



# **Online Recruitment Management System for SiLex Solutions (Pvt) Ltd**

**A dissertation submitted for the Degree of Master of  
Information Technology**

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## **Abstract**

Human resources are people who work for a workforce in an organization, business establishment, or economy. Human resources are like a base for each organization. It plays a vital role in a company. The requirements of human resources are going up because of globalisation. Additionally, the recruiting process is very complex for any company.

SiLex Solutions (Pvt) Ltd is a fast-growing human resource company, and they are handling the recruitment process on behalf of their client companies. Currently done their recruitment process manually. This manual process is very time-consuming, required a more human resource to process, communication difficulties and full of paper-based. Also, it is difficult to prepare reports for decision-making process as well. An online recruitment management system is proposed to resolve these problems. The aim of this system is to develop a reliable, accurate and efficient web-based online recruitment management system. The main objectives of this system are automated the recruitment process and lead the entire recruitment process to a smart staffing strategy.

This system facilitates lots of advanced features to the job seekers and job providers. This system enables advertise vacancies via the website, client companies can send vacancy details to advertise, job seekers can apply for vacancies, schedule selection tests and interviews, held online selection tests, email notifications, report generation, get backups and restore backups. Using this system the company can achieve the following benefits. Benefits of the system are reducing advertising costs, minimize documentation, improve efficiency and productivity, reduce human error and save time.

This system has considered the development life cycle and uses the open-source platform to build an efficient output. The system is developed using PHP as the development language, MySQL as the database management system, Bootstrap used as the interface design platform, Apache web server as the server environment to provide a low-cost efficient solution for the client. The developed system is tested by using several testing methods such as unit test, integration test, system test and acceptance test. Furthermore, the questionnaire is provided to get the feedback of the system users. The entire application could be run on any platform and any web browser with a stable internet connection.

## Declaration

The thesis is my original work and has not been submitted previously for a degree at this or any other university/institute. To the best of my knowledge, it does not contain any material published or written by another person, except as acknowledged in the text.

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This is to certify that this thesis is based on the work of

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under my supervision. The thesis has been prepared according to the format stipulated and is of acceptable standard.

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## List of Abbreviations

ORMS	– Online Recruitment Management System
HR	– Human Resource
CV	– Curriculum Vitae
ICT	– Information and Communication Technology
ATS	– Applicant Tracking System
GUI	– Graphical User Interface
SaaS	– Software as a Service
RAM	– Random Access Memory
MB	– Megabyte
GB	– Gigabyte
GHz	– Gigahertz
DB	– Database
PHP	– Hypertext Pre-Processor
MySQL	– My Structured Query Language
IE	– Internet Explorer
UML	– Unified Modelling Language
IT	– Information Technology
GUI	– Graphical User Interface
ERD	– Entity Relationship Diagram
HTML	– Hypertext Markup Language
CSS	– Cascading Style Sheets
UAT	– User Acceptance Test
PDF	– Portable Document Format
XAMPP	– Cross Platform, Apache, MariaDB, PHP, and Perl
IDE	– Integrated Development Environment
SDLC	– Software Development Life Cycle

# Chapter 1: Introduction

## 1.1 Introduction

Demand for the labour force in the world is very high and it has become one of the rapidly growing industries in the world. The youth of the population, empowerment of women, inflation, urbanization and rate of the education are effect to the labour rate. According to the world bank report, within the next ten years, the world needs more than six hundred million job opportunities to fulfil the labour demand [1].

Before introducing the open economy, Sri Lankan job market is not much popular [2]. As a result of the open economy, private sector companies are established and afterwards, the job market becomes popular and complex [3]. There are several booming industries in Sri Lanka and the labour market is in the top among them [4]. Depending on the high demand for labour, the recruitment process may be a very complex and time-consuming task. Most of the private and public sector organizations still use a manual recruitment process.

SiLex Solutions (Pvt) Ltd is a fast-growing human resource company. SiLex Solutions is responsible for recruiting employees on behalf of their client companies. They have a good client base. The problem is their current recruitment process is done manually and it has many shortcomings.

Most real-life situations of this process are advertising the vacancies in several media such as newspaper, TV, and internet. Then job seekers apply for these posts through the internet or post. Human Resources (HR) staff of the company collects all the application and go through one by one for shortlisting the most appropriate applicants.

SiLex Solutions (Pvt) Ltd publishes the vacancies which they got from the client companies. Depend on the client requirements SiLex Solutions has the right to either hold the selection test(s) or interview(s) or both. If the clients need to held a selection test, relevant questioner should be prepared by the clients according to the job title and send it to the company. Also, an interview board consists of a client company member(s). Shortlist the candidates according to the marks they got. After that most suitable candidates are selected as employees and send their details to the relevant companies. This entire process is done manually.

Both employers and job seekers are faced with many problems with the contemporary manual recruitment system. A major problem is the current labor-intensive system takes more time to process the recruitment. It requires lots of human resources and paperwork to complete this procedure. The correctness of the manual system may be low. Most of the people didn't get the information about the vacancies properly due to the lack of information flows. Also, due to lack of communication, some applicants cannot get the information about the interview details.

To overwhelmed the problems mentioned above, the Online Recruitment Management System (ORMS) is required. This is a single platform which job seekers and companies can interact with one interface. This system is implemented with web-based recruitment functions, such as client companies can register and pay the membership fee via online and log in to the system. Login details will send as an automatically generated e-mail wich include username, password and activation link. After that, they can send the vacancies which are presently available on the company. Admin has the full authority to publish these vacancies to the website. Then job seekers who wish to apply for the vacancies should register with the system and apply for the vacancy. HR staff shortlist the registered applicants and schedule the selection test and automated emails will be sent to the applicants that include all the relevant details about the

selection test. Selection test will be held as an online exam in their exam centre. Then schedule interviews for candidates and all the information about interviews are also informed via automated emails.

Using this system, a company can reduce waste time, reduce errors as a result of the manual process, less paperwork, less human resources requirement and can select the most suitable candidates for the post.

This Online Recruitment Management System automates the company's recruitment procedure and leads to a smart staffing strategy. This system facilitates apply, advertise, scheduled selection tests and interviews – anytime, anywhere and on any with a stable internet connection.

## **1.2 Problem Domain**

SiLex Solutions (Pvt) Ltd is done their human resources recruitment process manually. Their recruitment process has the following major steps; user registration, advertise job vacancies, apply for the vacancies, shortlist candidates, held selection tests and interviews, then select the suitable employees. Manually managing the recruitment process has lots of shortcomings and failures.

CV's sent by post might not reach before the closing date or company might miss viewing the received emails. It is very time-consuming to select appropriate candidates among a large number of CVs. For that company needs more HR staff and they consider all the received applications and match the requirements. Also, printing selection test papers are wasting papers and it is lead to environmental contamination. Marking selection test papers are also a time-consuming process. Otherwise, contact the candidate to inform selection test dates and interview dates may be problematic.

Presently, all the records associated with the recruitments are entered into a manual paper-based system. It is difficult to get reports needed for the HR department and for the management. Also, it is difficult to update the data. Similarly, it is difficult to find data immediately. Because of this paper-based system, office space is wasted due to the maintaining of a large number of files. Another significant drawback of the manual system is when a particular company needs an urgent vacancy it may be difficult to find an appropriate individual immediately.

## **1.3 Motivation for the project**

To overwhelmed the above difficulties, the suggested online recruitment management system will be helpful. It automates a large part of a HR staff tasks and responsibilities, simplifies and smooth the workflow and save their time.

Furthermore, there are numerous systems available on the internet to manage the recruitment process. But those systems haven't fulfilled all the features required by the SiLex Solutions. Consequently, purchasing one of those systems is useless and waste money for the company. Therefore, to overcome the above problems online recruitment management system will be helpful. At the same time, information technology and the internet are fast growing in the country [5]. Hence, most of the people can access this system [6].

## **1.4 Aims and Objectives of the proposed system**

The aim of the proposed system is to develop a web-based recruitment system for SiLex Solutions (Pvt) Ltd. This system has a job posting, advertise vacancies, apply for vacancies, select applicants for selection test, scheduled selection tests and interviews, held online selection tests, held interviews add interview marks, backup facility and automated email notification. All these facilities are held on one platform.

The main objective of this system is automating the company's recruitment procedure. Therefore, no waste of time, no waste paper and no mistakes encounter. Nevertheless, report generation for decision-making process is easier. By the way, the online recruitment system facilitates both job seekers and client companies.

