Software Engineering Project Proposal

Project Title: A University Project Management Web Application That Accounts for Social Isolation

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Project Category/Topic: Software Engineering

Project Aim:

During the COVID-19, the university students are compelled to study at home. For the final year students, they need to complete their final year project and dissertation at home. In the past, students can communicate, share resources, and discuss technical issues with their supervisor and classmates in the university, but right now, students are all over the world and this makes the communication between students become less and harder and also make supervisor hard to manage student's progress. Therefore, the aim of this project is to develop a web application that encourage communication between students (e.g. leave comment or chat or share resources), and help supervisor manage student's project progress such as proposal, feedback, and weekly objectives.

Related work:

I have done some research on the existing project management web application, but most of them are used to support teams or individual along the entire project management life-cycle such as the Gantt chart and the Pivotal Tracker, which are not very close to my project aim. The project is more like the combination of the Pivotal Tracker and the Canvas. The Pivotal Tracker is an agile project management tool that allows developers to plan their project together, but it cannot share and communicate project plan to unfriended people. For Canvas, students can communicate with other students but do not know what project other students are doing. In my application, student can see other students project information, discuss problem together, find relevant project with relevant supervisors and students, and share resources. To enable student communication to each other, a chat function is required, so the web socket will be implemented. To link information between students and supervisors, the relational database is also required.

Project Objectives/Deliverables:

Before implementing the significant requirements below, there are two things need to be completed first. The first objective is to set up the Spring framework with the MVC architecture (front end and back end). The second objective is to construct relational database. After the front end and back end are set up and the database is created, I can then implement the features below to my web application.

Significant requirements:

Student

1. As a student, I want to create a project page, so that I can put my project information in it.
2. As a student, I want the project page has sections about the project proposal:
   a) Project topic
   b) Project aim
   c) Project objectives
   d) Relative work
   e) Methodology
   f) Project plan
   g) etc.
3. As a student, I want the proposal in project page have status so that I can set my status to not began, began, and completed
4. As a student, I want to find other students who is going to do or did the similar project as me. (can search students in other topics)
5. As a student, I want the system push students who are doing similar project with me to me, so that I do not need to search by myself
6. As a student, I want to chat with other students or supervisors, so that we can share knowledge and discuss progress.
7. As a student, I want to share useful resources and paper read on my page.
8. As a student, I want to link project to supervisors, so that I can know that which supervisor supports which project, and choice and communicate with the right person.
9. As a student, I want to have a section to put my weekly progress, so that the supervisor and other students can have a thought about what I did.
10. As a student, I want the weekly progress section has a URL column so that the supervisor can use the URL to my repository to check the progress, but other students will not see the URL link.
11. As a student, I want to set my future objectives and set status.

Supervisor

1. As a supervisor, I want to see the list of students (projects) that I am supporting. Also, the past years students.
2. As a supervisor, I want to accept or reject student's proposal and give student feedback.
3. As a supervisor, I want the students can only see other student's project page after their proposal is accepted by me so that no plagiarism.
4. As a supervisor, I only want to see students, in the same department.

Not Significant requirements:

1. As a user, I want to have login page.
2. As an admin, I want to add new user.

preliminary architecture

For this project, I am going to use the Spring framework with the MVC architecture to create the application. The reason I decided to use the Spring framework is because, it is the most popular java web development, which it is a state-of-the-art framework. The MVC is a design pattern that consists of 3 layers, the Model, View, and Controller. Each layer is responsible for a different part of functionality. The Model layer is responsible for handling the domain classes and the repositories (connect database, store data). The View layer is the user interface layer (front end) that responsible for displaying information to user and I am going to use languages and tools such as JavaScript, JSP, CSS, AngularJS Bootstrap, and Ajax to design the front end. The Controller layer is the back end that will receive and respond the requests send from the View layer.

