

ENSC 305W/440 DEMO



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Shaihryar Khan

Jashan Dhaliwal

PRESENTATION OVERVIEW

1. The Shop Smart Team
2. What is Shop Smart?
3. Main Functionalities
4. System Overview
5. Hardware Components
6. Software Components
7. Materials
8. Market & Competition
9. Cost Analysis & Budget
10. Schedule
11. Future Work

THE TEAM



Jashan Dhaliwal
Chief Communications Officer



Zargham Amer
Chief Executive Officer



Manpreet Singh
Chief Operations Officer



Shaihryar Khan
Chief Technical Officer



Yasamin Houshmand
Chief Financial Officer

WHAT IS SHOP SMART?



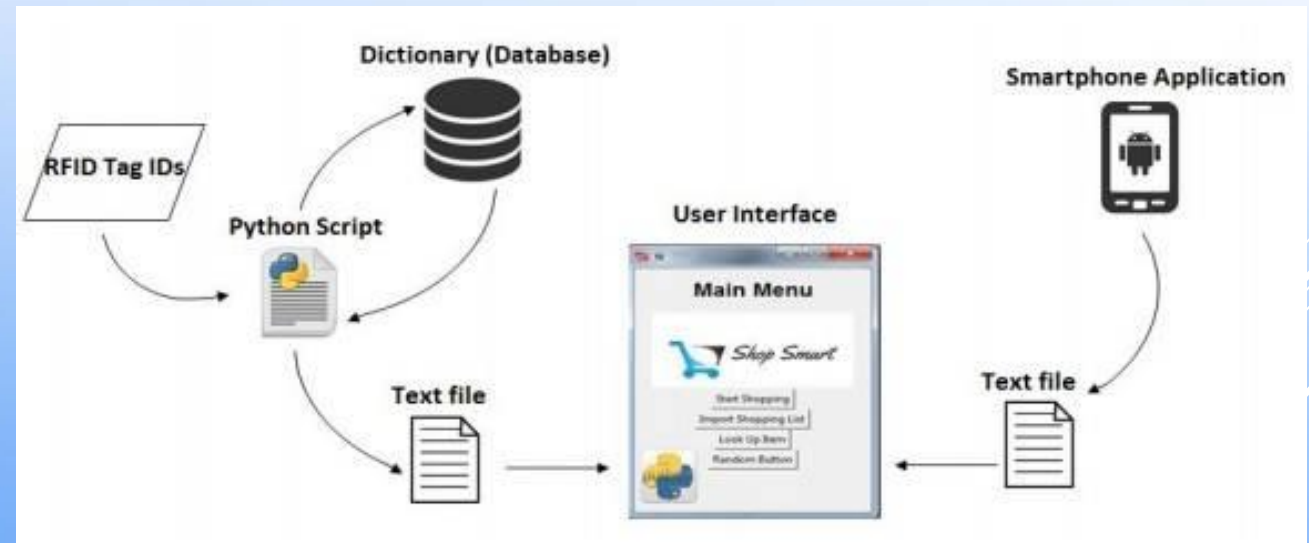
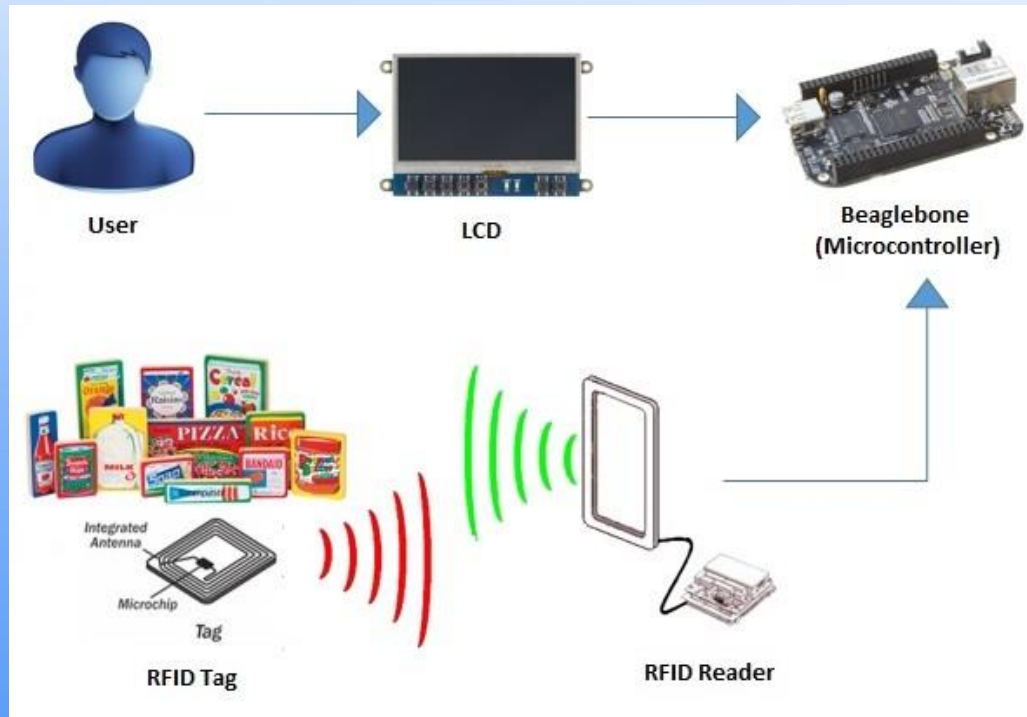
https://www.youtube.com/watch?v=wCFeeff_cwM&feature=youtu.be&ab_channel=MoatazBillehMednini

