
# Tribhuvan University

## Faculty of Humanities and Social Science

**A PROJECT REPORT ON**

# ONLINE JOB PORTAL SYSTEM

**Submitted to**

**Department of Computer Application**

**Orchid International College**

**Bijaychowk, Kathmandu**

***In partial fulfillment of the requirements for the Bachelors in Computer Application***

**Submitted by**

**Adarsha Shrestha**

**July 2023**

**Under the Supervision of**

**Er. Dhiraj Kumar Jha**

**Tribhuvan University**

**Faculty of Humanities and Social Science**

**Orchid International College**

# SUPERVISOR'S RECOMMENDATION

I hereby recommend that this project prepared under my supervision by Adarsha Shrestha entitled "**ONLINE JOB PORTAL SYSTEM**" in partial fulfillment of the requirements for the degree of Bachelor of Computer Application is recommended for the proposal evaluation.

**SIGNATURE**

Dhiraj Kumar Jha

**SUPERVISOR**

Head of Department

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Bijaychowk, Gaushala, Kathmandu

**Tribhuvan University**

**Faculty of Humanities and Social Science**

**Orchid International College**

## LETTER OF APPROVAL

This is to certify that this project prepared by Adarsha Shrestha entitled "**ONLINE JOB PORTAL SYSTEM**" in partial fulfillment of the requirements for the degree of Bachelor in Computer Application has been evaluated. In our opinion it is satisfactory in the scope and quality as a project for the required degree.

| **Signature of Supervisor** | **Signature of HOD/Coordinator** |
|---|---|
| _____<br>Er. Dhiraj Kumar Jha<br>Head of Department<br>Department of IT<br>Orchid International College | _____<br>Er. Dhiraj Kumar Jha<br>Head of Department<br>Department of IT<br>Orchid International College |
| **Signature of Internal Examiner** | **Signature of External Examiner** |
| _____<br>Ms. Sikha Sharma<br>Fulltime Faculty<br>Department of IT<br>Orchid International College | _____ |

# ABSTRACT

This project involves building a job board web application on the Django Web Framework. The project requires defining the scope setting up the development environment, creating a Django project, creating Django apps for each feature, defining models, creating views and templates, implementing authentication, and implementing search and filter functionality. The job board web application will include features like job posting, job search, user profiles and application tracking. Users registered as Employer can post job listings and the users registered as normal users can apply for those job postings according to their preferences.

The frontend of the system is built using HTML, CSS, BOOTSTRAP and JS. The backend of the system is built using Django with PostgreSQL as Database and other libraries as required.

**Keywords:** HTML, CSS, BOOTSTRAP, JS, Django, PostgreSQL

# ACKNOWLEDGEMENT

I would like to express my sincere gratitude to several individuals for supporting me throughout my final project. First, I wish to express my sincere gratitude to my supervisor, **Er. Dhiraj Kumar Jha**, for his enthusiasm, patience, insightful comments, helpful information, practical advice and unceasing ideas that have helped me tremendously at all times in my research and during the development of my project. His immense knowledge, profound experience and professional expertise in Data Quality Control has enabled me to complete this research and project successfully. Without his support and guidance, this project would not have been possible.

I also wish to express my sincere thanks to Orchid International College for providing and giving permissions to use all the required equipment and necessary material to complete the project. Furthermore, I would like to express my special thanks of gratitude to our teacher **Ms. Sikha Sharma** for her able guidance and support in completing our project.

I would like to extend my gratitude to each individual, friends and guardians for providing me with all the facility that was required.

Adarsha Shrestha
93902029

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# Chapter 1: Introduction

## 1.1 Introduction

The job board web application is a dynamic and user-friendly platform designed to bridge the gap between job seekers and employers. In today's fast paced world, the demand for efficient and effective recruitment processes has grown significantly. The web application aims to address this need by providing an accessible and feature-rich platform where jobseekers can explore diverse employment opportunities and employers can effortlessly connect with potential candidates. Through the implementation of secure user registration and authentication, job seekers and employers can create personalized accounts to access a wild range of services.

Employers will have the privilege of posting job listings, specifying essential details such as job title, description, location, salary and more. Moreover, employers can conveniently manage applications, ensuring a streamlined hiring process. Jobseekers, on the other hand, can utilize the search functionality to find relevant job listings tailored to their preferences. The application will provide options for sorting the job listings, making the job-seeking process more efficient and effective.

An intuitive admin interface will be developed to manage job listing, user accounts and other site contents efficiently. The admin will have the authority to moderate use-generated contents, ensuring a safe and reliable environment for all users.

By addressing these challenges and implementing these features, the Job Board Web Application aims to provide a seamless and efficient platform, empowering job seekers to find their dream opportunities and employers to discover exceptional talent with ease.

## 1.2 Problem Statements

The job board web application project aims to create a platform that connects job seeker and employers. The application needs to provide secure user registration and login functionality for both jobseekers and employers. Employers should be able to post job listings, edit them and manage applications efficiently. Jobseekers should be able to search for jobs, apply through the platform and track their application. Data security, privacy and a responsive design are also crucial aspects of the project. By addressing these problem statements, the job board application can offer a seamless and efficient experience for its users.

## 1.3 Objectives

The objectives of Job Board Web Application are:

- to help job seekers easily find suitable job opportunities,
- to make the platform accessible and user-friendly on different devices,
- to allow users to create their profiles,
- to provide an easy-to-use admin interface to manage content efficiently,
- to assist employers in safe and trustworthy for users to share their information.

## 1.4 Scope and Limitations

### 1.4.1 Scope

Users can register and create an account. Users can authenticate themselves through login credentials. Employers can assign appropriate categories, levels and types to their job listings. Users can filter jobs based on those job categories, levels and types. An administrative panel will be provided to admins to manage user accounts, job listings and other site-contents.

### 1.4.2 Limitations

- Limited job matching capabilities: Matching job seekers with suitable job opportunities is a complex task. While this system typically provides basic search and filtering options, they may not offer sophisticated algorithms or advanced matching capabilities that can significantly enhance the job search process.
- Accuracy and relevance of job listings: Maintaining accurate and up-to-date job listings can be a challenge. This system relies on employers to post and update their listings, and if employers fail to keep the information current, it can lead to a poor user experience for job seekers.
- Limited job visibility: This system often faces challenges in ensuring that all job listings receive sufficient visibility. With a large number of listings, it can be difficult individual jobs to stand out, resulting in reduced exposure for some positions.

## 1.5 Development Methodology

Agile Methodology is going to be used while building the job board web application. This project does not have specific documentation, ample time, fix requirements and well understood technology. So, in order to build this system, agile methodology can be used so that the changes can be made any time.

### 1.5.1 Agile Methodology

The meaning of Agile is swift or versatile. Agile methodology is a practice that promotes continuous iteration of development and testing throughout the software development lifecycle of the project. Each iteration is considered as a short time "frame" in the agile process model, which typically lasts from one to four weeks. The division of the entire project into smaller parts helps to minimize the project risk and to reduce the overall project delivery time requirements. [3]


**Figure 1.1: Agile Methodology**

## 1.6 Report Organization

This is the report organization for the system which also includes charts/diagrams to illustrate the system architecture and design. Furthermore, it contains information regarding the tools and technologies used to build the system.

