

CMPT 275: Software Engineering I

Assignment 1 - Project Proposal

Group: 8

Team Name: The Great Eight

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Revision History

Revision	Status	Publication/Revision Date	By
1.0	Created	September 19, 2019	Hoang Bao Ngan Nguyen
1.1	Revised (added) - Table of Contents - Risk Management - Staffing & Organization - Project Website	September 21, 2019	Kevin Jerome
1.2	Revised (added) - Project Plan - Summary - Overview	September 22, 2019	Hoang Bao Ngan Nguyen, Kevin Jerome
1.3	Revised (added) - Summary - References - Project Plan	September 24, 2019	Joseph Dillman, Wei Da Song
1.4	Final Revision (updated & edited) - Formatted - Proofread - All content	September 25, 2019	Kevin Jerome

Table 1 - Revision History of Document

Project Summary

Remedi - *Organize Your Health.*

Remedi is a web and mobile based application designed to assist in managing exercises, therapy and medication, as specified by a physician, for patients suffering from Parkinson's Disease (PD). The application is composed of 5 key features: scheduling, progress tracking, reporting, reminders, and exercises. These features will be described in greater detail in the Project Overview.

Through a web-based platform, Remedi will allow physicians to communicate exercises, therapies, or medications to patients as prescribed, along with the number of repetitions and duration for each action. After installing and linking their mobile application, the patient will be automatically alerted and provided with details for each prescribed action according to the physicians input. The patient will be able to track the progress of their actions and share what they've done with their physician.

Remedi is designed to be used by PD patients aged 40 to 75 in PD stages 1 to 3 where motor skills are worsened but not completely limited [1]. A familiarity with iOS, and high-school level proficiency in English will be required by patients.

Remedi will be useful for both physicians as well as patients. Physicians will be able to easily prescribe actions to patients and have a record of completion and feedback as time progresses. Patients can avoid the stress involved with interpreting confusing documents as Remedi will handle scheduling and provide instructions for each prescribed action. Currently, patient non-adherence to at-home therapy can occur in as many as 65% of cases [2], [3]. Remedi seeks to lower this non-adherence by providing a streamlined user experience for patients.

Project Overview

Research suggests that Parkinson's disease results in the death of dopamine-producing neurons in the brain, resulting in a lower level of dopamine in patients affected with the disorder [4].

Doctors who treat the disease tend to prescribe medications which help to regulate dopamine release in people living with Parkinson's and also recommend certain exercises or physical therapy which have been shown to slow the decline of or even improve some effects of the disease such as reduction in balance or impairment of speech [5]. By administering a combination of medicine and exercise, those affected may be able to alleviate some of Parkinson's unpleasant symptoms that are experienced daily.

Typical symptoms of Parkinson's disease usually manifest in the form of anomalies in motor control and a decline in cognitive function. Cerebral malfunction may result in irregular movement and tends to create difficulty in coordinating interaction between limb segments [8].

Research conducted has shown that patients who performed exercises regularly had an improvement of more than 40% in stiffness, and a one-third reduction in tremors [10]. In addition, physical activities also appear to help enhance the cognitive abilities in Parkinson's patients [9].

As previously mentioned, we are targeting those with stages 1-3 of Parkinson's disease as we feel that they are the most likely candidates to still be able to use an app given the effects of their symptoms [1]. Beyond physical ability, we shall only assume that the user understands a high school level of English and that they are able to navigate into the application itself within the iOS environment. Finally, we are not assuming any prerequisite medical knowledge.

Our application aims to create a solution that supports Parkinson's patients by improving their quality of life by using focused and medically-sound therapeutic exercises that are recommended by their physician.

