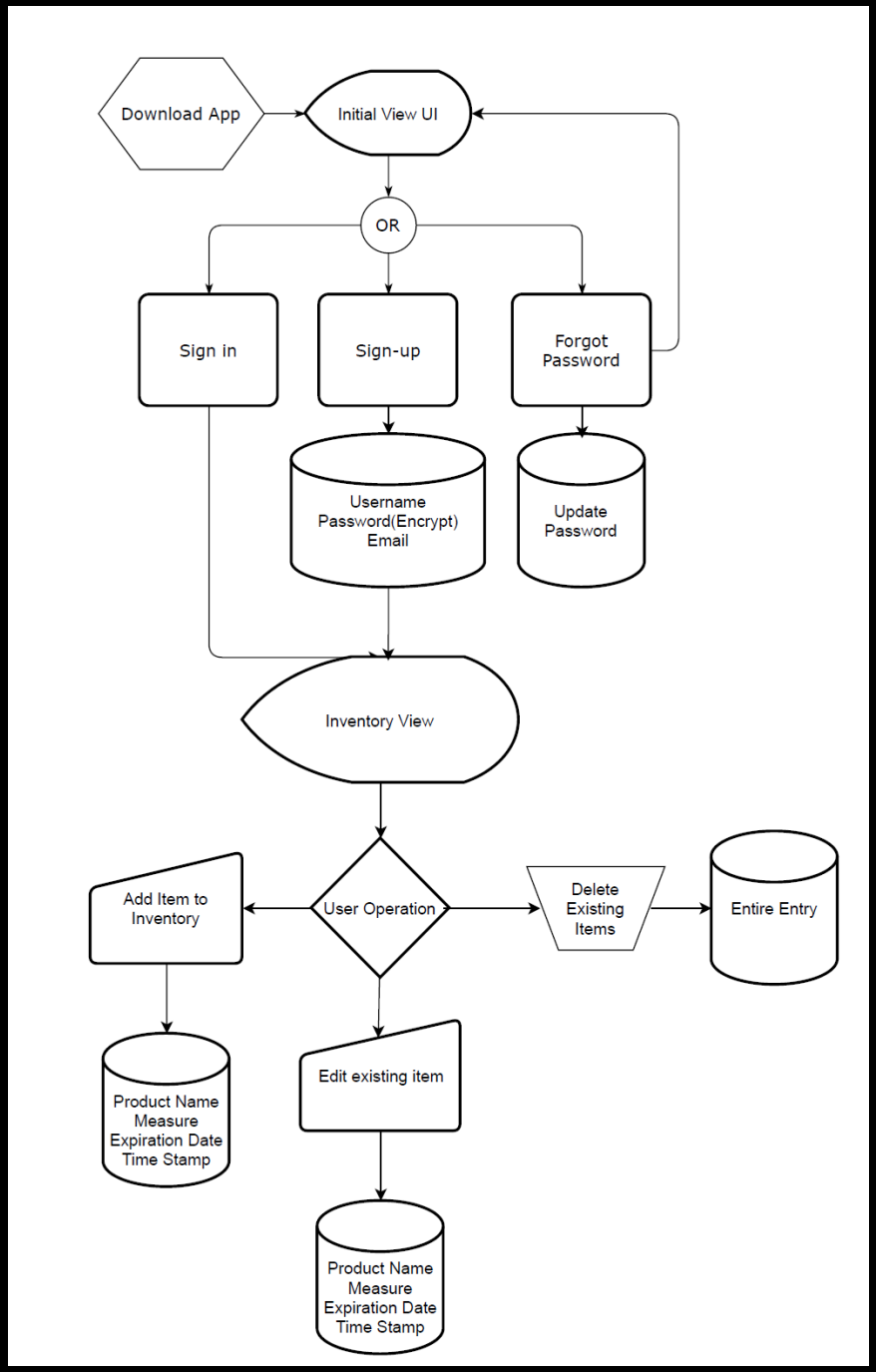
```
https://api.nutritionix.com/v1_1/item?upc=49000036756&appId=[YOURID]&appKey=[YOURKEY]
```

Response:

