Software Requirements Specification

for

Day Care Project

Version <0.7.0b1>
“Cinnamon Toast Crunch”

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Contents

Revisions

Version	Primary Author(s)	Description of Version	Date Completed
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1. Introduction

1.1. Document Purpose

This document will present a detailed description of the day care system. It will outline all of the software's features and all of its purposes. It will give a clear walk-through of each type of user interface and the required hardware for the system. This documentation is designed to be referenced by stakeholders and the development team.

1.2. Product Scope

Our program will allow a transition into a user-friendly system that will help the personnel and the customers. One of the main benefits will be fixing the organizational downfalls of the old paper system. This will be achieved through an automated sign in/out system for all children attending the day care facility. It will also improve communication between teachers and parents through classroom changes, issues that may arise, reminders from parents, illness updates and missed days, and any special need requirements for children. This will increase accountability, improve and streamline record keeping for the day care, and provide an overall increase in care for the children.

Our project helps alleviate the workflow issues from a daycare center's day to day child organization routines. This application offers a streamlined workflow for teachers and parents with secure and simple sign in/out for the children.

1.3. Intended Audience and Document Overview

The intended audience is for the development team, students creating the project, and also the "client", which in this case is the professor.

The Overall Description section describes the system as informal requirements. This will help establish and give a context for how the rest of the document pertains to the application being developed. The Specific Requirements section is aimed for the developers. This includes more terminology that would be directed specifically for persons in the development field. However the entire document is meant for both audiences and will be readable for both as a result.

1.4. Definitions, Acronyms and Abbreviations

- **RFID:** Radio Frequency Identification.
- **SSN:** Social Security Number.
- **API:** Application Programming Interface. Allows a program to communicate with another.
- **Encryptions:** Data that is concealed by converting it into code.
- **Action Overflow Button:** Extra options that are revealed by the vertical "…" on Android.
- **Navigation Drawer:** A panel that transitions in from the left edge of the screen and displays the app's main navigation options.
- **Dialogue Box:** A small area on screen where a user is asked to for input or to make a choice.
- **NFC:** Specialized branch of RFID technology.
- **Key Fob:** Type of security token: a small hardware device with built-in authentication mechanisms.
- **Interface / Client:** The means by which the user and a computer system interact, in particular the use of input devices and software. The particular layout of on-screen elements.
- **SMTP:** Simple Mail Transport Protocol.
- **MD5:** Message-digest algorithm for cryptographic hash functions and produces a 128 bit hash value typically expressed in text format as a 32 digit hexadecimal number.
- **Toast**: A brief message displayed to user, usually for indicating whether an action was successful.
- **Push notification:** Notification delivered to remote devices, such as a parent's phone.
- **GCM:** Google Cloud Messaging. Part of Google Play Services which provides a backend for managing and delivering push notifications.
- **Tickle:** Also referred to as "send-to-sync," a push notification that tells the user there is new data to sync on the server, rather than sending the data directly as part of the notification.

1.5. Document Conventions

Formatting conventions used in this document are as follow:

Arial font size of 11 is used for the entire document for the body of the document. Italics would only be used for comments. Section labels are Arial font size 14 and bold. Sections one step below the main label will be Arial font size 12 and bolded.

1.6. References and Acknowledgments

Google Developer information page: https://developer.android.com/design/index.html

2. Overall Description

2.1. Product Perspective

Main Lobby Tablet:

- An Android tablet that can be used by anyone at the day care facility.
- Allows anyone to sign the children in and out by using a username and password through the application.
- An Android phone, with the app installed, can use NFC to tap a RFID tag and then sign in/out the specific children.
- A parent user can perform any of the functionalities on this terminal as they can on their own device. The interface will also look the same to decrease difficulty.

Parent User:

- They will have the option to use their own Android device or the Main Lobby Tablet.
- They can see any news that is relevant to their child in a news feed. These will include notes from anyone at the day care.
- They can add notes for the day care and teacher about anything that is relevant to their child.

Teacher User:

- The teacher will have a view of every child that has been signed in and assigned to their class. This can be used for roll call whenever needed.
- The teacher will be able to select any child and choose to move them to any class.
- Teachers can view notes on any of the children in their class.
- Notifying a parent or an entire class will be done through notes. Also there will be an option to call the parent if immediate contact is required.

Receptionist/Staff User:

- Responsible for adding parents and children to the system with the needed information. Will be approved by the administrator.
- If there needs to be a change to the children's or parent's information, they can change it for them.
- If there is a problem with checking a child in or out, the staff can do it for the parent.
- At any point in time, they can see where the child is currently and any information the child might have.

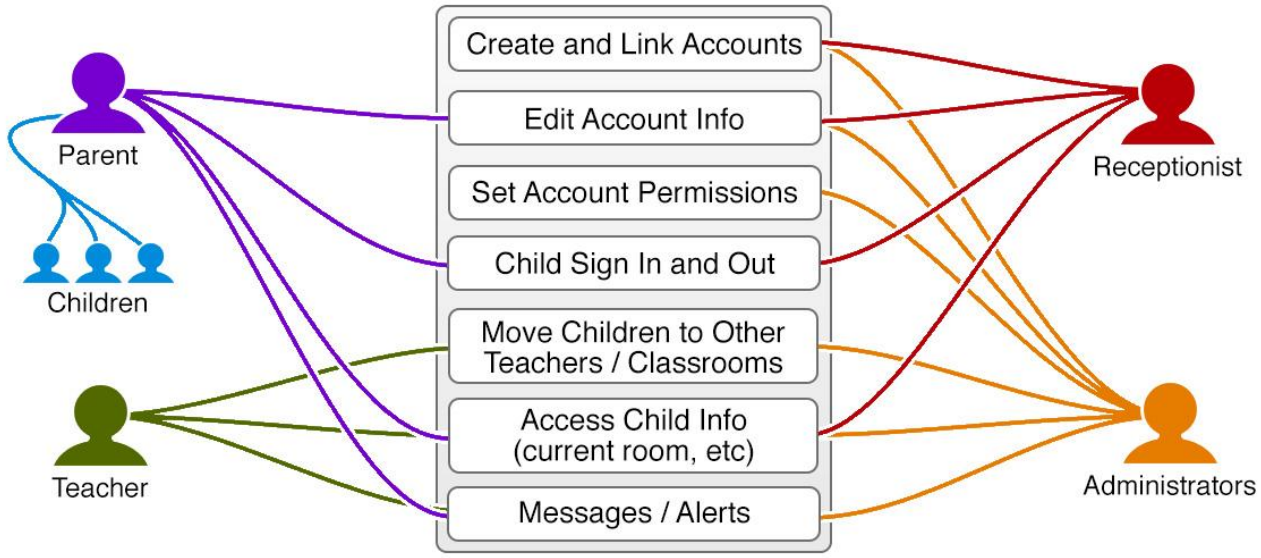
Administrator:

- Ability to add, edit, remove, or view all content within the application.
- Any of the options for functions that any user can execute, the administrative client will be able to use as well.
- Responsible for reviewing new staff, teacher, and parent user accounts and changing account rights and permissions accordingly.

