

# **Pay It Forward**

## **Project Plan**

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# 1 Introduction

## 1.1 Project Statement

The Pay it Forward project will result in a web-based platform hosted by the City of Ames to connect used-item donors with appropriate donation outlets. Outlets will be able to create accounts and make changes to their publicly available information as approved by administrators of the system. After that, outlets will be able to select which items they accept as donations. Citizens who wish to donate items can input the things they have available then search for the best outlet for them. The list of donation centers can be sorted by factors such as location, amount of items accepted, and accepting high priority donations. This application should be easy and fast to use from both web and mobile browsers.

## 1.2 Purpose

The City Council has made it a priority to reduce waste going to landfills, and they made our client responsible for seeing to this challenge. Beyond reducing our consumption of materials, the next two best ways to see to this goal is by reusing and recycling the items that we use. Our application will provide the residents of Ames tool to simplify the process of finding an outlet for donating their items for reuse. By making this step easier, it is expected to increase the amount of items that are reused within the community; thereby, decreasing the amount of waste being contributed to landfills. If this project achieves its goal, the non-profit organizations of Ames will see an increase in donations to help them succeed in fulfilling their missions while creating a healthier and cleaner system by lowering traffic to landfills.

## 1.3 Goals

- I. Create an extremely simple and quick donation center reference site
- II. Gain practical experience in communicating with clients and eliciting requirements
- III. Generate a sufficient and efficient design for this software system
- IV. Produce a product that fulfills the vision of the client in the best way possible
- V. Improve project management skills
- VI. Contribute to the success of an environmentally-friendly program in the City of Ames
- VII. Establish professional connections in the working world

## 2 Deliverables

These deliverables are necessary for completing the Pay it Forward application. These will be submitted to our client contact, Merry Rankin. These deliverables will be iteratively submitted throughout the project's development for review and will be submitted in full at the completion of the project. See Section 6 for timeline.

- Microsoft SQL database server with tables capable of holding relative information for this system. Tables include users, donation centers, items, and item categories.
- Complete project code meeting requirements in Section 4
- System documentation -- This will include documentation about the system, including installation and maintenance. This will ensure system maintainers with the city will be able to maintain this new system in the future. Our group will provide support for initial setup.

# 3 Design

## 3.1 Previous Work / Literature

A prototype was created by Jordan Harper, Arlen Burroughs, Kyle Long, and Josh Harper in Dr. Lutz's Computer Science 409 class. This client expressed interest in having a similar, easy-to-use web pages as displayed in Figure 3.1.1. This "Pay It Forward" prototype had a simple flow of item category selection page, donation center choice page, and then a page with donation center information. Also included in the prototype are sample forms for login pages, donation center request forms, and other relevant functionality mockups.

A couple of major donation centers around the world are Goodwill and the Salvation Army. Both of their websites have a tool to locate the closest donation centers to a given location. Once a donation center is selected you can see various information possible including business hours, items accepted or not allowed, directions to the location and more. Both websites also have reference material to determine valuations on donation items for tax purposes. Users right now have to manually find each item and calculate the total amount to claim on their tax returns.

## 3.2 Proposed System Block Diagram

See Figure 3.2.1

## 3.3 Assessment of Proposed Methods

These methods will allow Ames citizens and donation centers to connect in the fewest number of clicks possible for both parties. We discussed including a login for all users to allow in depth search history and previous donation sites.

However, requiring a login to use any of the site's features may discourage users. As a compromise, we decided to allow donors to search and select their donation centers without needing to login, but a login functionality will be offered optionally for a more personalized experience. Admins and donation centers are required to have accounts though to access special editing privileges. This way we can assure that only approved non-profit organizations are using this site to advertise what they accept as donations.

Additionally, we will be developing on a Windows server with a Microsoft SQL database hosted by Iowa State. Once the project is ready for deployment, we will migrate the system to the City of Ames' hardware. This decision was made

because that is the technology on which their current website resides, and we need to integrate with the existing site.