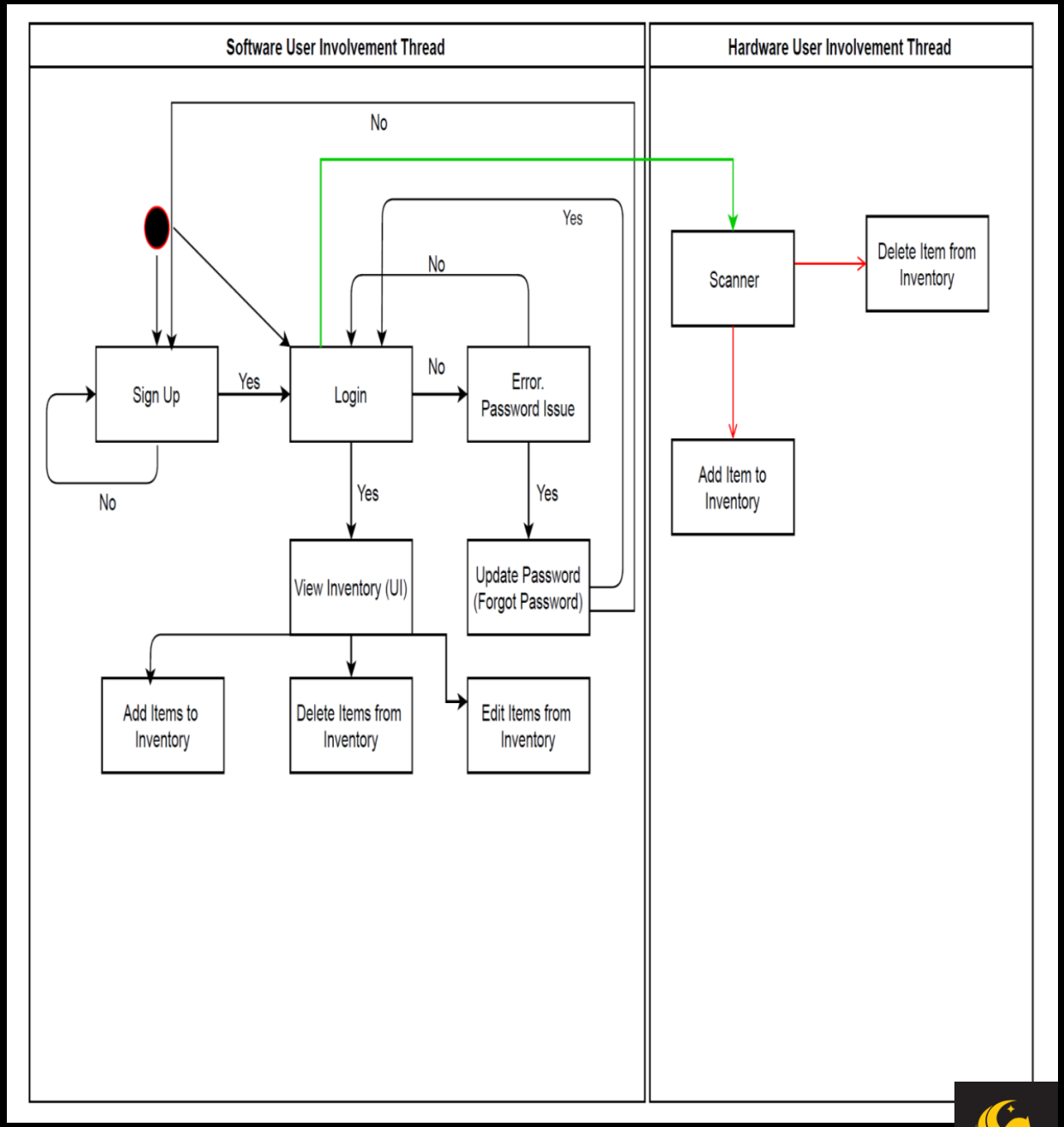

```
{
   "item_id": "51c3d78797c3e6d8d3b546cf",
   "item_name": "Cola, Cherry",
   "brand_id": "51db3801176fe9790a89ae0b",
   "brand_name": "Coke",
   "item_description": "Cherry",
   "updated_at": "2013-07-09T00:00:46.000Z",
   "nf_ingredient_statement": "Carbonated Water, High Fructose Corn Syrup and/or Sucrose, Caram
el Color, Phosphoric Acid, Natural Flavors, Caffeine.",
   "nf_calories": 100,
   "nf_calories_from_fat": 0,
   "nf_total_fat": 0,
   "nf_saturated_fat": null,
   "nf_cholesterol": null,
   "nf_sodium": 25,
   "nf_total_carbohydrate": 28,
   "nf_dietary_fiber": null,
   "nf_sugars": 28,
   "nf_protein": 0,
   "nf_vitamin_a_dv": 0,
   "nf_vitamin_c_dv": 0,
   "nf_calcium_dv": 0,
   "nf_iron_dv": 0,
   "nf_servings_per_container": 6,
   "nf_serving_size_qty": 8,
   "nf_serving_size_unit": "fl oz",
}
```