2.2. Product Functionality

- Anyone will be able to sign the children in and out by using a username and password through the application. Once logged into the application there will be a sign in/out children option. The user chooses that option and selects the appropriate choice of in or out. The children's information will be automatically placed into or removed from the application and saved with a timestamp for record keeping purposes. More information in section 3.2.1 and 3.2.2.
- The user will also have the option to use a NFC enabled Android device to sign the children in or out. It will allow a faster option for the checking in and out process. See section 3.2.3.
- The parent user can use the app on an Android phone or tablet. They will still have the option to use the main lobby tablet since it designed for anyone to use.
- The added child will be assigned to the appropriate classroom and teacher. When the parent needs to pick up the child they will have an accurate location in the day care facility.
- Inside the application, the parent can update any notes for the child. They can add anything of importance such as any illness the child may have, medications and administration the child needs, and any other special attention item. Also, they can view any notes the teacher may have left for their child and any overall class notes. For more, see section 3.2.7 and 3.2.8.
- Parent users will be able to update their information when logged in to their account. Section 3.2.5 outlines what can be changed at any time.
- The teacher will have a view of every child that has been signed in to the day care and is assigned to their class. Section 3.1.1.1 and 3.2.6 includes more detail for this functionality.
- If the day care needs to move a child between classes, they will be able to select the child and choose which class to move them to. The other teacher's list will then update with the child added to their classroom list.
- There will be an option to create a message to be sent to the entire classes' parents. This will allow them to update on any events or remind parents about anything relevant to the day care class. Also, each student's parent can have a note or message sent to them from the day care. See section 3.2.7.

2.3. Users and Characteristics



This standalone software system originated to help alleviate the accountability issues from a daycare center's day to day child organization routines. It offers a streamlined work-flow for teachers and parents, with secure and simple sign in/out for the children.

2.4. Operating Environment

In order for the application to run on an Android device, the device must have the Android OS 4.0.3., Jelly Bean, or newer. The target environment is Android 5.0, Lollipop. Any system running a version of Android below 5.0 but above 4.0.3 will have full functionality, but may not display all visual design elements, such as themes and colors. Any system that has an operating system older than Jelly Bean will be unable to download or use the application as is.

2.5. Design and Implementation Constraints

1. **Time constraints.**

   A large constraint of this project is the predetermined time schedule we have. A large percentage of that time will be taken by documentation, leaving us with only about a month to develop the actual software. Many things can stem from this. There are several features that we would like to include, but the time simply won't allow it. We are planning to build around the possibility that we may run out of time, so we will get a working product and add the features that the time allows.

2. Some staff unfamiliar with development aspects.

Our staff has different strong points, which could be considered a constraint. A variety of skill sets is valuable for covering different areas as long as the planning takes an individual's strengths into consideration. However, the team could run into efficiency issues if a member is assigned to develop an aspect of the software that they are unfamiliar with. They will have a learning curve which ends up 'wasting time' on a project with strict time constraints.

3. Security.

Due to time constraints, the security methods used for this software system may be limited to encryptions and API keys. We will use the best methods known to the group to create a product that is secure as possible. Like anything, security can always be improved.

4. Psychology of user interfaces.

Our staff has a general understanding of the psychology behind creating intuitive user interfaces; the benefits received from deep research on the subject don't justify it for the needs of this project.

2.6. User Documentation

See Appendix A.

2.7. Assumptions and Dependencies

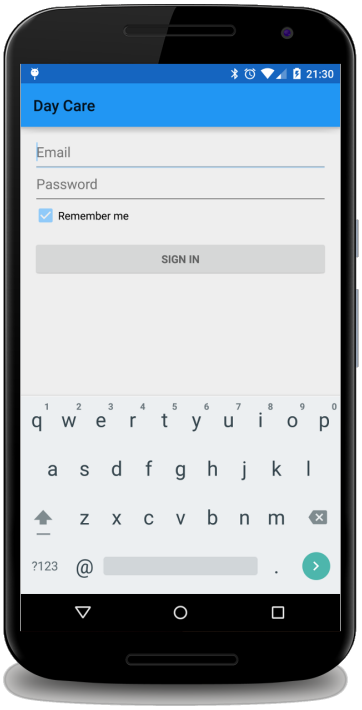
Some assumptions are made for the administrative functions. The ability to view, edit, or delete information is an assumption type. Also, when an account is created the administrator should approve it but it isn't required for the user to start using the account. The reason for this would be the only people who are able to create accounts are staff personnel. For updating and maintaining, we can assume that certain staff will have access to the web server information, database, and other system level access.

3. Specific Requirements

3.1. External Interface Requirements

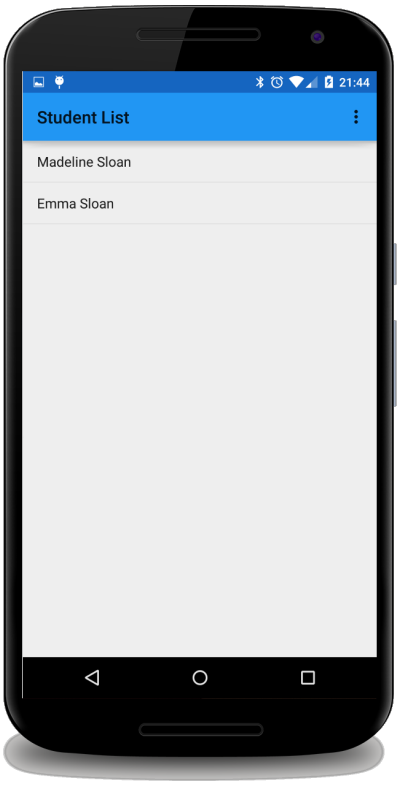
3.1.1. User Interfaces

Login Screen:

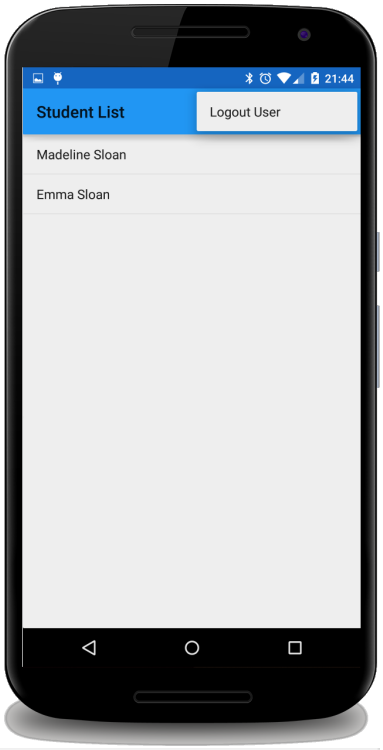


3.1.1.1. Login Screen (all clients):
This is the start screen for all users. The account logged in as will determine app behavior. If the Remember Me checkbox is checked, the account will stay logged in until manually logged out, even if the app is shut down or the phone powered off..