### **3.4 Validation**

We will navigate through the website, trying various end cases to test the functionality as we develop. By testing iteratively, we aim to catch as many bugs as possible before they cumulate into a more problematic situation. Once we believe that the system works, we can try to create some automated tests, such as smoke tests to make sure the system can handle the desired bandwidth in which it may need to operate.

We will also confer with Merry along the way to validate that the product we are producing matches the expectations. If we need more diverse opinions, the Office of Sustainability Team is available for our use as a focus group for small scale Beta Testing.

# 4 Requirements and Specifications

## 4.1 Functional

- Provide a list of all donation centers
- Provide profile pages for each donation center
  - Should include information about hours, contact information, location, items accepted, if pickup/delivery is available, etc.
- Give users the ability to search for donation centers
  - Allow users to enter item types to donate by category (including other)
  - [Optional] Allow items to be prioritized
  - [Optional] Allow user to save search results to recall at a later time
- Allow users to produce a summary to be saved, printed, or emailed
  - Should include information such as hours, locations, and items accepted for each donation center in search
- Provide a method to create donation centers
- Allow existing donation centers to update their information
  - Remind donation centers to update or confirm their information every six months
  - If a donation center does not update their account or confirm their account for two years, the center shall be removed from the system
- Create admin user accounts
  - Allow admin to approve and delete donation centers
  - Allow admin to edit the purpose and other site details
- Gather user location to prioritize donation centers
  - Provide map with donation centers marked
- Send regards to the user from the donation center
- Provide donors a way to share their usage of the website to popular social media sites
- Remind donation centers to review their information if they haven't done so in 6 months
- Provide a way for donors to view the impact of their donation
- The mobile version will allow a user to start a call after selecting a phone number
- The system will start an email to any email address that a user selects
- [Optional] The system shall store donation history and search history for the donors access later
- [Optional] The system shall attach values to donations and compile them into a report for taxation purposes

## **4.2 Non-Functional**

- Must be mobile accessible with logical formatting
- Should be easy to use
  - Provide a simple interface for users of all backgrounds
- Must be integratable into the existing City of Ames software platform
- Should not require users to log in for center information
- Shall be portable for use in other locations

### 4.3 Use Cases

The following are use cases derived from communications had with the client. Most fields are self-explanatory. However, the “Satisfaction if completed correctly” is on a 1-10 scale, with a value of 1 implying that the client would gain no additional satisfaction if this feature is implemented correctly and a value of 10 implying immense satisfaction.

Similarly, the “Dissatisfaction if not completed correctly” is on a 1-10 scale, with a value of 1 implying that the client would not be dissatisfied at all if this feature was not implemented as described and a 10 implying extreme disdain if the product does not include the feature as described. These rankings directly come from the client.

*Name:* Create a donation center

*Satisfaction if completed correctly:* 10

*Dissatisfaction if not completed correctly:* 10

*Trigger:* Click “Create a Donation Center”

*Purpose:* Add another place to donate items

*Preconditions:* Has access to the webpage

*Actors:* Donation Center, Administrator

*Normal Case Steps:*

1. The Donation Center accesses the Pay It Forward webpage
2. The Donation Center clicks “Create a Donation center”
3. The Donation Center submits donation center request form
4. The administrator approves or denies request
5. The Donation Center that submitted the request is notified

*Outcome:* Information about this donation center is now available through the web page

*Name:* Edit donation center details

*Satisfaction if completed correctly:* 10

*Dissatisfaction if not completed correctly:* 10

*Trigger:* Click “Edit Information”

*Purpose:* The user wishes to change their history of donated items

*Preconditions:* The user is logged in as the donation center

*Actors:* Donation Center Administrator

*Normal Case Steps:*

1. The Donation Center Administrator is on the donation center’s page
2. The Donation Center Administrator clicks “Edit Information”
3. The Donation Center Administrator submits the form with updated info
4. The administrator accepts or denies the request to change information
5. The Donation Center Administrator that submitted the request is notified

