

# **CSC 648/848 Software Engineering – Fall 2022**

## **Milestone 1**

### **Use Cases, High-Level Requirements, and Architecture**

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## **1. Executive Summary**

Nowadays, it's becoming more challenging for students to find their dream job. Thus, the JobHunter app is here to help students find the most desirable positions they are unaware of. JobHunter is a specialized application for persons interested in a career in the tech industry. Companies are able to post listings for open positions and internships they are offering. Users of the application are able to post their profiles and resumes to show their skills off to interested companies in order to land a job. Users are also able to apply for the job listings directly in-app without having to go to a company's website.

The JobHunter app can help people with guidance. The app will have helpful links to other websites, verified Google docs, good resume templates, and introduction templates. Also, the application will have a guided quiz that would help determine people's interests. Based on their interests, the app will tell the user the most suitable job for their skills and interests. After taking the examination, the user would better understand what position they desire to take.

## **2. Personas and Main Use Cases**

### Key Personas

SFSU students ages 18 and above will be the primary users of this application. Their ultimate goal for using this application is to land a job in one of the nine tech fields the application focuses on. They will also be using this application to post their resumes for interested companies to recruit them for work. The students are looking for jobs in the tech industry and will have skills related to their passion. For example, Computer Science majors would have software development skills such as different front-end coding languages. Another example would be that Computer Engineering students would have hardware skills, like experience with circuit boards and processors. Pain points for this user base would be figuring out what field they should be applying to based on their skill sets, narrowing down their job search to a specific field, and getting help with the interview process if they have little to no job experience. Another pain point would be setting up their profile in a manner that would interest the recruiting tech companies, such as uploading their resume(s) and having adequate information on their self-introduction page.

Tech companies who are looking to find new employees are another type of user that will be using the application. They aim to post their job/internship openings for students to see and apply for. They want to fill their openings in order to get their work and projects done. Companies will be focusing on filling positions related to the nine tech fields the application is focused on. They will not be posting job positions unrelated to these criteria. The companies posting job listings on this application will be able to fill out a form to submit the job opening, containing information such as job description, requirements, estimated pay range, and other factors. They will also be able to set up a 'company profile' for users to explore and read about their company to see if their values align. Pain points for this user base would be navigating through all the applications they receive and contacting the users in order to set up interviews, writing up detailed job descriptions that fulfill all requirements for the post to be validated, and maintaining their profile's information.

Application administrators or developers are another type of users for this application. Their goal is to maintain the application's functionality and make sure all data is being indexed correctly, whether that be storing user information or keeping the available job listings up-to-date. Their skills would include front-end coding languages used for the framework of the application, such as HTML, CSS, React.js, etc., as well as back-end languages like Javascript. They will also need to have experience with maintaining SQL databases in order to maintain the information being stored from users' input. Pain points for these users would be keeping the database up 24/7 for users to sign up/login and access application information whenever they need to, as well as getting rid of/refactoring data or code that is no longer needed or can be optimized for the app to run smoothly.

### Main Use Cases

Jim Kattan, a senior at SFSU majoring in Computer Science, is looking for a post-graduate job. He did not work during university, so he has no experience to show on his resume. He goes onto our application in order to search for entry-level tech jobs. He searches for jobs based on his skills and views each job posting to see if he is interested in any of the openings.

Chris Carrey, a Hiring Manager for Google, is looking for new hires for their Virtual Reality & Augmented Reality department. He goes onto the application and signs into his account. He creates a job posting containing the job

information. He posts the job opening for interested users to apply. He gets 10 applications within the first 5 minutes. He reviews the submissions and reaches out to suitable candidates for an interview and next steps.

Michael Halpert, a Sophomore at SFSU majoring in Computer Engineering, wants to find an internship to gain experience in the tech field before graduation. He goes onto our application and creates an account since it is his first time using it. On his account, he uploads his resume and puts in his skills that he learned in class. He then searches for jobs related to his skills by filtering. His skills matched an internship opening for Amazon's Blockchain team, so he applied on their job listing.

Pam Kapoor, a recent SFSU graduate, finished her degree in Computer Science and is now looking for a job. However, she does not know what specific field she wants to work in. She goes onto the application and logs into her account. She takes the 'Guidance Quiz' in order to find recommended fields to apply for. After finishing the quiz, the application gives her the recommended field(s) to look into, so she searches for jobs and filters these specific fields out. She does not apply for anything right away since she is still deciding on what she wants to do.

Kramer Costanza, a Junior at SFSU majoring in Computer Science, is looking for a job in the tech field. He has never worked a job in his life. He is unsure how to apply and what the interview process is like. He goes to our application and creates an account. Once he makes his account, he finds the Helpful Links page. He searches for tips and tricks for interviewing so that he is better prepared for his job search.