**Table 1.1: Outline of the Report**

| | |
|---|---|
| **Introduction** | Introduction<br>Problem Statement<br>Objectives<br>Scope and Limitations<br>Development Methodology<br>Report Organization |
| **Background Study** | Background Study<br>Literature Review |

| | |
|---|---|
| **System Analysis** | Requirement Analysis<br>Feasibility Analysis<br>System Design |
| **Implementation and Testing** | Tools and Technology<br>Test Cases |
| **Conclusion** | Conclusion<br>Lesson Learnt<br>Future Recommendations |

# Chapter 2: Background Study and Literature Review

## 2.1 Background Study

The background research for the college project report explores the relevance and context of the project topic. In order to facilitate a smooth interaction between businesses and job searchers for a successful hiring process, the project seeks to build a job board web application on the Django programming language. The difficulties in locating the proper candidate and the ineffective data storage and analysis inherent in traditional hiring practices highlight the need for a web-based solution. It is clear from a thorough literature analysis that there are many platforms, but they might be affected by security problems, technical issues, and fierce rivalry.

Therefore, this project aims to overcome these restrictions by giving companies a user-friendly platform to post job listings and manage applications while also enabling job seekers to develop profiles and submit applications for positions that suit them. The project intends to simplify the hiring process and improve job seeker-employer relations by adding filtering choices, messaging capabilities, and analytics for employers.

## 2.2 Literature Review

Job boards are an essential component of the modern job search process. They allow job seekers to browse job listings and apply for positions online, while also providing employers with a way to reach a larger pool of candidates. Web applications built on Django, a high-level Python web framework, have become popular for building job boards due to their ease of use and scalability.

One study by Liang examined the use of web-based job search platforms in China and found that these platforms have become an important tool for both job seekers and employers. The study highlighted the need for effective job matching algorithms and user-friendly interfaces, both of which can be achieved through the use of web application frameworks like Django. [1]

The old job seeking methods are too slow, stressful, challenging and also lack quality. In addition, the applicants have to consider the cost and the amount of time to get the

information they need, and other preparations they have to make. Finding all available job vacancies is a main step at in the job-seeking process [2]

A review by Jang et al. examined the use of machine learning algorithms in job matching for job boards. The authors found that machine learning algorithms can improve job matching accuracy and reduce search time for job seekers. Django's built-in Object-Relational Mapping (ORM) and support for machine learning libraries such as scikit-learn make it a suitable choice for implementing machine learning algorithms in job board web applications. [4]

Now-a-days the job market is so extensive that a variety of industries and companies are searching for right candidates and the prospective candidates are searching for right companies for growth opportunities. This purpose is served by most of the job portals on line. This is another job portal with an open environment for the job seekers and recruiter to meet on the same dais and know about each other so that the right candidate is placed in a right company.[5]

Overall, the literature suggests that building a job board web application on Django can provide a cost-effective and scalable solution for employers and job seekers alike. The use of Django's built-in features such as ORM and authentication, along with the ability to integrate with other Python libraries, make it a suitable choice for building job boards with advanced features such as job matching algorithms and machine learning.

# Chapter 3: System Analysis and Design

## 3.1 System Analysis

The system analysis of the system is done by conducting requirement analysis, feasibility analysis, data modeling and process modeling as follows:

### 3.1.1 Requirement Analysis

The requirement analysis of job board web application is done through finding the functional and non-functional requirements for the system.

#### 3.1.1.1 Functional Requirements

Functional Requirements are the statements of services the system should provide, how the system should react to particular inputs and how the system should behave in various situations.

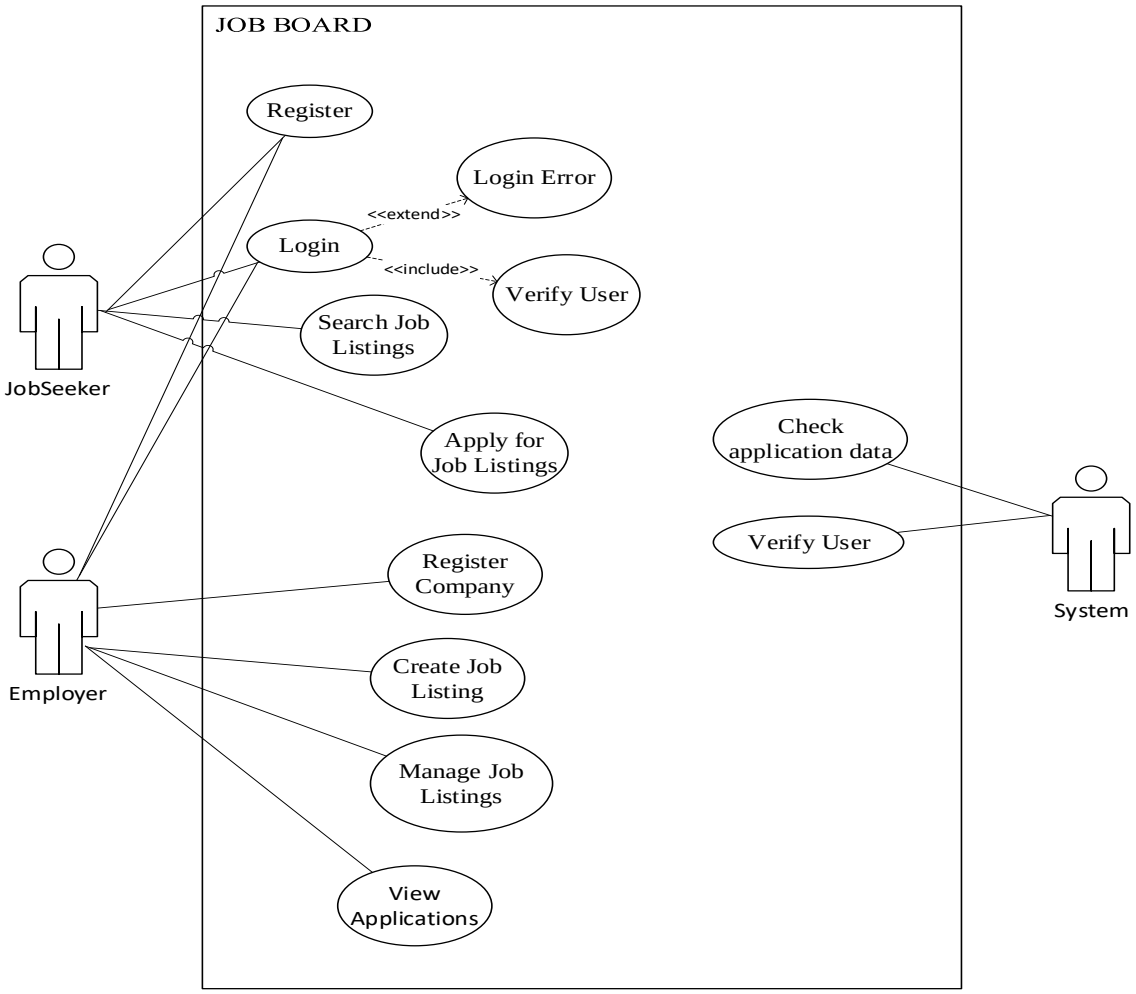


**Figure 3.1: Use Case Diagram for Online Job Portal System**

**Table 3.1: Use Case for Login**

| | |
|---|---|
| Use Case Identifier | UC1: Login |
| Primary Actor | User |
| Secondary Actor | The users should be able to login to the system. |
| Success Scenario | 1. The user is logged in.<br>2. The user is acknowledged.<br>3. Redirected to respective pages. |
| Failure Scenario | 1. The user is not logged in.<br>2. User is not acknowledged.<br>3. Flash error message. |