*Outcome:* The donation center has updated information

*Name:* Remind donation centers to update information

*Satisfaction if completed correctly:* 10

*Dissatisfaction if not completed correctly:* 5

*Trigger:* Periodic reminder

*Purpose:* Keep donation center information up-to-date

*Preconditions:* The user has contact information on file

*Actors:* Donation center administrator

*Normal Case Steps:*

1. The user sets up account with contact information
2. Time elapses and Donation Center Administrator is sent an update information notification

*Outcome:* The donation center's information is regularly updated

*Name:* Administrator approves accounts

*Satisfaction if completed correctly:* 10

*Dissatisfaction if not completed correctly:* 10

*Trigger:* Click link to current requests page

*Purpose:* The administrator can manage the donation centers allowed

*Preconditions:* The user is an administrator

*Actors:* Administrator

*Normal Case Steps:*

1. The Administrator logs on with administrator privileges
2. Click on the "Requests" link
3. Select a request
4. Approve or deny the selected request

*Outcome:* The donation centers are approved or denied based on the administrator's decision.

*Name:* Approve donation center detail change

*Satisfaction if completed correctly:* 10

*Dissatisfaction if not completed correctly:* 8

*Trigger:* Donation center makes change to information

*Purpose:* To update the donation center details

*Preconditions:* User is logged in as an administrator

*Actors:* Administrator

*Normal Case Steps:*

1. From admin account page, navigate to the approve requests page
2. Approve requests individually

*Outcome:* The approved changes will be published to the website

*Name:* Admin delete accounts

*Satisfaction if completed correctly:* 10

*Dissatisfaction if not completed correctly:* 10

*Trigger:* Administrator wishes to delete a donation center

*Purpose:* This allows the administrator to delete pages that are out of date

*Preconditions:* User is logged in as an administrator

*Actors:* Administrator

*Normal Case Steps:*

3. From admin account page, navigate to the delete accounts page
4. Delete pages

*Outcome:* This donation center will listed as closed and will not be found in a search.

*Name:* Log in

*Satisfaction if completed correctly:* 8

*Dissatisfaction if not completed correctly:* 2

*Trigger:* User wishes to have account-specific privileges

*Purpose:* Allows administrators, donations centers, and normal users to have account specific options

*Preconditions:* User is on the website, and have existing account

*Actors:* Any user with an account

*Normal Case Steps:*

5. Click “Login”
6. Enter credentials

*Outcome:* User will be logged into account which has specific permissions

*Name:* View donation center list

*Satisfaction if completed correctly:* 10

*Dissatisfaction if not completed correctly:* 8

*Trigger:* User wants to view donation centers without preferences

*Purpose:* View a list of donation centers which the user can click for more information

*Preconditions:* User is on the website

*Actors:* Any user

*Normal Case Steps:*

7. Click on “Donation Centers” in the menu

*Outcome:* User will be sent to the list page for viewing

*Name:* View Donation History

*Satisfaction if completed correctly:* 10

*Dissatisfaction if not completed correctly:* 5

*Trigger:* N / A

*Purpose:* The user wishes to view their history of donated items

*Preconditions:* The user is logged in or has saved cookies

*Actors:* Donor

*Normal Case Steps:*

1. The Donor accesses the Pay It Forward webpage
2. The Donor selects the “Tools” menu
3. The Donor clicks the “History” link

*Outcome:* The user’s donation history is displayed on the page

*Name:* View All Donation Centers

*Satisfaction if completed correctly:* 10

*Dissatisfaction if not completed correctly:* 10

*Trigger:* N / A

*Purpose:* The user wishes to view all registered donation centers

*Preconditions:* N / A

*Actors:* Donor

*Normal Case Steps:*

1. The Donor access the Pay It Forward webpage
2. The Donor selects the “Tools” menu
3. The Donor clicks the “All Donation Centers” link

*Outcome:* All registered donation centers are displayed on the page and are clickable to view more details

*Name:* Provide Valuation Report

*Satisfaction if completed correctly:* 8

*Dissatisfaction if not completed correctly:* 4

*Trigger:* N / A

*Purpose:* The user wishes to view approximate values of all items they have donated

*Preconditions:* The user is logged in or has saved cookies

*Actors:* Donor

*Normal Case Steps:*

1. The Donor accesses the Pay It Forward webpage
2. The Donor selects the “Tools” menu
3. The Donor clicks the “Value Report” link