The sub-objectives are to develop an Online Recruitment Management System is,

- Provide a user-friendly interface so that job seekers can easily apply for the vacancies and HR staff of the company can handle the recruitment process smoothly.
- To provide a way to advertise vacancies, way to apply for the job vacancies and acknowledge the status.
- To computerize the recruitment information for review, maintenance and produce reports to administrators.

## **1.5 Scope of the project**

This proposed system suggests a solution to automate the manual recruitment process. The scope of this proposed system will focus on the job seekers and client companies who will use this system. This online recruitment management system has several modules to facilitate the recruitment process. Using the client management module, client companies can register and add vacancy details. Also, using the online test module, admin can handle the selection test for job seekers. Furthermore, this system has a feature of scheduling interviews and selection tests dates.

Communication between the applicant and company did by the automated emails. Also, this system can generate the reports for decision management process. The proposed system has a backup facility. Using the proposed system company can reach an effective and efficient recruitment process.

The proposed system has developed based on the following assumptions. The user should have a stable Internet connection, the user should understand the English language and the user should have computer literacy.

## **1.6 Dissertation Outline**

Following is a brief description of the remaining chapters of the dissertation.

### **Chapter 2 – Background**

A summary of background information relevant to the implementation is presented in this chapter. A critical review of similar systems available and technologies available and relevant implementation.

### **Chapter 3 – Methodology**

This chapter provides information about the requirement gathering process and techniques used to identify the system requirements. Also, considering the functional and non-functional requirements. Appropriate diagrams such as UML diagrams, ER diagram, UI designs and descriptions of the proposed system are included in this chapter. Furthermore, this chapter described the coding and implementation tools and techniques which are used to develop the entire system.

### **Chapter 4 - Evaluation**

Provide a description of the reviewing process of the software. Using the test data, the developed system is tested. This chapter also includes aspects such as a test plan and test cases.

### **Chapter 5 - Conclusion**

This chapter presents a summary of the work, discusses its findings and contributions; points out the limitations of the current work and outlines directions for future work.

## Chapter 2: Background

### 2.1 Introduction

The background study is mainly considering the similar systems which are currently available on the internet. There are some systems which are used to handle the recruitment process. The manual recruitment process has many drawbacks such as time-consuming, need a more human resource, difficult to update data, difficult to find a suitable person immediately etc. The solution to these problems is a computerized recruitment system. Computerization makes it is easy for a company to do their recruitment process. Currently, available recruitment systems are difficult to customize according to SiLex Solutions recruitment process.

### 2.2 Review of present well-known hiring systems

There are many online recruitment management systems available on the internet. These systems are used to improve the efficiency of the recruitment process. The recruitment industry is enhancing day by day and it is easy to use a computerized system. Few of similar systems are,

#### ❖ Zoho Recruit

Zoho Recruit [7] is an Applicant Tracking System (ATS) that helps to find the right candidates without spending time and effort. This system is used by recruiting agencies and recruiting departments worldwide. This powerful solution lets them manage all their job openings, resumes, candidates and contacts more quickly and efficiently. Some of the features of Zoho Recruit are indicated below.

- Create and Publish Job Openings.  
Zoho is facilitated to create and publish vacancies. Also, publish it to the popular job boards including LinkedIn etc.
- Create beautiful career pages.  
Allow candidates to apply for job openings from the client company's careers website. Customize the page to be in sync with the client organization's theme.
- Resume Management.  
Manage resumes and track the progress of candidates more efficiently. Zoho Recruit helps to gather applicant's resume database, schedule interviews, and do more.
- Notification.  
Keep good communication between applicant and client via emails and SMS.
- Import Document (CV).  
Zoho Recruit is so smart that when candidates apply for jobs and attach their resumes, their details automatically get parsed and stored in your candidate database.
- Schedule interviews.  
Zoho Recruit will schedule interviews. This helps interviewers stay on their toes and keep their information up-to-date.
- Advanced analytics.  
Get a quick overview of the status of jobs, interviews scheduled and candidates. Zoho Analytics has used different types of graphs and charts to analyses the data. The number of candidates added, in comparison to the number of candidates hired and the interviews scheduled etc. are few examples for the analytics.

Zoho is mainly focused on applicant tracking process. It does not cover up the online test module. Zoho is open source and it is limited to one recruiter and five concurrent job openings. We need to pay an additional amount for further facilities such as mass email facility etc.

### ❖ **iKrut**

iKrut [8] is an easy to use candidate recruitment system. Specially designed to support the growth of small and medium companies. Using iKrut, companies can reduce time to hire, cost per hire and administration part. iKrut is simply designed with high user-friendly therefore, no training is required. Some of the features of iKrut are specified below.

- **Jobs Widget.**  
iKrut gives some code and whoever looks after your website can place that code onto your site meaning that any jobs you add into your iKrut account will appear instantly on your corporate site.
- **Build an application form.**  
Simply select which application form goes with which job. In addition, premium customers can disable the cv/resume upload tool which is the default setting on the application process so the candidate can only submit an application form.
- **Powerful analytics.**  
Get access to bulk reports on who is applying to vacancies and from what exact source. You can produce reports as well as work out your cost and time to hire across the whole company or an individual department. You can produce these both graphically or as a downloadable table.
- **Bulk Candidate Messaging.**  
Admin is an important person for any recruiter but iKrut just wipe out it. iKrut's bulk rejection tool is a very important tool to send rejection messages.

iKrut is also focused on applicant tracking process. It has the online test module but it covers only the numerical test. iKrut is free but not open sources software and it is developed as a Software as a Service (SaaS). Due to the limitations of some features such as client records, it not suitable for large recruitments.

### ❖ **OpenCATS**

OpenCATS [9] is the free and open applicant tracking system. OpenCATS will work in small to enterprise size organizations and any number of applicants. Some of the features of the OpenCATS system is,

- **It is easy.**  
OpenCATS is easy to use and it has a user-friendly interface. Because of this companies need minimal training time for recruiters. The job portal has a simple search and application process that will help candidates to get easy access.
- **Full recruiting life-cycle.**  
OpenCATS provides the infrastructure for the entire recruiting life-cycle, regardless of the type of role that you are recruiting for. Also, the volume of recruiting is not affected by this system.
- **Resume storage, contact storage, applicant tracking and notes.**  
OpenCATS will help to keep track of all the details, activities, records, contact numbers and keep client work-flow managed.

- **Backup and restore.**  
This OpenCATS system can be backed up as often as you need. There is a simple and amateur GUI-based backup/restore system. System administrators can also perform backups/restores through the MySQL database and file system. Anyone can back up and restore OpenCATS, despite any technical knowledge and capabilities.
- **Built-in Emailing.**  
The email functionality is important in OpenCATS. Currently, OpenCATS can be used to send emails to candidates, clients, and contacts. It can also be used to notify of status changes and new applications, or anything you would like it to do. Templates can be set up and used and branding can be included.

OpenCATS is open source software but commercial CATS product is also available with highly polished, professionally supported and more features than open-source. Also, OpenCATS does not cover up the online test module.

### ❖ **SmartRecruiters**

SmartRecruiters [10] is a recruiting software specially designed for the modern workforce. Increase recruiter productivity, faster hiring team collaboration, and enhance the candidate experience from source to hire are some advantages of the SmartRecruiters. Several features of the system are indicating below,

- **Interview Scheduling**  
SmartRecruiters have the facility to schedule interviews.
- **Job Board Posting**  
Clients vacancies published to the system.
- **Automatic Notification**  
Contact applicants through the emails.
- **Candidate Management**  
Excellent candidates' management facilities.

Very similar to iKrut. SmartRecruiters have a free version but it limited to 50 resumes per month. Also, this system is not supported by online candidate assessments. As well as it has limitations of reporting capability.



## 2.3 Critical Analysis of the Similar Systems

In the above Section, 2.2 described the similar systems and some of their features. In this section compare these features with respect to the proposed Online Recruitment Management System. Table 2.1 shows a summary of the critical analysis of similar systems.

*Table 2.1: Critical analysis of the proposed system & existing systems*

<b>Features</b>	<b>Zoho Recruit</b>	<b>iKrut</b>	<b>OpenCATS</b>	<b>SmartRecruiters</b>	<b>Proposed System</b>
Publish Job Openings	Yes	Yes	Yes	Yes	Yes
Communication	Yes	Yes	Yes	Yes	Yes
Import Document	Yes	No	No	No	Yes
Advanced Analytics	Yes	Yes	No	Yes	Yes
Online Test Facility	No	Yes, but numerical test only	No	No	Yes
Backup & Restore	Yes	Yes	Yes	No	Yes

## 2.4 Summary

The computerized recruitment system is a very effective way for the hiring process. It automates the whole hiring process. Above Section 2.2 mentioned the several systems which have different features. Also, Table 2.1 has been shown the critical analysis of the feature in those systems. The proposed system combined all these features together to satisfy user requirements.