### 3. List of Main Data Items and Entities

Data Item	Definition/meaning	Usage
userData	Stores data such as id, email, password(encrypted), Name, resume, etc.	It will be used when we need to retrieve data so a user can log into their account to view/apply for jobs.
recruiterData	Stores data such as id, email, password(encrypted), and company/recruiter name and gives them privileges to access their job postings and other actions.	It will be used when we need to retrieve data for recruiters to log into their accounts to post/edit job listings or contact applicants.
postData	Stores data such as who created and what kind of job they are looking for (AI, VR, etc.)	It will be used when we display a list of uploaded jobs.
quizData	Stores the quiz questions for the Guidance Quiz and the recommended job positions based on quiz answers.	It will be used to retrieve data when users are taking the Guidance Quiz in order to display the questions, as well as display the recommended job listings based on the user-inputted answers.
linkData	Stores the links used for the Helpful Links page.	It will be used to retrieve the links to display when users are searching for links on the Helpful Links page.

#### 4. Initial List of Functional Requirements

##### Priority List

P1	Critical (must have)
P2	Important (should/could have)
P3	Opportunistic (nice to have)

1. Have a working application (P1):

*To develop a web-base application to help SFSU students to find their dream jobs and career paths in Tech. This application will help students with the search of their ideal job (career path) according with thier skills and passion.*

2. The web application must allow Tech companies to post jobs in 9 areas. (P1)

*Artificial Intelligence and Machine Learning, Robotic Process Automation (RPA), Edge Computing, Quantum Computing, Virtual Reality and Augmented Reality, Blockchain, Internet of Things (IoT), 5G, and Cyber Security. Each of these areas would have Job titles, descriptions, and skills as a minimum.*

3. Allow to search & filter jobs based on tech areas, job positions, and skills. (P1)

*Pipe and filter architecture: Filter has independent entites called filters (components) which perform transformation on data and process the input from the users. Pipe serve as connectors for the stream of data being transformed, each connected to the next component in the pipeline. Data Source -> Filter -> Filter -> Data Target.*

4. Users can get alerts for matching job interests, and Users can turn off alerts if needed.(P1)

*users can opt in/out to receive alerts from the application on job listings that they are interested in or have applied to. User feel free to close it if they don't want to get the alerts from the application.*

5. The site will have administrator capabilities to trigger the matching alerts to the corresponding users. (P1)
6. Have login and sign-up pages for users. (P1)

*For the sign-up page, we will check whether the email address user input is valid or not(to verify a proper email address from users, the application may require email confirmation as they received an email from the system) and check the username is taken or not, and also we will check the passwords' security level.*

7. Job postings will have direct links to company sites for interested applicants. (P2)

*Post detail (location, address, company size, link for the the company's websit, etc).*

8. Each user will have a profile page. (P1)

*The page will show their skills, resume, job experiences, education, and links for other social media.*

9. Search box to search for other users and follow them. (P2)

*Adding a searching box especially for searching the users, searching by name/account id/email/or others.*

10. The application will focus on desktop/laptop browsers, and not on native app development for mobile browsers. (P1)

*Customers will use the applications primarily via the web and using PC/laptops and occasionally via their mobile devices. The application will however have to be developed using responsive UI implementation so that it renders well on mobile devices.*

11. The site will utilize a user database set (management system) for storing all user information and postings. (P1)

*Database management system can connecting well, and also able to update the information while using change some data.*

12. Recruiters will be able to view applicant profiles, post job listing, edit their job posting, contact applications about their job postings,(P1)

*Recruiters can also sign up their's account (should be in a separate data set).*

13. Users can change or edit their search on the same page. (P1)

*Application will have a navigation bar to make sure each page have the bar to let the user edit and search other jobs/users at the same page.*



14. Users can search job listings without registering or logging into their account. (P2)

*All job posting webpage should be opened for everyone. Edit personal profile, apply a job, take a look other user's profile and follow other users need to sign up an account.*

15. Users will be able to see what listings they have applied for. (P2)

*Each job user applied will store into the database, and shows as a list in user's profile page. (optional to let other see this list)*

16. User credentials will be encrypted. (P1)

*User credentials are typically a username and password combination used for logging in to online accounts. However, they can be combined with more secure authentication tools and biometric elements to confirm user identities with a greater degree of certainty.*

17. Users will be able to take Guidance Quiz when logged in. (P1)

*Decide to do a Job Pathway advise pop-up window (Career Advise Robot). User will able to answer some questions to find the correct job direction.*

18. Users can navigate the Helpful Links page without registering or logging into their account. (P1)

*Post job webpage will have company's link and some details.*

19. Users can apply directly for job listings without filling out a third party application. (P2)

*Create a table to let user fill in their information(resume, contact informaton, etc), and store all information details to the database and also sent a confirmation email to user'e email to comfirm that job apply sucessfully.*

20. Users can contact recruiters from the job listing page. (P2)

*Show recruiters'e contact information, such as email.*

21. Job application process will be streamlined by utilizing users' uploaded resume and follow-up questions if applicable. (P2)

*Storing resume and personal information from the profile into the database to let user upload theirs' resume easily when applying a job position.*

