Team 9: Project Proposal Report

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Project Name

PillPal

Project Synopsis

Medical app that reminds people to take their medication and makes medication management simple.

Project Description

PillPal has been undertaken to help individuals keep track of their daily medications. Many people have multiple prescriptions and it can be easy to lose track of them. This app aims to help manage that load. PillPal's medium will be reminders set on a mobile device and optionally will work through Alexa. These reminders will tell a person or caregiver when the next time and dosage is along with an image of the medication and if a dose has been missed. This will be done through a series of text-based, mobile notification and/or vocal alerts. Furthermore, the PillPal will allow the user and/or caregiver to monitor usage and record any side effects. It will also have reminders of contraindications and when supply is running low for the given medication. An additional function would be a journal to allow people to recall any information regarding any changes in health such as vital signs, symptoms, sleep, reasoning for withheld medication, etc. PillPal would allow people or caregivers to take their health into their own hands, including a better method to communicate information.

Project Milestones - Fall Semester

Milestone	Estimated Completion Date
Finalize project details and setup project on GitHub	10/06/2019
Decide on initial design of UI	10/06/2019
Gather requirements and sketch layout	10/13/2019
Get familiar with React Native and other technologies	10/20/2019
Finish skeleton of application so it works on mobile devices	10/27/2019
Finish skeleton of database and connect it to application	10/27/2019
Finish basic UI and functionality for each page	11/10/2019
Improve UI and functionality for each page	11/24/2019
Finish testing for current state of project	12/08/2019
Finish documentation for current state of project	12/08/2019

Project Milestones - Spring Semester

Milestone	Estimated Completion Date
Improve UI and implement functionality for each page	02/16/2020
Finish skeleton of Alexa skill	02/23/2020
Finish building and integrating Alexa Skill	03/01/2020
Transition to a non-KU database (TBD)	03/15/2020
Finish testing	04/12/2020
Finish documentation	04/12/2020
Submit application to Android App Store and Apple Store	04/19/2020
Add enhancements/defect fixes and update on both App stores	05/03/2020

Project Budget

Everything that we are doing can be done for free with the exception of getting an Apple Developer Account. However, there are optional paid tiers available for several of the resources listed below. We are going to use the KU database for the majority of development, but may or may not decide to transition to another free database option before graduating from KU in May 2020.

Resource	Special Training?	Vendor	Estimated Cost	Date Needed By
GitHub Repository	No	Microsoft Corporation	$0	10/06/2019
IDE	No	Many options, up to each developer based on personal preference	$0	10/20/2019
Android phone for testing	No	Not Applicable	$0	10/20/2019
iPhone for testing	No	Not Applicable	$0	10/20/2019
KU database	Yes	University of Kansas	$0	10/20/2019
React Native	Yes	Facebook Inc.	$0	10/20/2019
Alexa Skills Kit	Yes	Amazon.com, Inc.	$0	03/01/2020
Apple Developer Account	No	Apple Inc.	$99	03/01/2020

Work Plan

The tasks listed below will generally be assigned to these specific team members. However, other tasks may be assigned as needed and everyone is encouraged to contribute wherever they would like to or wherever is especially needed.

Task	Andrew Hubbard	Lauren Stephenson	Grant Stewart	Brian Quiroz	Shogun Thomas
Frontend, UI		x		x	x
Backend, Database	x		x		
Testing	x	x	x	x	x
Documentation	x	x	x	x	x

Preliminary Project Design

PillPal has been undertaken to help individuals keep track of their daily medications. Many people have multiple prescriptions and it can be easy to lose track of them. This app aims to help manage that load. The UI (front end) of the app will be developed using React Native. The app will run on both iOS and Android devices. PillPal's medium will be reminders set on a mobile device and optionally will work through Alexa. These reminders will tell a person or caregiver when the next time and dosage is along with an image of the medication and if a dose has been missed. This will be done through a series of text-based, mobile notification and/or vocal alerts. It will also have reminders of contraindications and when supply is running low for the given medication. Users will also have the option to have multiple people tracked on the same device at one time. This would be especially useful for caregivers and/or parents who want to manage the medication intake of more than one person but only require one account.