## **Chapter 3: Methodology**

### **3.1 Introduction**

This chapter gives an overview of the entire design of the system. It consists of analysis, design and implementation part of the system. System analysis is an important activity when a system developed. The analysis is mainly focused on requirement gathering, fact-finding, identifying the functional and non-functional requirements and requirements specification of the system. The design process translates requirements into the software system. System design can be done with a Unified Modelling Language (UML). The main objectives of the design process are the identification of the software components, the software architecture, interfaces, data structures and algorithms.

### **3.2 Requirement Gathering**

Requirement gathering or requirement elicitation is a very important part of the project. Requirement gathering is a process of capturing the requirements from the various stakeholders of the project. It will help in understanding the needs and expectations of the customer. If an author is unable to do the requirement gathering task properly, it may have a significant impact on the end results of systems or projects [11]. There are many facts finding techniques available for analysis, but here an author has used interviews, observations and document analysis.

#### **Interviews**

Interviews are the most commonly used and are primary ways for information gathering from stakeholders. In here an author has used unstructured interview method and asked certain questions from the client, regarding their requirements and make sure that the interview covers all the areas. It is more flexible and less biased. An author has gathered the required information and participated in all types of stakeholders for this interview. Interview questionnaire is attached in Appendix A.

#### **Observations**

In this technique, an author can gather requirements by observing the existing manual system. It is very helpful to understand the weaknesses of the current manual system and can identify the required functionalities of the system. Also, there are many similar systems on the internet. Observe those system's demo versions to get an idea about the of the system.

#### **Document Analysis**

Analyzing the current process and documentation can help to understand the client's current situation. Reviewing the available company documentation, charts, recruitment analysis statistics and past recruitment patterns and get an idea about the requirements of the new system.

### 3.3 Requirement Analysis

Requirement analysis is a very important fragment of a software development process. Functional and non-functional requirements are used to analyse the process. Analyses the collected information to obtain a clear understanding of the new system to be developed. The requirements should be defined clearly to ensure the design and implementation successful. Different types of methods are being used to do the analyzing to find a solution.

Requirements for the new system gathered using interviews, observations and document analysis methods. Based on that information and analyzed information can be divided into functional and non-functional requirements.

#### 3.3.1 Functional Requirements

Functional requirements describe what the system should do. Below described the functional requirements of the proposed system.

##### **Functional requirement of an administrator**

- Accept and publish vacancy details.  
Admin can view vacancies sent by the clients and publish vacancies. Also, admin can edit details as well.
- Update company website.  
Admin can update the company website with the latest details.
- Check client details.  
Admin can view registered client details and edit them if required. Also, admin can check the payments and if payment has done mark it as 'Pay'. If payment is overdue then send a reminder email to the client asking for late payment.
- Shortlist the applicants.  
Admin can view all the applicant's full details. If an applicant has fulfilled the basic requirements, then admin can select them for the selection test or/and interview. Also, admin can edit applicant details if required.
- Schedule selection test and interviews.  
Admin can schedule the selection tests and interviews without any clashes.
- Send email notifications.  
Admin can send various types of notification emails such as payment reminder notification for clients, invite selection test and interviews for the applicants, rejection notification email to the applicants, selection notification for the selected applicants, inform the selected applicant details to the client company etc.
- Set questions for selection tests.  
Admin can upload selection test questions to the database, delete the question from the database and add test for the database. Also, admin can view these questions and edit questions if required.
- Generate reports.  
Admin can generate various reports to the decision making purpose such as applicant details, client details, number of vacancy details etc.
- Get backups and restore backups.  
Admin can get system backups as separate tables or as an entire database at once. Also, admin can restore data into the database if required.
- Delete database.  
Admin can delete data in the database more than five (5) years old because it is no longer used.

### **Functional requirement of job seekers and clients**

- Job seekers and clients can register.  
New users are required to register as members before they are allowed to use the system.
- User Login.  
Existing users have to login to the system in order to use the system facilities.
- Clients can register company details.  
Client companies can register the company details with the system.
- Clients can make a payment.  
Client companies need to pay membership. The system allows paying online banking.
- Clients can send vacancies.  
Client companies can add vacancy details to the system.
- Job seekers can apply online for vacancies.  
Job seekers can apply for the vacancies via online.

### **3.3.2 Non-Functional Requirements**

Non-functional requirements describe how the system works [12].

- Usability  
After developing the system entire recruitment process migrate manually to an automated system. Therefore, staff can be able to learn and use the system with minimum effort. Especially staff who have less computer literacy can be able to understand the system functionality and work with the system. Also, job seekers who haven't IT knowledge can be able to interact with the system.
- Performance  
Web page response time is a very important factor to any website. When jobseeker loads the web page it should load without any time delay. As well as the user requests a particular task from the system, feedback should be display quickly. Most probably users expect this facility from the system
- Security  
In here considered the protection of data and the system. ORMS contain some confidential personal data of users therefore, system security is a very important factor.
- User Friendliness  
Easy to use and flexible user interface are very important for users who haven't strong computer literacy. Also, GUI is more preferred than the text, therefore, GUI makes an end user's job easier. The system contains images, icons and buttons to understand clearly.
- Reliability  
It describes the ability of a system or component to operate under specified conditions for a specified period of time. Simply it defines as the feasibility that a product will operate without failure for a specified number of uses or for a specified period.

### 3.4 Design techniques

The design process translates requirements into a diagram representation of the software. System design can be done with a Unified Modelling Language (UML). The major objectives of the design process are the identification of the software components, the software architecture, interfaces, data structures and algorithms [13]. A UML model comprises a set of diagrams. Figure 3.1 below shows the UML diagram hierarchy. In here entity relationship diagram, use case diagram and sequence diagram are described below.

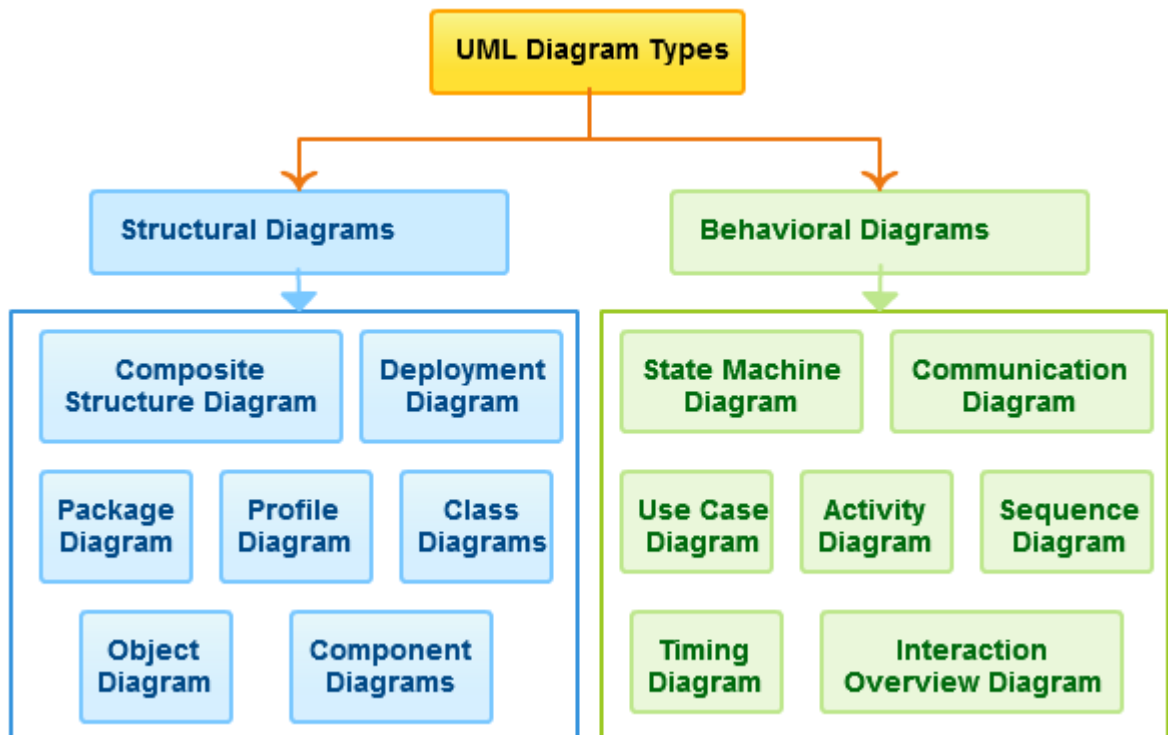


Figure 3.1 UML diagram hierarchy

### 3.5 Entity Relationship Diagram

Entity Relationship Diagram (ERD) is shown the entities such as people, objects or components and their relationship to each other. ER Diagrams mainly consist of entities, relationships and attributes. An entity is an object, person, concept or event. It is something which stores data. Normally shown as a rectangle. Relationships are how entities associated with each other. Relationships are normally shown as diamonds or labels directly on the connecting lines. The attribute is a property or characteristic of an entity. It is shown as an oval or circle [13]. The ER diagram for the proposed system is shown in Figure 3.2. and high-level architecture of the system is shown in Figure 3.3.