**Table 3.2: Use Case for Adding Jobs**

| | |
|---|---|
| Use Case Identifier | UC1: Add Jobs |
| Primary Actor | Employer |
| Secondary Actor | The employer should be able to add a new job. |
| Success Scenario | 1. The job is added to the database.<br>2. The employer is acknowledged.<br>3. Redirected to job-list page. |
| Failure Scenario | 1. The database is not updated.<br>2. The employer is not acknowledged.<br>3. Flash error message. |

**Table 3.3: Use Case for Applying Jobs**

| | |
|---|---|
| Use Case Identifier | UC1: Apply for jobs |
| Primary Actor | Job Seeker |
| Secondary Actor | The logged in users should be able to apply for jobs. |
| Success Scenario | 1. The job is applied<br>2. The user is acknowledged.<br>3. Redirected to respective pages. |
| Failure Scenario | 1.The user is not logged in.<br>2. User is not acknowledged.<br>3. Flash error message. |

#### 3.1.1.2 Non-Functional Requirements

1. Performance:

This system is designed for smooth performance with optimization and good response even for the low-end devices.

2. Security

In this system only authorized personnel can gain access to the admin panel and only valid users with valid username and password can access the user dashboard.

3. Availability

The system is designed to be available 24*7. In case of major malfunctions, the system will be repaired quickly so that the business is not severely affected.

4. Ease of Use

Users with simple level of understanding of how sites work can easily use this system as it is built with that in focus.

### 3.1.2 Feasibility Analysis

Feasibility analysis is used to assess the strengths and weaknesses of a proposed project and present directions of activities which will improve a project and achieve desired results.

1. Technical

This project is technically feasible. The Django web framework is widely used and has excellent documentation, making it easy to develop web applications with complex functionality. Additionally, there are many libraries and third-party packages available for Django that can be used to enhance the platform's functionality.

2. Operational

This project is operationally feasible. The platform is designed with a user-friendly interface, allowing employers and job seekers to easily navigate and use the platform. Additionally, the platform will be scalable, allowing it to handle a large number of job listings and applications.

3. Economic

This project on Django is economically feasible. The platform is built using open-source technologies, reducing the cost of development.

4. Legal

This project is legally feasible. The platform complies with applicable laws and regulations such as data protection and privacy laws, as well as comply with industry standards for recruitment platforms.

5. Schedule

Schedule feasibility is the degree to which a deadline for a strategy, plan, project or process is realistic and achievable. The feasibility of this project is high as the system can be completed within the time limit.

| | Gantt Chart | | | | | | | | | | Estimation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 20-Mar | 1-Apr | 16-Apr | 1-May | 16-May | 1-Jun | 16-Jun | 1-Jul | 20-Jul | 5-Aug | |
| Planning | | | | | | | | | | | 13 Days |
| Research | | | | | | | | | | | 16 Days |
| UI Design | | | | | | | | | | | 47 Days |
| Implementation | | | | | | | | | | | 81 Days |
| Usability Testing | | | | | | | | | | | 20 Days |
| Documentation | | | | | | | | | | | 122 Days |

**Figure 3.2: Gantt Chart for Online Job Portal System**

### 3.1.3 Object Modeling

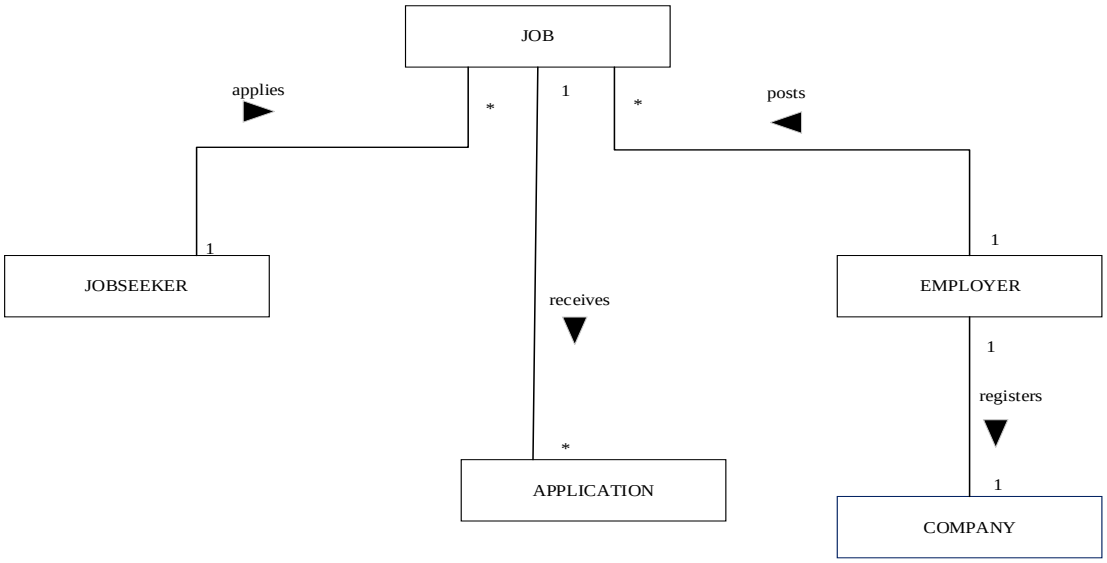


**Figure 3.3: Domain Object Modeling for Online Job Portal System**

Here, there are five objects with their respective relationship. One employer can register one company. Also, one employer can add multiple jobs. A jobseeker can apply for multiple jobs. One job can receive multiple applications.