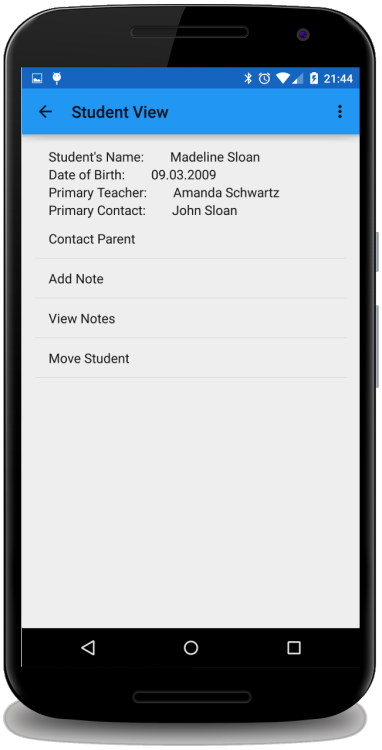
Teacher Interfaces:



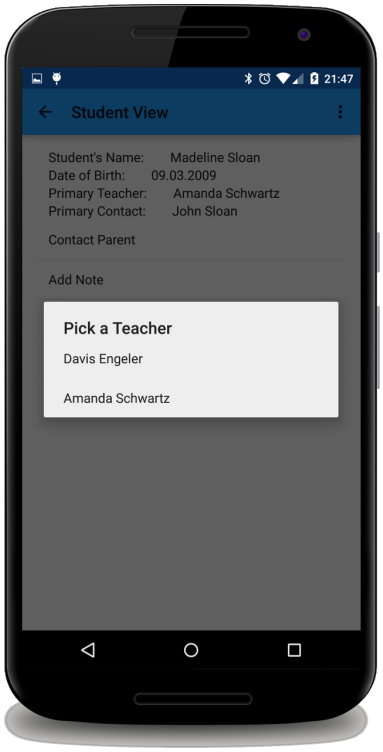
3.1.1.2. Teacher Client:
This is the home screen for the teacher. This will allow the specific teacher, logged in, to see all of the students that are assigned to their class. If a teacher had a student that was moved into her class by another teacher, it would update and add the student's name on the home screen.



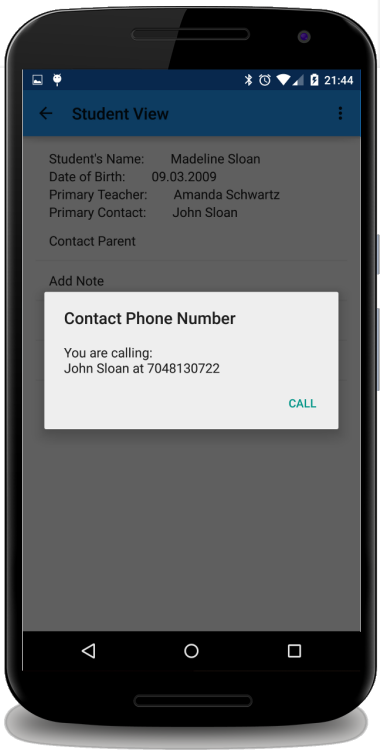
3.1.1.3. Extra Actions Menu: Clicking on the extra actions icon (3 vertical dots on the right side of the Navigation Bar) inflates a menu with an option to log the user out.



3.1.1.4. Child's Information: This includes the child's name, date of birth, primary teacher, and primary contact. Also, it has buttons for contacting a parent, adding a note, moving a student, or reading notes on file.

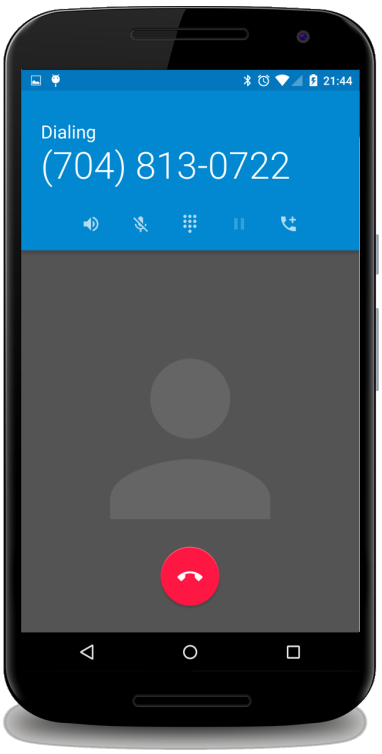


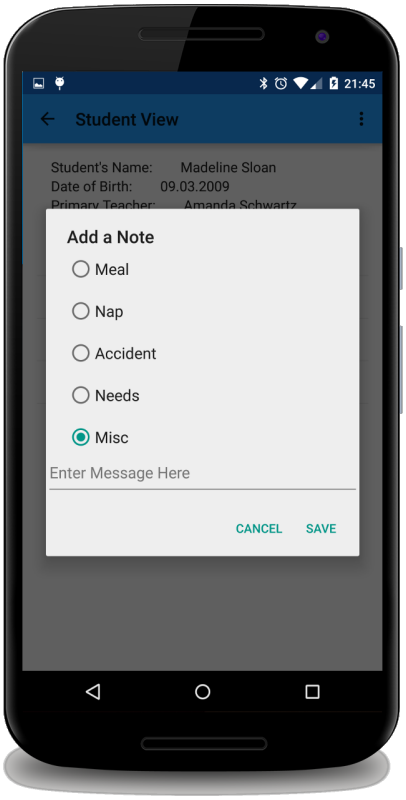
3.1.1.5. Moving a Child: Pop-up dialog with options to pick which classroom to move the child is listed. There is a submit button to save the assignment.



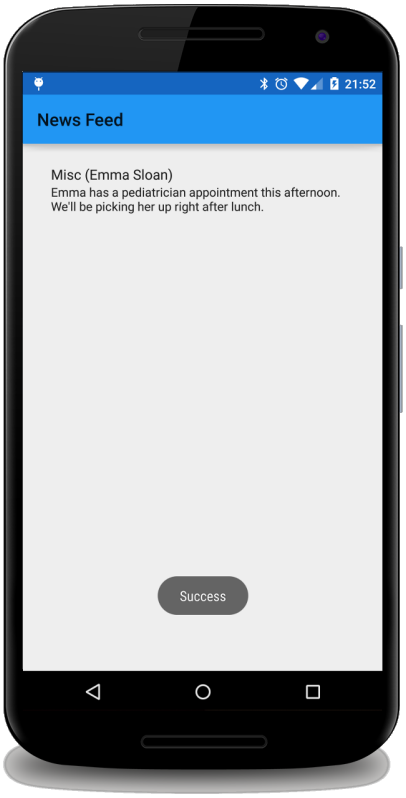
3.1.1.6. Contacting a Parent: This displays the telephone number and name of the parent. The user can touch the call button to have the device directly make a phone call using the phone's native dialer.

3.1.1.7. Dialing: The phone's default dialer takes over. After the call is finished, the user is automatically returned to the app.