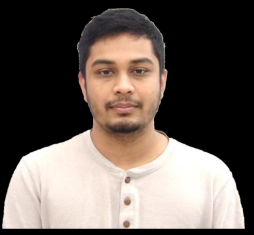

UCF

Flowchart


Download App
Initial View UI
OR
Sign in
Sign-up
Forgot Password
Username
Password(Encrypt)
Email
Update Password
Inventory View
Add Item to Inventory
User Operation
Delete Existing Items
Entire Entry
Product Name
Measure
Expiration Date
Time Stamp
Edit existing item
Product Name
Measure
Expiration Date
Time Stamp

Activity Diagram





- Push notifications are sent on the phone
- Notifications based on expiration date (1 week, 1 day prior)
- Item expired notifications

Alerts/Notifications

- Scanner captures UPC and sends to board
- Board configures UPC and scan in/scan out bit as an array
- Array is sent to phone via Bluetooth (captured via listeners)

SW – HW Integration

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- Login Functionality
- Reconfigure UI to Fauna datatypes
- Alerts
- Finish Bluetooth integration with HW

Pending SW Objectives

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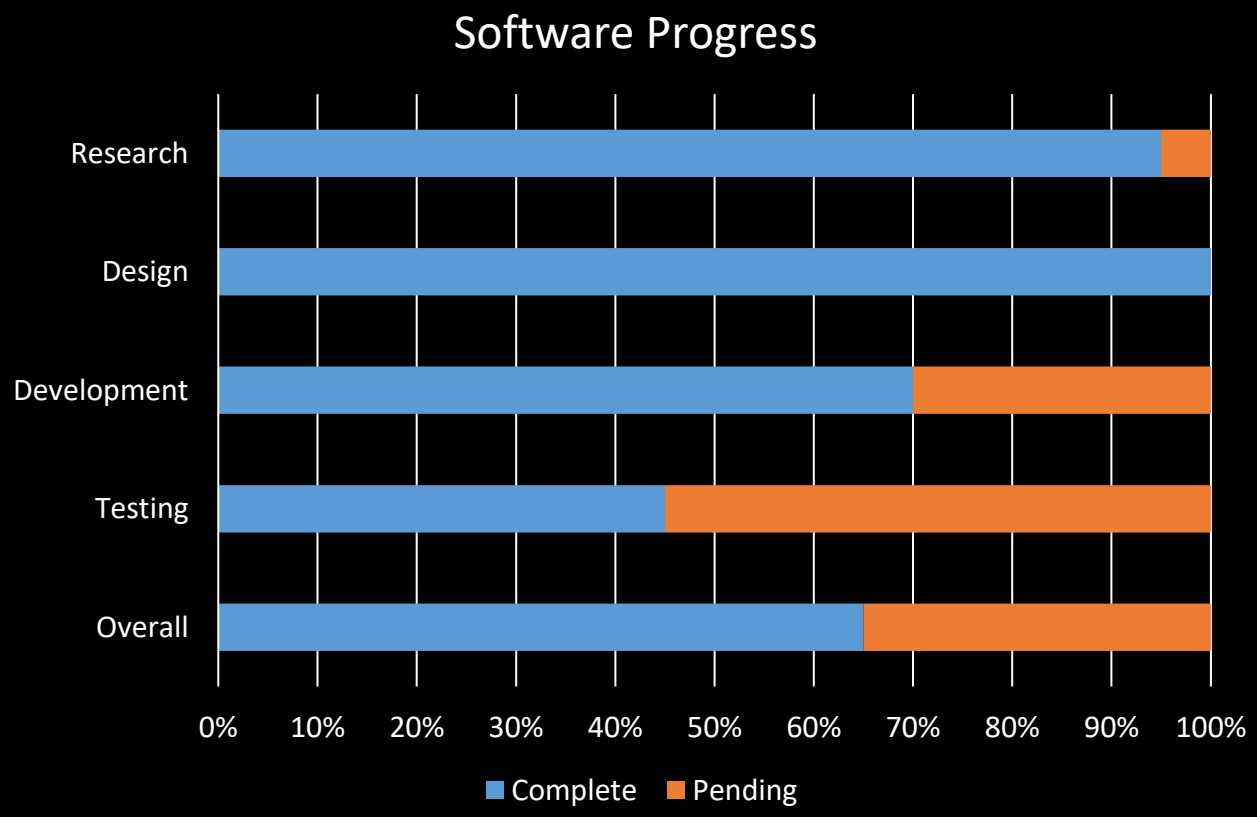