MAIN FUNCTIONALITIES



- RFID item tracking and scanning
- On-cart budget and shopping list tracking
- In store item locator
- Item browsing with the android application
- Shopping list creation with the android application
- Shopping list transfer from android application onto GUI
- On-cart self-checkout option

SYSTEM OVERVIEW

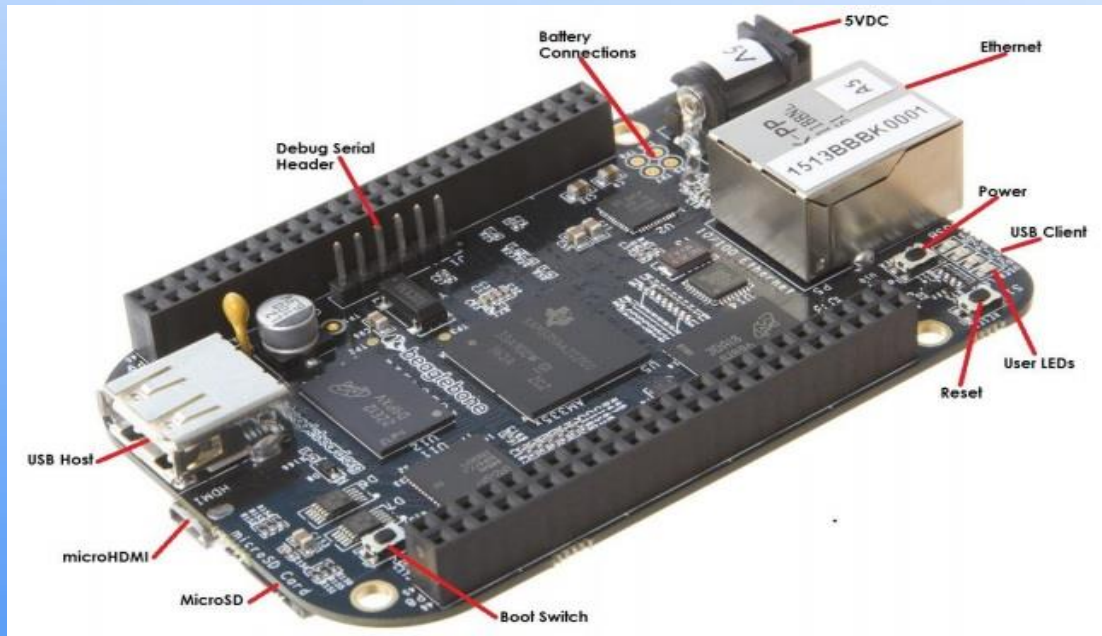


High Level System Overview [2] [3] [4] [5]