We plan the following five (5) features:

1. **Scheduling** – users of the application shall be able to keep track of therapeutic exercises according to a schedule decided by their physician via a website.
2. **Progress Tracking** – users of the application shall be able to view their exercise frequency over time via visual and analytic representations of historical exercise data.
3. **Reporting** – users of the application shall be able to generate a summary of their performed exercises that can be exported into a comma-separated-value (csv) file and/or .pdf file.
4. **Reminders** – users of the application shall have an option to be reminded to perform exercises or to take medication, with notifications following a set schedule.
5. **Exercises** – users of the application shall be able to view the names, descriptions, and quantity of exercises that are prescribed by their physician and shall be provided with an instructional illustration on how to carry out each exercise.

The project idea is split into three distinct areas:

1. **The iOS application:** The user application itself will provide all the above-listed functionality.
2. **A supplementary website for physicians:** Physicians shall be able to perform actions on a connected website that will change the information displayed on the user application.
3. **The database:** The database shall hold information obtained from both the application and website and act as an intermediary between the application and website.

The stakeholders for this project will consist of the student creators involved in designing the application, as a successful project will contribute to academic growth and career development. In addition, Dr. Tsang is one of the stakeholders due to the nature of his involvement in the class. Parkinson's patients are our end-users, so they are also stakeholders because the resulting app - if successful - can have a direct and positive impact on their quality of life.

Project Planning

Communication relating to the internal development of the application shall be done in two primary ways: in-person meetings and online sharing of information.

Meetings shall be held at least twice per week at a prearranged time slot of 10:30am to 12:20pm on Tuesdays and Thursdays on the 2nd floor of the SFU library. Exact room locations will vary due to booking constraints. Meetings shall follow an agenda that is to be prepared beforehand and are fully documented as the meeting progresses.

Online sharing consists of messaging and file transfers via Slack and the Google suite. The primary communication platform, Slack, serves as a tool to organize both formal and informal communications, with filtering and searching capabilities present. Google provides Google Drive – a place for hosting files - and Google Docs – a service for creating shareable online documents.

Communication outside of the team shall be conducted through a team-elected intermediary who is responsible for being an access point to external parties. Examples of external parties include the course professor, Herbert Tsang, the course’s teaching assistant, and those in professional organizations.

A team website is accessible via: https://kevmot.github.io/cmpt275_fa2019_team8
The website contains critical information relating to assignments and the project and has been made fully accessible to the public.

The project’s software repository has been created and is hosted on GitHub, with the primary versioning software being Git.

The project shall be constrained by a budget consisting of man-hours and money. Three major categories of expenses include software, hardware, and labour. Since we require no financial investment, the monetary portion of the budget is \$0.00 CAD.

1. Software expenses:

- a. Xcode:
 - i. Our cost: \$0.00
 - ii. Theoretical cost: \$0.00
- b. Apple Developer Program:
 - i. Our cost: \$0.00
 - ii. Theoretical cost: \$99 USD.

2. Hardware expenses:

- a. iPhone:
 - i. Our cost: \$0.00 – already acquired.
 - ii. Theoretical cost: starting at \$1,099 CAD for the newest model.
- b. Mac computer:
 - i. Our cost: \$0.00 x 6 – already acquired.
 - ii. Theoretical cost: starting at \$1,000 CAD for the newest model.

3. **Labour:**

- a. Man-hours:
 - i. 6 developers x 13 weeks x 12 hours/week = 936 man-hours
- b. Financial cost:
 - i. Our cost: \$0.00/semester x 6 developers = \$0.00.
 - ii. Theoretical cost: Developer salary x number of developers x time taken

Key Tasks	Start Date (mm/dd/yy)	End Date (mm/dd/yy)	Milestones / Deliverables
Project Initiation	09/16/19	09/24/19	1) Project plan 2) Project website
Requirements and Initial Design	09/26/19	10/15/19	1) Requirements document 2) Design document 3) Quality assurance plan
Version 1 and Presentation	10/17/19	11/03/19	A working prototype with all of the features implemented
Version 2	11/04/19	11/17/19	1) Version 2 of the prototype 2) Test plan 3) Detailed work assignment document
Version 3 and Presentation	11/19/19	12/1/19	1) Final product 2) Presentation document