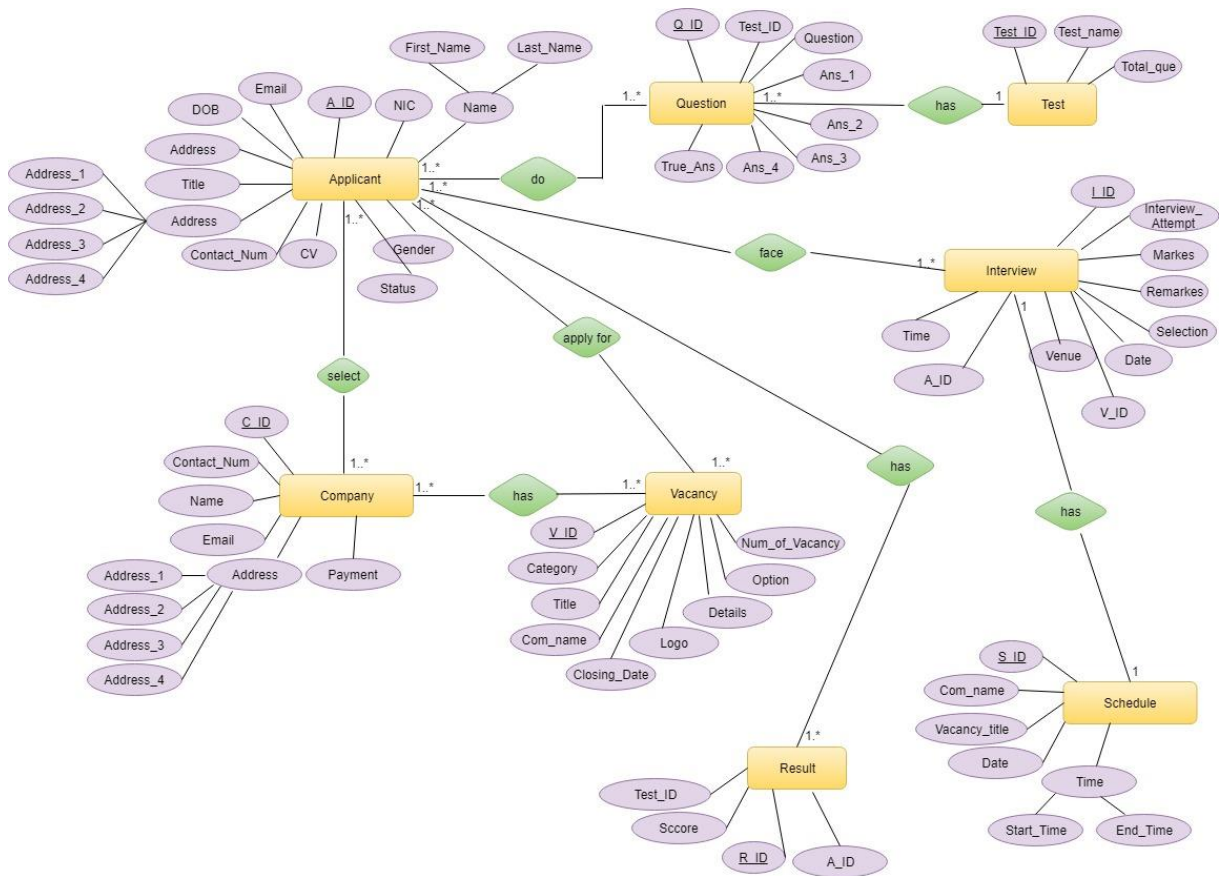


Figure 3.2 ER Diagram

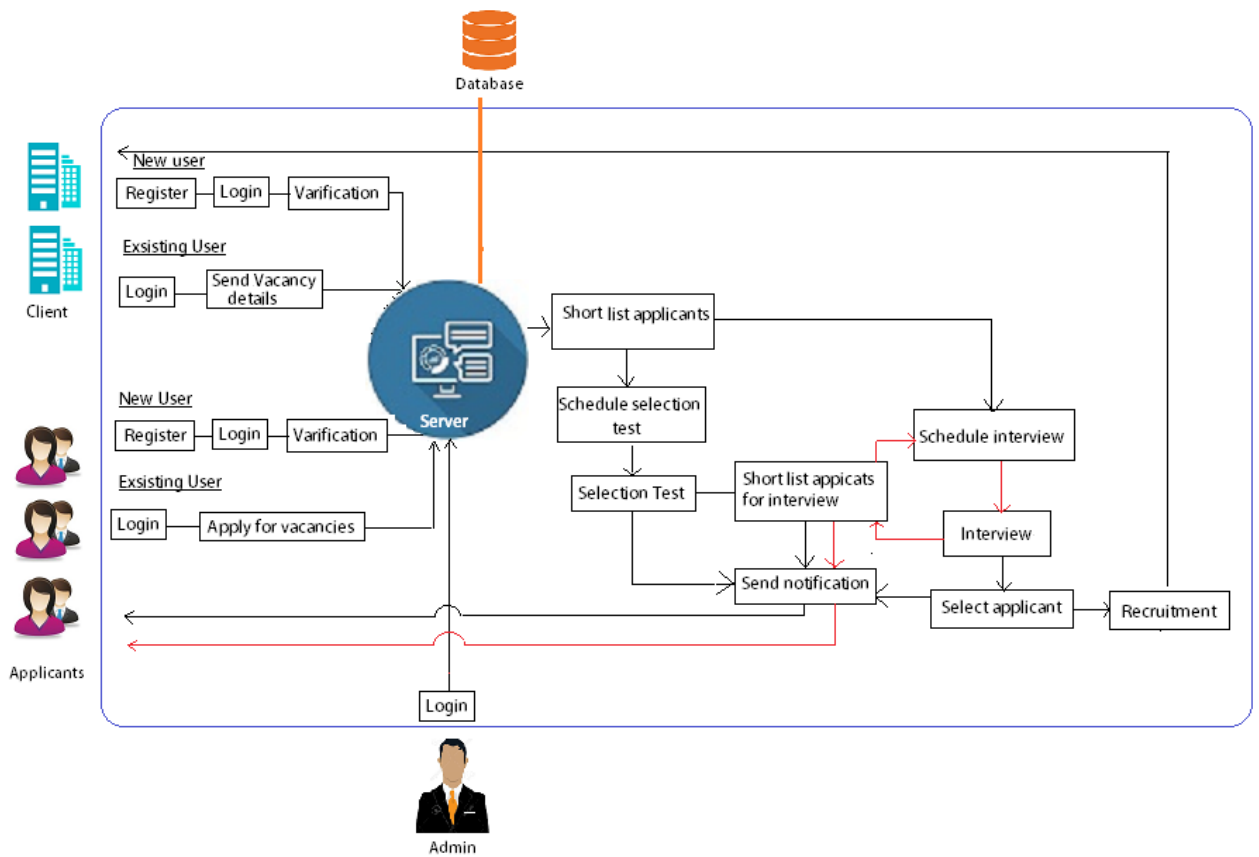


Figure 3.3 High-level architecture for the System

### 3.6 Use Case Diagram

Use case diagrams are consisting of Unified Modeling Language (UML). Graphically describes who will use the system and how the user interacts with the system. The proposed system has three main actors such as Employer, Applicant and administrator [14]. A use case diagram for the proposed system is shown in Figure 3.4. Next level use case diagrams are shown in Appendix B.