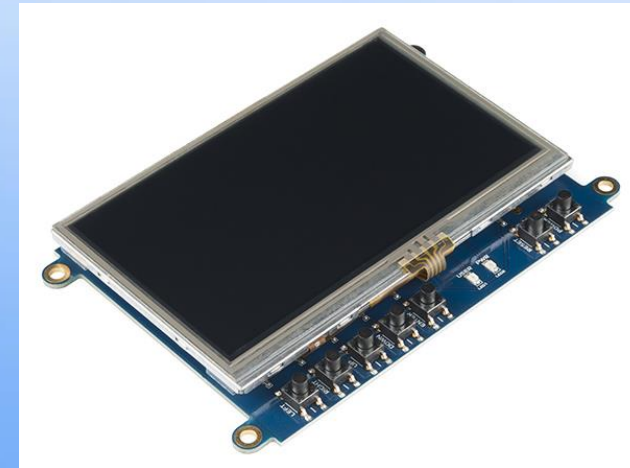
HARDWARE COMPONENTS

1. BeagleBone Black Board
2. LCD Cape
3. RFID Tags
4. RFID Reader
5. WiFi Module

BEAGLEBONE BLACK BOARD & LCD CAPE



BeagleBone Black Board Rev C [6]

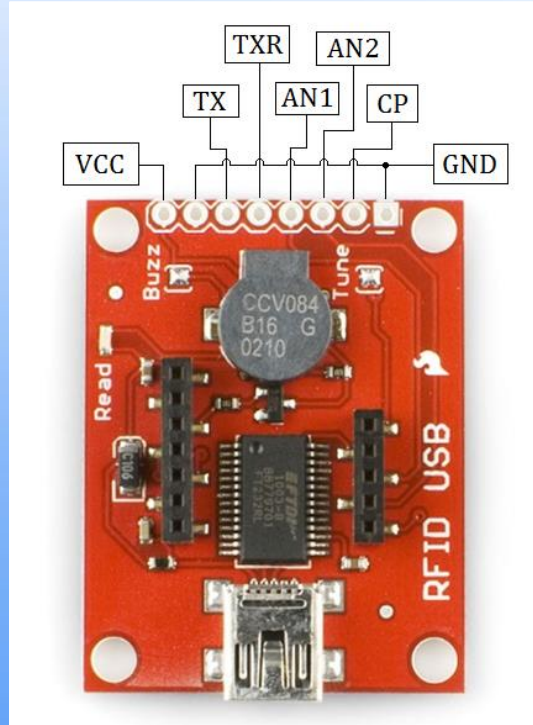


4.3" LCD Cape [7]

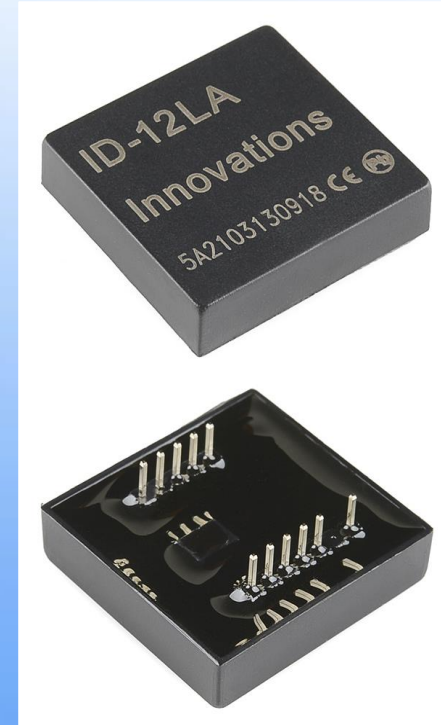
RFID TAGS & RFID READER



L-Link 125kHz RFID Tags [8]



SparkFun RFID Reader Layout with Labeled Parts [9]

