TỔ CHỨC GIÁO DỤC FPT

Higher Nationals – Assignment Front Sheet

Student Name/ID	Pham Van Tuan/GCD210193		
Unit Title	Unit 30: Application Development		
Assignment Number	Assignment 1	**Assessor**	Pham Thanh Son
Submission Date	4/7/2024	**Date Received 1st submission**	
Re-submission Date		**Date Received 2nd submission**	

Grading grid

P1	P2	P3	M1	M2	D1

Assessor Feedback:

*Please note that constructive and useful feedback should allow students to understand:

a) Strengths of performance
b) Limitations of performance
c) Any improvements needed in future assessments

Feedback should be against the learning outcomes and assessment criteria to help students understand how these inform the process of judging the overall grade.

Feedback should give full guidance to the students on how they have met the learning outcomes and assessmentcriteria.

Grade:	**Assessor Signature:**	**Date:**

Resubmission Feedback:

*Please note resubmission feedback is focussed only on the resubmitted work

Grade:	**Assessor Signature:**	**Date:**

Internal Verifier's Comments:

Signature & Date:

* Please note that grade decisions are provisional. They are only confirmed once internal and external moderation has taken place and grades decisions have been agreed at the assessment.

Members of team 4
Phạm Văn Tuân Trương Lê Vĩnh Tường Nguyễn Văn Tuyến

Contents

Table of Figures:

1. Introduction

Welcome to the groundbreaking world of FPTJobMatch, an innovative web-based platform poised to revolutionize the traditional job posting and hiring process. In this section, we invite you to explore the transformative capabilities of our state-of-the-art software, designed to streamline and elevate the recruitment experience for both employers and job seekers alike.

Within this introduction, you will discover a concise overview of FPTJobMatch's core objectives and functionalities. We'll provide insight into how our platform simplifies the complexities inherent in job posting, application management, and candidate selection. By offering a user-friendly interface and cutting-edge features, FPTJobMatch aims to set a new standard in job matching and recruitment efficiency.

Prepare to embark on a journey through the comprehensive features and capabilities of FPTJobMatch, as we unveil a transformative solution engineered to meet the dynamic demands of the modern employment landscape. Whether you're an employer seeking top talent or a job seeker navigating the job market, FPTJobMatch promises to deliver an unparalleled experience tailored to your needs.

Join us as we delve into the future of recruitment with FPTJobMatch, where efficiency, effectiveness, and ease-of-use converge to redefine the way we connect talent with opportunity.

1.1 Document Purpose

This Software Requirements Specification (SRS) document pertains to FPTJobMatch, the cutting-edge web-based platform revolutionizing the job posting and hiring process. The purpose of this document is to outline the specific software requirements necessary for the development, implementation, and deployment of FPTJobMatch, ensuring a clear understanding of the system's functionality and objectives.

Within this document, you will find a comprehensive overview of the scope of FPTJobMatch, including the features and functionalities it encompasses. While this SRS primarily focuses on the core components of the system, it may also touch upon related subsystems or integrations essential for its seamless operation.

By delineating the software requirements in detail, this document serves as a blueprint for the development team, guiding the creation of FPTJobMatch to align with the envisioned goals and user expectations. Additionally, it provides stakeholders, including employers, job seekers, and investors, with a clear understanding of the capabilities and limitations of the platform.

Throughout this SRS, you will encounter specific requirements pertaining to user interface design, database management, security protocols, and integration with external systems, among others. Each requirement is meticulously documented to ensure accuracy, consistency, and completeness in the development process.

In essence, this SRS serves as a vital communication tool, facilitating collaboration between stakeholders and the development team to ensure the successful realization of FPTJobMatch as a transformative solution in the employment landscape.

1.2 Product Scope

FPTJobMatch is a comprehensive web-based platform designed to revolutionize the job posting and hiring process, providing a streamlined and efficient solution for both employers and job seekers. The software aims to simplify the complexities of job recruitment by offering intuitive features and robust functionality.

The primary purpose of FPTJobMatch is to facilitate seamless interaction between employers and job seekers, creating a user-friendly environment where both parties can connect and engage effectively. By providing secure user authentication and role-based access, the system ensures data integrity and confidentiality, enhancing the trust and reliability of the platform.

For employers, FPTJobMatch offers a range of powerful features, including the ability to create and post job listings with detailed descriptions and qualifications. Employers can efficiently manage incoming job applications, shortlist candidates, and review profiles, streamlining the hiring process and saving valuable time and resources. Additionally, the platform provides tools for sorting and filtering candidates based on relevant criteria, enabling employers to find the best-fit candidates for their job openings quickly.

Job seekers benefit from FPTJobMatch by gaining access to a vast array of job listings and opportunities from various industries and locations. The platform's intuitive search functionality allows job seekers to find relevant job listings based on their preferences and qualifications, empowering them to explore and apply to suitable positions effortlessly. Furthermore, job seekers can maintain and update their profiles with personal and professional information, ensuring that their profiles remain up-to-date and attractive to potential employers.

Admins play a crucial role in overseeing the smooth operation of the platform, managing user accounts, and ensuring compliance with platform guidelines. With features such as account creation, suspension, and deletion, admins maintain control over user management, ensuring the integrity and security of the platform. Additionally, automated notifications streamline communication between admins and employers, providing timely updates on job category approvals and other important matters.

Overall, FPTJobMatch aims to revolutionize the job matching and recruitment process by providing a comprehensive and user-friendly platform that benefits employers, job seekers, and admins alike. With its robust features, intuitive interface, and efficient functionality, FPTJobMatch sets out to simplify the job recruitment process, enhance the hiring experience, and ultimately, connect the right talent with the right opportunities.

1.3 Intended Audience and Document Overview

The Software Requirements Specification (SRS) document for FPTJobMatch is intended for various stakeholders involved in the development, deployment, and usage of the software platform. These stakeholders include developers, project managers, marketing staff, users (both employers and job seekers), testers, and documentation writers. Each of these audience types has specific sections within the document that are relevant to their roles and responsibilities.

Developers:

- Developers will primarily focus on understanding the technical requirements and specifications outlined in the document. They will need to ensure that the software is developed according to these requirements and that all functionalities are implemented correctly.
- Relevant sections for developers include the detailed descriptions of system features, user roles, authentication mechanisms, database schema, and API specifications.
- Developers should start by reading the overview sections to gain a high-level understanding of the project scope and objectives before delving into the technical details of each requirement.

Project Managers:

- Project managers will be interested in understanding the overall scope of the project, the timeline for development, and the resource requirements.
- They will also need to monitor progress against the documented requirements and ensure that the development team stays on track.
- Sections relevant to project managers include the project scope, timelines, resource requirements, and dependencies.
- Project managers should start by reviewing the project overview, followed by the detailed requirements and timelines to understand the project's scope and schedule.

Marketing Staff:

- Marketing staff will require an understanding of the features and functionalities of FPTJobMatch to effectively promote the platform to potential users (employers and job seekers).
- They will also need to understand the target audience and the unique selling points of the platform to create marketing materials and campaigns.
- Sections relevant to marketing staff include the product overview, user features, and benefits associated with using FPTJobMatch.
- Marketing staff should begin by reading the product overview and user features sections to grasp the key selling points of the platform.

Users (Employers and Job Seekers):

- Users, including employers and job seekers, will need to understand how to use the platform effectively to accomplish their respective goals.
- They will be interested in features such as user authentication, job posting, job search, application submission, and profile management.
- Sections relevant to users include user authentication and roles, employer features, job seeker features, and admin features.
- Users should start by reading the sections that pertain to their specific role (employer or job seeker) to understand how to navigate and utilize the platform.

Testers:

- Testers will focus on verifying that the software meets the specified requirements and functions correctly.
- They will need to create test cases and scenarios based on the documented requirements and conduct thorough testing to identify any bugs or issues.
- Sections relevant to testers include the detailed descriptions of system features, user roles, and acceptance criteria for each requirement.
- Testers should start by reviewing the detailed requirements and acceptance criteria to develop comprehensive test cases.

Conclusion:

The Software Requirements Specification (SRS) document for FPTJobMatch provides a comprehensive overview of the project scope, objectives, and technical requirements. By organizing the document into sections that cater to different audience types, stakeholders can easily access the information relevant to their roles and responsibilities. Whether it's developers implementing the software, project managers monitoring progress, marketing staff promoting the platform, users navigating the system, or testers ensuring quality, each stakeholder can find the information they need to contribute effectively to the success of the FPTJobMatch project.

2. Overall Description

2.1 Product Overview

The FPTJobMatch system offers a comprehensive solution for job posting and recruitment, catering to the needs of three distinct user roles: Admin, Job Provider, and Job Seeker. Each role serves a specific function within the platform, contributing to a seamless and efficient recruitment process.