*Outcome:* A report is displayed showing the approximate values of all items the user has previously donated

*Name:* Produce Impact Report

*Satisfaction if completed correctly:* 8

*Dissatisfaction if not completed correctly:* 5

*Trigger:* N / A

*Purpose:* The user wishes to view the impact their donations have made

*Preconditions:* The user is logged in or has saved cookies

*Actors:* Donor

*Normal Case Steps:*

1. The Donor accesses the Pay It Forward webpage
2. The Donor selects the “Tools” menu
3. The Donor clicks the “Impact Report” link

*Outcome:* A report is displayed that visualizes the impact that the user has made for the City of Ames

*Name:* Add Items to Donation List

*Satisfaction if completed correctly:* 10

*Dissatisfaction if not completed correctly:* 10

*Trigger:* The donor wants to begin searching for a place to donate their items.

*Purpose:* By specifying all the items the donor wants to donate, the system can help find the best place to donate all of their items.

*Preconditions:* The donor has the site open. No logon is needed, but it can be provided as an option for those wanting a more customized experience.

*Actors:* Donor

*Normal Case Steps:*

1. The donor selects a category of items.
2. The system populates a second field with all the items in that category.
3. The donor selects the specific item type from the field.
4. The donor specifies number of items of that type that they have to donate.
5. The donor adds this donation item to the list.
6. The system records all specified fields about this item type.
7. Steps 1 through 6 are repeated until all desirable donation items are added.

*Alternative Scenario Name:* Donor Specifies an Optional Priority Level

*Alternative Scenario Trigger:* The donor fills in the optional priority level field when entering an item

*Alternative Scenario Steps:*

- 5a. The donor specifies a priority level of this donation item type.
- 5b. The donor adds this donation item to the list

*Outcome:* A list exists in the system of all the items a donor wishes to donate.

*Name:* Produce a Sorted List of Donation Centers

*Satisfaction if completed correctly:* 10

*Dissatisfaction if not completed correctly:* 8

*Trigger:* The donor completes adding items to the list of things they want to donate.

*Purpose:* The donor wants to find the optimal location(s) to donate their items.

*Preconditions:* There is at least one item in the list of items to donate.

*Actors:* Donor

*Normal Case Steps:*

1. The donor selects to initiate a search
2. The system queries the database and finds donation centers that will accept the items in the list
3. The system sorts the list first by the number of items accepted at each site then by the distance from the user

*Alternative Scenario Name:* Produce a List Sorted By Distance of Donation Centers

*Alternative Scenario Trigger:* The donor selects to sort the list by distance

*Alternative Scenario Steps:*

- 3a. The system sorts the list first by the distance of the donation center from the user then by the amount of items accepted by the site.

*Outcome:* The donor can view and interact with a sorted list of donation centers that accept their specified items.

*Name:* Select Where to Donate Item(s)

*Satisfaction if completed correctly:* 10

*Dissatisfaction if not completed correctly:* 6

*Trigger:* A donor decides where to donate an item

*Purpose:* Allow a donor to sort the items according to which site(s) would be most convenient for them

*Preconditions:* The donor is on the page displaying the list of donation centers relevant to their donation items

*Actors:* Donor

*Normal Case Steps:*

1. The donor selects one item or multiple items
2. The donor selects to which donation center they would like to donate the selected item(s)
3. The system adds the selected item(s) to the list of items to be donated to that site
4. The system removes the selected item(s) from the list of items yet to be sorted
5. Steps 1 - 4 are repeated as necessary

*Outcome:* The donor has all the items that they will donate sorted according to which donation center they would like to donate those items

*Name:* Produce Donation Summary

*Satisfaction if completed correctly:* 10

*Dissatisfaction if not completed correctly:* 7

*Trigger:* The donor indicates they would like a summary of their planned donation(s)

*Purpose:* The system provides the donor with a detailed summary that, for each donation center, includes the items the donor indicated wanting to donate, the address of the site, directions to the site, the site's business hours, and other relevant details

*Preconditions:* The donor has sorted the items to desired donation sites.