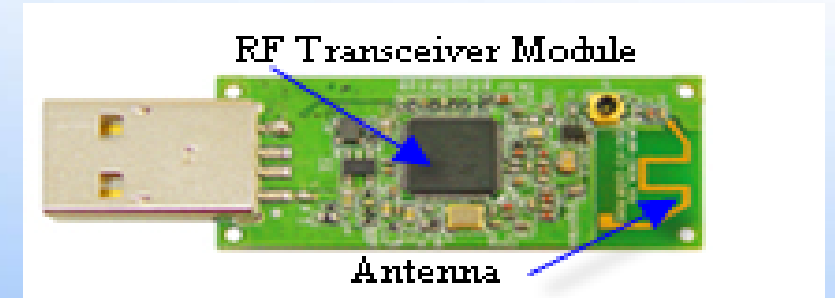


ID-12LA RFID Reader [9]

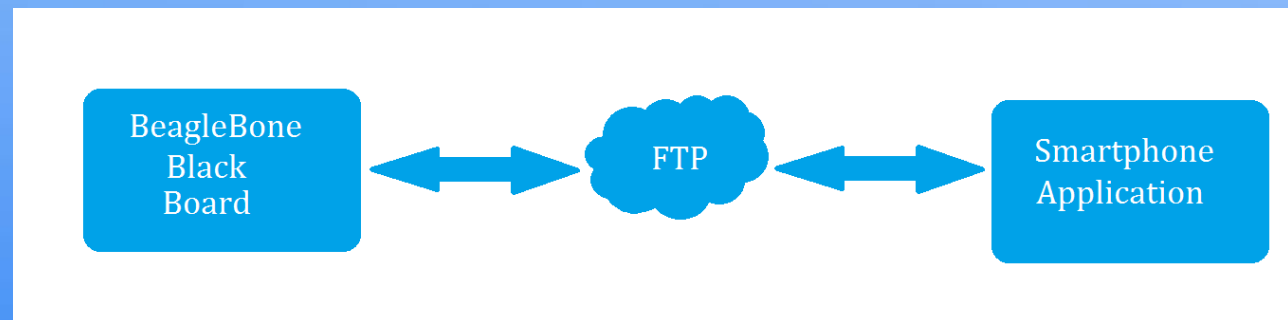
WIFI MODULE



Tenda W311MI WiFi Module [10]



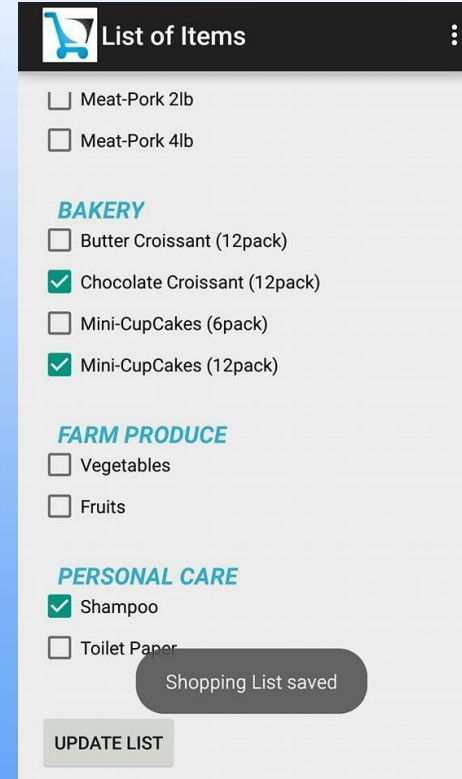
USB Adapter WiFi PCB [11]