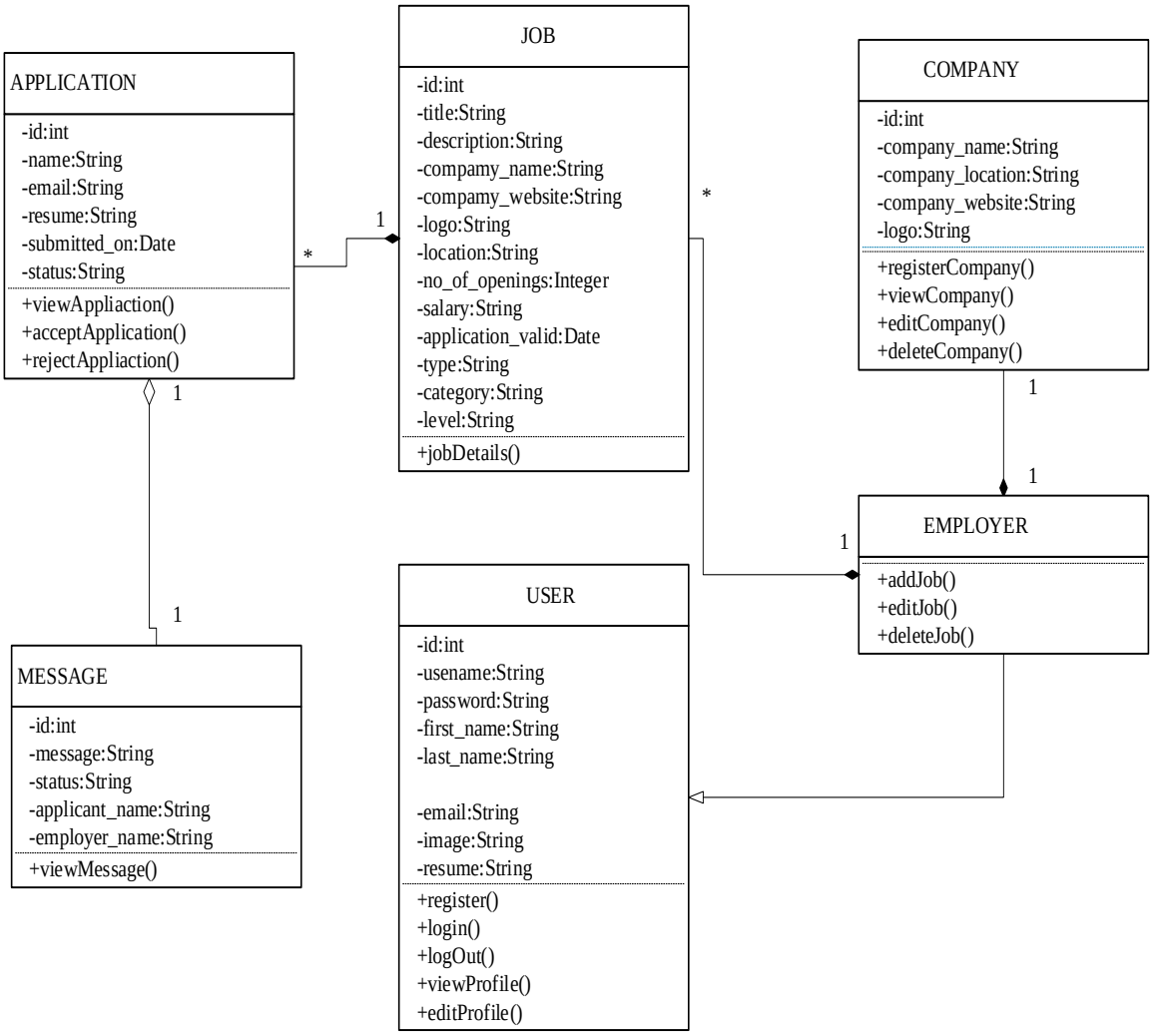


**Figure 3.4: Class Diagram for Online Job Portal System**

### 3.1.4 Process Modeling

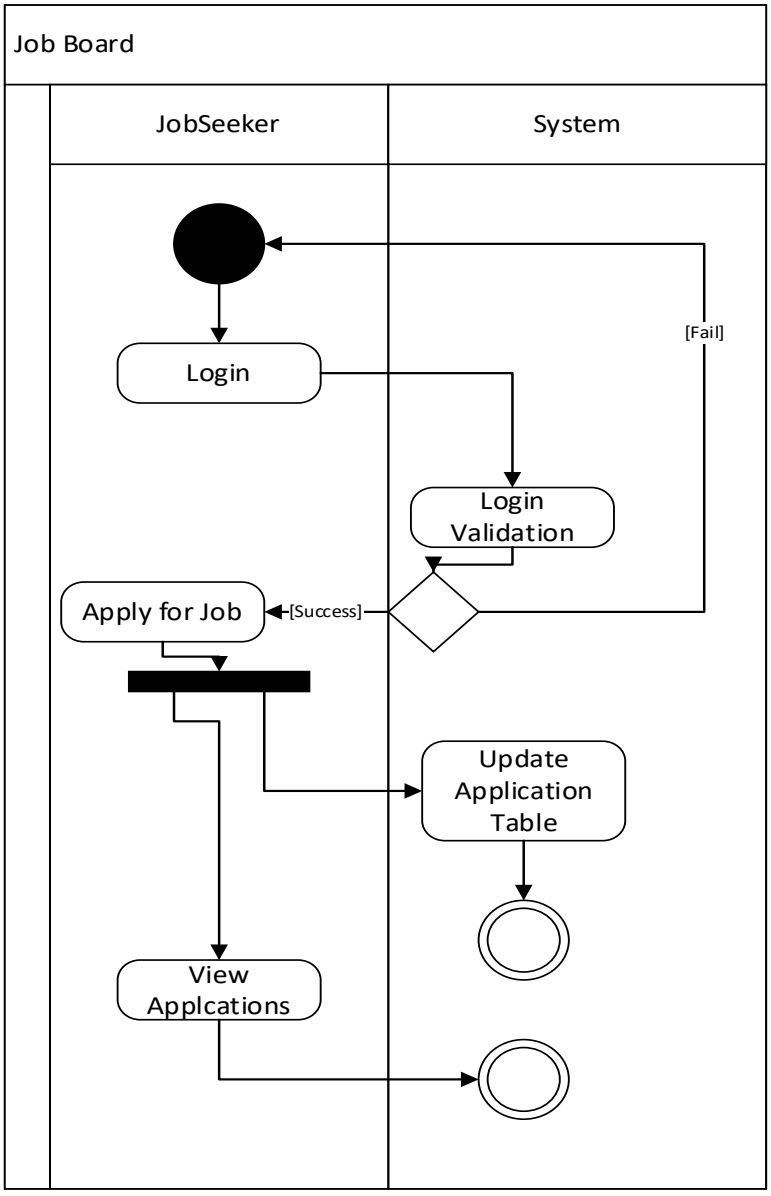


**Figure 3.5: Activity Diagram for Online Job Portal System**

### 3.1.5 Dynamic Modeling

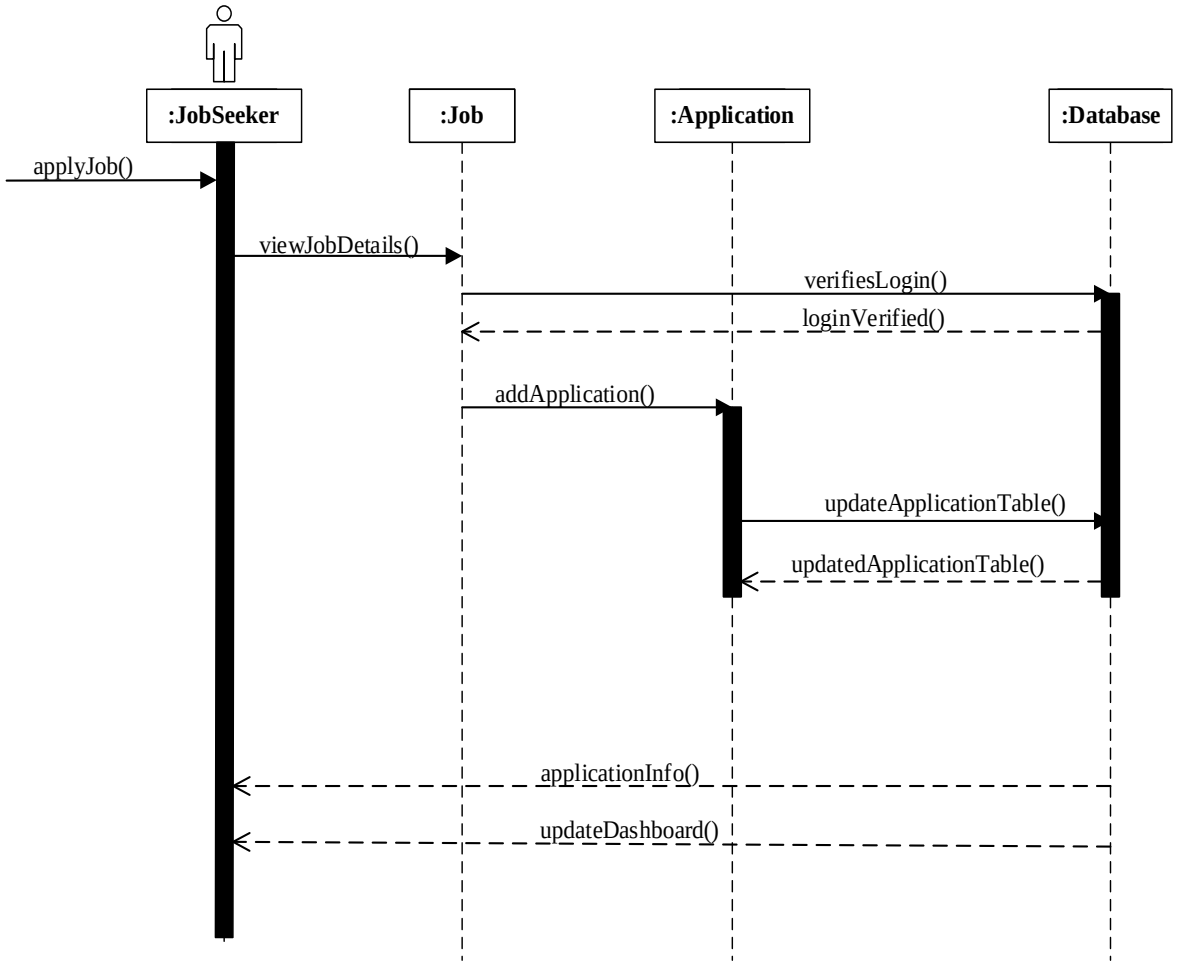


**Figure 3.6: Sequence Diagram for Online Job Portal System**

## 3.2 System Design

### 3.2.1 Component Diagram

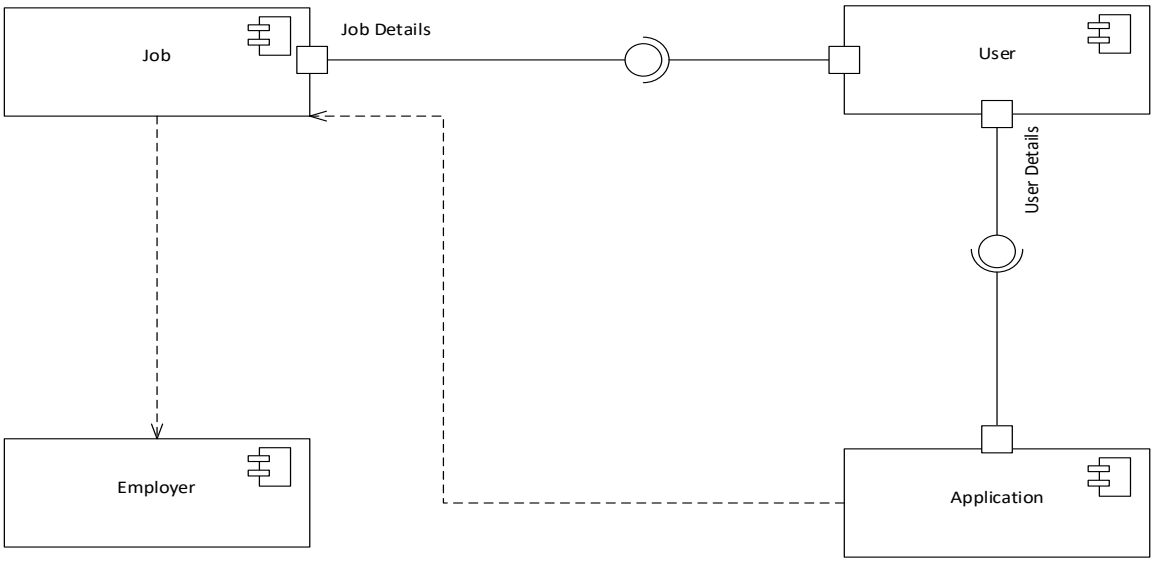