For Job Providers, the system offers a range of features to streamline the job posting process. Employers can create and post job listings with essential details such as job title, description, qualifications, and application deadline. Additionally, tools are provided to manage incoming job applications, including options to shortlist, review, and respond to candidates. Job Providers also have access to detailed profiles of job seekers, along with sorting and filtering capabilities to identify candidates based on relevant criteria.

Job Seekers benefit from features designed to simplify their job search and application process. They can search for job listings based on various criteria and apply to positions by submitting their resumes, cover letters, or a short self-introduction. Confirmation notifications are sent to job seekers upon successful application submission, ensuring transparency throughout the process. Job Seekers can maintain and update their profiles, including personal and professional information, to enhance their visibility to potential employers.

Admins play a crucial role in managing the platform and ensuring its smooth operation. They have the authority to manage user accounts, including account creation, suspension, and deletion, as well as facilitate password reset functionality for users. Admins also oversee the approval process for new job categories requested by employers, with automated notifications keeping employers informed of the status.

Overall, the FPTJobMatch system offers a user-centric approach to job matching and recruitment, empowering both employers and job seekers with the tools and features they need to succeed in today's competitive employment landscape.

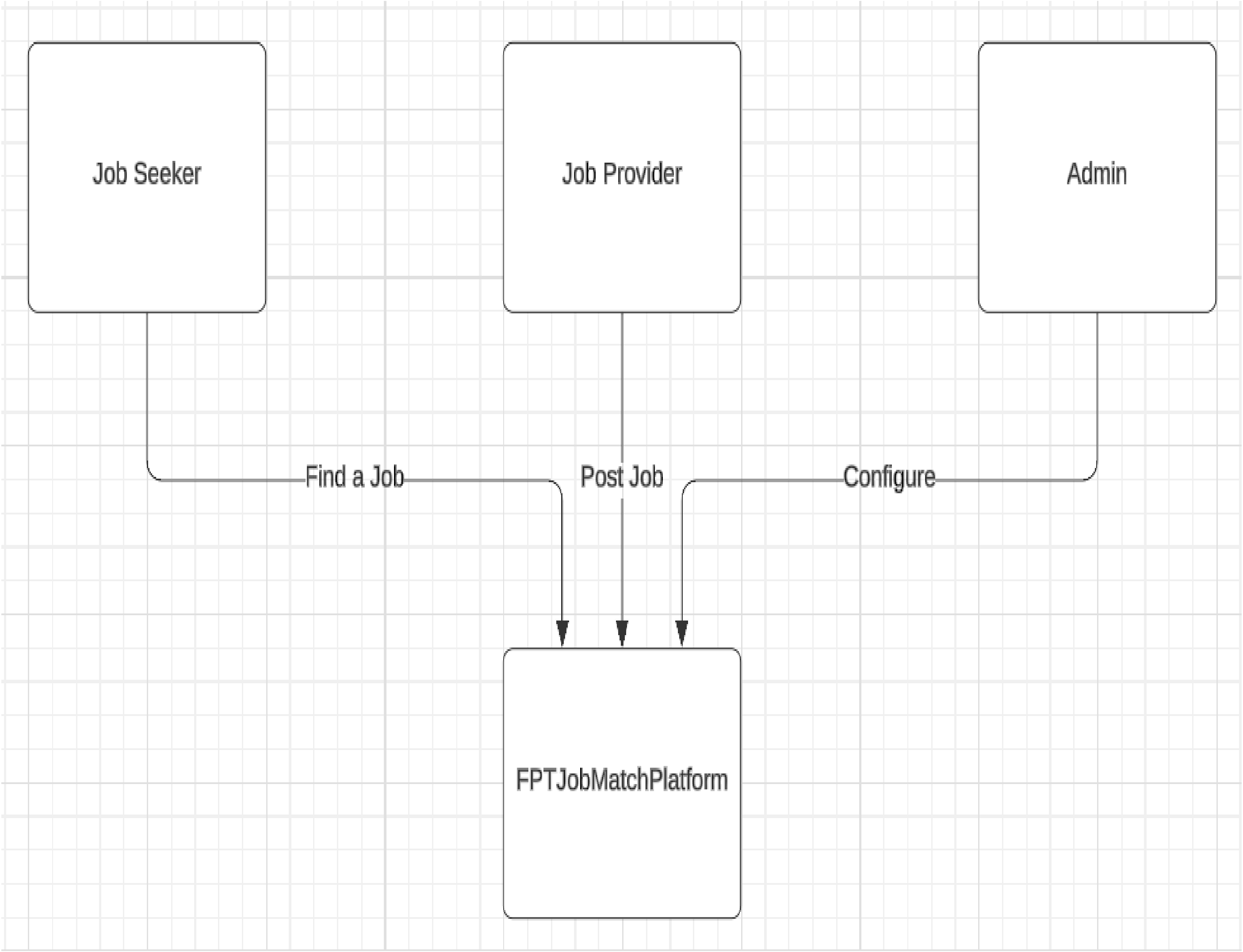


Figure 1 Informal Diagram 1

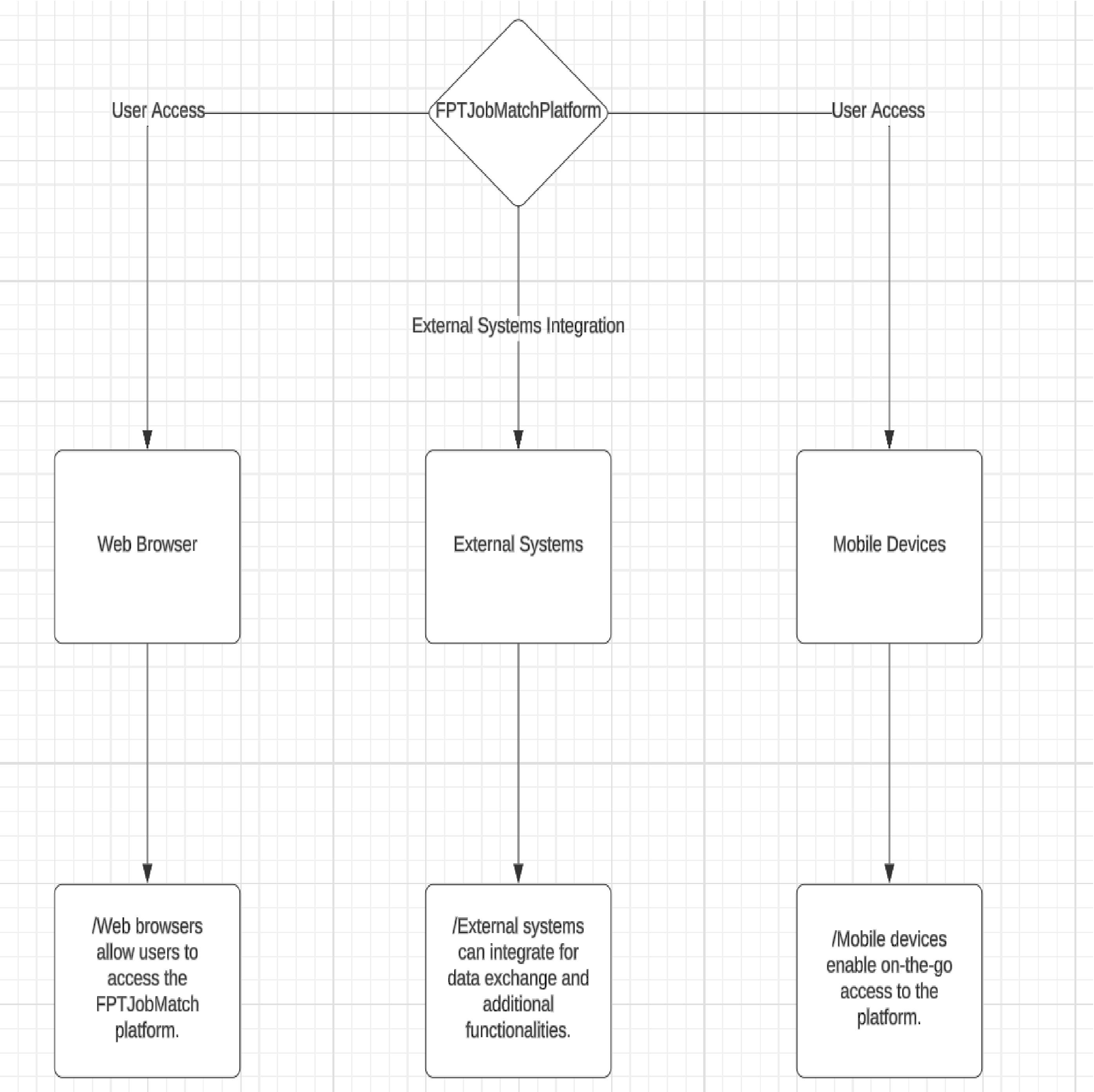

FPTJobMatchPlatform
User Access
User Access
External Systems Integration
Web Browser
External Systems
Mobile Devices
/Web browsers allow users to access the FPTJobMatch platform.
/External systems can integrate for data exchange and additional functionalities.
/Mobile devices enable on-the-go access to the platform.