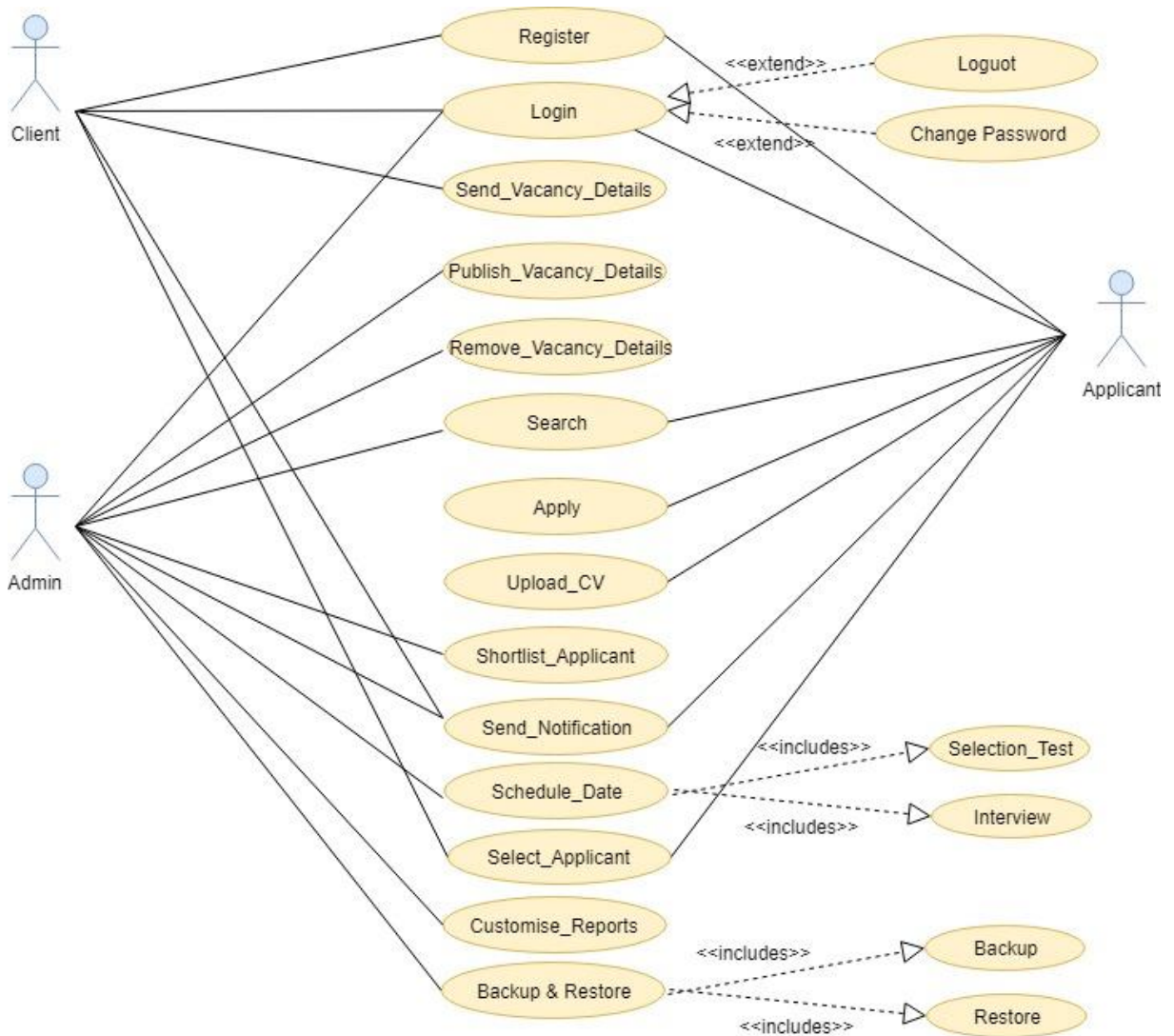


Figure 3.4 Use Case Diagram

### 3.6.1 Use Case Narratives

Use case narratives are the text-based description of use cases. Descriptions should be written in natural language and it is a very useful communication tool between the developer and the users. Use case narratives for the developed system is shown in Table 3.1 - 3.5.

*Table 3.1 Use case narrative for registration*

<b>Use Case</b>	User Registration
<b>Description</b>	Users should register to the system for accessing the functions.
<b>Primary Actor</b>	Client, Applicant
<b>Secondary Actor</b>	None
<b>Pre-conditions</b>	
1. Required to have a valid email address.	
<b>Flow of Event</b>	
<ol style="list-style-type: none"> <li>1. Users must provide an email address.</li> <li>2. Users must provide a password.</li> <li>3. User must have confirmed a password.</li> <li>4. Once the user registered user will get an email notification to confirm his registration with the system.</li> <li>5. User needs to click on the activation link in the email.</li> <li>6. Activate the user account.</li> </ol>	
<b>Post-condition</b>	
1. Once the user registered and activate the account, the user can access functionalities.	

*Table 3.2 Use case narrative for user login*

<b>Use Case</b>	User Login
<b>Description</b>	To access the functionality of the system user should log in to the system.
<b>Primary Actor</b>	Client, Applicant, Admin
<b>Secondary Actor</b>	None
<b>Pre-conditions</b>	
<ol style="list-style-type: none"> <li>1. Client, applicant and admin must register with the system.</li> <li>2. Activate the account.</li> </ol>	
<b>Flow of Event</b>	
<ol style="list-style-type: none"> <li>1. The user enters the login interface.</li> <li>2. The user fills in their username &amp; password in each box to run the login process.</li> <li>3. The user can now log-in to the dashboard.</li> </ol>	
<b>Post-condition</b>	
1. Go to dashboard	



Table 3.3 Use case narrative for send vacancy details

<b>Use Case</b>	Send vacancy details.
<b>Description</b>	Send currently available vacancy details to publish.
<b>Primary Actor</b>	Client
<b>Secondary Actor</b>	None
<b>Pre-conditions</b>	
1. The client must register with the system.	
<b>Flow of Event</b>	
<ol style="list-style-type: none"> <li>1. Client needs to register the company details.</li> <li>2. Client needs to make the payment.</li> <li>3. Client needs to post one or more vacancies.</li> <li>4. The client will get a notification via email when the vacancy is published.</li> <li>5. The client will get the notification when select the suitable candidate to assume the job.</li> </ol>	
<b>Post-condition</b>	
1. Fill the vacancy.	

Table 3.4 Use case narrative for the apply vacancy

<b>Use Case</b>	The applicant applies for the job vacancy.
<b>Description</b>	Applicants can be able to apply for published job vacancies.
<b>Primary Actor</b>	Applicant
<b>Secondary Actor</b>	None
<b>Pre-conditions</b>	
1. Applicant must register with the system.	
<b>Flow of Event</b>	
<ol style="list-style-type: none"> <li>1. The applicant will search the currently available vacancies.</li> <li>2. Log in to the system.</li> <li>3. Apply by filling the form.</li> <li>4. Upload the CV.</li> <li>5. The applicant will get a notification via email once invited for the selection test or interview.</li> <li>6. If an applicant selected for the vacancy, go-ahead with the appointment process.</li> </ol>	
<b>Post-condition</b>	
1. Contact with Company for the appointment process.	

Table 3.5 Use case narrative for the Admin

<b>Use Case</b>	Access the functions related to the admin.
<b>Description</b>	Admin can be able to control and manage the system.
<b>Primary Actor</b>	Admin
<b>Secondary Actor</b>	None
<b>Pre-conditions</b>	
1. Admin must login with the system.	
<b>Flow of Event</b>	
<ol style="list-style-type: none"> <li>1. Admin control jobs, advertisements, schedules and jobseekers.</li> <li>2. Manage website.</li> <li>3. Report generation.</li> <li>4. Get backups and restore backups.</li> </ol>	
<b>Post-condition</b>	
1. Select the most suitable candidate for the client.	

### 3.7 Sequence diagrams for the entire process

The sequence diagram shows the sequence of messages exchanged between the objects needed to carry out the functionality of the system. It is a type of interaction diagram and uses to understand the requirements for a new system [15]. A sequence diagram is shown in Figure 3.5.