**Figure 3.7: Component Diagram for Online Job Portal System**

### 3.2.2 Deployment Diagram

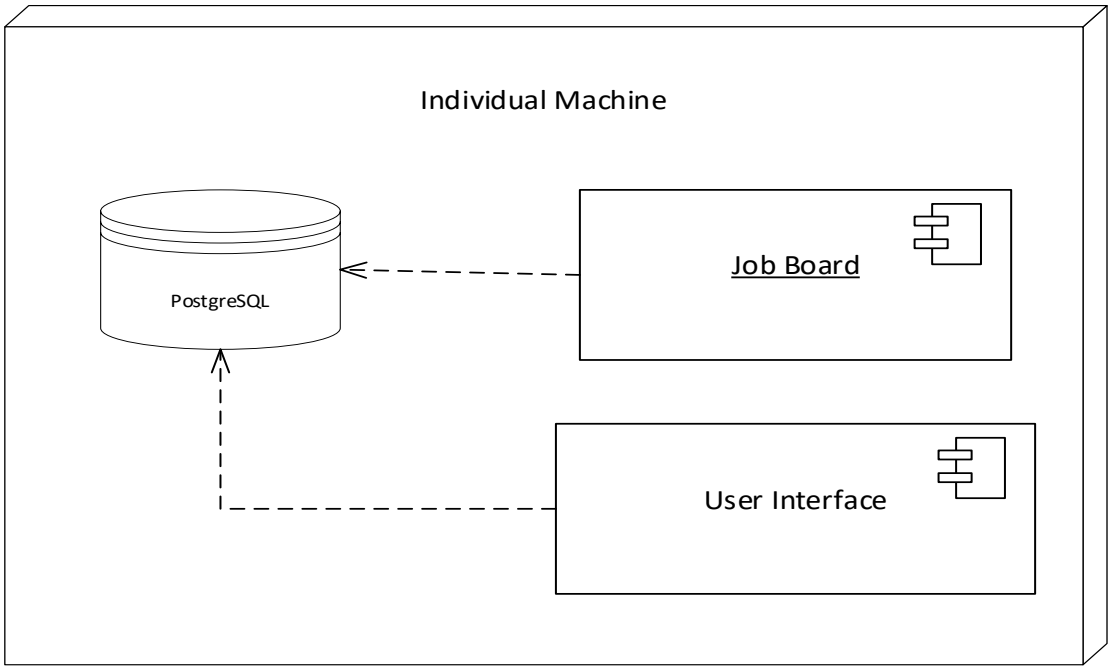


**Figure 3.8: Deployment Diagram for Online Job Portal System**

## 3.3 Algorithm Details

The detail information about the algorithms that has been used in this system are as follows:

- **TF-IDF (Term Frequency-Inverse Document Frequency):**

  The **'TfidfVectorizer'** the **'sklearn.feature_extration.text'** module is used to convert the text data into numerical values.