Table 2: Project Key Tasks, Milestones, and Deliverables

Remedi

The Great Eight

Project Start:	Thu, 9-19-2019	
Today:	2019-23-09	
Display Week:	1	

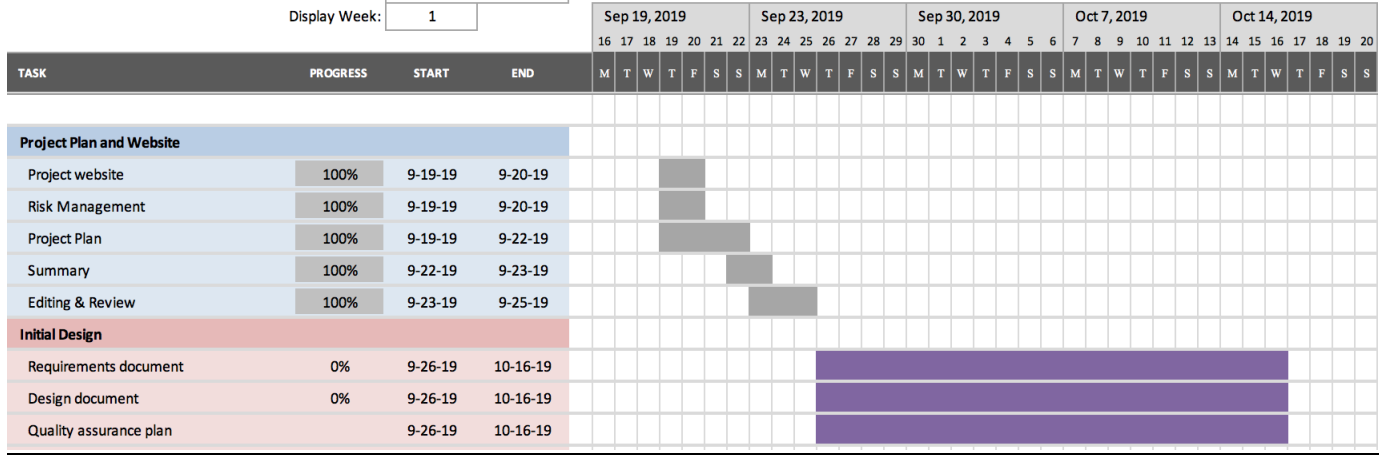


Figure 1 - Project Schedule, Assignments 1 and 2

Remedi

The Great Eight

Project Start:	Thu, 10-17-2019	
Today:	2019-24-09	
Display Week:	1	

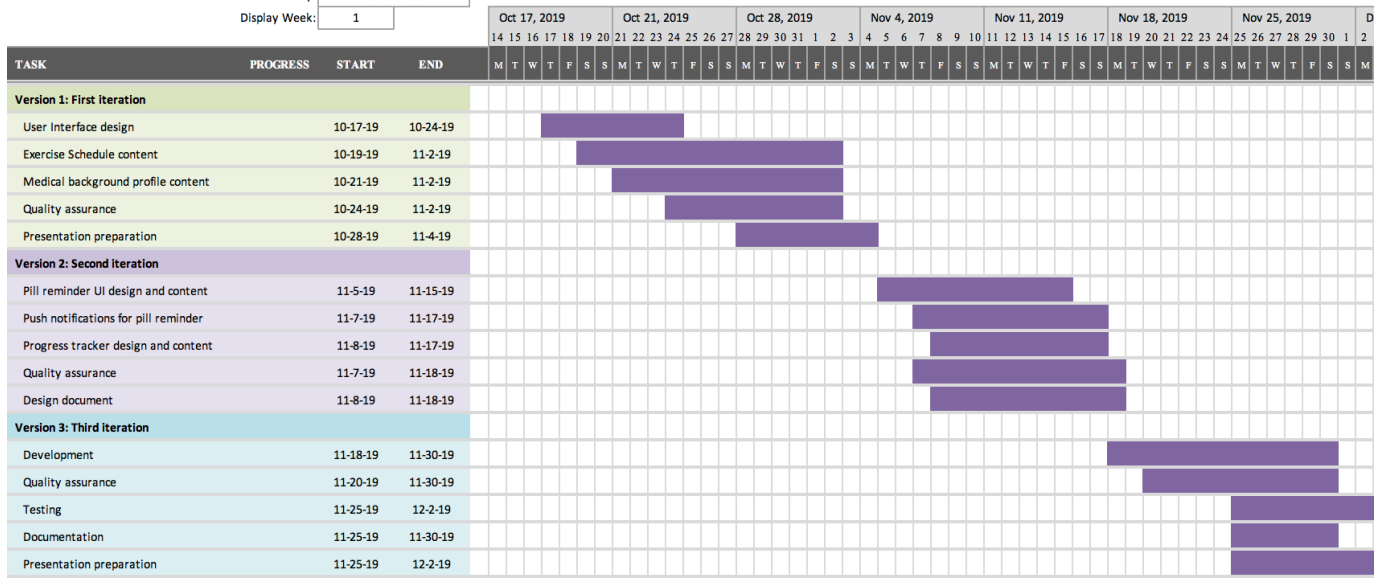


Figure 2 - Project Schedule, Assignments 3,4,5

Risk Management

As per the Sommerville text:

1. Potential impact: “*The effects of the risk might be assessed as catastrophic (threaten the survival of the project), serious (would cause major delays), tolerable (delays are within allowed contingency), or insignificant*” [6].
2. Likelihood of occurrence: we shall assess the likelihood of occurrence to be either insignificant, low, moderate, high, or very high [6].
3. Impact area: we shall classify risks as project risks, product risks, and business risks [6].

Risks	Potential Impact on Project	Likelihood of Occurrence	Impact Area	Mitigation Strategy
Estimation				
Time needed to develop software is underestimated.	Catastrophic	High	Project, product	Increase planning sessions so team is less prone to underestimate.
Time needed to validate software is underestimated.	Serious	High	Product	Integrate testing with development.
Organizational				
Severe weather prevents campus access.	Tolerable	Moderate	Project, business	Set up remote working capabilities.
People				
Illness of team member limits development time.	Tolerable	Very High	Project	Assign work that easily allows for anyone to work on a task.
Team member leaves.	Catastrophic	Insignificant	Project	Support and encourage healthy team dynamics.
Team member lacks requires skill set to effectively contribute.	Serious	Low	Project	Allow team members to work in their areas of strength.
Requirements				

Scope of project changes, requiring significant additional development time.	Serious	Moderate	Project	Spend additional time forecasting project schedule and assessing requirements.