*Actors:* Donor

*Normal Case Steps:*

1. The donor selects to produce a donation summary
2. The system queries information related to the sites that have items added to their list
3. The system compiles information onto one screen
4. The donor selects to print the report
5. The system initiates the printing of the report

*Alternative Scenario Name:* Save Report as PDF

*Alternative Scenario Trigger:* The donor selects to save the report as a PDF

*Alternative Scenario Steps:*

- 5a. The donor selects to save the report as a PDF
- 5b. The system compiles the report into a PDF file
- 5c. The system uploads the file to the donor's device

*Outcome:* The donor has report that they can reference to view details on their donation.

*Name:* Share donation information to social media

*Satisfaction if completed correctly:* 6

*Dissatisfaction if not completed correctly:* 3

*Purpose:* The system provides the donor options to share information via social media to allow interaction with friends or to send off for themselves to reference in the future.

*Preconditions:* The donor has completed one of the following uses cases: *View Donation center list, Search donation centers, Provide donation summary, Select to donate an item at a specific donation outlet, view donation center page, provide valuation report, provide impact report*

*Actors:* Donor

*Normal Case Steps:*

1. The donor has completed the precondition and a "Share" button is shown along with the relevant information.
2. The donor selects the share button.
3. The system displays buttons corresponding to popular sharing destination
4. The user selects the destination
5. The system sends the information to the social media in a consumable format for that social media destination

*Name:* Initiate phone call

*Satisfaction if completed correctly:* 10

*Dissatisfaction if not completed correctly:* 6

*Purpose:* The system provides the donor a phone number link to initiate a call with the donation center.

*Preconditions:* The donor has completed one of the following uses cases: *View Donation center list, Search donation centers, Select to donate an item at a specific donation outlet, view donation center page*

*Actors:* Donor

*Normal Case Steps:*

1. The donor has completed the precondition and a phone number is listed with the donation center address and a contact email address.
2. A link is displayed on the phone number
3. The user clicks the phone number link
4. The system interacts with the donor's operating system to handle the phone number link (This will typically open the phone app to make a call)

*Name:* Initiate an email

*Satisfaction if completed correctly:* 10

*Dissatisfaction if not completed correctly:* 4

*Purpose:* The system provides the donor an email link for the user to contact a donation center.

*Preconditions:* The donor has completed one of the following uses cases: *View Donation center list, Search donation centers, Select to donate an item at a specific donation outlet, view donation center page*

*Actors:* Donor

*Normal Case Steps:*

1. The donor has completed the precondition and an email address is display with the donation center address and phone number.
2. The donor clicks the email address
3. The link interacts with the donor's operating system to handle the email link. (This will typically open the default email app in a new message)

## 5 Challenges

Our greatest challenge will likely be working with the City of Ames staff to create a tool that will work well within the existing site. As our client contact lacks extensive technical knowledge, we have to be careful to communicate in a way that the team's understanding is in sync with our client's vision. Our goal is to decrease the number of items going to landfills when they could be used elsewhere. As the general populace dislikes complicated processes, usability is an important requirement for our project. The citizens of Ames are not required to recycle or donate their items, so if they are motivated to do so we do not want to discourage them with a complicated interface. Ultimately, we will be challenged to make our product as easy to use as possible in order to achieve the goal of the project.

# 6 Timeline

## 6.1 Semester One

August:

August 26, 2016 - Project Selection

In August, our initial team is formed and we select which projects interest us. Iowa State staff then selects our project and verifies team members.

September:

The primary focus is for the team to create a better understanding of the project as a whole. This is accomplished by meeting with the client as well as team discussions among ourselves and with the advisor.

October:

October 23, 2016 - Project Plan

October 25, 2016 - Discover Technical Details

The project and its development plan begin to solidify. The project plan and the design document push the team into a development-planning mindset.

November:

November 07, 2016 - First Design Document

November 14, 2016 - Project Plan Revised

November 19, 2015 - Use Cases Defined

November 28, 2016 - Final Design Document

November 30, 2016 - Database and Source Control Set Up

The team focuses on finalizing documentation and preparing for the project presentation. This leads to a small amount of development beginning in the form of website structure and backend design.