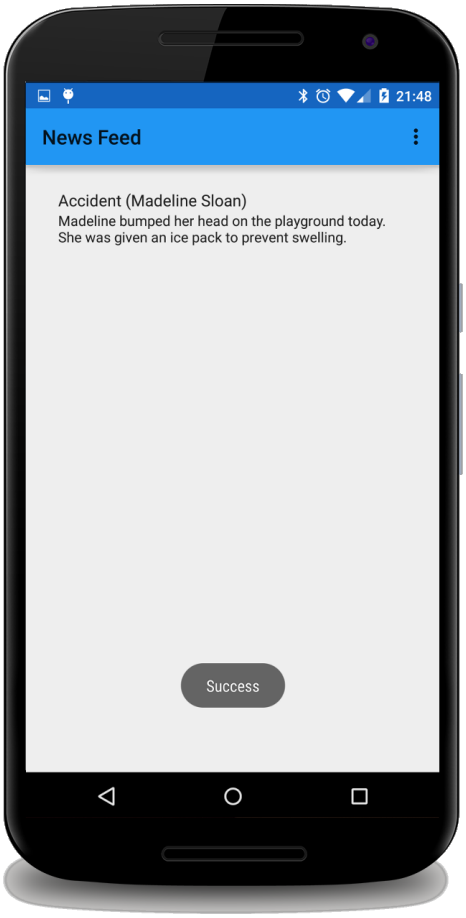


3.1.1.8. Adding Notes:
For the "Add a Note" screen, the user will be able to choose the type of note they are adding and the actual note itself. They can hit the save button to submit, or cancel the note.

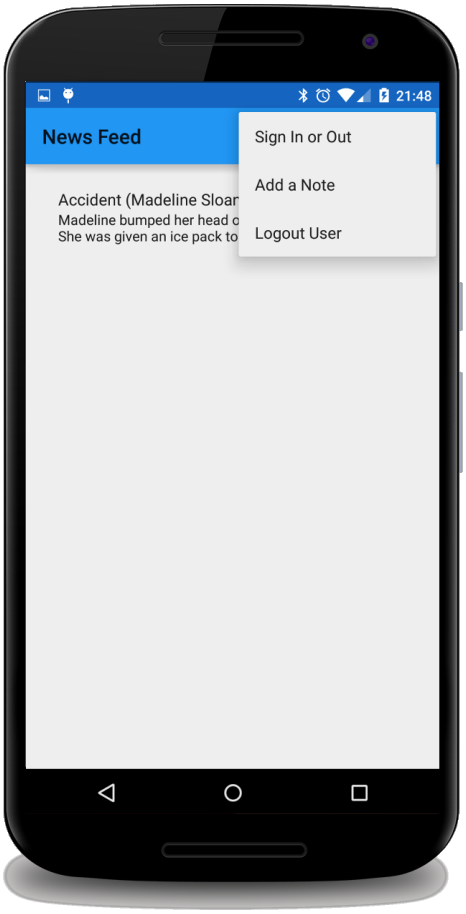


3.1.1.9. View Notes:
For the "View Notes" screen, the user will be presented with a newsfeed displaying any notes the parent has added.

Parent Interfaces:



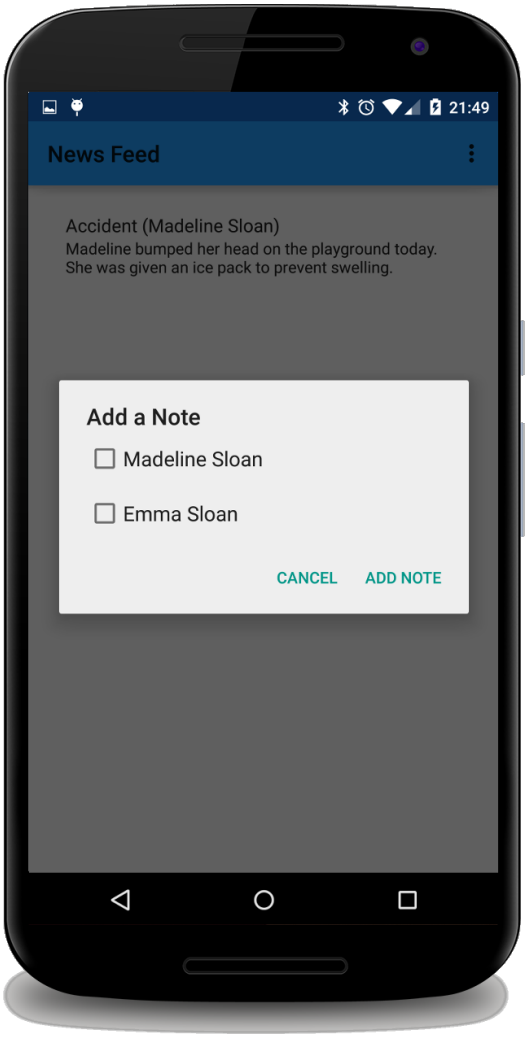
3.1.1.10. Parent Client:
This is the home screen for the parent user. This includes all updated notes from the teacher and also any notifications sent for the whole class. The news feed will also include an item for any classroom changes throughout the day. If a logged in parent interacts with a push notification, it will automatically open to the newsfeed and sync with the server.

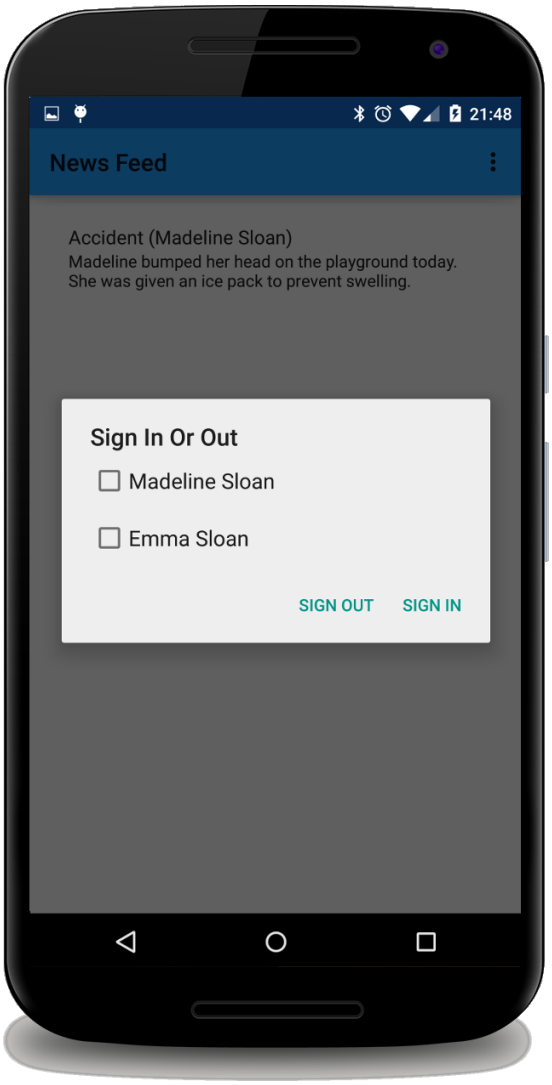


3.1.1.11. Parent Extra Actions:
The extra actions menu for the parent's newsfeed view includes options to sign children in or out, add a note for the teacher, and logout the user.