Figure 2 Informal Diagram 2

2.2 *Product Functionality*

Job Provider Features:

- Ability to create and post job listings.
- Inclusion of details such as job title, description, qualifications, and application deadline for each job listing.
- View and manage incoming job applications.
- Tools for shortlisting, reviewing, and responding to job applications.
- Capability to view detailed profiles of job seekers.
- Sorting and filtering tools for candidates based on relevant criteria.

Job Seeker Features:

- Ability to search for job listings based on criteria like job title, location, and industry.
- Options to apply to job listings by writing a short self-introduction or submitting resumes and cover letters.
- Confirmation notifications upon successful application submission.
- Maintenance of a profile with personal and professional information.
- Ability to update profiles, including resumes and contact information.

Admin Features:

- Management of user accounts, including creation, suspension, and deletion.
- Availability of password reset functionality for both employers and job seekers.
- Review and approval/rejection of new job categories requested by employers.
- Automated notifications to inform employers of the category approval status.

3. Specific Requirements

3.1 Functional Requirements

Job Provider:

- As a Job Provider, I want to be able to create and post job listings, so that I can advertise job vacancies to potential candidates.

- As a Job Provider, I want each job listing to include details such as job title, description, required qualifications, and application deadline, so that candidates have clear information about the job opportunity.

- As a Job Provider, I want to view and manage incoming job applications, so that I can efficiently handle candidate responses.

- As a Job Provider, I want tools for shortlisting, reviewing, and responding to job applications, so that I can effectively evaluate candidates and progress in the hiring process.

- As a Job Provider, I want the capability to view detailed profiles of job seekers, so that I can assess their qualifications and suitability for the job.

- As a Job Provider, I want tools for sorting and filtering candidates based on relevant criteria, so that I can easily identify potential matches for job vacancies.

Job Seeker:

- As a Job Seeker, I want to search for job listings based on various criteria such as job title, location, and industry, so that I can find relevant job opportunities.

- As a Job Seeker, I want to apply to job listings by writing a short self-introduction or submitting my resume and cover letter, so that I can express my interest and qualifications to employers.

- As a Job Seeker, I want confirmation notifications to be sent upon successful application submission, so that I have assurance that my application has been received.

- As a Job Seeker, I want to maintain a profile with personal and professional information, so that employers can learn more about me as a candidate.

- As a Job Seeker, I want the system to allow me to update my profile, including resumes and contact information, so that my information is always accurate and up-to-date.

Admin:

- As an Admin, I want to manage user accounts, including account creation, suspension, and deletion, so that I can maintain the integrity and security of the system.

- As an Admin, I want password reset functionality to be available for both employers and job seekers, so that users can regain access to their accounts if needed.

- As an Admin, I want to review and approve/reject new job categories requested by employers, so that the system's job categories remain relevant and organized.

- As an Admin, I want automated notifications to inform employers of the category approval status, so that they are promptly notified of any updates related to their job postings.