December:

December 07, 2016 - Present Project

The team presents the project's current state and further develops the project structure to prepare for Scrum development next month.

See Figure 6.1.1

## **6.2 Semester Two**

January:

January 17, 2017 - Discuss Semester Plans with City of Ames

The team initiates full development with Scrum sprints of two weeks in length. The structure is completed and feature-work begins.

February:

February 28, 2017 - Finish First Prototype

The main focus lies within creating a rough first prototype of the software system. Most, if not all, of the features should be implemented to, at least, the most basic level.

March:

March 31, 2017 - Finish MVP

By the end of this month, the software system will have all necessary features implemented to some degree. This minimum viable product (MVP) will be shown to the client for aggressive feedback.

April:

April 30, 2017 - Finish Product

Feedback from previous months is taken into heavy consideration, and, by the end of the month, the project is in a state that can be considered complete. The team then focuses on preparing for the final project presentation.

May:

The team presents the final product to the class.

See Figure 6.2.1

## 7 Conclusions

The goal of this project is to create a meaningful software system for the City of Ames in order to help reduce waste entering landfills. In achieving this overarching goal, we will need to work with our client representatives to achieve a clear and mutual understanding of the product requirements. To do this, we will develop and implement a design then present the results of that implementation to our contact. We will collect their input and repeat the cycle until the product meets and exceeds expectations. Our first semester will be spent primarily in the requirements elicitation and initial design phases. The further we progress through the year, more time will be spent on development as the client and team approach the same understanding and vision of the product. Following suit most of the second semester, we expect to perform two week sprints where we meet with the client and our advisor on alternating weeks. By following this process, we plan to deliver an exceptional product.

## 8 References

"Donate Goods." *The Salvation Army Family Stores*. N.p., n.d. Web. 14 Nov. 2016.

"Donate Stuff." *Goodwill Industries International, Inc.* N.p., n.d. Web. 14 Nov. 2016.

Harper, Jordan, Arlen Burroughs, Kyle Long, and Josh Harper. *Prototype*. Ames: Iowa State University, 3 Oct. 2016. PDF.

# 9 Appendices

Figure 3.1.1

The figure consists of two vertically stacked screenshots of a web application titled "Pay It Forward".

**Screenshot 1: "Donate An Item!"**

This page displays a message: "It looks like you want to donate something of yours. Good for you! Select which category your item belongs to from the dropdown below, and we'll show you which locations in Ames accept your item." Below this is a dropdown menu with the following options:

- Select a donation item category ▾
- Clothes
- Furniture

Below the dropdown are two buttons: "Search" and "All Centers".

**Screenshot 2: "Donation Center"**

This page displays a message: "Now select which donation center from the dropdown below, and we'll take you to it!" Below this is a dropdown menu with the following options:

- Select a donation center ▾
- Center 1
- Center 2

Below the dropdown is a single button: "Go!".