Inaccurate analysis of the users leading to a final product that is not user friendly	Serious	Moderate	Product, Business	Gather enough data from the target user (patients with Parkinson's) to truly address their needs and reflect it on the design
Technology				
Functionality required to fulfill a feature is not possible in the development environment.	Catastrophic	Low	Project, product	Look into environment capabilities before the team commits to certain implementation of a feature.
Database is not capable of providing the throughput required.	Catastrophic	Insignificant	Product	Look into technical limitations of several options before selection of database.
Tools				
Repository system becomes corrupt or is in an unusable state.	Catastrophic	Insignificant	Project, product	Ensure both local and remote repositories exist.

Table 3 - Project Risk Assessment

Project Organization and Staffing Plan

Kevin Jerome - Project Manager, Configuration Manager
kjerome@sfu.ca

Responsibilities: Project scheduling, repository health

Biography: Kevin is a fourth-year computer engineering student. After two co-ops with a global manufacturer of surveillance software and hardware, he has taken an interest in the field of security. He has experience with both software (C++, PowerShell, Python) as well as hardware and is looking for new opportunities that tackle problems from a system engineering perspective.



Figure 3 - Kevin Jerome

Joseph Dillman - Software Developer

jdillman@sfu.ca

Responsibilities: Programming, unit testing, product design

Biography: Joseph is beginning his fourth year as a computer engineering student and is interested in pursuing a software engineering related career. In two previous co-ops, one with the government and another at a local startup, Joseph held positions involving data science with Python and full-stack Javascript software development. He is currently searching for new opportunities, specifically in back-end development.