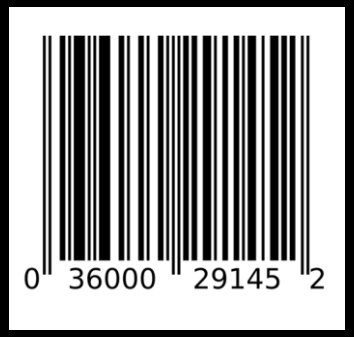
SW Current Progress

UCF

Meet the HW Team

Justin Rehg
CpE - HW

Lody Morillo
EE - HW



UPC

QR

1 Dimensional	2 Dimensional
• Represented by lines in sequence, these lines represent numbers. • Most scanners can read 1D barcodes • Most products use a 1D barcode	• Can be represented in many different ways • Requires a specific scanner that can capture and process the image.

Barcodes

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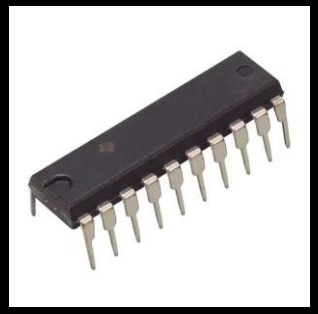
Feature	Description
Dimensions	Length: 2.7 inches Height: 6.3 inches Width: 3.5 inches
Internal CPU	32-bit
Scanning Modes	Manual Continuous
Connection Mode	Wired USB 2.0 Wireless USB 2.4 GHz
Price	$28.40

Tera Barcode Scanner

UCF



MSP430G2553IN20 Specifications	
Speed	16MHz
Storage	16KB
Low Supply-Voltage Range	1.8V to 3.6V
Power Consumption	230uA(Active) 0.5uA(Standby)
I/O pins	20
USCI	UART I2C Synchronous SPI
Operating Temp (°C)	-40 to 105
Price	$1.80 each

MSP430G2553IN20

UCF

- Change in framework.
  - From Native to Flutter
  - After finding out Native would not work for our needs.
- PCB Design mistake
  - We had a missing/incorrect component
  - Had to redesign the schematic

Challenges

UCF

Component	Price
Projected Budget	**$400**
Tera Scanner	$28.40
MSP430G2553 (x2)	$3.68
HC-05 Bluetooth Module(x2)	$15.98
MSP430G2ET Devkit	$15.00
Raspberry Pi Zero	$25.00
ASUS Tinkerboard	$89.49
Components	$27.89
Current Total	**$205.44**