3.2 Use case Diagrams

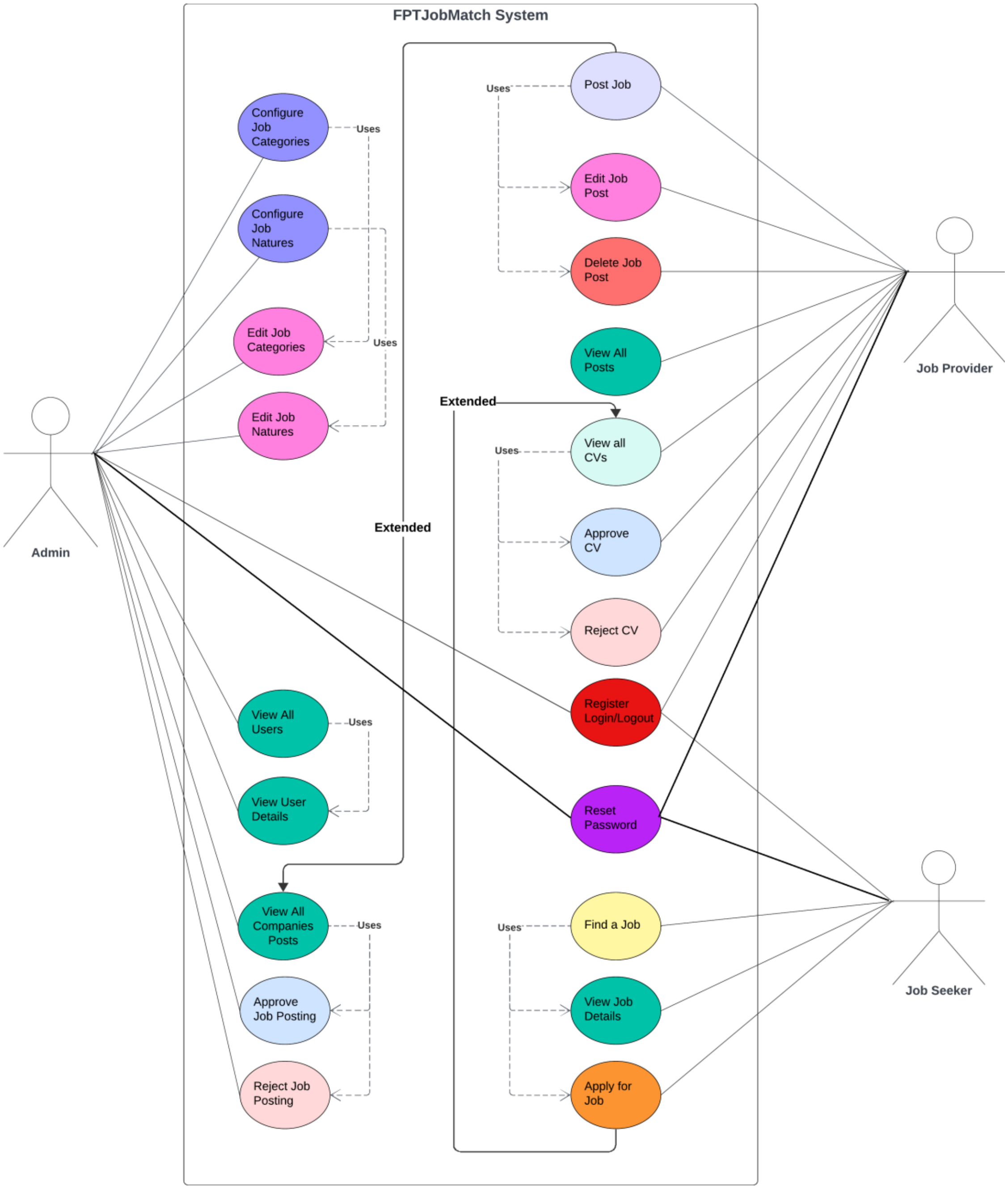


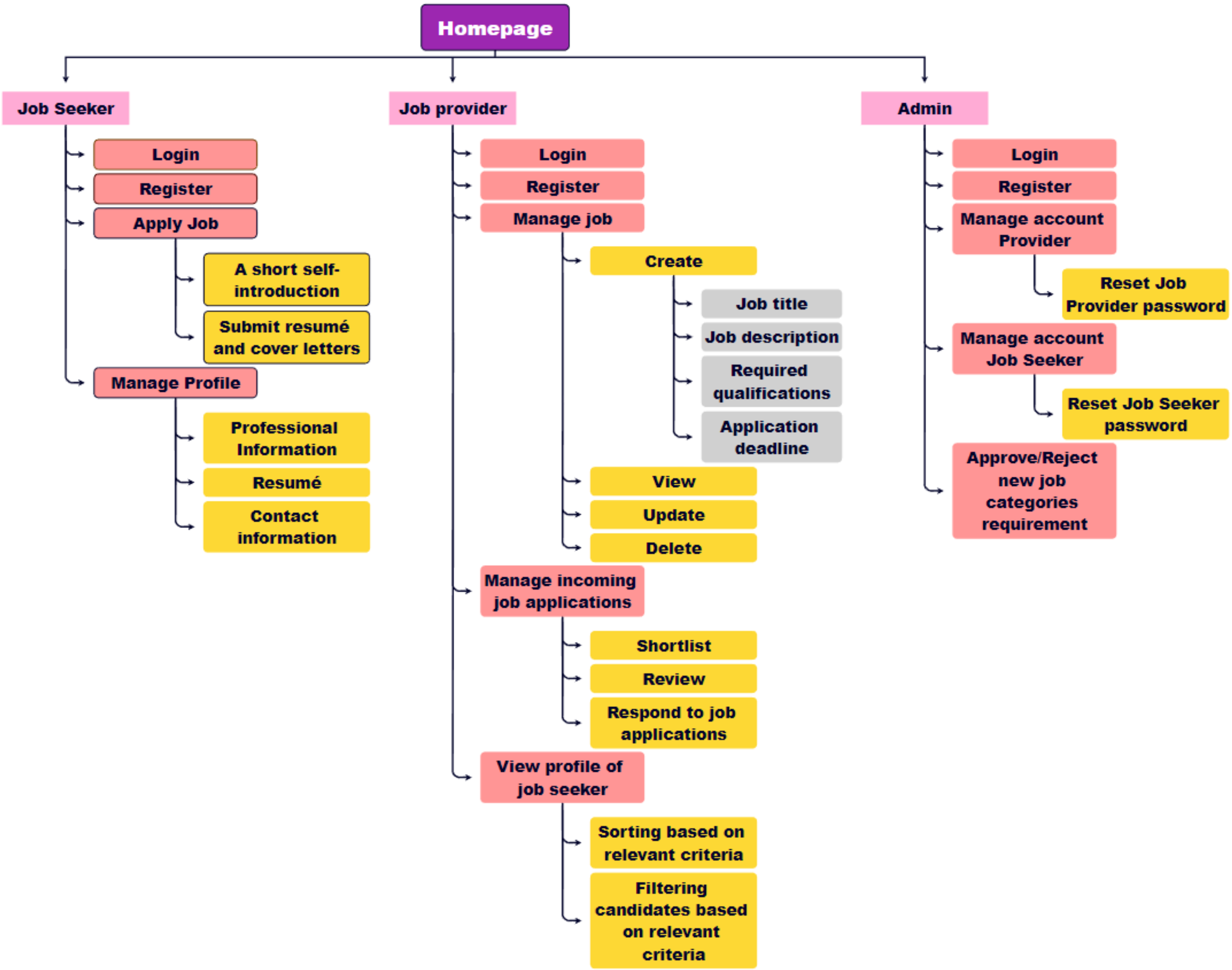
Figure 3 Use-case Diagram

FPTJobMatch is a comprehensive system that caters to job seekers and providers alike. Some of the key features of the system include:

- Posting and editing job listings
- Viewing job details and applying for jobs
- Approving or rejecting job postings
- Viewing all user and company posts
- Configuring job categories and nature
- Registering, logging in, and logging out

The system is designed to be user-friendly and intuitive, with extension points available for customization. The system is divided into three main user roles: Admin, Job Seeker, and Job Provider, each with its own set of permissions and access levels.

3.3 Site Map


Homepage
Job Seeker
Login
Register
Apply Job
A short self-introduction
Submit resumé and cover letters
Manage Profile
Professional Information
Resumé
Contact information
Job provider
Login
Register
Manage job
Create
Job title
Job description
Required qualifications
Application deadline
View
Update
Delete
Manage incoming job applications
Shortlist
Review
Respond to job applications
View profile of job seeker
Sorting based on relevant criteria
Filtering candidates based on relevant criteria
Admin
Login
Register
Manage account Provider
Reset Job Provider password
Manage account Job Seeker
Reset Job Seeker password
Approve/Reject new job categories requirement

In this site map:

- The Home Page acts as the entry point to the system.
- Depending on the user role, users are directed to their respective dashboards (Admin, Job Provider, or Job Seeker).
- Each dashboard provides access to specific functionalities relevant to the user's role.

- Sub-menus and pages are organized hierarchically under each main functionality, such as Configure, All Users, All Companies Posts for the Admin dashboard, Post Job, and All Posts for the Job Provider dashboard, and Find a Job for the Job Seeker dashboard.

- Actions such as editing categories, approving/rejecting job postings, posting jobs, viewing job posts, and finding job listings are represented as sub-pages under their respective functionalities.

4. Technical Design

4.1 Entity Relationship Diagram

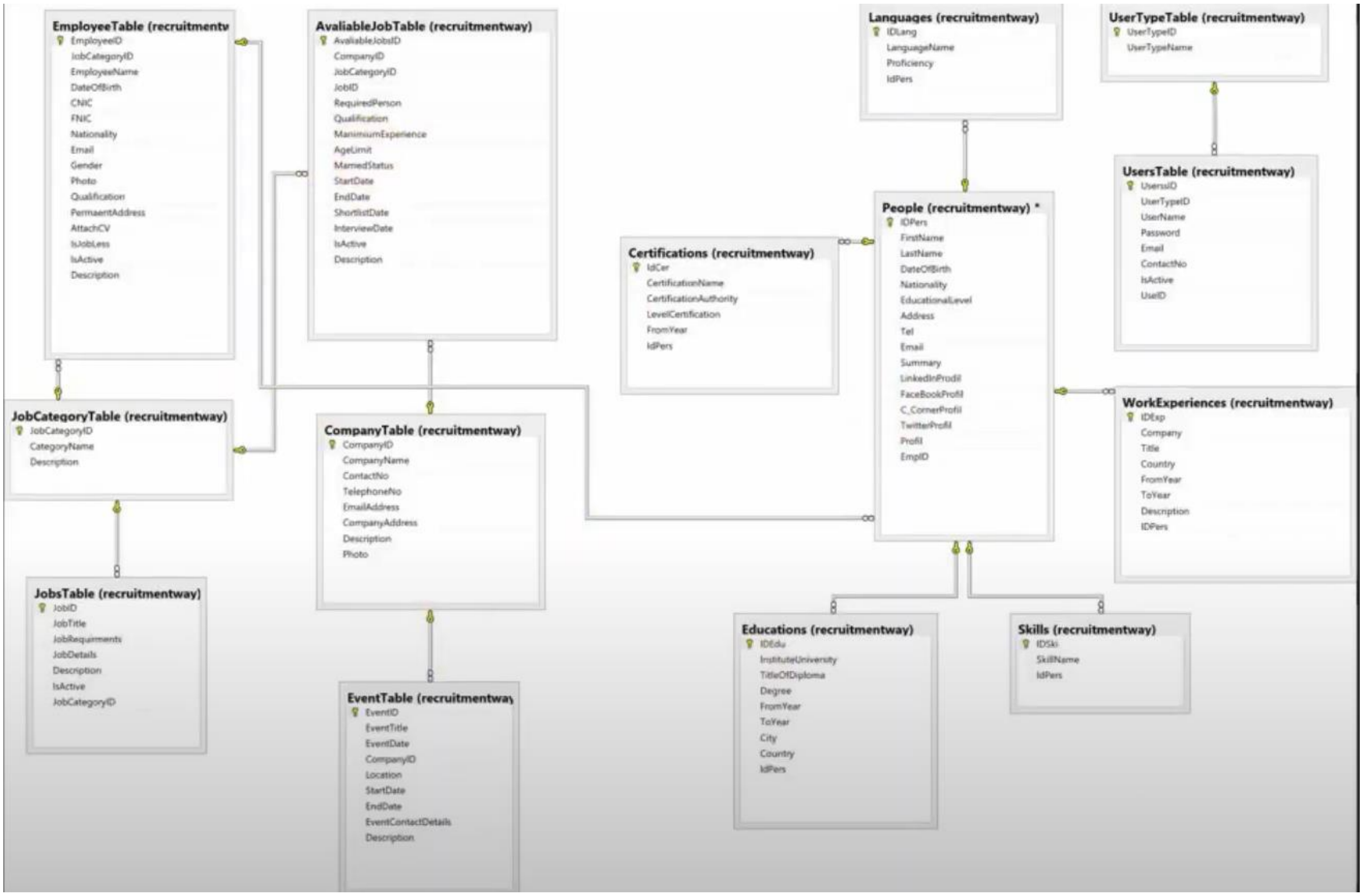


Figure 4 Entity Relationship Diagram

5. Risk Assessment

Risk	Severity	Likelihood	Mitigation Plan
Technical Issues	High	Moderate	Regular code reviews and testing, use of version control, continuous integration and deployment practices, regular updates and maintenance of software dependencies.
Data Security Breach	High	High	Implementation of robust security measures such as encryption, secure authentication methods, regular security audits, compliance with data protection regulations.
Server Downtime	High	Moderate	Implementation of redundant servers, automated monitoring and alerting systems, regular maintenance and updates, backup and recovery procedures.
Insufficient User Adoption	Medium	High	Comprehensive user training and support, regular communication and feedback gathering, iterative improvements based on user feedback, user-friendly and intuitive design.
Budget Overruns	High	Moderate	Thorough project planning and budgeting, regular monitoring and tracking of expenses, prioritization of essential features, contingency planning for unexpected costs.
Scope Creep	High	High	Clearly defined project scope and requirements, regular stakeholder communication and alignment, change management processes, prioritization of features and tasks.
Third-party Service Dependency	High	Moderate	Identification of critical dependencies, diversification of service providers where possible, clear service level agreements

			(SLAs), regular monitoring and communication.
Legal/Regulatory Compliance Issues	High	Moderate	Thorough understanding of relevant laws and regulations, consultation with legal experts, compliance audits, regular updates and adjustments to ensure adherence.
Poor Performance/Scalability	High	Moderate	Performance testing and optimization throughout development, use of scalable infrastructure and architecture, monitoring and proactive scaling based on usage patterns.
Communication Breakdown	Medium	High	Regular team meetings and updates, clear communication channels and protocols, documentation of decisions and discussions, proactive conflict resolution strategies.