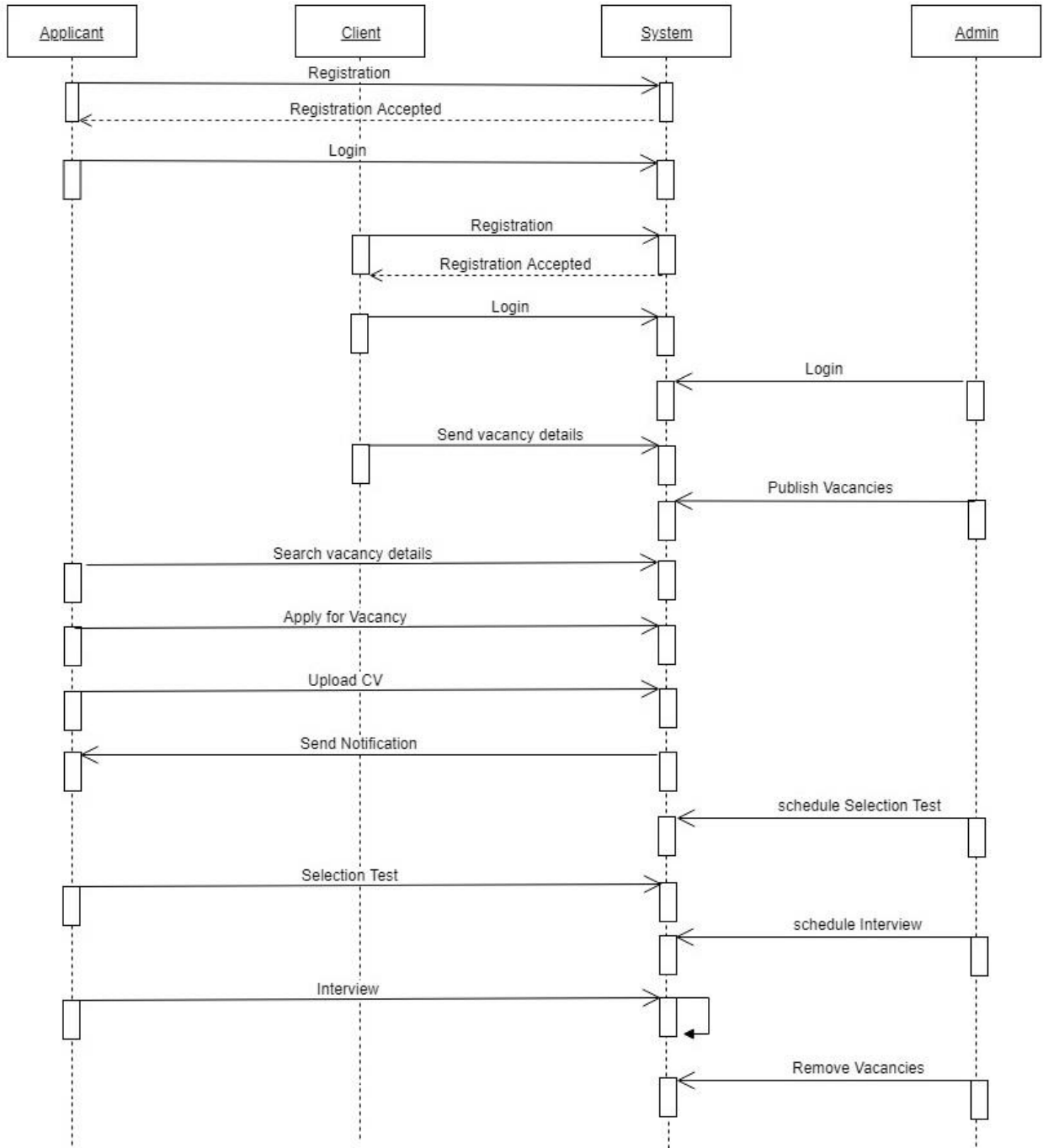


Figure 3.5 Sequence diagram for the entire system

### 3.8 Implementation Environment

Convert system specifications to an executable system is known as implementation. In here convert the design into user-friendly interfaces for front end and back end for performing system functions. Convenient language and suitable tools were chosen during the coding and development process. For implementation process, server-side environment and client-side environment were very important factors. These requirements are shown in Table 3.6 and Table 3.7.

Furthermore, the author has selected agile software development life cycle (SDLC) as the system development methodology. Agile methodology is very helpful to design and develop the right product. It is based on iterative development and continuous improvement. Agile methodology allows continuous changes in the requirements and initial stages. This model is very flexible and can easily adapt the project to the customers' needs and expectations.

The system architecture will be three-tier architecture. The client-tier consists of the user interface and data access levels for the user of the system. The application-tier consists of the application logic. The database-tier consists of all the data related to the system.

#### 3.8.1 Hardware and Software Requirements

Minimum hardware requirements are listed in Table 3.6.

*Table 3.6 Hardware requirement*

<b>Hardware Module</b>	<b>Requirement</b>
Processor	Intel 2GHz or higher
RAM	512 MB/1 GB or higher
Hard Disk	20 GB or More Disk space
Internet Connection	Broadband Connection
Resolution	Minimum 1024 x 768

Minimum software requirements are listed in Table 3.7.

*Table 3.7 Software requirement*

<b>Software Module</b>	<b>Requirement</b>
Operating System	Windows
Web Server	Apache webserver
PHP	PHP 5.x version
Database	My SQL
Web Browser	IE, Mozilla Fire Fox, Google Chrome

### **3.9 Development tools and techniques**

Below described the tools and technologies that were used to develop the system.

#### **XAMPP**

XAMPP is a free and open-source cross-platform server developed by Apache Friends. It contains Apache HTTP Server, MariaDB database, PHP and Perl. XAMPP is supporting Windows, Linux and Mac operating systems. To develop databases used MySQL which was built in the XAMPP bundle. XAMPP is simple, lightweight and easy to use [16].

#### **Bootstrap**

Bootstrap is a free and open-source front-end toolkit for developing websites. It contains HTML and CSS as well as JavaScript. Bootstrap, originally named Twitter Blueprint, was developed by Mark Otto and Jacob Thornton. Bootstrap is used to design interfaces [17].

#### **Adobe Photoshop**

Adobe Photoshop is a graphics editor developed and published by Adobe Inc [18]. Adobe Photoshop is used to design multimedia content of the system.

#### **PHP**

Hypertext Preprocessor (PHP) is a widely-used open-source server-side scripting language created by Rasmus Lerdorf. It is specially designed for Web development and can be embedded into HTML. In here PHP used as a development language [19].

#### **HTML**

Hypertext Markup Language (HTML) is the standard markup language for designing web pages. In here we used HTML for design interfaces.

#### **CSS**

Cascading Style Sheets (CSS) is a style sheet language. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript.

#### **PhpStorm**

It is a cross-platform IDE for Php. PhpStorm is used as an editing software for Php, HTML and JavaScript [20].

#### **Notepad ++**

Notepad ++ is a source code editor. It allows working on multiple open files in a window to help edit pages. Notepad ++ running in the MS Windows environment [21].

### **3.10 Test Plan**

One of the important phases of the software development lifecycle is testing and evaluation. In here following techniques are a plan to use for testing and evaluation of the system.

- **Unit Testing**  
Unit testing is used as the first testing method. The main goal of the unit testing is to isolate each part of the program and to check the correctness of the code.
- **Integration Testing**  
Integration testing is done by combining all the individual modules of the Online Recruitment System. Here, author has focused all the modules of the system.
- **System Testing**  
System testing is mainly done on the whole integrated system to make sure that the project that has been developed meets all the requirements. Each use case and functions were executed using valid and invalid data.
- **User Acceptance Testing**  
Provide a questionnaire to users and get feedback.

### **3.11 System Overview**

This section provides a brief explanation of the entire system. This online recruitment management system (ORMS) has a front end and back end interfaces. SiLex Solutions website consists of the front end and online recruitment management system consists of the back end. All the currently available job vacancies are published on the SiLex Solution's website. The system administrator is the responsible person for the vacancy publishing process. Some of the user interfaces are described below. Please refer to Appendix C - user documentation for the rest of the interfaces and system functionalities.

#### **Website**

SiLex Solution's website is the front end of the system. It is used as a platform to build interaction between employees and job seekers. The website consists of home, about us, job seekers, employer and contact us pages. All the vacancies published on the home page of the website (Figure 3.6). About us page consists of the introduction of the company. Also, contact us page has the contact details of the company.

[HOME](#) | [ABOUT US](#) | [EMPLOYERS](#) | [CONTACT US](#)

## Find the job that fits your life

CHECK OUT OUR AMAZING LIST OF VACANCIES.