Budget

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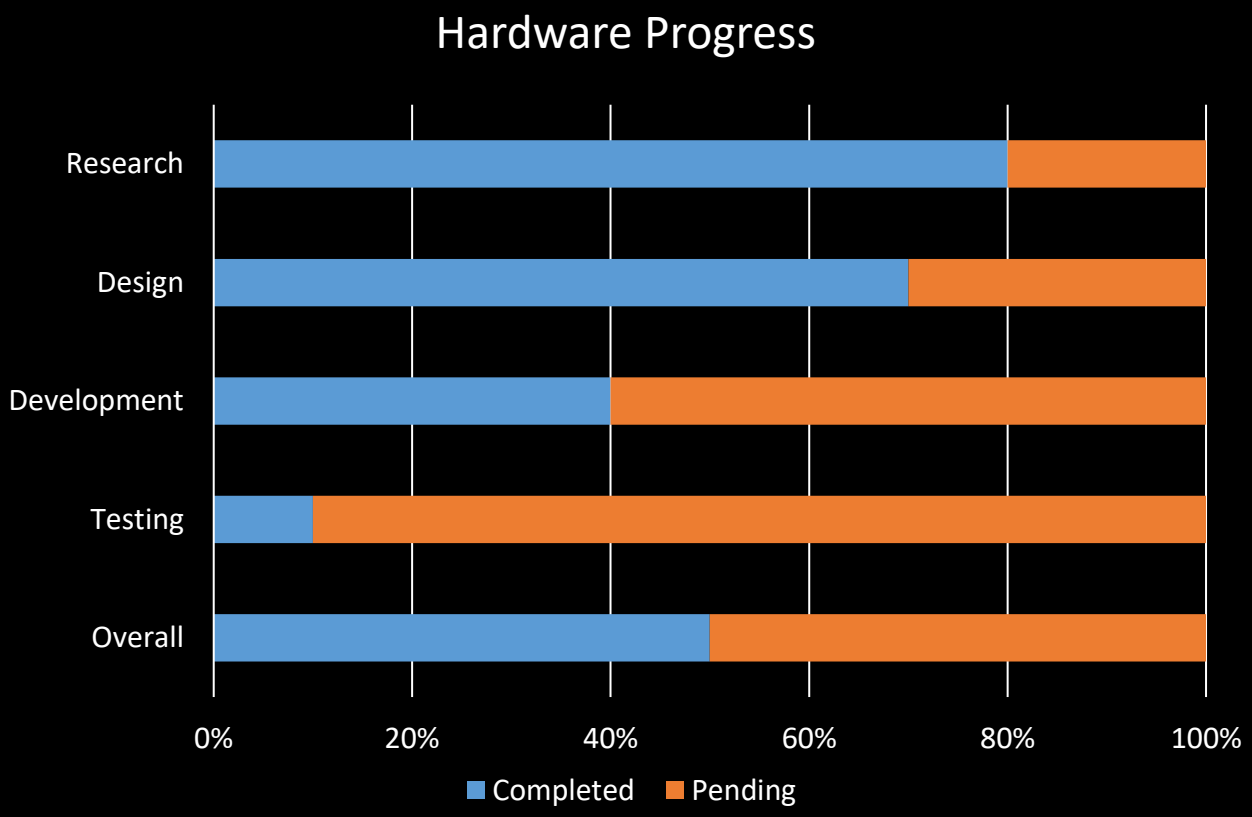


HW Current Progress

UCF

Usage of Components

- Bluetooth: Will be used for communication between Phone and Scanner
- USB 2.0 Port: Will be used to plug in the scanner to send information to the Bluetooth module to then send to the phone
- The LED lights
  - To show Bluetooth light is powered on
  - To show an item has been scanned in
  - To show an item has been scanned out
- Microcontroller: Will be programmed to take data from the scanner and sends it to the phone via bluetooth
- Switch: Will turn the PCB on/off

HW Current Progress

UCF

PCB Components Price List

1. 6 Pin Headers ($1.32 each)
   - 1 st 65935-0635 will be used to hold the Bluetooth module
   - 2nd 65935-0635 will be used to hold the slide switch
1. LED (Pack of 5, each color for $3.95)
   - LED1
   - LED2
   - LED3
1. Microcontroller ($2.48)
   - MSP430G2553IN20
1. USB-A (Pack of 5 for $2.95)
2. Bluetooth ($7.99)

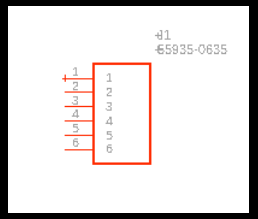
Total: $27.91

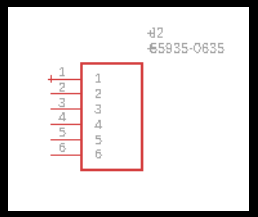
HW Current Progress

UCF

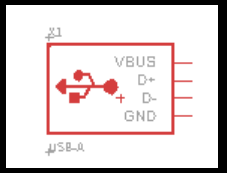
Type of Components Used on PCB

1. 6 Pin Headers (componentsearchengine.com)
   - 1 st 65935-0635 will be used to hold the Bluetooth module
   - 2nd 65935-0635 will be used to hold the slide switch