  TF-IDF is a numerical statistic that represents the importance of a word in a document relative to a collection of documents.

- **Cosine Similarity:**

  The **'cosine_similarity'** function from the **'sklearn.metics.pairwise'** module is used to calculate the similarity between the vectorized data of the input data and all other data from the database.

  Cosine Similarity measures the cosine of the angle between the two non-zero vectors and determines how similar they are. It provides a similarity score between 0 and 1, where 1 indicates perfect similarity.

  The formula to find the cosine similarity between two cosine vectors:

  $$Cos(x, y) = x \cdot y / ||x|| * ||y||$$

  Here,

  'x': 'job_vector'

  'y': 'feature_vectors'

  Here's how they correspond to the formula:

  'x': 'job_vector' is the TF-IDF vector representation of the input job's title, description, and level. This vector represents the job for which user wants to find similar jobs.

  'y': 'feature_vectors' is a matrix where each row is a TF-IDF vector representing a job in the database. It contains the TF-IDF representations of the titles, descriptions, and levels of all jobs except the input job.

  So, in the context of the code used:

  'x' represents the input job's TF-IDF vector.

  'y' represents the matrix of TF-IDF vectors for all other jobs in the database.

# Chapter 4: Implementation and Testing

## 4.1 Implementation

In this stage, the system requirements are converted into a working system by the means of code. Several tools are used during the development of the system which are described below:

### 4.1.1 Tools Used

**Programming Language:**

Django is used as Server-Side Scripting Language and JavaScript is used as Client-Side Scripting. Django is used to specifically connect, create, update, delete, modify content in PostgreSQL database.

**IDE**

VS Code is used as IDE. VS Code is a text editor used for writing codes in various languages with ease. It helps developers in writing code with efficiency and accuracy.

**Diagram Making Tool**

Microsoft Visio is used to make all the UML diagram for the documentation and implementation of this project.

## 4.2 Testing

### 4.2.1 Test Case for Unit Testing

Unit Testing refers to the testing of every small modular components of the system, keeping them isolated from other modules.

Steps followed in Unit testing:

- Conduct the code execution tests
- Identify and resolve any errors

**Table 4.1: Test Case for Login**

| **Project Name: Online Job Portal System** | | | | | | |
|---|---|---|---|---|---|---|
| **Test Case** | | | | | | |
| **Test Case ID:**TC_001 | | | **Test Designed By:** Adarsha Shrestha | | | |
| **Test Priority (Low/Medium/High):** Medium | | | **Test Designed Date:** 2023-07-26 | | | |
| **Module Name:** Login | | | **Test Executed By:** Adarsha Shrestha | | | |
| **Test Title:** Verify Login | | | **Test Execution Date:** 2023-07-26 | | | |
| **Description:** Test login module for job board web application. | | | | | | |
| **Pre-condition:** User is a registered user with valid username, email and password. | | | | | | |
| **Dependencies:** | | | | | | |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status (Pass/Fail)** | **Notes** |
| 1 | Visit the Login Page | | Login Page opened | as expected | Pass | |
| 2 | Provide registered username | username=toph | Username can be entered | as expected | Pass | |
| 3 | Provide password for the entered username | Password=iammelonlord | Password can be entered | as expected | Pass | |
| 4 | Click Login Button | | User should be redirected to the website. | as expected | Pass | |
| **Post-condition:** User is validated with database and logged in to the system. | | | | | | |

**Table 4.2: Test Case for Applying Job**

| **Project Name: Online Job Portal System** | | | | | | |
|---|---|---|---|---|---|---|
| **Test Case** | | | | | | |
| **Test Case ID:**TC_002 | | | **Test Designed By:** Adarsha Shrestha | | | |
| **Test Priority (Low/Medium/High):** High | | | **Test Designed Date:**2023-07-27 | | | |
| **Module Name:** Apply for Job | | | **Test Executed By:** Adarsha Shrestha | | | |
| **Test Title:** Apply for Job | | | **Test Execution Date:** 2023-07-27 | | | |
| **Description:** To check if authorized user can apply for jobs. | | | | | | |
| **Pre-condition:** User is authorized and logged in. | | | | | | |
| **Dependencies:** | | | | | | |
| **Step** | **Test Steps** | **Test Data** | **Expected Result** | **Actual Result** | **Status (Pass/Fail)** | **Notes** |
| 1 | Select job of preference | | Job details page opened | as expected, | Pass | |
| 2 | Click Apply button to apply for job | | User is redirected to the applications page. | as expected, | Pass | |
| **Post-condition: Selected job is applied and database is updated.** | | | | | | |

# Chapter 5: Conclusion and Future Recommendations

## 5.1 Conclusion

When all conditions are complete a web application for Job Board will be available for use. The web application will allow users to:

- Register as employers & jobseekers,
- Registered employers will be allowed to post job listings,
- Registered jobseeker will be allowed to apply for those jobs.

The objectives set for the application has been fulfilled.

## 5.2 Lesson Learnt

A lot of requirements were missed during the requirement collection phase which were later visible during coding that resulted in longer time consumption. I had to regularly take help from the Internet as well my friends. I had to contact our teachers for issues that looked simple afterwards. I did a lot of research and tried to solve the problems.

## 5.3 Future Recommendations

The system is made country specific for Nepal which can be furthermore upgraded to work on other countries as well. The UI can also be made more responsive than it currently is. The web application can be made to recommend jobs to the users according to their search history and previous applications.