The home screen will have one person's reminder information on it. To the top right, an add/switch user option will be provided. At the upper center of the screen, the user will be able to see how much time is left before they have to take their next pill. Immediately below, there will be a button that allows people to assert that they have taken their medication. Users will also have the option to add or change their notes for that day by tapping on the "View/Edit Today's Note". The notes will have options to add symptoms/ feelings and custom notes that can be viewed later. An additional function would allow people to recall any information regarding any changes in health such as vital signs, symptoms, sleep, reasoning for withheld medication, etc. At the lower center of the home page, users will be able to see the medications that they have to take during the day, and will have the option to edit the time/info for each pill. At the bottom of the home page, we will implement options for returning to the home screen, and proceeding to the calendar, settings, as well as log/charts of information for the current person.
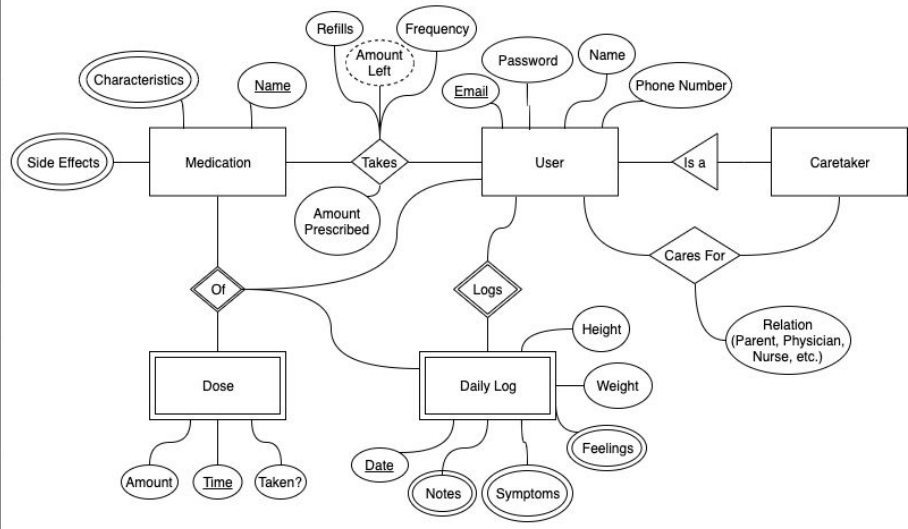
PillPal will allow the user and/or caregiver to monitor usage and record any side effects. The calendar will allow options to enter in information/ prescriptions for future dates. The settings will have options for account information (users, passwords, notification options, signing out), along with help/ app versions. The logs and charts will have weight, and any other information that could be tracked in a chart format, along with an option to enter in values for that day. Users will be able to see how quantifiable items such as weight have changed over time and thus be able to better assess whether their medication is having the desired effect or not having undesired side effects (such as weight gain/loss). In addition, we plan to give users the ability to export their data into a CSV file. PillPal would allow people or caregivers to take their health into their own hands, including a better method to communicate information, using a simple to use UI.