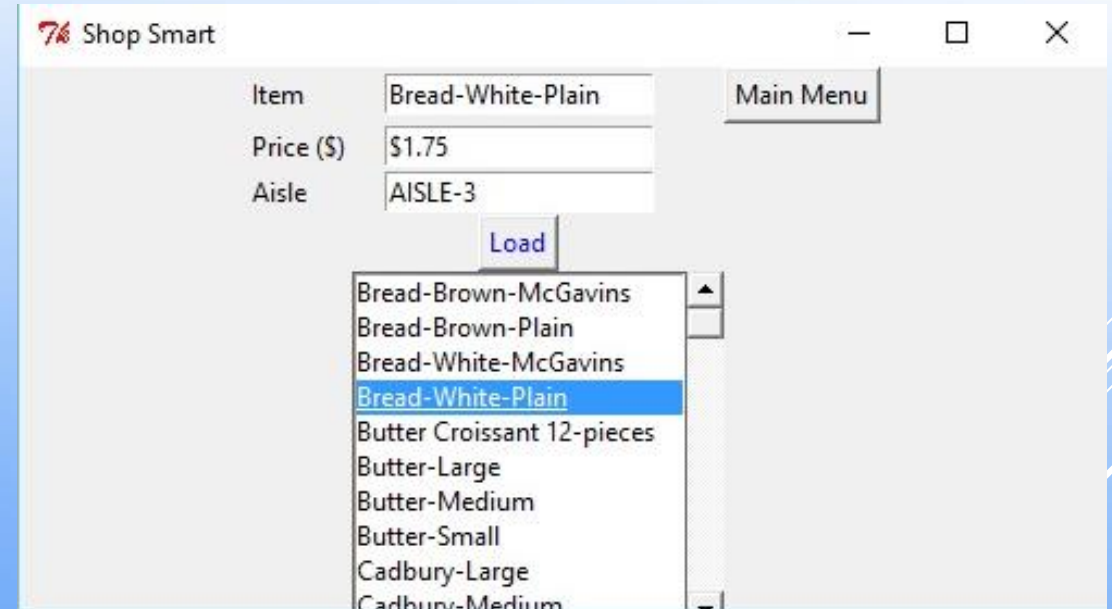
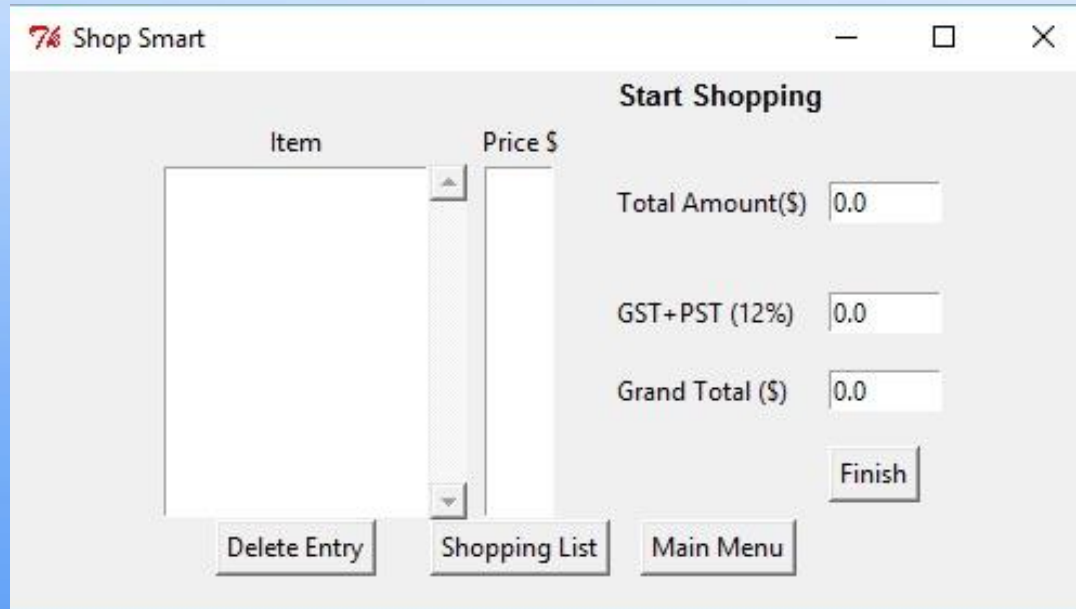
SOFTWARE COMPONENTS