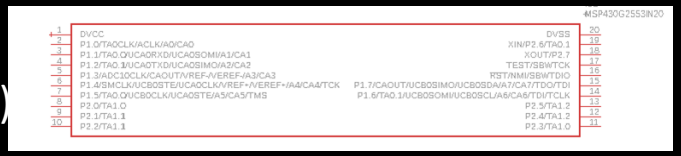




1. LED (github.com/adafruit/Adafruit-Eagle-Library)
   - LED1
   - LED2
   - LED3



1. Microcontroller (ultralibrarian.com)
   - MSP430G2553IN20



HW Current Progress

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LEDs

- Brand: Adafruit
  - connect directly to a digital I/O pin of a microcontroller to turn on and off.
  - Simply connect 3 to 6VDC to the + pin and ground to the - pin
  - 5 Ruby Red, Warm White, and Royal Blue "1206 size" LEDs, matched with a 100 ohm resistor
  - 4mm x 9mm / .16" x .35"
  - 2mm thick
  - Holes are 7mm / .28" apart

HW Current Progress

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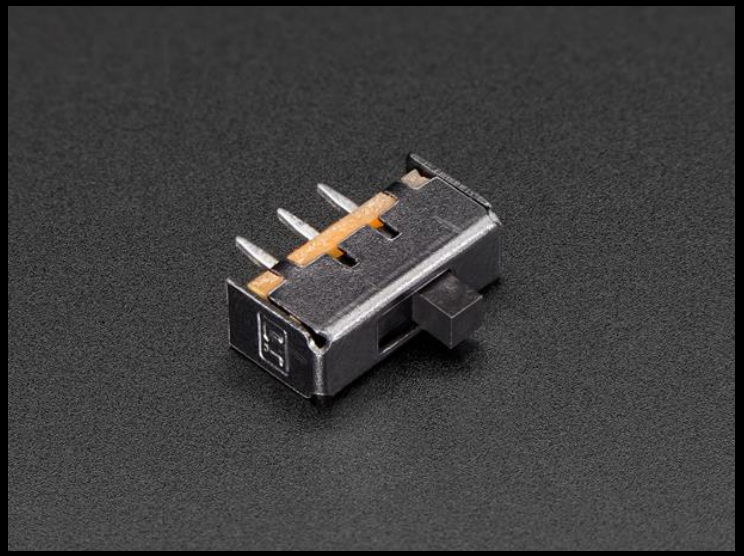
Slide Switch

•Brand: Adafruit

- Work great as on/off switches or selector switches
- They have 0.1" spacing and snap in nicely into a solderless breadboard.
- Weight: .33g



HW Current Progress

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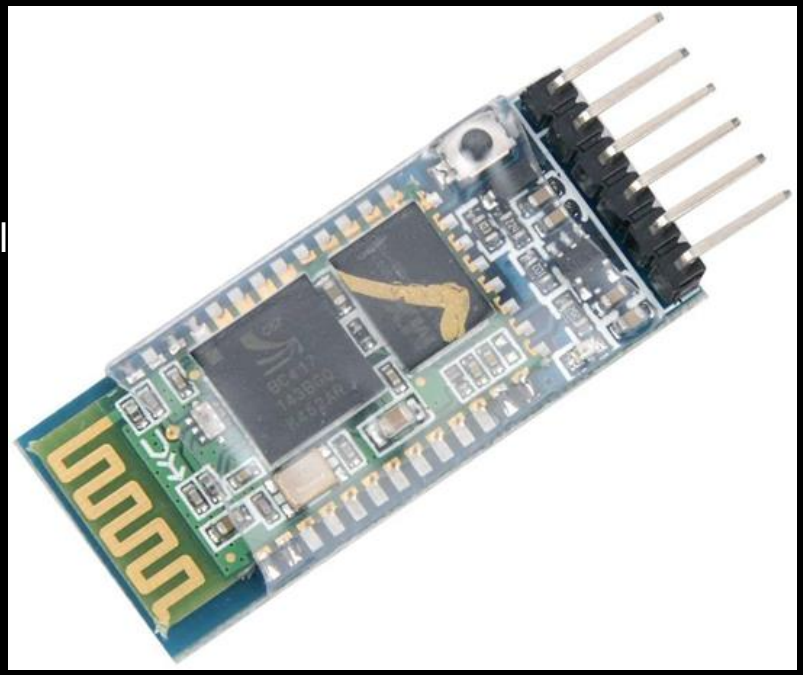
Bluetooth

•Brand: HiLetgo

- Connects to other Bluetooth 2.0 devices
- Easy to install on to PCB and will be used control information from phone to PCB and vise versa
- Working Voltage 3.6V to 6V
- Size: 37.3mm (Long) *15.5mm (wide)
- Weight: 3.5 grams



HW Current Progress

UCF