To save PillPal's data and keep an accurate log of a users experience an offline and online database will be needed to allow a user to record logs and get reminders at all times. The offline portion of the database will be stored on a users mobile devices under application storage. To implement the offline database PillPal will using SQLite as it has a dedication to the public domain and is free to use. For the online database PillPal will be running inside KU's mySQL database to store a user's sensitive medical data. To keep user data safe and redundantly available, the locally stored data will keep essential parts needed to run the application such as the daily logs, dosages and medication information, while the online storage will keep all data including specific sensitive information about the user. The database structure is set up on various dependencies and will include but not limited to the following data. For example a user will have an email, password, name and phone number, the user will then be given a table for medications, dose and daily logs. A medications attributes contain the name, characteristics and any side effects or contraindications that go along with said medication. The dose is dependent on the user and medication, containing the total prescription amount, the time needed to take the medication and a boolean for if the medication was taken on the said dosage time. The daily log will contain the date of the log, any user notes, symptoms, feelings, height and weight. User entity will be a subset of the caretaker allowing for a complete monitoring for the caregiver.
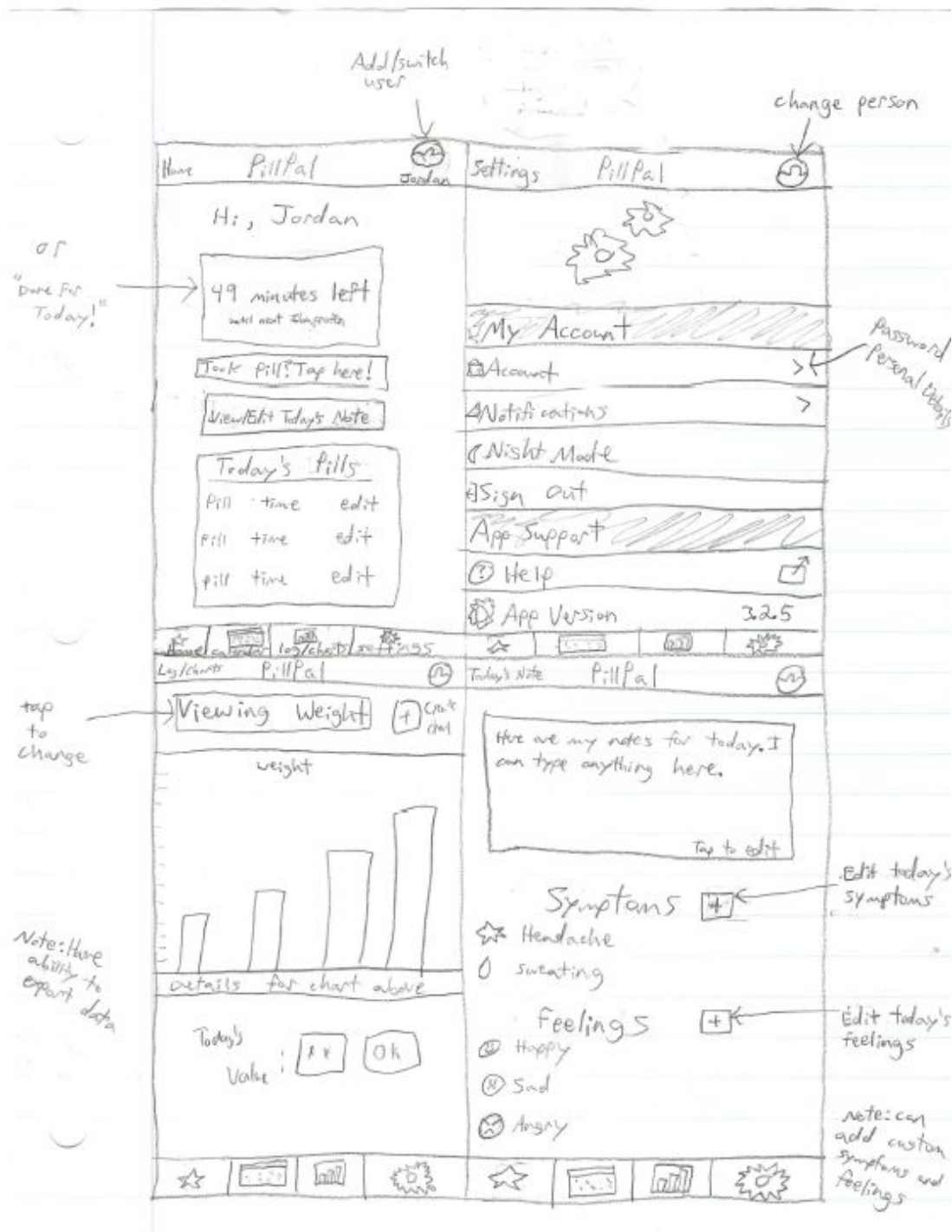
Some possible future features include using mySQL and a REST API to have an online database and making the app available online. Doing so would allow for a wider range of possible features. For instance, we could allow users to request medication refills online. However, this feature in particular would possibly involve some negotiating with medication providers as well as some meticulous care on our part when potentially dealing with patient's health information. Another feature we could add by having the app work online would be to enable the user to obtain medication information in real time from an online pre-existing database. That way, common medications would be more visible and easy to find by users and the overall user experience would be enhanced. If we do make the app available online we must also ensure that the basic functionality of the app (offline features) is not compromised in the event that no Internet connection is available. That is, the core functionality of our app will not rely on Internet connectivity. Users should be able to add and manage their medications as well as keep track of changes in their weight (and other items they are concerned with such as blood pressure) over time with the offline version of the app.
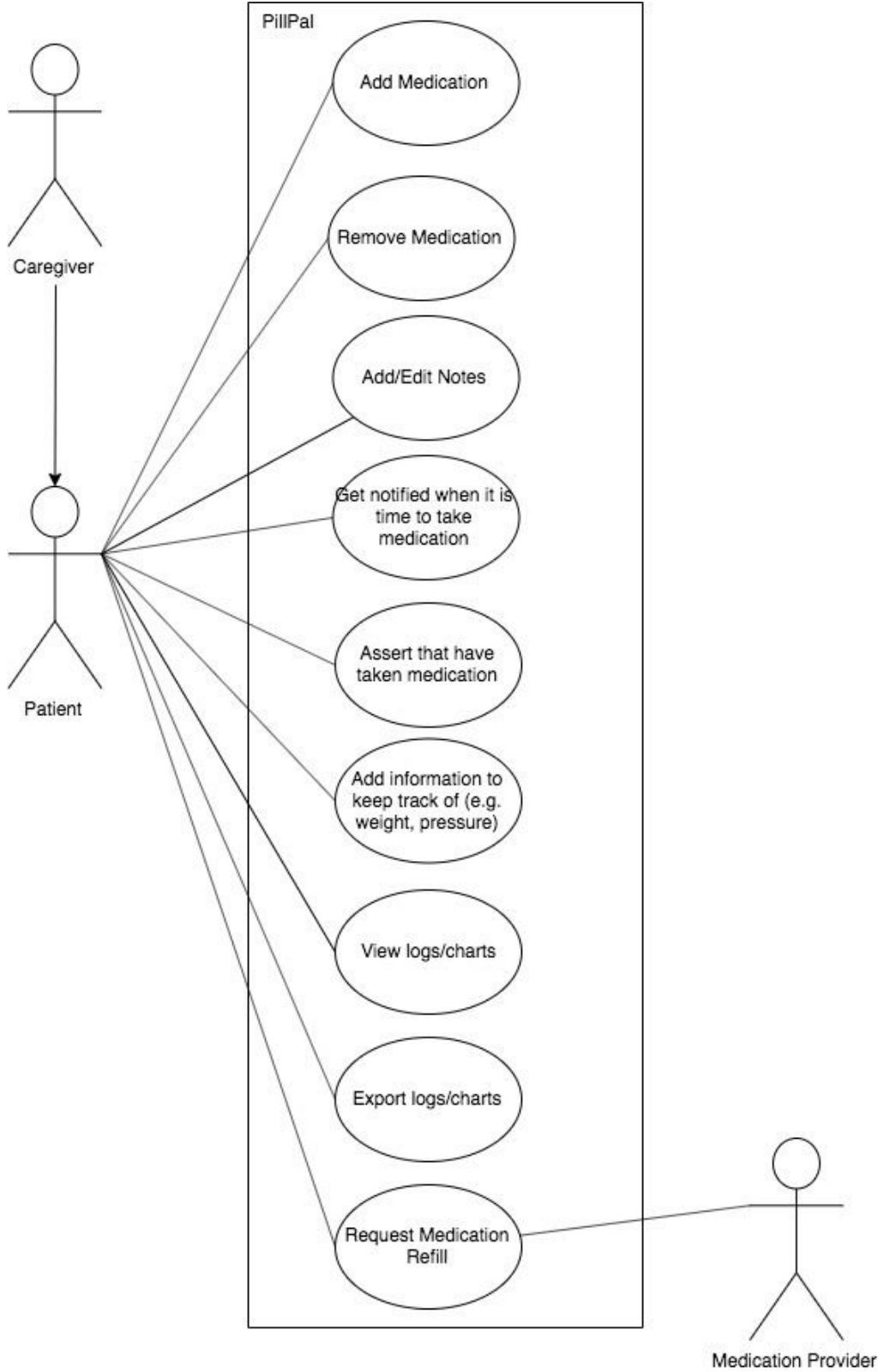
Database ER Diagram