1. Android Application
2. Graphical User Interface (GUI)

ANDROID APPLICATION

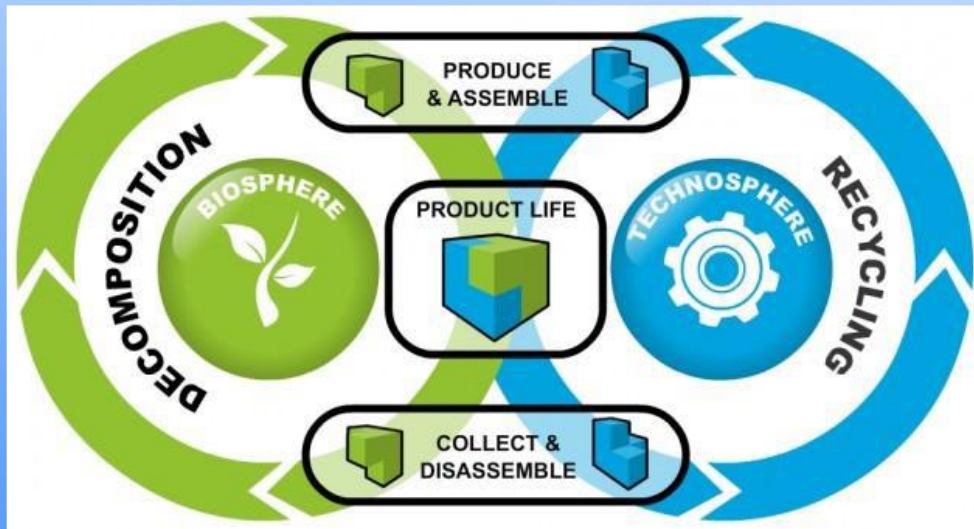


GUI APPLICATION



MATERIALS USED

Goal: Zero Waste & Cradle-to-Cradle



Cradle-to-Cradle Life Cycle [12]

Component	Materials
Shopping Cart	Alloy, Nylon
BeagleBone Board	PCB, Silicone
RFID Reader	Alloy, PCB, Silicone
RFID Tags	IC, Metal, Plastic
WiFi Module	Alloy, PCB, Silicone
Enclosure	ABS Plastic
Battery	Lithium-Ion

MARKET & COMPETITION

- ❖ Multi-billion dollar industry
- ❖ Competitors: Aisle411, IBM Smart Shopping Cart, ShopLite Solutions
 - How do we differ?



IBM Smart Shopping Cart [1]

BUDGET

Estimated

Beaglebone Black	\$87.05
LCD 4.3"	\$72.53
2 RFID Readers	\$113.52 *2 = \$227.04
RFID Tags	\$84.70
Shopping Cart + installation components	\$200
Antenna Design + PCB	\$300
Shipping and Customs Costs	\$360
Sub-Total	\$1331.32
Unexpected Costs and Expenses (Sub-Total * 15%)	\$199.70
Total Cost	\$1531.02

Actual

LF Passive RFID Desktop Reader/Writer	\$200.19
RFID Tags	\$170.50
SparkFun RFID Reader Starter Kit	\$122.75
Beaglebone Black – Rev C	\$72.53
Beaglebone Black Cape – LCD 4.3"	\$87.05
WiFi Module	\$22.40
Battery	\$22.40
RFID and BeagleBone Enclosures	\$50.45
Enclosure Cut-out	\$67.20
Assembly Tools	\$48.12
Total Cost	\$863.59
ESSEF Funding	-\$500.00
Out of Pocket Expenses per Person	\$72.72