Figure 4 - Joseph Dillman

Hoang Bao Ngan Nguyen (Krystal) - Software Developer

hbn2@sfu.ca

Responsibilities: General development

Biography: Krystal is a fifth-year Computer Engineering student with a focus in software development (web & mobile applications). She has work experience doing full-stack development using C#, .NET and SQL stack. Other technologies that she has experience is with Python for data science and machine learning, Java and C/C++.



Figure 5 - Hoang Bao Ngan Nguyen

Wei Da (David) Song - Quality Assurance

wdsong@sfu.ca

Responsibilities: Integration testing, software validation

Biography: David is a SFU computer engineering student in his fourth year of study. With past co-op experience as a software test engineer, David has been involved in working closely with software and hardware developers to validate and develop smart home devices. He has also worked to create automation scripts for use in an automated testing suite. David hopes to work on firmware development and automated systems in the future using his knowledge in Python and C++.

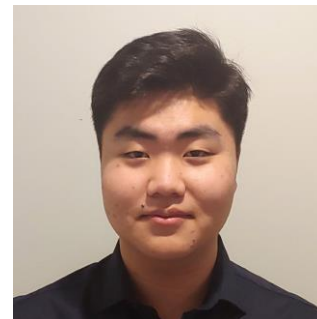


Figure 6 - David Song

Huy Thong Bui - Software Developer

htbui@sfu.ca

Responsibilities: General development

Biography: Thong is a fifth-year Computer Engineering student with an interest in data engineering and analytics, and his previous work experience includes experience as a research assistant, data engineer and data analyst. Thong codes mainly in Python and C/C++, and he is willing to learn more about new technologies and software development process.



Figure 7 - Huy Thong Bui

Payam Partow - Software Developer

payam_partow@sfu.ca

Responsibilities: General development

Biography: Payam is a fourth-year computer engineering student with past co-op experience as an IT specialist in stem-cell technologies. Payam has been involved in troubleshooting and repairing both hardware and software issues and has experience with server maintenance and security. Payam has some experience coding in C/C++ and Python and is willing to learn more about software development techniques.



Figure 8 - Payam Partow

References

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- [7] A. Moustafa, S. Chakravarthi, J. R. Phillips, A. Gupta, S. Keri, B. Polner, M.J. Frank, and M. Jahanshahi, "Motor symptoms in Parkinson's disease: A unified framework.", *US National Library of Medicine National Institutes of Health*, 12-Jul-2016. [Online], Available: <https://www.ncbi.nlm.nih.gov/pubmed/27422450>. [Accessed: 23-Sep-2019]
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- [10] A. Carvalho, A. Filho, E. Rodriguez, N. Rocha, M. Carta, and S. Machado, "Physical Exercise For Parkinson's Disease: Clinical And Experimental Evidence", *US National Library of Medicine National Institutes of Health*, 30-May-2018. [Online], Available: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5897963>. [Accessed: 23-Sep-2019]

Appendix A - Team meetings, agenda, and minutes

1. Meeting 1: Thursday, September 19, 2019

Accessible via:

<https://docs.google.com/document/d/1gH3NLiod9X1nGWhHELLHTky9F33fyV7TY5vbUyrJAQA/edit?usp=sharing>

CMPT 275: Software Engineering I: Meeting Minutes		
Group Number: 8		
Team Name: The Great Eight		
Date/Time: Thursday, September 19, 2019 - 10:30am - 12:20pm		
Location: SFU Library, 2nd floor		
Meeting Number: 1		
Attendance		
Member	Present	Reason for absence
Kevin Jerome	Y	
Joseph Dillman	Y	
Hoang Bao Ngan Nguyen	Y	
Wei Da (David) Song	Y	
Huy Thong Bui	Y	
Payam Partow	N	Communication error.