6. Design Tools

In the realm of software development, the process of designing both the architecture and the user interface of a system plays a crucial role in its success. To facilitate this process, various tools are available, each offering unique features and capabilities tailored to the specific needs of designers and developers. In this evaluation, we will explore four tools for designing UML diagrams and four tools for designing user interfaces, considering their effectiveness and compatibility with the requirements of the FPTJobMatch project.

Designing UML Tools:

Lucidchart: Lucidchart stands out as a popular web-based diagramming tool renowned for its versatility and user-friendly interface. With a vast array of UML diagram types and seamless collaboration capabilities, Lucidchart proves to be a reliable choice for both novice and experienced users. Its compatibility across various platforms and browsers ensures accessibility for all stakeholders involved in the project.

Figure 5 Lucidchart

Visual Paradigm: Visual Paradigm emerges as a comprehensive UML modeling tool equipped with advanced features tailored for software design and development. Supporting a wide range of UML diagrams, Visual Paradigm provides essential functionalities such as code generation and collaboration tools, fostering efficient teamwork and streamlined development processes across diverse environments.

Figure 6 Visual Paradigm

Enterprise Architect: Enterprise Architect offers a robust solution for enterprise-level organizations engaged in software development and systems engineering. With its extensive feature set, including support for model-driven architecture and collaboration tools, Enterprise Architect empowers teams to tackle complex projects effectively. Its compatibility with popular development environments further enhances its appeal to diverse teams and environments.

Figure 7 Enterprise Architect

StarUML: StarUML distinguishes itself as an open-source UML modeling tool that combines flexibility with simplicity. With support for various diagram types and customizable templates, StarUML caters to the needs of users seeking a lightweight yet capable solution. Its cross-platform compatibility ensures accessibility across different operating systems, making it an attractive option for users with diverse preferences.

Figure 8 StarUML

User Interface Design Tools:

Visual Studio: Visual Studio emerges as a comprehensive integrated development environment (IDE) offering robust tools for designing user interfaces. With features such as drag-and-drop interface builders and seamless integration with other development tools, Visual Studio provides an efficient and cohesive environment for UI design. Its compatibility with multiple platforms ensures versatility and accessibility for developers working on various projects.

Figure 9 Visual Studio

Adobe XD: Adobe XD stands out as a powerful design tool specifically crafted for creating user interfaces and interactive prototypes. With its extensive feature set and seamless integration with other Adobe Creative Cloud apps, Adobe XD empowers designers to bring their visions to life with ease. Its compatibility with both Windows and macOS platforms ensures accessibility for designers across different environments.

Figure 10 Adobe XD

Sketch: Sketch is renowned among UI/UX designers for its intuitive interface and robust feature set tailored for high-fidelity design work. With support for symbols, responsive design tools, and a rich library of plugins, Sketch enables designers to create compelling user interfaces efficiently. While exclusive to macOS, Sketch remains a preferred choice for designers immersed in the Apple ecosystem.

Figure 11

Figma: Figma emerges as a collaborative design tool that revolutionizes the process of UI design through real-time collaboration and cloud-based storage. With features for designing interfaces, prototyping interactions, and creating design systems, Figma fosters seamless teamwork and iteration. Its platform-independent nature ensures accessibility for designers regardless of their operating system preferences.

Figure 12 Figma

In conclusion, for designing UML diagrams, Lucidchart stands out as the preferred choice due to its versatility, user-friendly interface, and broad compatibility. Conversely, for user interface design, Visual Studio emerges as the optimal solution, offering robust tools, seamless integration, and compatibility with diverse development environments. By leveraging these tools effectively, the FPTJobMatch project can achieve its design goals efficiently and effectively, paving the way for success in the competitive landscape of software development.

7. Front End technology

Front-End Technology Selection for FPTJobMatch Project:

HTML:

HTML (Hypertext Markup Language) is the standard markup language used to create the structure and content of web pages. It consists of a set of elements that define the different parts of a webpage, such as headings, paragraphs, images, and links. HTML provides the foundation for structuring the content of the FPTJobMatch web application, allowing developers to organize and present information effectively to users.

Figure 13 HTML

CSS (including SCSS, SASS, LESS):

CSS (Cascading Style Sheets) is a stylesheet language used to define the presentation and layout of HTML elements on a web page. It allows developers to specify styles such as colors, fonts, margins, and positioning to enhance the visual appearance of the FPTJobMatch application. Additionally, preprocessors such as SCSS (Sassy CSS), SASS (Syntactically Awesome Style Sheets), or LESS (Leaner CSS) can be used to extend the capabilities of CSS and improve the efficiency and maintainability of the CSS codebase. These preprocessors offer features like variables, mixins, and nesting, which facilitate better organization and reusability of styles.

Figure 14 CSS

JavaScript Library/Framework:

For the JavaScript layer of the front-end development, a suitable library or framework will be chosen to enhance interactivity and user experience. Options include:

React.js: React.js is a popular JavaScript library for building user interfaces, known for its component-based architecture and virtual DOM rendering. It provides a declarative approach to building UI components, making it efficient and scalable for complex web applications.

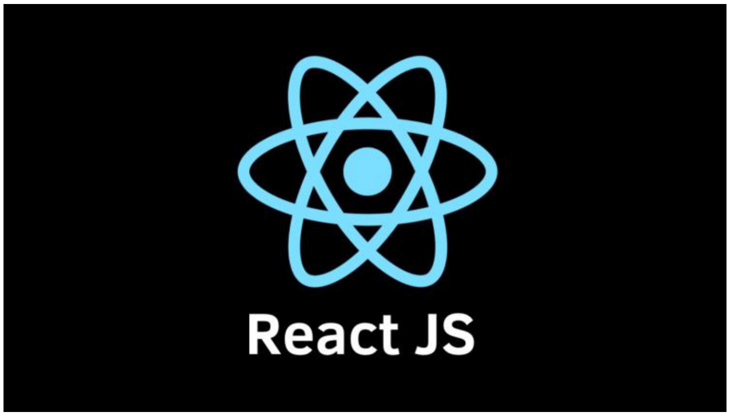


Figure 15 React.js

Vue.js: Vue.js is another lightweight and progressive JavaScript framework that offers simplicity and flexibility, making it easy to integrate with existing projects. Vue.js provides reactive data binding and a rich ecosystem of plugins, enabling developers to create dynamic and responsive user interfaces.

Figure 16 Vue.js

Angular: Angular is a comprehensive JavaScript framework maintained by Google, providing a full-featured solution for building robust single-page applications (SPAs). It offers features such as two-way data binding, dependency injection, and modular architecture, empowering developers to create scalable and maintainable front-end applications.

Figure 17 Angular

CSS Framework:

To expedite the styling process and ensure consistency across the FPTJobMatch application, a CSS framework will be utilized. Common options include:

Bootstrap: Bootstrap is a widely used CSS framework that offers a comprehensive set of pre-styled components and utilities for building responsive web interfaces. It provides a grid system, typography, forms, and other UI components, allowing developers to create visually appealing layouts with minimal effort.

Figure 18 Bootstrap

Tailwind CSS: Tailwind CSS is a utility-first CSS framework that prioritizes flexibility and customization. It offers a wide range of utility classes that can be used to style elements directly in HTML, providing granular control over design elements without the need for custom CSS.

Figure 19 Tailwind CSS

Materialize CSS: Materialize CSS is based on Google's Material Design principles and provides a set of pre-designed components and animations for creating modern and intuitive user interfaces. It offers responsive grids, typography, and UI components inspired by Material Design guidelines, facilitating the creation of visually consistent and user-friendly interfaces.