22. Users can delete their account. (P3)

*Delete Account means the action of deleting an Account. This removes the Account from the database entirely. A deleted Account may be recovered through a Restore Account action for a limited time after the date of deletion, until it is fully purged from all databases.*

## 5. List of Non-Functional Requirements

1. The application shall be developed, tested, and deployed using tools and servers approved by the Class CTO and as agreed in M0 (some may be provided in the class, some may be chosen by the student team, but all tools and servers have to be approved by the class CTO).
2. The application shall be optimized for standard desktop/laptop browsers, e.g., must render correctly on the two latest versions of two major browsers
3. Selected application functions must render well on mobile devices
4. Data shall be stored in the team's chosen database technology on the team's deployment server.
5. The privacy of users shall be protected, and all privacy policies will be appropriately communicated to the users.
6. The language used shall be English.
7. The application shall be very easy to use and intuitive.
8. Google maps and analytics shall be added.
9. No email clients shall be allowed. You shall use webmail.
10. Pay functionality, if any (e.g. paying for goods and services) shall not be implemented nor simulated in UI.
11. Site security: basic best practices shall be applied (as covered in the class)
12. Modern SE processes and practices shall be used as specified in the class, including collaborative and continuous SW development.
13. The website shall prominently display the following exact text on all pages  
*"SFSU  
 Software Engineering Project CSC 648-848, Fall 2022. For Demonstration Only"*  
**at the top of the WWW page. (Important so as not to confuse this with a real application).**

## 6. Competitive Analysis

Our App: Job Hunter	Competitors' apps: Indeed, CareerBuilder.com, Microsoft Career, Craigslist
Log in, Sign-ups - Users can create accounts in order to store their information and for ease in communicating with the various companies posting job listings.	Log in, Sign-ups - Users can create accounts in order to store their information and for ease in communicating with the various companies posting job listings.
Posting jobs - Jobs can be posted by hiring companies for users to access and apply for if interested.	Posting jobs - Jobs can be posted by hiring companies for users to access and apply for if interested.
Guidance Quiz - Users may not be able to find out the correct position to apply for. The app will provide a guided quiz and ask simple questions to filter suitable jobs.	Job listings are NOT focused on the tech industry, and can show jobs that are not of interest to the user.
Useful links - The application will have a dedicated page for links to help users with job interviews, technical questions, and other tips for landing a job in the tech industry.	Third party application - When applying for jobs, the site would often redirect users to a third-party application or portal to complete the process.
Specialized for ONLY tech job-postings - The job postings that will be shown on Job Hunter will only be related to the tech field.	
Easy apply - Users (when logged in) can upload their resume onto their profile and it will be utilized to streamline the application process so that it minimizes time spent on applying.	

Job Hunter is a web application for users to find jobs in the tech industry. Unlike competitors such as Indeed or CareerBuilder, Job Hunter is focused solely on tech job listings. Job Hunter will also have a Guidance Quiz in order to help users determine which field will best utilize their skills and match their interests. Users will be able to utilize a majority of the application's features without having

to register, but creating an account will allow for a more efficient and streamlined process when applying for jobs. Other sites would require one to log in just to sign up for jobs, but Job Hunter does not. Job Hunter also has a dedicated page containing links to help prepare users for the interview process, give insight on certain occupations, and more. Job Hunter utilizes many different features in order to guide users to find jobs that will best utilize their skills and interest and prepare them for the job hunt.

## **7. High-level System Architecture and Technologies Used**

Our program will be following the MVC architectural pattern. MVC is an architectural pattern consisting of three parts: Model, View, and Controller. Model is responsible for handling data logic. View displays the information from the model to the user. Controller controls the data flow into a model object and updates the view whenever data changes. It also separates presentation and interaction from the system data. The system is structured into three logical components that interact with each other. The Model component manages the system data and associated operations on that data. The View component defines and manages how the data is presented to the user. The Controller component manages user interaction (e.g., key presses, mouse clicks, etc.) and passes these interactions to the View and the Model. The MVC architecture system should be used when there are multiple ways to view and interact with data. It should also be used when future requirements for interaction and presentation of data are unknown.

Technologies used for our application:

- MySQL
- Express.js
- Angular
- Node.js
- AWS

## **8. Team and Roles**

Muzaffar Sharapov	Team Lead
Jiayi Gu	Front End Developer
Julian Manaois	Database & GitHub Check
Chengkai Yang	Front End Developer
Yagiz Saatci	Back End Developer

## 9. Checklist

Team found time slot to meet outside of class	<b>Done</b>
GitHub Master chosen	<b>Done</b>
Decided & agreed upon listed SW tools, deployment server	<b>Done</b>
Team is ready & able to use chosen front-end and back-end frameworks, those with less experience are learning & practicing in order to succeed	<b>Done</b>
Team lead ensured all members read final M1 and agree/understand the assignment before submission	<b>Done</b>
Private GitHub repository is organized as discussed in class. (e.g. master branch, development branch, a folder for milestone documents, etc.)	<b>Done</b>