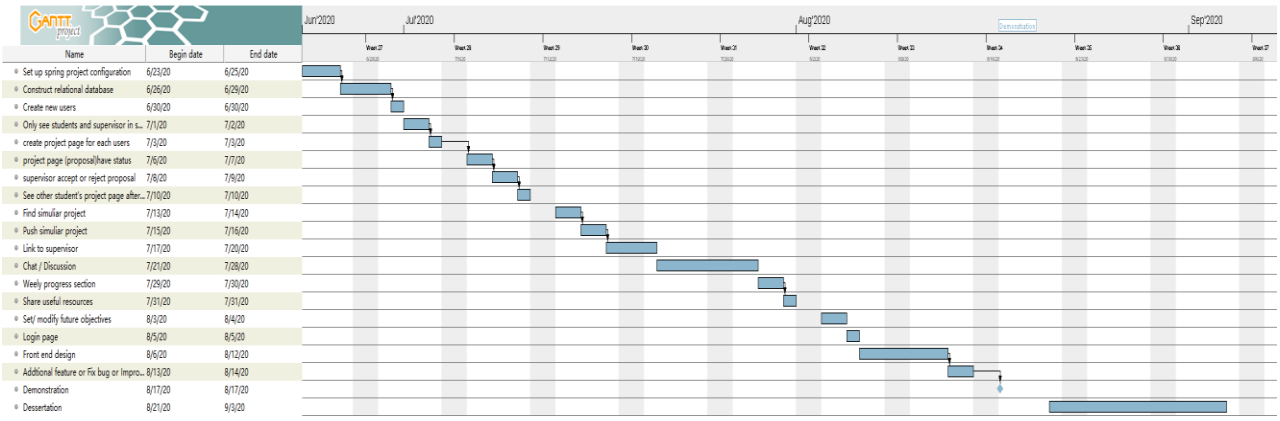
As I am going to do relational database, so I will implement Hibernate with the Spring MVC architecture. The hibernate is a Java object-relational mapping tool that allows me to map an object-oriented model (domain classes) to a relational database. In this project, I am going to learn how to implement web socket and Angular JS with Spring.

Methodology:

In this project, I am responsible to complete the whole application individually, which means all the functions can only be done one by one, so I am going to use Waterfall model as the project methodology rather than the Agile model. The Agile model is a concurrent approach, which is more suitable to use in a team project that requires many people to work concurrently. As this is an individual project, the linear and sequential Waterfall model will be more appropriate to use. In the project, I will use the Gantt Chart to list the tasks and milestones and reflecting the project objectives/deliverables.

Project plan:

sufficient to complete the project in time. I am very familiar with develop web application in Java, so in the set-up project configuration part, I can save a lot of time. Also, I am familiar with relational database, so I can save time in the structured relational database too. Lastly, I have experience in doing individual project, so I have time management skill.



In week 3 (June 23), I am going to set up the framework configuration and construct a relational database. In the week 4 and week 5, I am going to create project page (proposal page) that allow student to enter their proposal and allow supervisor to accept it. For week 6, my plan is to implement find and push similar project to student and link supervisor with students. For week 7, I am going to implement the chat/ discussion function. In week 8 and week 9, the weekly progress section, future objectives, and share resources features will be implemented. In week 10, front end, login will be completed. If there are additional features and there are enough time, then implement additional features, if no additional features, then do some manual test. Week 11 is the demonstration week. From week 12, I will start to do my dissertation.

Risks and contingency plan:

There are some difficult aspects of the project which I am worried about completing. Firstly, this project requires relational database, in my last relational database project, the relational database is huge and I did not structure it well, as the result, the code become very messy and hard to organize, which waste lots of time. In this project, I will make sure the relational database is structured well. Secondly, I am going to implement WebSocket for the discussion function in this project and I have never use WebSocket before, so this function might be time-consuming. If I cannot complete this function on time, I may use refresh page instead, by doing this, there will have no real-time update, which is not a good practice, so this is a contingency plan.

Hardware/Software Resources:

To complete this project, The Spring framework IDE will be required. To use the Spring IDE, there is a minimum hardware requirement: Core i5, 1.8 GHz, 4 gig RAM, 1 gig disk space. The Spring IDE is a free open source framework and the hardware requirement is not high, so both student/supervisors can access to it. For the database, I will use the MySQL database and this database is also free, and both students and supervisor can get an account from the university.

Data:

No data set required.