### HOT JOBS

Show 10 entries Search:

Job Ref No.	Company Name	Vacancy Title	Closing Date	More Details	Apply
6	Detec (Pvt) Ltd	PHP Developer	2019-10-14	<a href="#" style="background-color: #FFA500; color: white; padding: 2px 5px;">MORE DETAILS</a>	<a href="#" style="color: #000080; text-decoration: none;">Apply</a>
5	Sri Lanka Telecom	Web Developer	2019-08-14	<a href="#" style="background-color: #FFA500; color: white; padding: 2px 5px;">MORE DETAILS</a>	<a href="#" style="color: #000080; text-decoration: none;">Apply</a>
4	Kenso Group Ltd	IT Assistant	2019-09-05	<a href="#" style="background-color: #FFA500; color: white; padding: 2px 5px;">MORE DETAILS</a>	<a href="#" style="color: #000080; text-decoration: none;">Apply</a>
3	Mobizz (Pvt) Ltd	Quality Assurance Engineer	2019-09-02	<a href="#" style="background-color: #FFA500; color: white; padding: 2px 5px;">MORE DETAILS</a>	<a href="#" style="color: #000080; text-decoration: none;">Apply</a>
2	Singhagiri (Pvt) Ltd	Accounts Trainee	2019-08-08	<a href="#" style="background-color: #FFA500; color: white; padding: 2px 5px;">MORE DETAILS</a>	<a href="#" style="color: #000080; text-decoration: none;">Apply</a>
1	Xiteb (Pvt) Ltd	PHP Developer	2019-08-07	<a href="#" style="background-color: #FFA500; color: white; padding: 2px 5px;">MORE DETAILS</a>	<a href="#" style="color: #000080; text-decoration: none;">Apply</a>

Showing 1 to 6 of 6 entries Previous | 1 | Next

6

EMPLOYERS

11

JOB CATEGORIES

14

RESUMES

4

RECRUIT EMPLOYERS

### OUR PARTNERS

## LOOKING FOR A JOB!

Join with our employers and earn what you deserve.

Copyright © 2019. All Right Reserved by SiLex Solutions (Pvt) Ltd.

*Figure 3.6 Published vacancies in website*

## Registration Page

Users should have registered with the system to access the system functions. For that, they have a valid email address. Providing require details users can sign up with the system. After clicking submit button user get the verification code to the email address. After a click, the activation code user can log into the system. Screenshot of the registration page is shown in Figure 3.7.



**SIGN UP**

SiLex Solutions

Email

Password

Confirm Password

SUBMIT RESET

Already have an account? [Login here.](#)

*Figure 3.7 User Registration*



## Login Page

Through this login interface, the user can log in to the system by providing email address and password. If the user forgot the password, the user can click forgot password link and reset the password. As well as a user don't have an account user can sign up with the system by clicking the sign up now link. Screenshot of the login page is shown in Figure 3.8.

*Figure 3.8 User Login*

## Dashboard

Admin can access this after successful login. It contains the following functions which are needed to the admin. Vacancy details, client's details, job seekers details, report generation, backup facility, schedule interviews and selection test, selection test and dashboard are the main functions consists in the dashboard. Screenshot of the dashboard is shown in Figure 3.9.

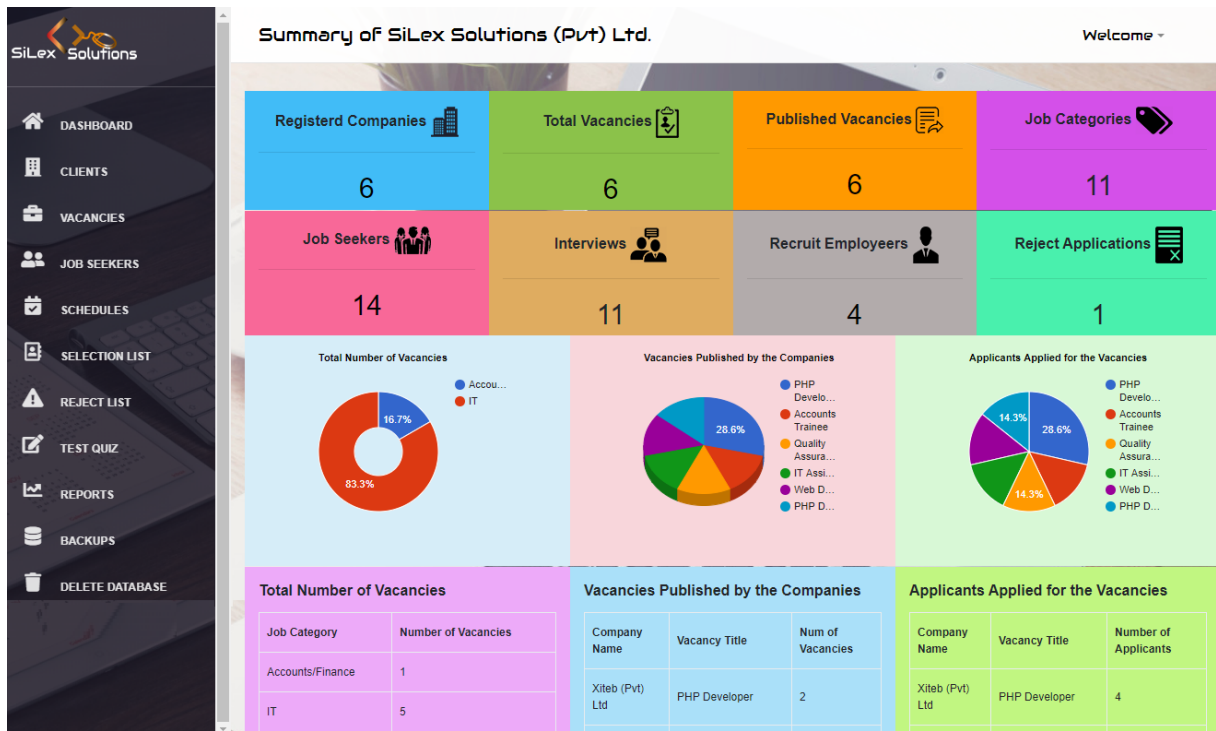


Figure 3.9 Dashboard

## 3.12 Summary

This section mainly focused on the analysis of the user requirements and design part of the entire system. It contains requirement gathering, find functional and non-functional requirements, software architecture design and initial diagram designs such as ER diagram and UML diagrams. ER diagram, use case diagram and sequence diagram which are discovered in the design section. Furthermore, we have discussed development tools, technics and test plans. Finally, it contains a few of the interfaces of the system.

## Chapter 4: Evaluation

### 4.1 Introduction

This chapter gives an overview of the entire testing and evaluation process of the system. The primary purpose of software testing is to deliver quality software to the client. The developed system is tested against the user requirements, which are gathered at the requirement gathering phase.

### 4.2 Main objective of the Test process

The foremost objective of the testing process is to make sure the final output meets the end-user requirements. A subsequent important objective is finding bugs when occurred during the development phase. At the same time, it provides the quality output (bug-free) to the customer is another objective of the software testing process.

### 4.3 Cross-browser Testing

Cross-browser testing is a very important part of web-based applications. In here browser testing is carried out on the latest browsers such as Firefox, Chrome, IE and Safari. Table 4.1 shows the result of cross-browser testing.

*Table 4.1 Cross-browser testing*

Tested Pages	Status			
	Firefox	Chrome	IE	Safari
Home Page	Pass	Pass	Pass	Pass
About Us page	Pass	Pass	Pass	Pass
Contact Us Page	Pass	Pass	Pass	Pass
Registration page	Pass	Pass	Pass	Pass
Login Page	Pass	Pass	Pass	Pass
Add Company Details for Register Page	Pass	Pass	Pass	Pass
Add New Vacancy Page	Pass	Pass	Pass	Pass
Apply for a Vacancy Page	Pass	Pass	Pass	Pass
Admin Dashboard	Pass	Pass	Pass	Pass

## 4.4 Test Cases

Test cases have a set of test data and expected results for a particular test scenario. Test cases have following values add to the system. It gives an idea about the truthfulness of the system and how it features work. Test cases are shown in Table 4.2 - 4.11.

### User Registration

Table 4.2 Test case for user registration

ID	Test Case	Expected Result	Status
01	Click the submit button without inserting any field.	Show error message "Please enter all the details!" <b>Please enter all the details !</b>	Pass
02	Click the submit button after all fields completed.	Show successful message "Please check your email to activate your account" <b>Please check your email to activate your account.</b>	Pass
03	Skip username or email or password values and click submit.	Show error message "Please enter all the details!" <b>Please enter all the details !</b>	Pass
04	User tries to register with an existing email address	Show error message "Email already exists" <b>Email already exists.</b>	Pass
05	A user enters less than 6 characters to the password field	Show error message "Password must be at least 6 characters" <b>Password must be at least 6 characters.</b>	Pass
06	A user enters incorrect confirm password	Show error message "Your passwords do not match. Please type carefully." <b>Your passwords do not match. Please type carefully.</b>	Pass
07	Insert invalid email address	Show error message "Invalid email address" <b>Invalid email address.</b>	Pass