Figure 20 Materialize CSS

For the front-end development of the FPTJobMatch project, HTML, CSS (including preprocessors), JavaScript library/framework, and CSS framework will be utilized to create a responsive, interactive, and visually appealing web application. The selection of each technology will be based on its appropriateness, compatibility, and alignment with the project's needs, ensuring a seamless and efficient development process.

8. Back End technology

Back-End Technology Selection for FPTJobMatch Project:

Programming Language:

The programming language chosen for the back end serves as the foundation for implementing server-side logic and handling data processing. Here are the options considered:

ASP.NET MVC with C#: ASP.NET MVC is a powerful framework for building scalable and maintainable web applications. C# is a robust and versatile programming language that is well-suited for developing enterprise-level applications. Together, ASP.NET MVC and C# provide a comprehensive and efficient solution for implementing server-side logic and handling requests from the front-end.

Figure 21 ASP.NET MVC with C#

Python: Known for its simplicity, readability, and extensive ecosystem of libraries and frameworks like Django and Flask. Python offers rapid development and scalability, making it suitable for web application development.

Figure 22 Python

JavaScript (Node.js): Enables full-stack JavaScript development, allowing developers to use the same language on both the client and server sides. Node.js is known for its event-driven architecture and non-blocking I/O, making it ideal for building scalable and real-time applications.

Figure 23 JavaScript (Node.js)

Java: Renowned for its performance, scalability, and strong support for enterprise-level applications. Java frameworks like Spring and Jakarta EE offer robust features for building scalable and maintainable web applications.

Figure 24 Java

Operating System:

The choice of operating system (OS) for the server environment depends on factors such as deployment environment, server management preferences, and compatibility with other technologies. The two main options considered are:

Linux: Renowned for its stability, security, and cost-effectiveness. Common distributions like Ubuntu, CentOS, and Debian are widely used for server deployments, offering a reliable platform for hosting web applications.

Figure 25 Linux

Windows Server: Suitable for environments with existing Microsoft infrastructure and .NET applications. Windows Server provides integration with Microsoft technologies and tools, offering a familiar environment for developers.

Figure 26 Windows Server

Web Server: The web server software is responsible for handling incoming HTTP requests and serving static and dynamic content to clients. Common options include:

Apache HTTP Server: A widely used open-source web server known for its stability, security, and modularity. Apache offers support for various programming languages and frameworks, making it a versatile choice for web application hosting.

Figure 27 Apache HTTP Server

Nginx: Known for its high performance, scalability, and efficient handling of concurrent connections. Nginx excels at serving static content and acting as a reverse proxy, making it ideal for high-traffic websites and applications.

Figure 28 Nginx

Database:

The choice of database management system (DBMS) is crucial for storing and managing application data efficiently. Common options include:

Microsoft SQL Server: Microsoft SQL Server will be used as the relational database management system (RDBMS) for storing and managing application data. SQL Server is a powerful and scalable database platform that provides support for ACID transactions, data integrity, and high availability. It offers advanced features for data storage, retrieval, and manipulation, making it suitable for the complex data requirements of the FPTJobMatch project.

Figure 29 Microsoft SQL Server

PostgreSQL: An open-source relational database known for its robust features, scalability, and support for ACID transactions. PostgreSQL offers advanced features like JSON support, full-text search, and geographic data types.

Figure 30 PostgreSQL

MySQL/MariaDB: Widely used open-source relational databases known for their ease of use, performance, and compatibility with various platforms. MySQL and MariaDB are suitable for a wide range of applications, from small-scale projects to large-scale deployments.

Figure 31 MySQL/MariaDB

MongoDB: A popular NoSQL database known for its flexibility, scalability, and support for unstructured data storage. MongoDB is ideal for applications with dynamic schemas and complex data models, offering high performance and horizontal scalability.

Figure 32 MongoDB

Hosting Solution:

The hosting solution determines where the application will be deployed and how it will be managed. Common options include:

Cloud Platforms : Offers scalability, reliability, and a wide range of services for deploying and managing applications. Cloud platforms provide flexible pricing models and global infrastructure, making them suitable for projects of any size.

Dedicated Hosting: Provides full control over server resources and configurations, offering maximum performance and security. Dedicated hosting is ideal for applications with specific resource requirements or compliance needs.

Platform as a Service (PaaS) Providers (e.g., Heroku, DigitalOcean): Offers a managed environment for deploying and scaling applications with minimal setup and configuration. PaaS providers handle infrastructure management, allowing developers to focus on building and deploying their applications.

Frameworks:

Frameworks provide pre-built components and libraries to streamline development and address common challenges. Common options include:

Django (Python): A high-level web framework for rapid development and clean, pragmatic design. Django follows the Model-View-Template (MVT) architecture, providing built-in features for authentication, URL routing, and database ORM.

Flask (Python): A lightweight web framework known for its simplicity, flexibility, and extensibility. Flask is suitable for building small to medium-sized web applications, offering a minimalistic approach to web development.

Figure 33 Flask (Python)

Spring Boot (Java): A powerful framework for building Java-based enterprise applications with ease of configuration and convention over configuration. Spring Boot provides out-of-the-box support for features like dependency injection, RESTful APIs, and security.

Figure 34 Spring Boot (Java)

By selecting ASP.NET MVC with C#, Windows Server, IIS, Microsoft SQL Server, and Microsoft Azure as the back-end technologies for the FPTJobMatch project, we ensure alignment with the project's goals, scalability requirements, security considerations, and development team expertise. These technologies provide a robust, scalable, and secure foundation for building and deploying the FPTJobMatch application, ensuring its success in the competitive job matching market.

9. Tools for source control management

The selection of development tools is a critical aspect of any software development project. It is a decision that requires a comprehensive evaluation to ensure the optimal selection that aligns with the project's needs. In our project, we have chosen to use Git and GitHub as our primary tools for source control management.

Git:

Figure 35 Git

Git is a distributed version control system that allows multiple developers to work on a project simultaneously without overwriting each other's changes. It provides a robust and flexible platform for tracking changes, managing branches, and coordinating work among team members.

In our project, Git was instrumental in maintaining a clean and organized codebase. It allowed us to create separate branches for different features, ensuring that the main codebase remained stable while new features were being developed. Furthermore, Git's powerful merging capabilities made it easy to integrate these features back into the main codebase once they were completed.

GitHub

Figure 36 GitHub

While Git provided the underlying version control functionality, GitHub added a layer of collaboration and project management tools that greatly enhanced our team’s productivity. GitHub served as a centralized repository for our code, making it accessible to all team members regardless of their location.

GitHub’s features such as pull requests, code reviews, and issue tracking made it easier for us to collaborate and keep track of our progress. Pull requests allowed team members to propose changes to the codebase, which could then be reviewed and approved by others. This ensured that all changes were vetted for quality before they were merged into the main codebase.

The issue tracking feature of GitHub provided a platform for us to report bugs, request features, and discuss project-related matters. This helped us maintain a clear and organized record of all project-related issues and discussions.

In conclusion, the combination of Git and GitHub provided a powerful and flexible platform for source control management in our project. These tools facilitated efficient collaboration among team members, ensured the integrity and stability of our codebase, and contributed significantly to the successful completion of our project. It is recommended that future projects continue to leverage these tools, while also considering other options like GitLab, based on specific project requirements and team preferences.

10. Software Development Models

Software Development Life Cycle (SDLC) Models

Software Development Life Cycle (SDLC) models provide a structured approach to the process of developing software. They offer a framework that includes various stages such as requirements gathering, design, implementation, testing, deployment, and maintenance. Here, we will discuss three popular SDLC models: Scrum, Waterfall, and V-model.