3.1.1.12. Choosing a child:
Another screen will include a list of the children a parent has enrolled. You reach this screen by choosing "Add Note". This will allow the parent to choose which child they would like to add a note to.

3.1.1.13. Adding a Note:
Same screen as teacher view. Please see section 3.1.1.8.

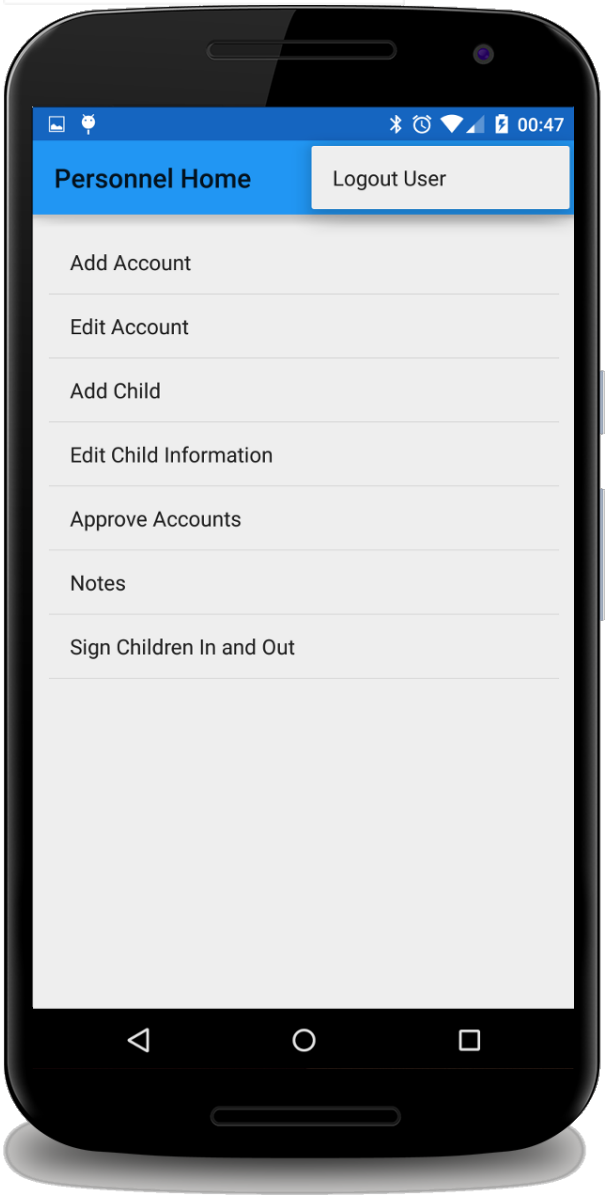


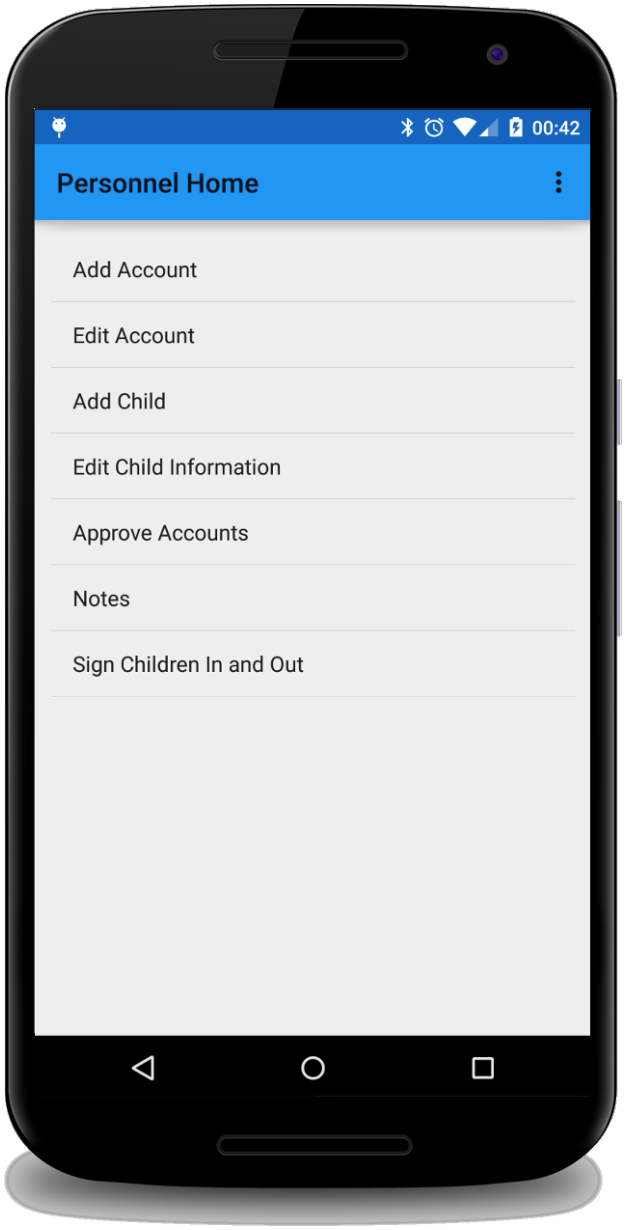


3.1.1.14. Sign In/Out:
This includes a list of the parent's children with checkboxes to choose which children to sign in and out. The boxes will be checked by default for children who are currently signed in, so to sign all kids out, the parent only needs to click the sign out button.

Administrator/Staff Interface:

3.1.1.15. Admin Client:
The home screen will list all available options to any parent user or teacher user, such as adding notes and signing children in and out. The option to create, approve, and edit accounts will be included.





3.1.1.16. Extra Actions:
The administrative view's extra actions menu includes an option to logout the user.

3.1.2. Hardware Interfaces

We will be using the Android platform for the majority of the system. An Android Tablet with NFC enabled and an Android phone, with or without NFC, will be required in order for testing and implementation. RFID tags will be utilized for the sign-in/out process.

3.1.3. Software Interfaces

A web server will be needed for the process and delivery of the web page. HTML, CSS, PHP, and JavaScript (JQuery) is how the web page will be developed. In addition, MySQL will be how the database is implemented for all the stored records.

3.1.4. Communications Interfaces

For this particular application, GCM messaging service will be needed for all of our push notifications. When a user logs into an account on a device, a GCM id is created and sent to the server. This id links a particular user account to a particular device id and is used by the GCM backend to route notifications. If the user logs on to a different device, or a different user logs on to the device, a new GCM id is generated and registered.

We plan on using an MD5 cryptographic hash function as our main way of encrypting the sensitive data that will be communicated back and forth. Also, the amount of data that is being transferred would be considered minimal because it's not graphics intensive and extremely text based. Therefore, data transfer rates should not be an issue. Operating with Android OS Jelly Bean and newer, we can guarantee that the data transfer rate the particular device can handle will be within the range required.