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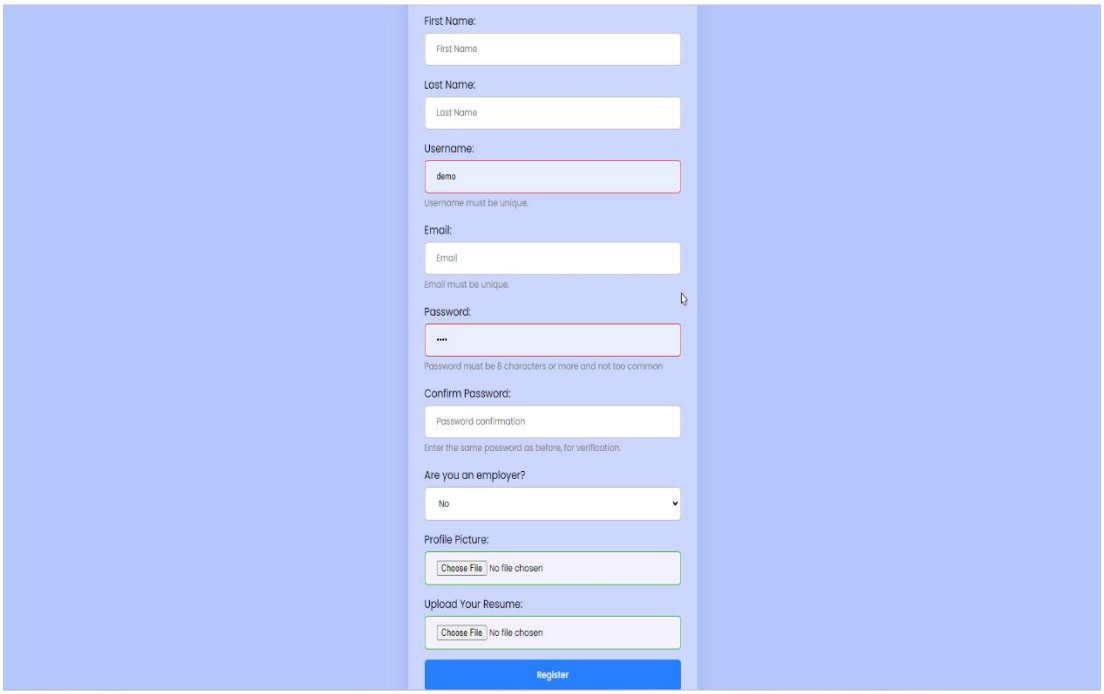
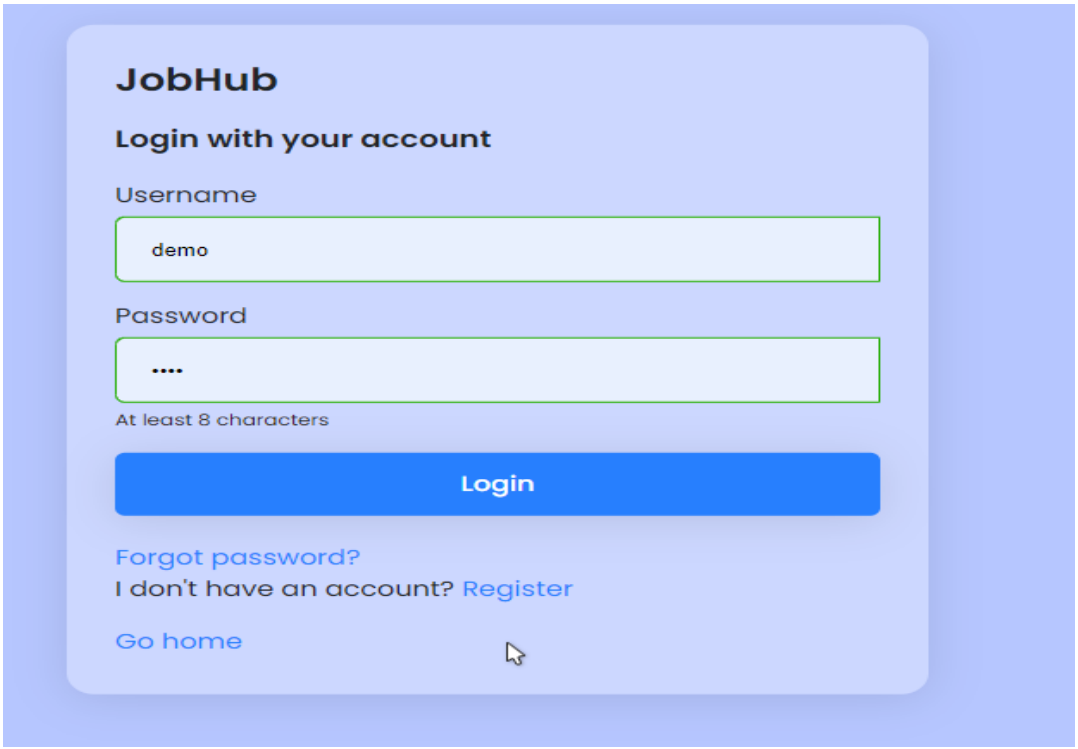
# Appendices