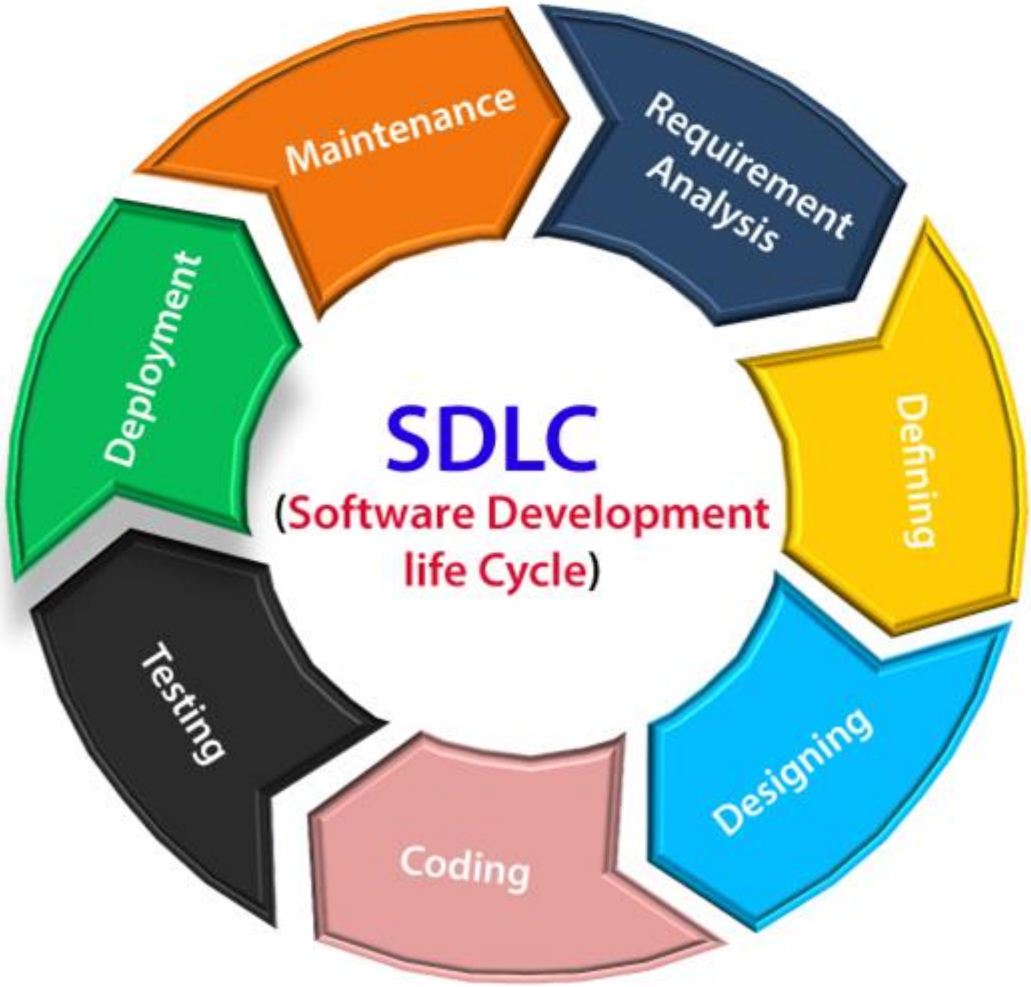


Figure 37 Software Development Life Cycle (SDLC) Models

Scrum

Scrum is an iterative and incremental Agile software development framework. It emphasizes flexibility, collaboration, and customer satisfaction. The development process is divided into ‘sprints’, which are time-boxed iterations that typically last between one to four weeks. Each sprint results in a potentially shippable product increment. Scrum encourages regular inspection and adaptation to cope with changes in requirements and technology.

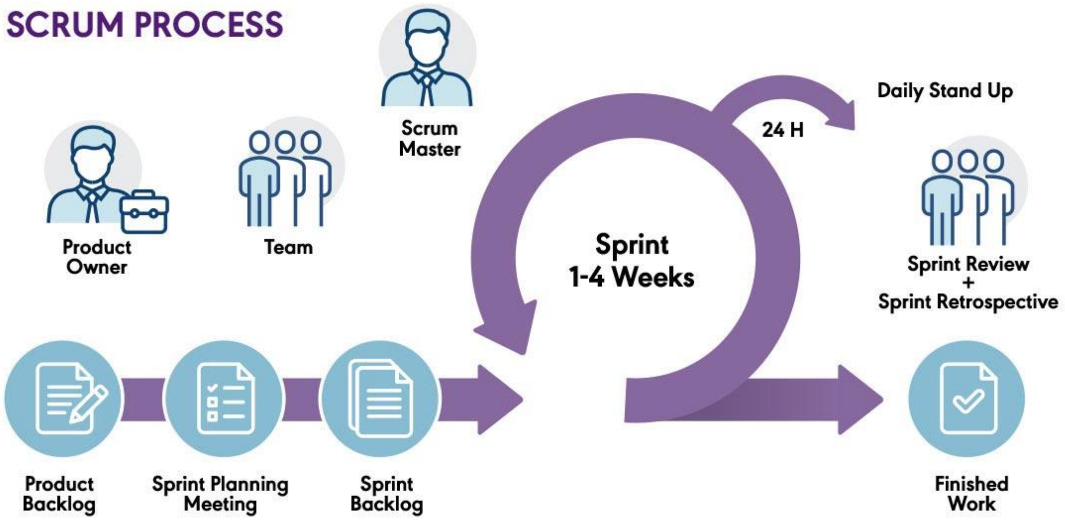


Figure 38 Scrum

Key components of Scrum include the Scrum Team (Product Owner, Scrum Master, and Development Team), Scrum Events (Sprint, Sprint Planning, Daily Scrum, Sprint Review, and Sprint Retrospective), and Scrum Artifacts (Product Backlog, Sprint Backlog, and Increment).

Waterfall

The Waterfall model is a sequential design process, often used in software development processes, where progress is seen as flowing steadily downwards (like a waterfall) through the phases of conception, initiation, analysis, design, construction, testing, production/implementation, and maintenance.

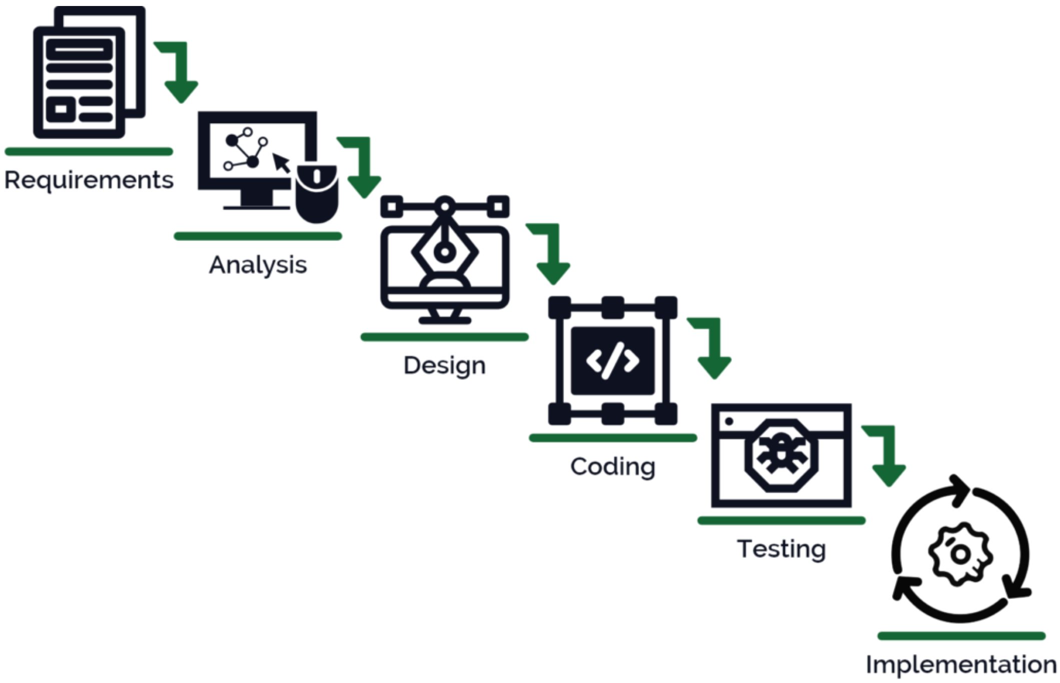


Figure 39 Waterfall

Each phase is distinct, and a subsequent phase begins only after the preceding phase is complete. This model emphasizes meticulous record-keeping, allowing for a thorough documentation trail and a clear understanding of the progression through the development cycle.

V-Model

The V-Model is an extension of the Waterfall model and is based on the association of a testing phase for each corresponding development stage. This means that for every single phase in the development cycle, there is a directly associated testing phase. This is a highly disciplined model and the next phase starts only after completion of the previous phase.

