Social Issue Being Addressed: Educational Inequality

Project Title: *Brain Wave*

GitHub Repository Name, Path: brainWave, https://github.com/hannad4/brainWave

Option Chosen: Option 2 - Social issue of personal interest

Implementation Method: Ruby on Rails, PostgreSQL. Accessible via any web browser

Project Idea: A website that serves as a "hub" of various supplemental resources for students who study/go to school in areas that have an unequal distribution of academic resources.

Why This Project is Innovative:

Educational inequality is defined as "the unequal distribution of academic resources to socially excluded communities." This unfairness typically stems from many factors, such as wealth and location, but one significant commonality exists; often times, students who live with some form of educational inequality will find school to be increasingly difficult, which in turn could lead to an increasing amount of "drop-outs" for that area. *Brain Wave* would attempt to address this issue by serving as a "one stop shop" or "center" for a plethora of resources, which would include items such as methods for studying, guides to follow when faced with academic challenges, organizational tips, etc. This application would differ from others because it would attempt to address the problem from the root; the application would try to provide information and guidance in a way such that the student's mindset can be developed in matter that is better geared for success. Instead of just acting as a service that points to good resources, *Brain Wave* would also include information on how to apply such tools in an effective manner, so that the student can feel that they are utilizing the tools in a valuable way. In doing so, the student could feel happier, less stressed, and more excited for their academic pursuits.

Algorithms to be Implemented:

This application will aim to suggest resources in general as well as on a user-specific basis. In order to do this, it will ask the user questions, and then suggest the appropriate resources/guidance based on the user's responses. Questions such as "what grade are you in?", "how interested are you in school?", "do you own a smartphone/laptop?", and others will all be used to calculate which contents will be best for the user's needs. This will result in an application which includes a user experience that feels more personalized to the user.

Data Structures to be Used:

This application will need to have a system to "record" the user's responses, as well as various methods for calculating data and such. As a result, this application will utilize various data types and structures in correlation with the supported data types of PostgreSQL as needed. The most notable of these will be arrays, hashes, booleans, various character types (ie. char,

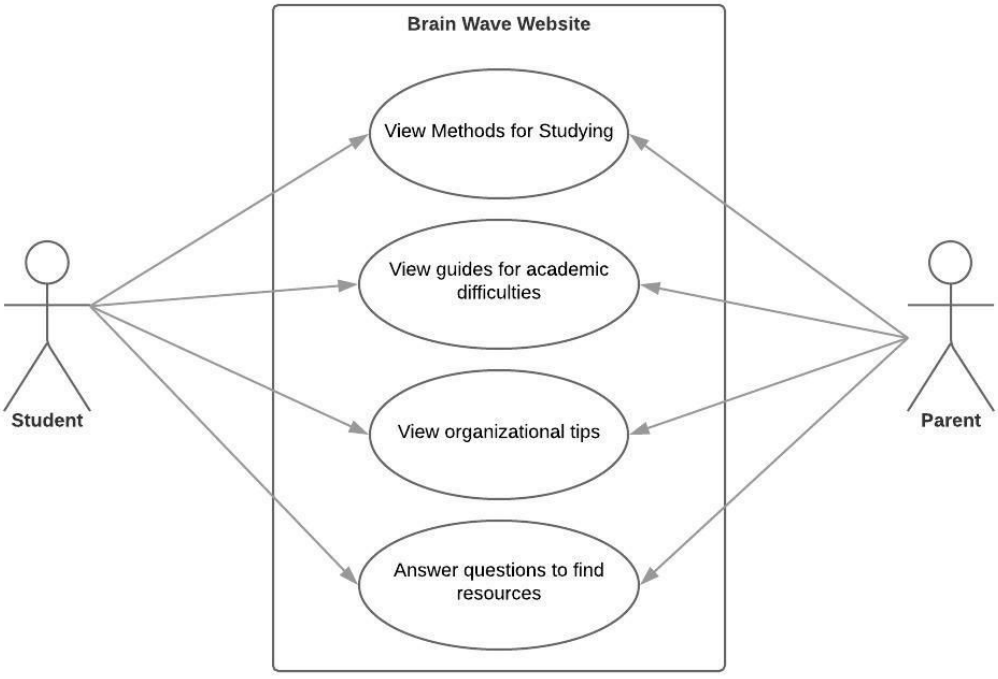
text), various number types (ie. integer, floating point), and various temporal types (ie. date, time). Different data types may be used as needed throughout the development of this project.