3.2. Functional Requirements

1. Sign in:
    a. For the specific child, it adds the child into the system and places them as an active view for the teacher for whom the child is assigned. Also, a current date and time stamp is recorded and saved into a database for use in determining fees charged to the parent. The parent's view will only include their own children. For the staff and administrator view it will list all children and have an option to search for a specific child. See user interface for parent in section 3.1.1.14.
2. Sign out:
    a. Removes the child from the assigned teacher's view and records the current date and time stamp for the same purpose of allocating any fees associated with a late sign out. The parent's view will include only their children and the interface is in section 3.1.1.14. Also, staff and administrators will be able to search through all the children and sign them out.
3. NFC functionality (Optional):

a. Using the NFC on the parent's android device, when the device taps the tag at the Main Lobby Terminal, it pops the dialog for logging in or out. If the user is already logged in, it will navigate straight to the sign in/sign out screen. Then all the functionality listed in section 3.2.1 and 3.2.2 will apply.

4. Creating new accounts:
    a. Information needed to set up staff and teacher login accounts:
        i. First and last name of the staff personnel/teacher.
        ii. Social Security Number.
        iii. Email address.
    b. Information needed to set up parent login accounts:
        i. First and last name of parent.
        ii. Telephone number.
        iii. Social Security Number.
        iv. Email address.
        v. Children's information.
            1. First name and last name.
            2. Date of birth.
            3. Social Security Number.
    c. The email address will be used as their login name. The user will not be able to change the login name to anything else.
    d. A password will be assigned automatically. The user will have the option to change it when they are logged in to their account.
    e. This will be completed by staff or administrators.
5. Editing current accounts:
    a. Information that can be changed:
        i. First and last name
        ii. Email address
        iii. Telephone number
        iv. Children's information
            1. First name
            2. Notes
            3. Primary teacher.
    b. Editing functionality is limited to the Administrative/Office view.
6. Teacher assignments:
    a. Students need to be assigned to a specific teacher.
    b. A teacher can have as many students as the day care approves.
    c. A student can change teacher assignments unlimited amount of times and at any point in time of the day.
    d. Only staff and administrator can assign teachers to children.
7. Notifying a parent or teacher:
    a. Note (for any user)
        i. Choose the type of note from the following:
            1. Meal

2. Nap
3. Accident
4. Needs
5. Misc.

ii. Enter a message that is no more than 145 characters.
iii. Must update in the news feed.
iv. If the note is for a parent with a registered device, the server will send a push notification to that device.

b. Notifying a class (day care use only)
i. Sent to the parents of all of the children assigned to one teacher.
c. Any staff or administrator can complete any of these tasks.

8. Viewing a child's notes:
a. For every child, all of the notes can be viewed as a news feed.
i. A series of cards that will show the type of note and the message of the note.
ii. This will be the default home screen for a parent user.
1. See 3.1.1.10 for the specific layout of the parent's news feed.
b. Any user that has access to the specific child's information will have access to this news feed.
9. Moving students:
a. Staff or administrators can move a student to a different teacher at any time of the day.
b. Once completed it will be updated immediately for the new teacher and original teacher.
10. Calling a parent
a. See 3.1.1.6 and 3.1.1.7.
11. Approving accounts
a. Any account added needs to be reviewed for accuracy and approved. An administrative account does not need to be reviewed because it will be added by a current administrator only.
b. Set the appropriate permission to one of the following:
i. Staff
ii. Parent
iii. Teacher
c. Administrators function only.
12. Creating an administrative account
a. Information needed to set up Administrator accounts:
i. First and last name of administrator.
ii. Social Security Number.
iii. Email address.
b. The email address will be used as their login name. The user will not be able to change the login name to anything else.
c. A password will be assigned automatically. The user will have the option to change it when logged in to their account.

13. Changing account passwords
    a. If any account user has forgotten their user password, the administrator can reset the password to a generated password. The user will then be able to change it to a different password after they login.

14. Listing Children:
    a. Pull parent SSN and child SSN and an encryption combo will give the child's ID which can be used to access the child's private information. It will also be able to link the private information to the child's public information to generate the entire child's profile.

3.3. Behaviour Requirements

3.4. Use Case View

<A use case defines a goal-oriented set of interactions between external actors and the system under consideration. Since sometimes we will not be able to specify completely the behaviour of the system by just State Diagrams, we use use-cases to complete what we have already started in section 3.3.1.

TO DO: Provide a use case diagram which will encapsulate the entire system and all possible actors. Do not include detailed use case descriptions (these will be needed when you will be working on the Test Plan), but make sure to include a short description of what every use-case is, who are the actors in your diagram. For more information please refer to your UML guide and the MiniThermostat SRS example file.>

4. Other Non-functional Requirements

4.1. Performance Requirements

1. Actions that involve updating personal information will not take more than 10 seconds.

2. Moving children from one class to another should take at the most 10 seconds.

3. The result of adding a user to the system will take no more than 20 seconds.

4. All notes need to be delivered within 5 minutes from being created.

5. Authenticating users with RFID may not exceed 5 seconds.

4.2. Safety and Security Requirements

- **Sensitive Account Information**

  Sensitive information stored for each account with be stored with a one-way encryption. Things like Social Security Numbers, passwords, etc, will be encrypted.

- **User Authentication**

  Passwords are never stored or compared in plain text. User IDs and API Keys are generated through encryptions of special strings that are unique to each account. Each device will require admin authentication and matching User ID and API Key. A user's key fob will store their unique User ID and special authentication key, never their personal information or password.

- **Child Information**

  Information for each child is never stored in association with their names. Instead, the information is stored with unique Child IDs which are generated through methods based on the child's parent account. This adds an extra layer of protection to sensitive information about each child, including their current classroom, medication notes, etc.

4.3. Software Quality Attributes

- **Usability**

  This software should be designed for a fast and efficient workflow that allows for quick adoption in many environments. The end user has a small learning curve through the use

of intuitive user interfaces, resulting in improved usability.

- **Reusability**

  This software is efficient and reusable over time by keeping the usage history separate from current weekly, actions. Administrators will have the option to choose how long to keep usage history.

- **Interoperability**

  This software has the opportunity to tie into other systems through the use of the API. Some features could easily be converted into “public” APIs for other internal systems could tap into. If the pre-existing system offers some sort of API functionality, this software could also tap into that.

- **Reliability**

  The software should smoothly run on either a web server or local server. A local server would provide the most reliability since it would not require an active internet connection to interact with: in the event of an ISP outage, the system could still be access and modified. (For the ease of development and display of this project, we will be using a web server).