COST ANALYSIS

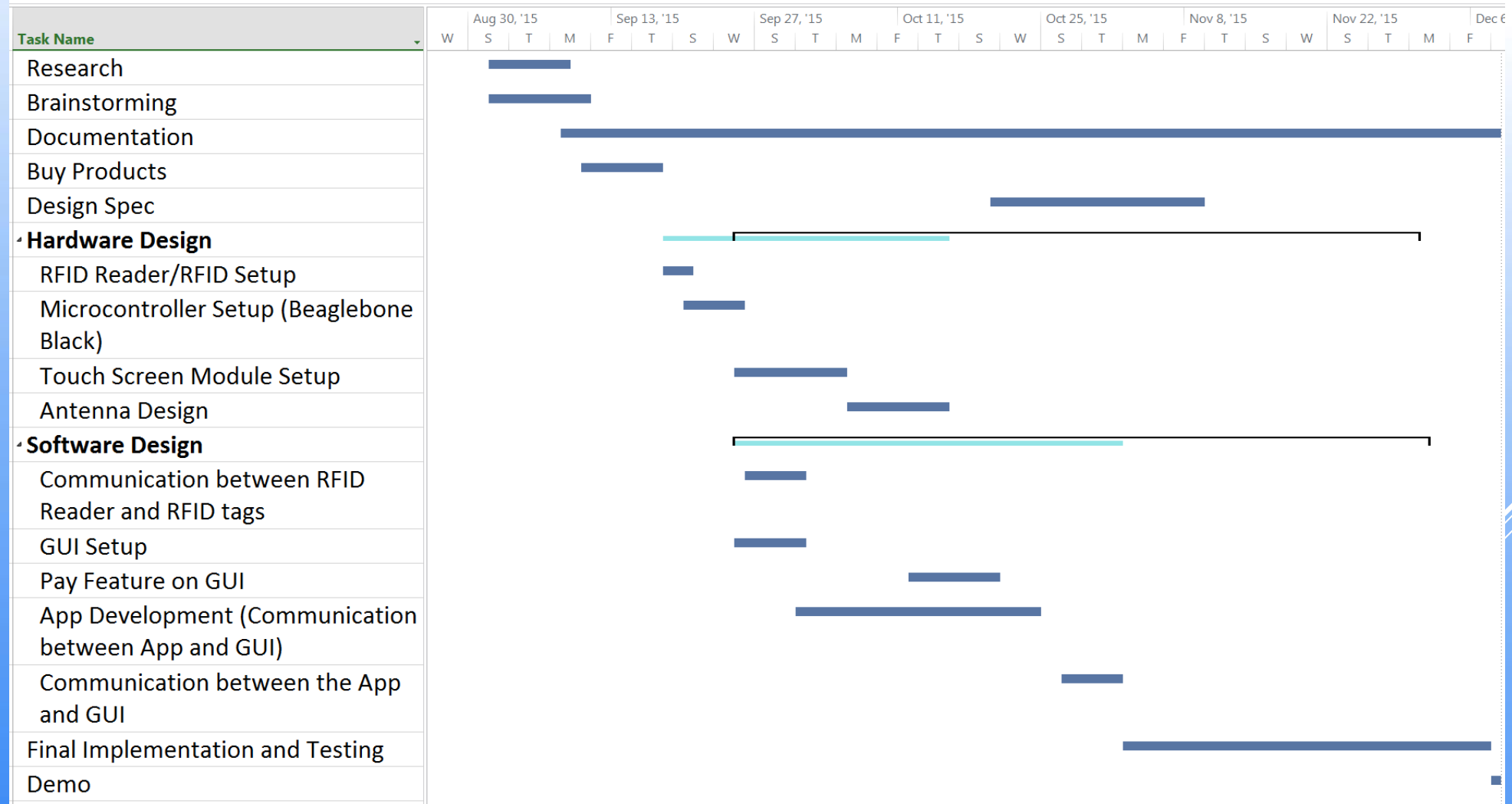
Current cost per Shopping Cart	\$375.13
RFID Reader	\$122.50
LCD Cape	\$87.05
BeagleBone Black	\$72.73
Boxed Enclosure	\$50.45
WiFi Module	\$22.40
Battery	\$20

Potential Improvements	\$135
RFID Reader PCB + Chip	\$40
LCD Cape	\$20
BeagleBone Black PCB	\$50
Boxed Enclosure	\$15
WiFi Module	\$5
Battery	\$5

Improvements by:

- Making deals with Vendors
- Purchasing local goods – avoid customs costs, taxes, etc.
- Design PCBs wherever possible
- Do labour jobs ourselves (box enclosure cut-out)
- More time for research on product costs

ESTIMATED SCHEDULE



FUTURE WORKS

- GUI based API for store workers to create tags for items
- PCB Design instead of RFID reader and BeagleBone board
- 7inch touchscreen
- Built-in battery system to power the boards
- Waterproof housing
- Improvement for the tag reading range
- Standalone app that can read the tags directly on the application (phone)
- Bulk item handling
- Anti-theft solutions

WHAT WE LEARNT

ACKNOWLEDGEMENTS

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Senate of Undergraduate Awards Adjudication Committee

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- [11] *Wireless Home Network Made Easy, WiFi USB Transceiver*.
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QUESTIONS?