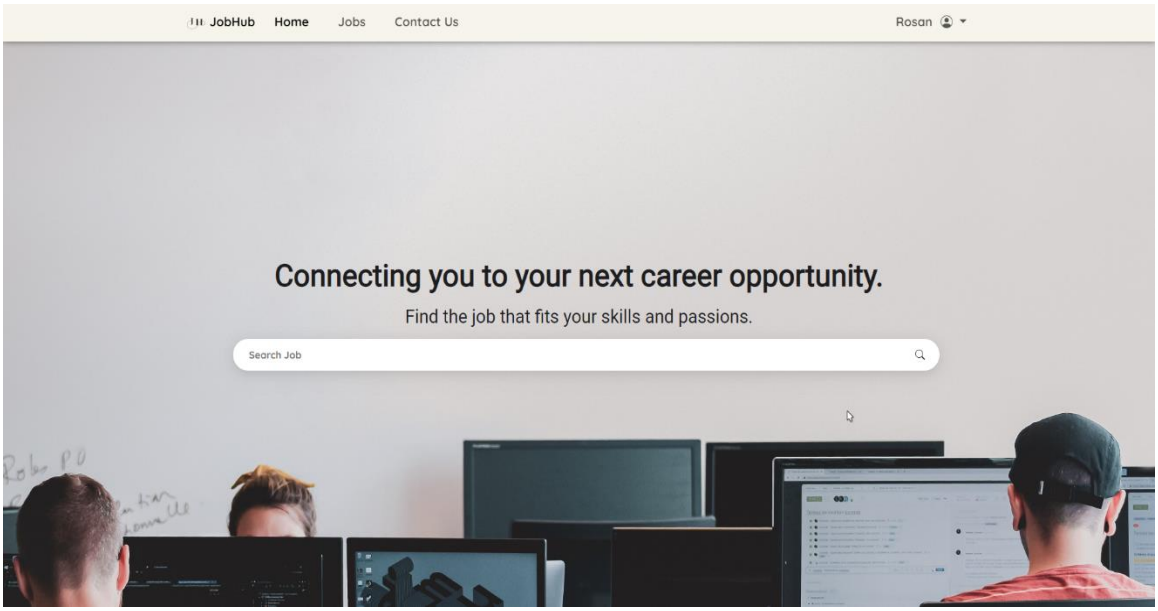
Register Page



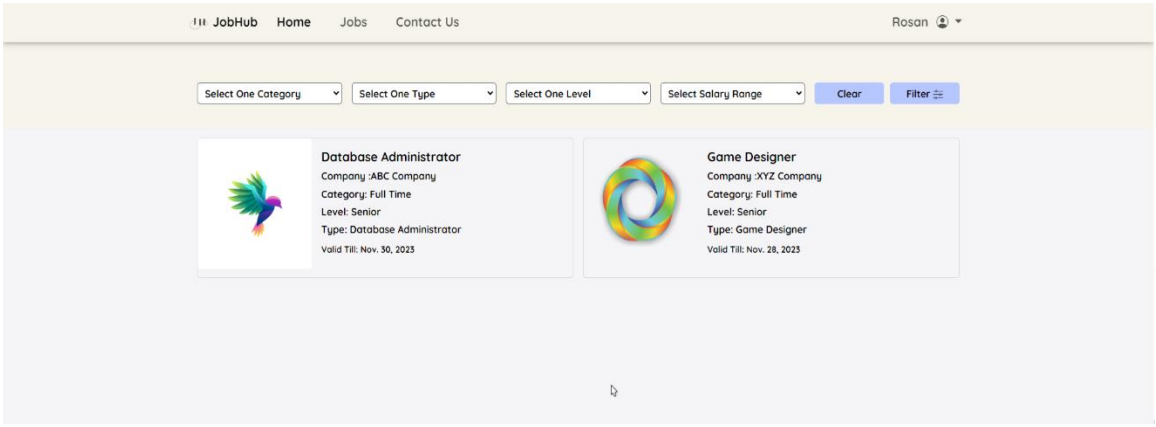

Login Page



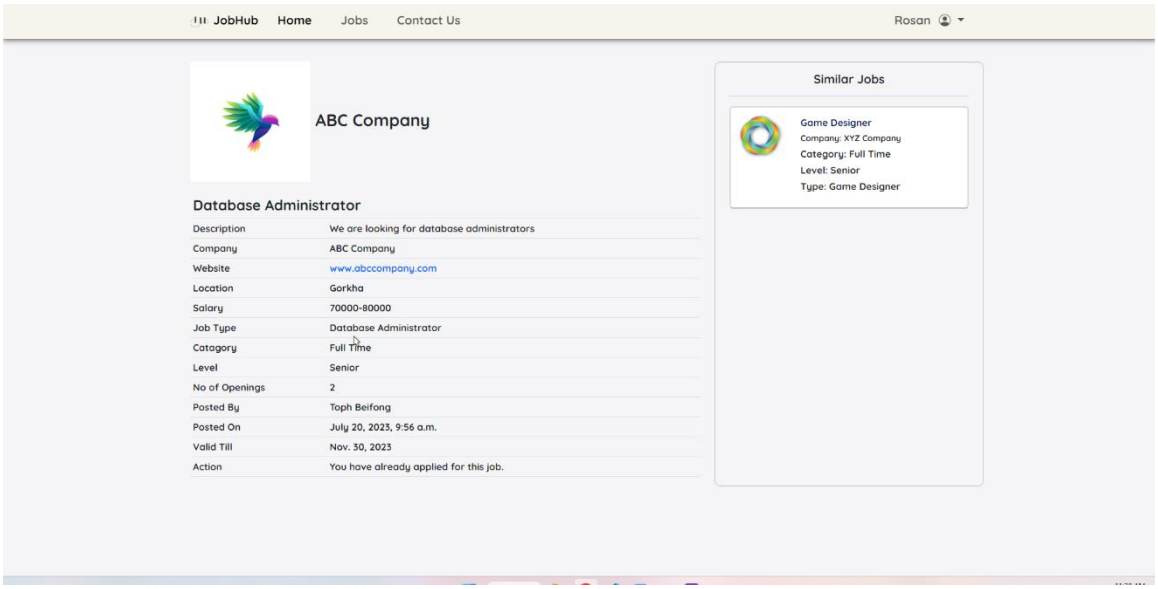
Index Page



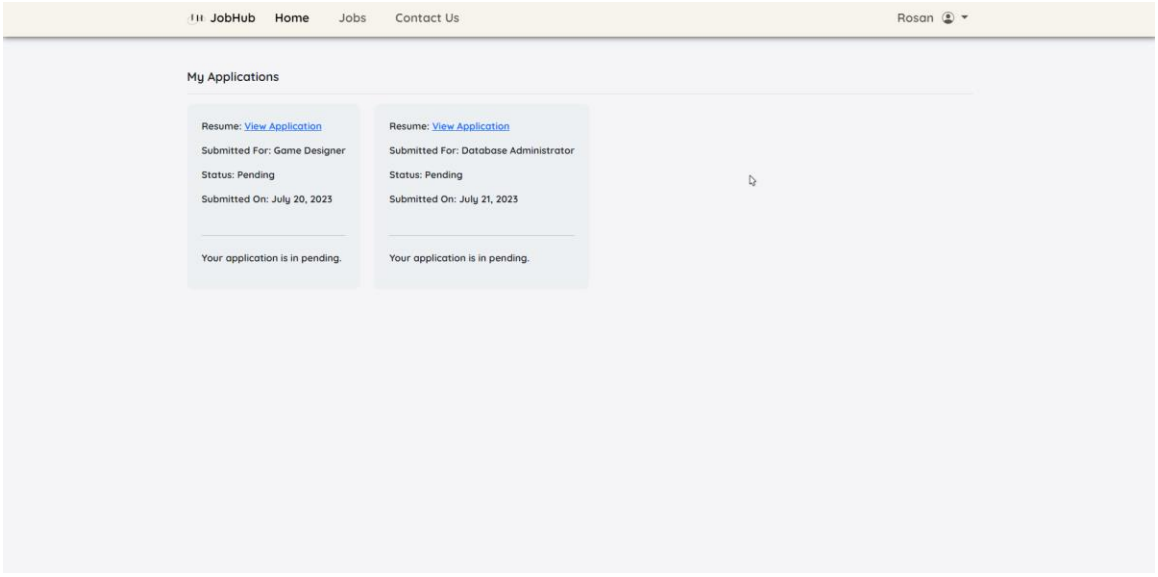

Job Lists Page



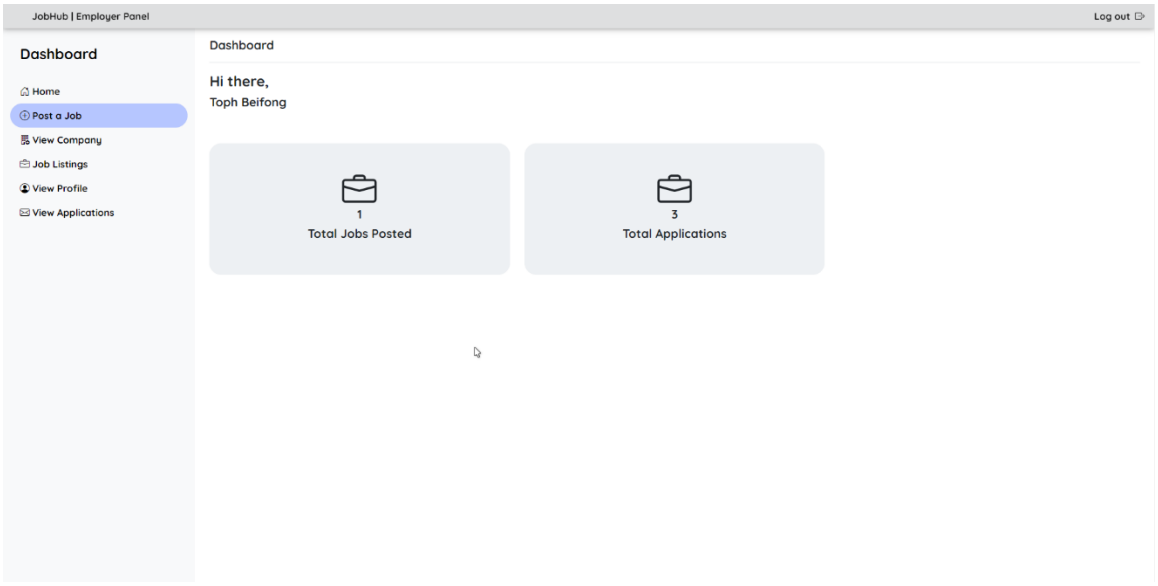
Job Details Page




Jobseekers' Application Page



## Employer Dashboard




## Employer Company Page