4.4. Database Design

1. Tables for the database:
    a. Parent
        i. SSN
        ii. Name
        iii. Email address
        iv. Phone
        v. Children SSN
        vi. ID from md5 (Name + SSN)
            1. Unique
    b. Children
        i. SSN
            1. Unique
        ii. Name
        iii. Date of birth
    c. Child Information
        i. Child ID (Parent SSN + Child SSN pass through encryption giving ID)
            1. Unique
        ii. Current location

d. Login
    i. Email address
        1. Unique
    ii. Password
e. Staff
    i. Name
    ii. SSN
        1. Unique
    iii. Email address

Appendix A - User Documentation

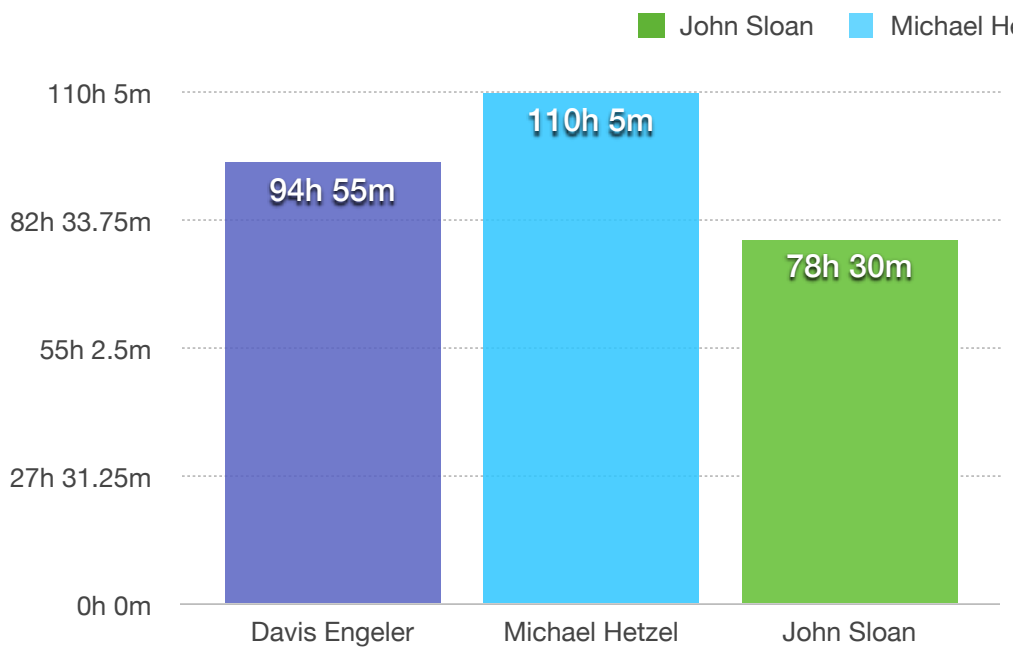
Appendix B - Group Log

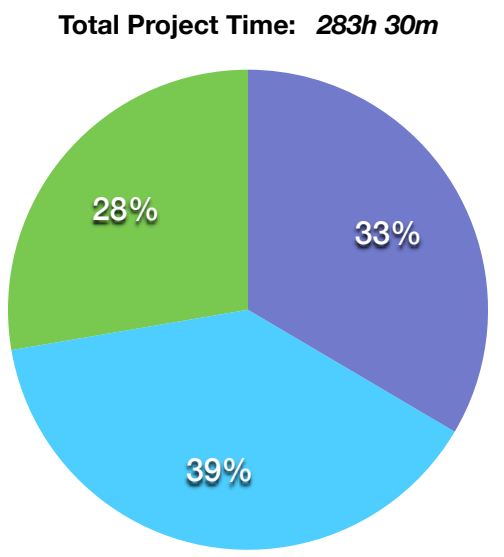
Time tracking for CSCI 540 Team #1. This chart keeps the running totals for hours spent by team member to give a visual representation of workload for the Day-Care Project

Hours by Team Member

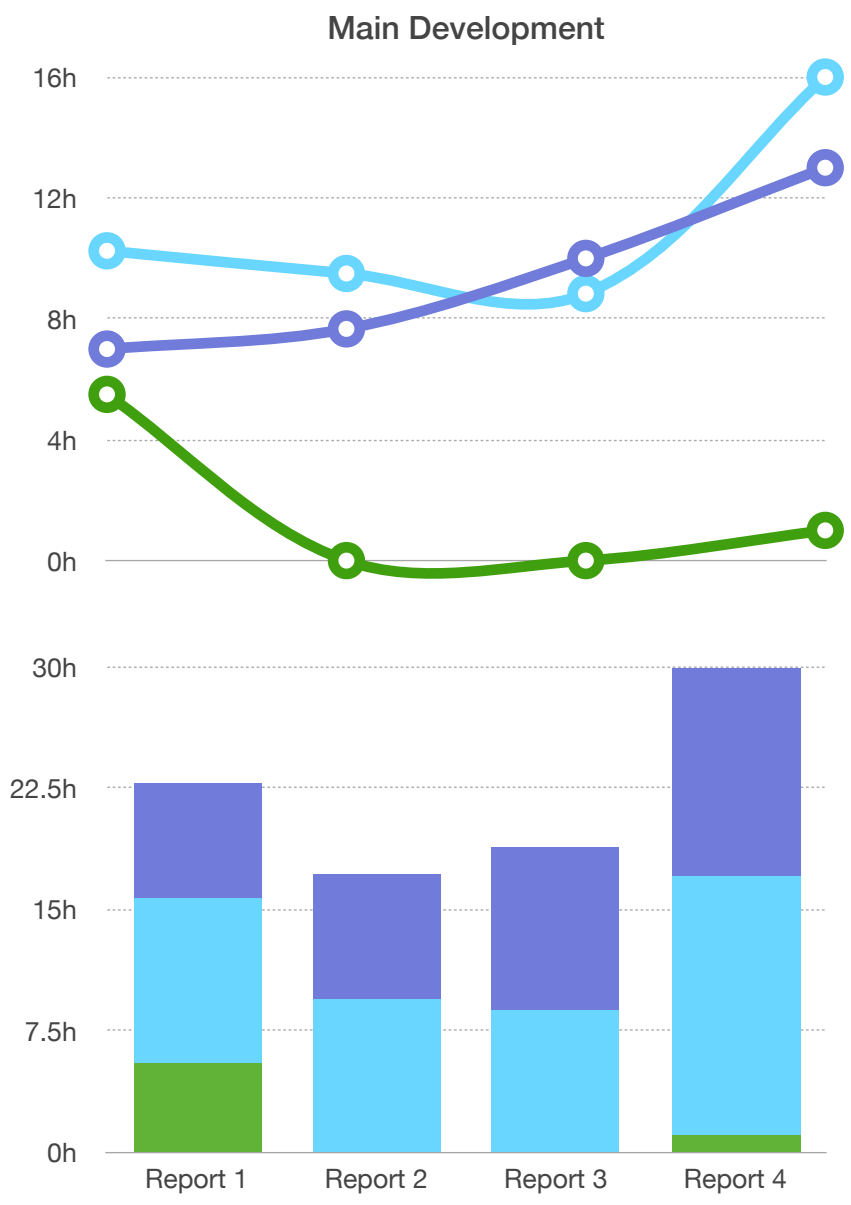
MEMBER	HOURS
Davis Engeler	94h 55m
Michael Hetzel	110h 5m
John Sloan	78h 30m