Software Engineering Concepts to be Learned:

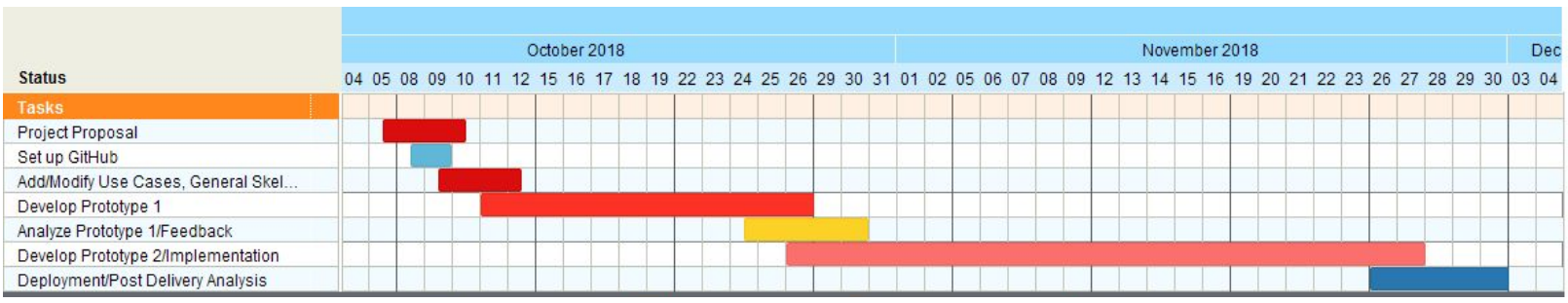
In terms of technicalities, this project will be built utilizing Ruby on Rails and PostgreSQL. As a result, these two fields will need to be investigated and self taught, as they are not covered in lecture or in a classroom-style environment. Any associated fields that are part of developing a Rails application will also need to be investigated, such as HTML, CSS, and JavaScript. Many resources that will be used for learning Rails and PostgreSQL for the Mercer Street Friends project will also be utilized for the benefit of this project. These include: the class recommended text *Agile Development with Rails 5.1*, online services such as *Codecademy*, *Learn Ruby Online*, *PostgreSQL Tutorial*, and *Tutorials Point*'s PostgreSQL tutorial. Throughout the development of the project, additional concepts will be investigated if/when needed.

In terms of organization and project planning, the experience obtained from previous individual/team term projects will be reinforced during this project's life cycle. Concepts learned in class such as use case diagrams, state charts, and class diagrams will be utilized to aid in the project's development as needed. However, since this is an individual ("one-man") project assignment, concepts such as paradigms of team management will not be used.

Use Case Diagram:



Gantt Chart:



Resources to be Used:
(Please see resources under "Software Engineering Concepts to be Learned" section as well)

- Sam Ruby, David Bryan Copeland, and Dave Thomas' *Agile Development with Rails 5.1*
- https://www.codecademy.com/learn/learn-rails
- https://www.learnrubyonline.org/
- http://www.postgresqltutorial.com/
- https://www.tutorialspoint.com/postgresql/
- https://guides.rubyonrails.org/
- https://www.postgresql.org/docs/

Further resources will be utilized as needed throughout the development of this project

OSS License Used
There are many licenses that are available for Open Source projects such as this one. Below is a table of licenses that were considered for this project, along with some of their strengths and weaknesses:

License Name	Strengths	Weaknesses
MIT License	- Allows for software to be used commercially, and to be distributed or modified - Allows for software to be used or modified in private - A license and copyright notice must be included in the software	- Does not require the source code to be made available upon distribution
The Unlicense	- Allows for software to be used commercially, and to be distributed or modified - Allows for software to be used and modified in private	- No source code is required to be made available on distribution - No distributions of the software are required to include the license
GNU GPL v3.0	- Allows for software to be used commercially and to be distributed and/or modified - Allows software to be used or modified private - Requires the source code to be made available upon distribution - The same license must be used for any distribution of	- Restrictions that this license implements may make it more difficult for people to adopt the project and further develop on it

	the software - Any changes to the project must be documented.	

It was decided that this project will utilize the GNU GPL v3.0 license. The details of this license are suitable for projects aimed for the betterment of the general public; the restrictions set in place are good for allowing for modifications and improvements to be made to *Brain Wave*, as well as allowing for appropriate documentation that notes of any change. Such a license will allow for the end user and interested participant to "be in the know" about how the project is being developed and what is being changed. Although this license may be more restrictive compared to that of others, it is beneficial by requiring that any works - larger or smaller - must use the same license and conditions.