Agenda
Topic: Formal Communication (Information Sharing)
Discussion: Team discussed several services such as Slack and Discord. More people in the group appeared to favour Slack.
Action taken: Slack workspace to be set up.
Assignee: Joseph Dillman
Topic: Project Website
Discussion: Team discussed Github Pages and Google Sites. Familiarity + ease of use made Github pages the clear choice.
Action taken: Github Pages project to be set up.
Assignee: Kevin Jerome
Topic: Individual Role Assignment
Discussion: Who will be project manager? Will we rotate? Agreed that it was too early to decide roles yet.
Action taken: Defer role assignment to weekend.
Assignee: n/a
Topic: Team Name
Discussion: Not many ideas given. Kevin came up with “The Great Eight”.
Action taken: Team shall be named “The Great Eight”.
Assignee: n/a
Topic: Brainstorm of App Ideas

<p>Discussion:</p> <p>Voice-assisted note taking app (with simple GUI for reading/deleting notes)</p> <p>Medication recommendation flowchart (legal risk?)</p> <p>Pill reminders and therapy (mental wellness)</p> <p>Reaction timer?</p> <p>Driving assessment</p> <p>Games:</p> <ol style="list-style-type: none"> 1. draw/create something with a random motion 2. speech game (say words, monitor loudness and accuracy) 3. word game using voice as input 4. crossword puzzle but you answer with your voice <p>Caretaker - patient communication app</p> <p>therapy recommendation (based on user feedback)</p>
<p>Action taken: Create short list of apps.</p> <p>Shortlist of standalone apps:</p> <p>Pill reminder and therapy/exercise manager (and progress tracker)</p> <p>reaction time, driving type tests</p> <p>reminder to practice chewing, balance, motor skills exercises etc...</p> <ul style="list-style-type: none"> - speech/word game (test loudness, accuracy) - crossword puzzle game (answer with voice) - Caretaker communication: send over daily checkups, any updates regarding condition, the scores of games/tests <p>Shortlist of features:</p> <p>Voice assisted note-taking app</p>
<p>Assignee: Everyone</p>

Table 4 - Meeting Minutes 1

2. Meeting 2: Tuesday, September 24, 2019

Accessible via:

<https://docs.google.com/document/d/1dYDrawHt9YrjQvnxDVm39C4x6QZ3YANbxjuceAGK8D4/edit>

CMPT 275: Software Engineering I: Meeting Minutes
Group Number: 8

Team Name: The Great Eight		
Date/Time: September 24th, 2019 10:30am-12:20pm		
Location: SFU Library		
Meeting Number: 2		
Attendance		
Member	Present	Reason for absence
Kevin Jerome	Y	
Joseph Dillman	N	Job interview.
Hoang Bao Ngan Nguyen	Y	
Wei Da (David) Song	Y	
HuyThong Bui	Y	
Payam Partow	Y	

Agenda
Topic: # of and high-level description of features
<p>Discussion:</p> <p>Scheduling - User can keep track of therapies and exercises (quantity + name)</p> <p>Progress tracker - User can view progress over time via visualizations</p> <p>Reporting - User can generate reports that can be sent to their MD</p> <p>Reminder - User receives notifications reminder to perform exercise/medication.</p>

Exercise video - User can view an instructional video that aids in understanding of the exercise
Action taken: Put features in the document (project summary, project overview)
Assignee: n/a
Topic: Defining who the stakeholders are
Discussion: Team members Herbert End user
Action taken: Use the definition of stakeholders that we've come up with
Assignee: n/a
Topic: Overall architecture
Discussion: <ul style="list-style-type: none"> - Patient uses the app - Doctor uses a website that has connectivity to the app - App <-> website can transfer via a shared online database
Action taken: Use the description to create the overall architecture
Assignee: n/a
Topic: Budget
Discussion: HW: \$0,6 computers (which we already have) SW: \$0, we don't need to publish the app and the SW is provided Labour: man-hours

Action taken: Create and allocate the budget, put in document
Assignee: David Song

Table 5 - Meeting Minutes 2