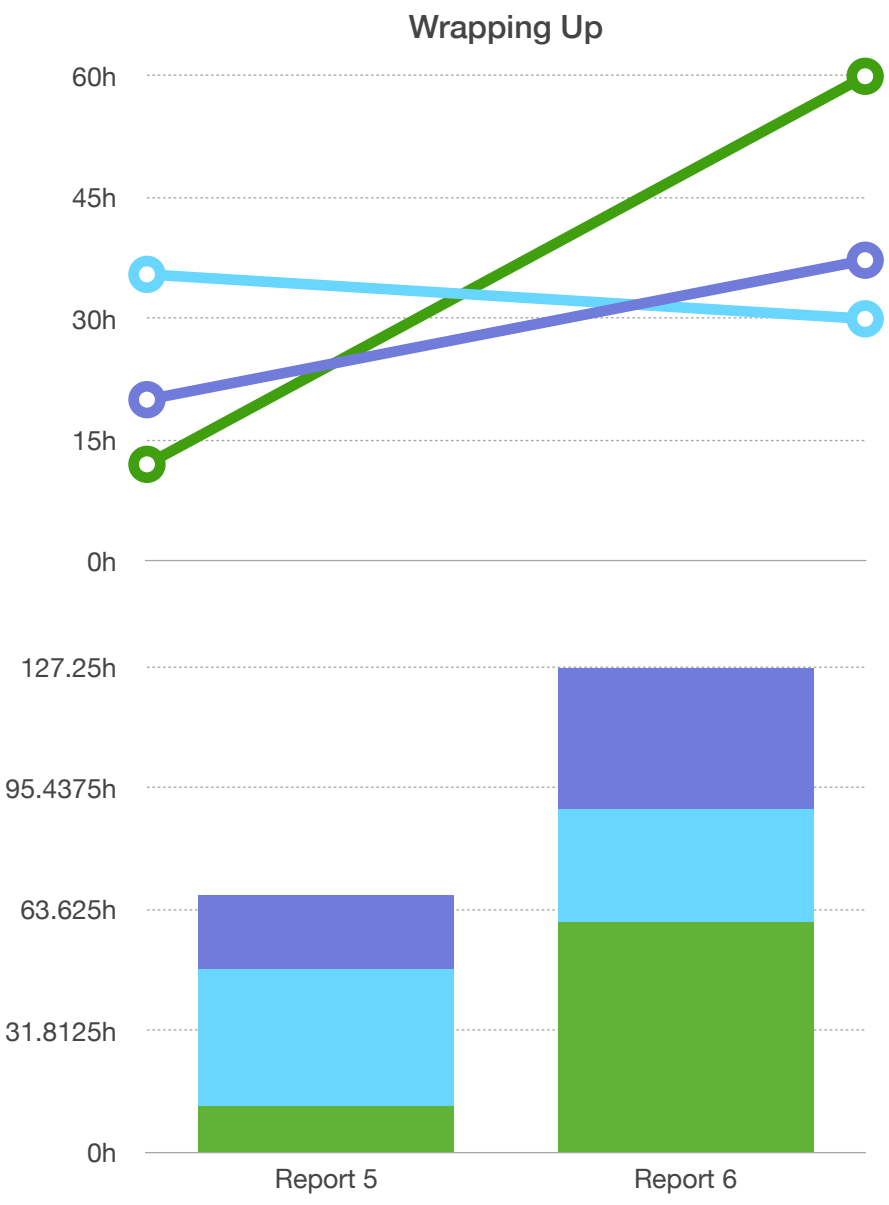
Time Totals





Time Breakdown





Davis Engeler Contributions and Time Tracking

CONTRIBUTION	TIME SPENT
Sep 21, 2014 - Sep 26, 2014	***7h 0m***
Initial Ideas	0h 30m
GitHub Setup and Training	1h 30m
Contributions Tracking Setup	0h 30m
Feasibility Study Documentation	2h 0m
Requirements Documentation Draft	1h 0m
Set Up Server and Database	1h 0m
Design Input	0h 30m
Sep 27, 2014 - Oct 3, 2014	***7h 40m***
Server and Database Initializations	1h 30m
Requirements Documentation Draft	2h 30m
Admin Portal Mockup	0h 25m
Contributions Tracking Redesign	1h 0m
Whiteboarding	0h 45m
Animation Mockups	1h 30m
Oct 4, 2014 - Oct 18, 2014	***10h 0m***
Project Plan	1h 30m
Database Structure	3h 0m
Database Issues	4h 0m
API Authentications	1h 30m
Oct 18, 2014 - Oct 31, 2014	***13h 0m***
Database and API Development	13h 0m
Nov 1, 2014 - Nov 15, 2014	***20h 0m***
API Development	20h 0m
Nov 16, 2014 - Dec 1, 2014	***37h 15m***
API Development	35h 45m
Timesheet Organization	1h 30m
TOTAL	**94H 55M**

Michael Hetzel Contributions and Time Tracking

CONTRIBUTION	TIME SPENT
Sep 21, 2014 - Sep 26, 2014	***10h 15m***
Initial Ideas	0h 30m
Feasibility Study Documentation	1h 30m
Requirements Documentation Draft	4h 15m
Initial Android JSON Test	3h 30m
Design Input	0h 30m
Sep 27, 2014 - Oct 3, 2014	***9h 30m***
Requirements Documentation Draft	9h 30m
Oct 4, 2014 - Oct 18, 2014	***8h 50m***
Project Plan	1h 30m
Editing Requirements Documenation	1h 30m
Database Structure	3h 0m
Database ER Diagram	1h 0m
Android Studio Setup	1h 0m
Android Device Authentication Request	0h 50m
Oct 18, 2014 - Oct 31, 2014	***16h 0m***
Android Development	16h 0m
Nov 1, 2014 - Nov 15, 2014	***35h 30m***
Android Development	35h 30m
Nov 16, 2014 - Dec 1, 2014	***30h 0m***
Android Development	30h 0m
TOTAL	**110H 5M**

John Sloan Contributions and Time Tracking

CONTRIBUTION	TIME SPENT
Sep 21, 2014 - Sep 26, 2014	***5h 30m***
Initial Ideas	0h 30m
Feasibility Study Documentation	1h 0m
Android Design Mockups	4h 0m
Sep 27, 2014 - Oct 3, 2014	***0h 0m***
n/a	0h 0m
Oct 4, 2014 - Oct 18, 2014	***0h 0m***
n/a	0h 0m
Oct 4, 2014 - Oct 18, 2014	***1h 0m***
Android Help	1h 0m
Nov 1, 2014 - Nov 15, 2014	***12h 0m***
Android Help	4h 0m
Replicating Project	4h 0m
Reading / Working on Push Notifications	4h 0m
Nov 16, 2014 - Dec 1, 2014	***60h 0m***
Android Development	60h 0m
TOTAL	**78H 30M**