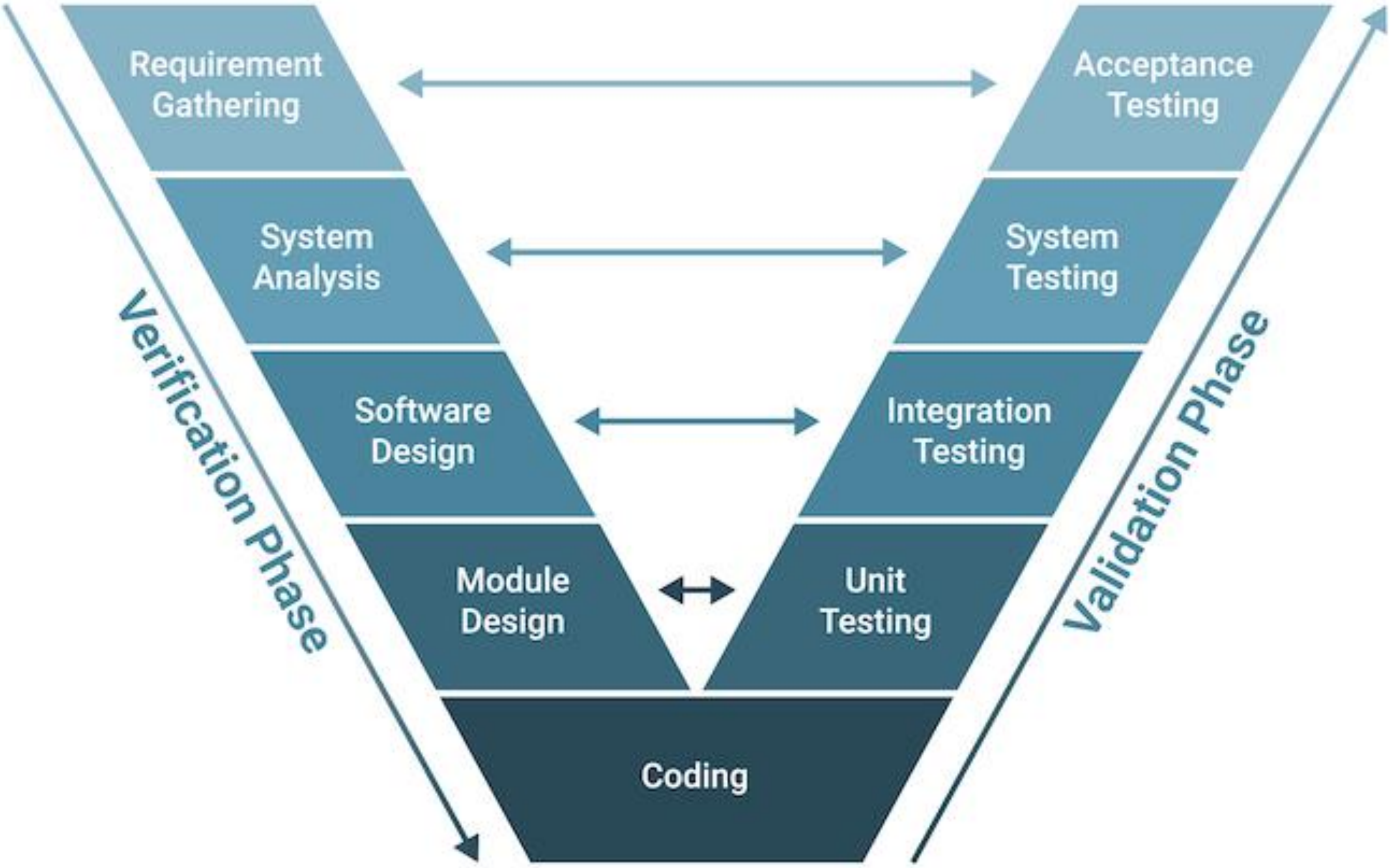


Figure 40 V-Model

The V-Model demonstrates the relationships between each phase of the development life cycle and its associated phase of testing. The horizontal and vertical axes represent time or project completeness (left-to-right) and level of abstraction (coarsest-grain abstraction uppermost), respectively.

Models will be used:

The selection of a Software Development Life Cycle (SDLC) model is a crucial decision that can significantly impact the success of a project. This decision should be made after a detailed analysis, considering factors such as project complexity, flexibility requirements, and stakeholder involvement. For our FPTJobMatch web application system, we use the Agile Scrum and Lean models.

Agile Scrum

The Agile Scrum model is an iterative and incremental approach to software development. It emphasizes flexibility, customer satisfaction, and team collaboration. In Scrum, the development process is divided into small manageable units known as ‘sprints’, each resulting in potentially shippable functionality.

Given the dynamic nature of the FPTJobMatch web application, where user feedback and market trends can frequently influence feature requirements, Scrum provides the flexibility to adapt to these changes rapidly. Regular sprint reviews allow for stakeholder feedback, ensuring the product meets user expectations and needs.

Lean

The Lean model of software development is derived from Lean Manufacturing principles. It focuses on eliminating waste, amplifying learning, deciding as late as possible, delivering as fast as possible, empowering the team, building integrity, and seeing the whole.

In the context of our FPTJobMatch web applications, Lean can help streamline processes, reduce waste (in terms of code, features, and efforts), and ensure that the team’s efforts are focused on delivering value to the users. The principles of seeing the whole and building integrity can contribute to a more cohesive product that meets user needs effectively.

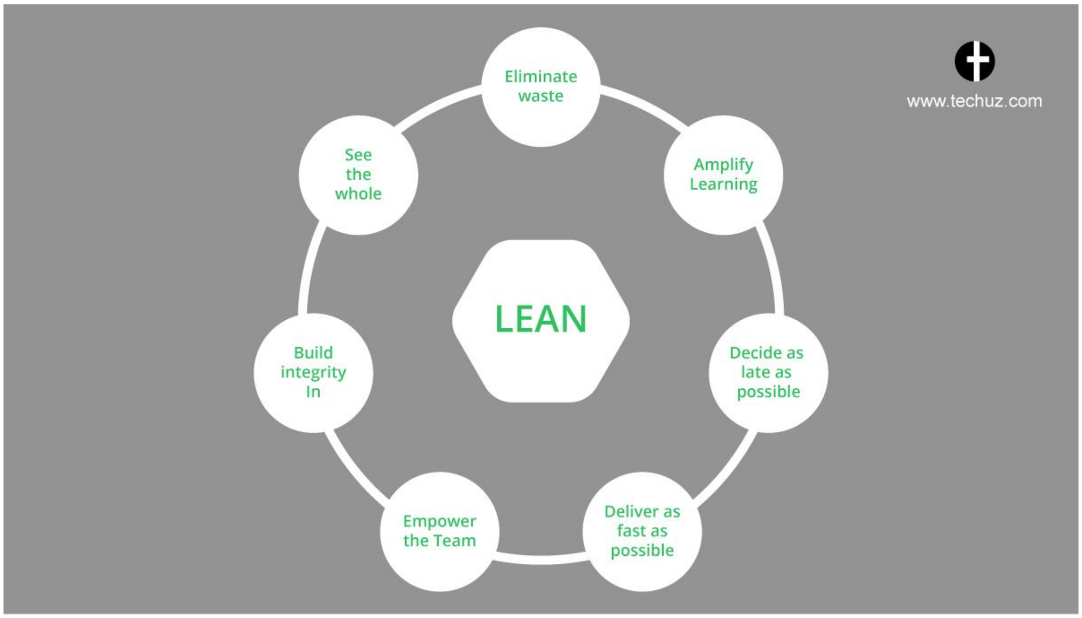


Figure 41 Lean

In conclusion, while both Agile Scrum and Lean have their strengths, the choice between them would depend on the specific circumstances of the project. It is recommended to use a hybrid approach, leveraging the strengths of both models to deliver a high-quality job-finding web application that meets user needs and expectations effectively and efficiently.

Reference:

www.w3schools.com. 2024. Introduction to HTML. [ONLINE] Available at: https://www.w3schools.com/html/html_intro.asp. [Accessed 7 April 2024].

www.w3schools.com. 2024. CSS Introduction. [ONLINE] Available at: https://www.w3schools.com/css/css_intro.asp. [Accessed 7 April 2024].

generalassemb.ly. 2021. Learn the Basics of JavaScript Libraries | General Assembly. [ONLINE] Available at: https://generalassemb.ly/blog/what-is-a-javascript-library/. [Accessed 7 April 2024].

vuejs.org. 2024. Introduction | Vue.js. [ONLINE] Available at: https://vuejs.org/guide/introduction. [Accessed 7 April 2024].

angular.io. 2024. Angular - What is Angular?. [ONLINE] Available at: https://angular.io/guide/what-is-angular. [Accessed 7 April 2024].

www.postgresql.org. 2024. PostgreSQL: About. [ONLINE] Available at: https://www.postgresql.org/about/. [Accessed 7 April 2024].

builtin.com. 2024. What Is Maria DB? (Definition, Uses, vs. MySQL) | Built In. [ONLINE] Available at: https://builtin.com/data-science/mariadb. [Accessed 7 April 2024].

stackify.com. 2023. What Is SDLC? Understand the Software Development Life Cycle - Stackify. [ONLINE] Available at: https://stackify.com/what-is-sdlc/. [Accessed 7 April 2024].