Symbol	Name	Description
▭	Entity Set	A collection of similar *Entities* In OO terms, this would be like a class while the entities themselves are like different instances of that class
⬭	Attribute	A property of the entities within an entity set In OO terms, this would be like the instance variables of a class
⬭⬭	Mutil-Valued Attribute	An attribute that may have multiple values for a given entity In OO terms, this would be like a list instance variable
(⬭)	Derived Attribute	An attribute that is not stored but can be derived from the values of other attributes
<u>Text</u>	Key Attribute	An attribute that must have a unique value for every entity within the set. This is used to identify an entity This would be like the serial number of the entity
◇	Relationship Type	A group of similar *Relationships* between two or more entities. This indicates that the entities interact in some way and may have their own attributes that describe the relation.
▷	Subclass Relation	Indicates that the given entity set is a special type of another set. The triangle points away from the subclass and toward the superclass In OO terms, this is like class inheritance
▭	Weak Entity Set	Indicates that the entity set is dependent upon an entity from a different set. This means that these entities need to be identified by their key attribute and the key attribute of the entity that they are dependent upon
◇◇	Dependency Relation	Indicates that the attached weak entity set is dependent upon the other attached entity set

UI Sketch Diagram

Add/switch user

change person

Home PillPal Jordan

Hi, Jordan

or "Done For Today!"

49 minutes left
until next diagnostic

Took Pill? Tap here!

View/Edit Today's Note

Today's Pills
Pill time edit
Pill time edit
pill time edit

Home calendar log/chart #255

Settings PillPal

My Account
Account >
Notifications >
Night Mode
Sign out
App Support
Help
App Version 3.25

Password
Personal details

Log/charts PillPal

tap to change

Viewing Weight chart

weight

Note: Have ability to export data

Details for chart above

Today's Value : 1x Ok

Today's Note PillPal

Here are my notes for today. I can type anything here.

Tap to edit

Symptoms +
Headache
sweating

Edit today's symptoms

Feelings +
Happy
Sad
Angry

Edit today's feelings

Note: can add custom symptoms and feelings

Use Case Diagram

Ethical and Intellectual Property Issues

An ethical issue PillPal could face is that this application intended use is for reminders and making medication management simple. It is not intended to be a replacement for a medical physician and can be seen as a helpful tool for relaying information to a physician as well as keeping a user on track with required medication. PillPal is also not responsible for complications one might experience or any undesired effects a dosage might have on a user. PillPal will need to set in place a non disclaimer or agreement upon usage of the application to inform a user of these intentions and that a medical physician is always required before of medications.

Another ethical issue PillPal will face is keeping users sensitive medical information safe. This can be done initially by having a locking mechanism on the entry screen, login with a pin or a username and password, to not allow easy access if a mobile device has been compromised. Keeping the data safe also includes having any sensitive data secure within our database system as applications on mobile devices are protected by the operating system and not encrypted within the application itself. This makes the target for exploiting on the mobile device itself so any sensitive data will be kept on the only mySQL database to prevent this.

An intellectual property issue PillPal will face is staying within licensing compliances when using open source software. React Native is under an MIT License agreement meaning that redistribution, modification, use, publication or distribution is allowed free of charge. But, the copyright notice used with MIT Licenses must be present within all portions of software pertaining to React Native. So making sure these copyright statements are present is critical to keeping PillPal's intellectual integrity. Another open source software PillPal will be using is SQLite. This open source agreement states that SQLite is written for the public domain and has no bounds on what a person or company does with the software. SQLite has been dedicated to the public domain so using this open source software requires no copyright agreements shown but if a Warranty of Title is needed, Hwaci will sell the Warranty of Title for SQLite.

Changelog

- Project Milestones
  - Overall Layout
    - Originally had all milestones listed in one table, but decided to split them into one table for fall semester and one for spring semester. This was done to better organize the milestones, especially as additional milestones were added.
  - Minor phrasing edits
    - Very minor phrasing edits were made such as shortening User Interface to UI and collapsing two related milestones that were due on the same date into one milestone with the same due date. This did not change the milestones in any way other than to improve visual aspect of the list.
  - New milestone: Gather requirements and sketch layout (10/13/2019)
    - Added because it is a critical early step in the project development.
- Work done by team
  - Brian is now assigned to front end instead of back end
    - We realized we needed more people doing front end and Brian was the most interested in doing front end out of the people not already doing it.