Figure 3.2.1

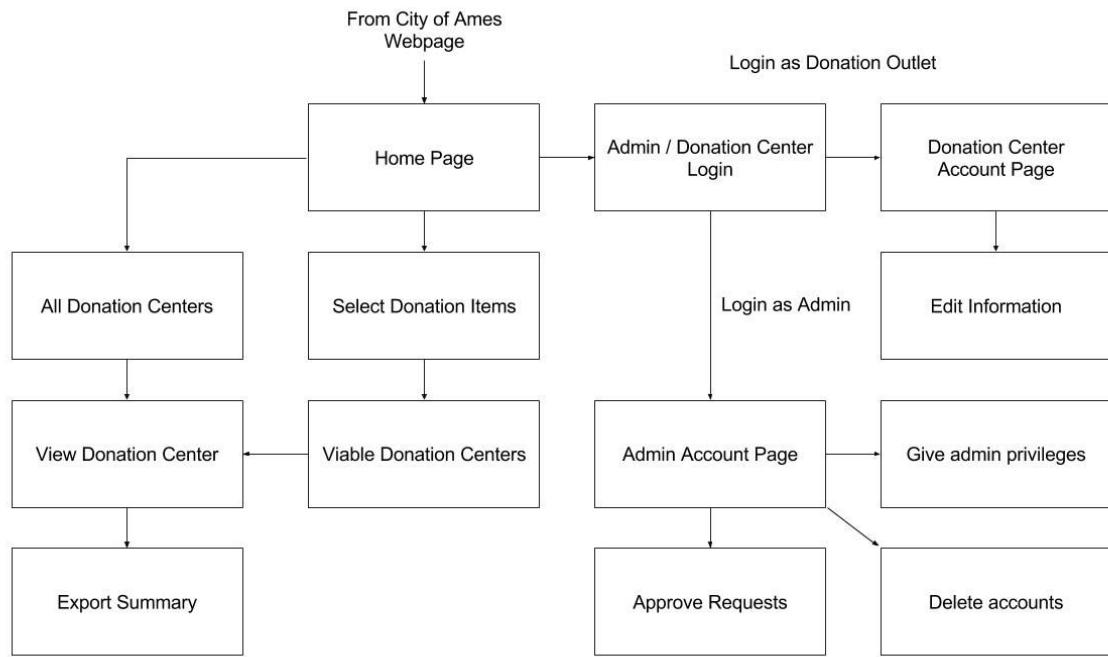


Figure 6.1.1

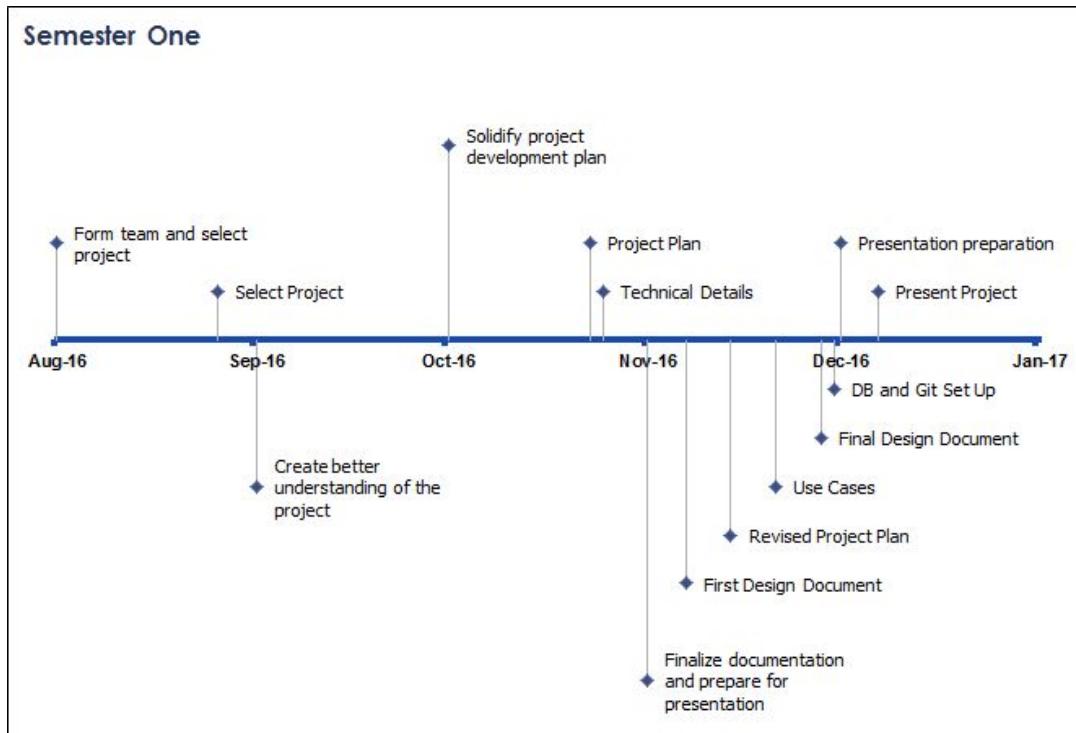


Figure 6.2.1