## Login functions

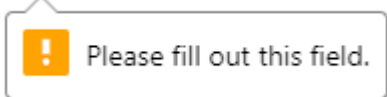



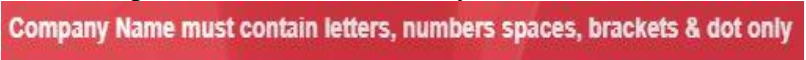


Table 4.3 Test case for user login

ID	Test Case	Expected Result	Status
01	Click the login button without inserting any field.	Show error message "Please enter Email & Password" <b>Please Enter your Email &amp; Password</b>	Pass
02	Insert all the correct data and press the login button.	Successfully log into the system and view dashboard.	Pass
03	A user without activating account & try to click the login button.	Show error message "Please activate your account first." <b>Please activate your account first.</b>	Pass
04	User clicks the activation link.	Show message "Your account has been activated. Click here to login." <b>Your account has been activated. Click here to login.</b>	Pass
05	User clicks activation link several times.	Show error message "You have clicked an invalid link or your account has been already activated. Click here to login." <b>You have clicked an invalid link or your account has been already activated. Click here to login.</b>	Pass
06	Insert correct email and incorrect password value and click login.	Show error message "Your Email and Password do not match. !" <b>Your Email and Password do not match. !</b>	Pass
07	Insert the correct password and incorrect email value and click login.	Show error message "Invalid Email or Password!" <b>Your Email and Password do not match. !</b>	Pass

08	Try to access dashboard without logged in.	<p>Show error message “Sorry, You are not allowed to access this page without login !!”</p> 	Pass
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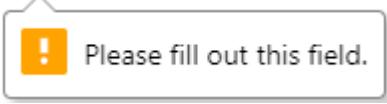
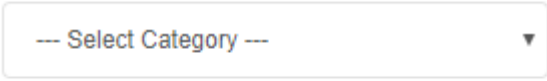






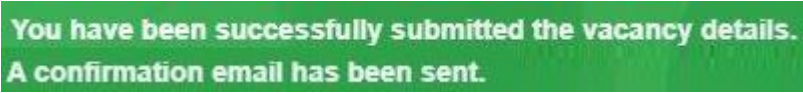
## Add Company Details

Table 4.4 Test case for add company details

ID	Test Case	Expected Result	Status
01	Press the save button without filling data	<p>Show error messages for all the required fields.</p> 	Pass
02	Mandatory fields highlighted	<p>* mark displayed in every mandatory field.</p> 	Pass
03	Insert all the correct data and press the save button.	<p>Show success message “You have been successfully registered. A confirmation email has been sent.”</p> 	Pass
04	User tries to register the same company twice	<p>Show error message “Company already registered. Now you can upload vacancy details.”</p> 	Pass
05	Fill the company name with special characters	<p>Show error message “Company Name must contain letters, numbers spaces, brackets &amp; dot only”</p> 	Pass
06	Insert invalid email address	<p>Show error message “Invalid email address”</p> 	Pass
07	Insert invalid contact number	<p>Show error message “Contact Number must have 10 characters”</p> 	Pass

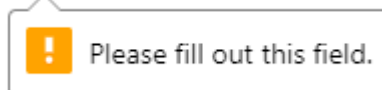
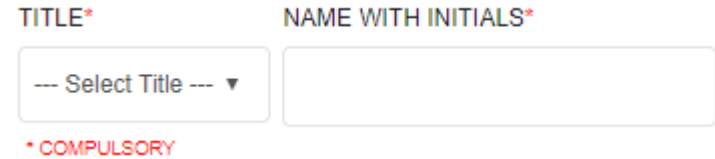
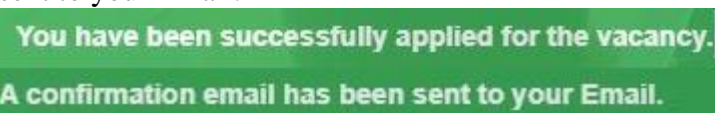
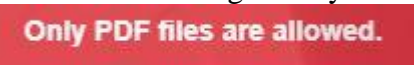





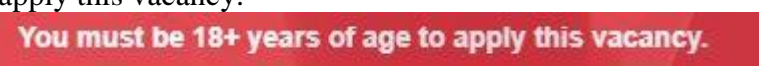
## Add Vacancy Details

Table 4.5 Test case for add vacancy details



ID	Test Case	Expected Result	Status
01	Press the save button without filling data	Show error messages for all the required fields. 	Pass
02	Mandatory fields highlighted	* mark displayed in every mandatory field. SELECT CATEGORY*  * COMPULSORY	Pass
03	Upload invalid file format (Logo & More details)	Show error message "Only JPG, JPEG, PNG files are allowed." 	Pass
04	Select closing date is incorrect.	Show error message "Closing Date should be before the present date." 	Pass
05	Fill the company name with special characters	Show error message "Company Name must contain letters, numbers spaces, brackets & dot only" 	Pass
06	Insert invalid email address	Show error message "Invalid email address" 	Pass
07	Insert a negative number of vacancies	Show error message "Number of Vacancy can't be negative number." 	Pass
08	The upload file size is greater than 1MB	Show error message "File must be less than 1 MB in size." 	Pass
09	Insert all the correct data and press the save button.	Show success message "You have been successfully submitted the vacancy details. A confirmation email has been sent." 	Pass

## Add Jobseeker Details

Table 4.6 Test case for add jobseeker function


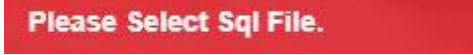
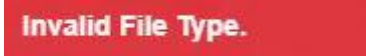

ID	Test Case	Expected Result	Status
01	Press the save button without filling data	Show error messages for all the required fields. 	Pass
02	Mandatory fields highlighted	* mark displayed in every mandatory field.  * COMPULSORY	Pass
03	Insert all the correct data and press the save button.	Show success message “You have been successfully applied for the vacancy. A confirmation email has been sent to your Email.” 	Pass
04	Upload invalid file format (CV)	Show error message “Only PDF files are allowed.” 	Pass
05	The upload file size is greater than 1MB	Show error message “File must be less than 1 MB in size.” 	Pass
06	User upload same CV twice.	Show error message “CV already exists. Try to change file name.” 	Pass
07	The applicant applied same vacancy in several times.	Show error message “You have already applied for this vacancy.” 	Pass
08	Fill the applicant name with special characters	Show error message “Name must contain letters, space & dot only” 	Pass
09	The user enters the invalid NIC number	Show error message “NIC number is invalid.” 	Pass
10	The user below 18 years of age tries to apply	Show error message “You must be 18+ years of age to apply this vacancy.” 	Pass



11	Insert incorrect contact number	Show error message “Contact Number must have 10 numbers.” 	Pass
12	Insert invalid email address	Show error message “Invalid email address” 	Pass

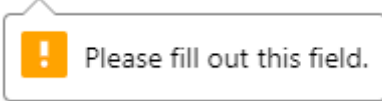
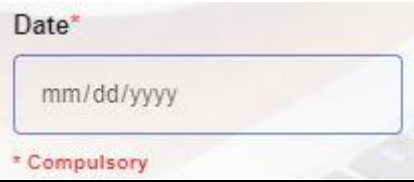



## Backup function

Table 4.7 Test case for backup function

ID	Test Case	Expected Result	Status
01	Press the Get Backup button without selecting the table(s)	Show error message “Please select at least one table for export” 	Pass
02	Press the Restore button without selecting a SQL file.	Show error message “Please Select Sql File” 	Pass
03	Upload invalid file format.	Show error message “Invalid File Type.” 	Pass
04	Database correctly upload.	Show success message “Database Successfully Imported.” 	Pass




## Add Schedule function

Table 4.8 Test case for add schedule function

ID	Test Case	Expected Result	Status
01	Press 'Add Schedule' button without filling data.	Show error messages for all the required fields. 	Pass
02	Mandatory fields highlighted	* mark displayed in every mandatory field. 	Pass
03	Insert all the correct data and click add schedule button.	Show success message "You have been successfully schedule the date." 	Pass
04	Select an incorrect date.	Show error message "The schedule date must be greater than Today." 	Pass
05	Select already booked date & time	Show error message "Date & Time already booked." 	Pass

## Add interview mark function

Table 4.9 Test case for add interview mark function

ID	Test Case	Expected Result	Status
01	Press 'Add Mark' button without filling data.	Show error message "Please add marks." 	Pass
02	Add marks successfully.	Show success message "Add marks successfully." 	Pass
03	Add marks twice for the same applicant.	Show error message "Marks already added." 	Pass

## Reset password function

Table 4.10 Test case for reset password function

ID	Test Case	Expected Result	Status
01	Press the 'Submit' button without filling data.	Show error message "Please enter email address." <b>Please enter email address.</b>	Pass
02	Enter an invalid email address.	Show error message "This email address doesn't exist" <b>This email address doesn't exist.</b>	Pass
03	Add marks twice for the same applicant.	Show success message "New Password has sent to your email" <b>New Password has sent to your email</b>	Pass

## Change password function

Table 4.11 Test case for change password function

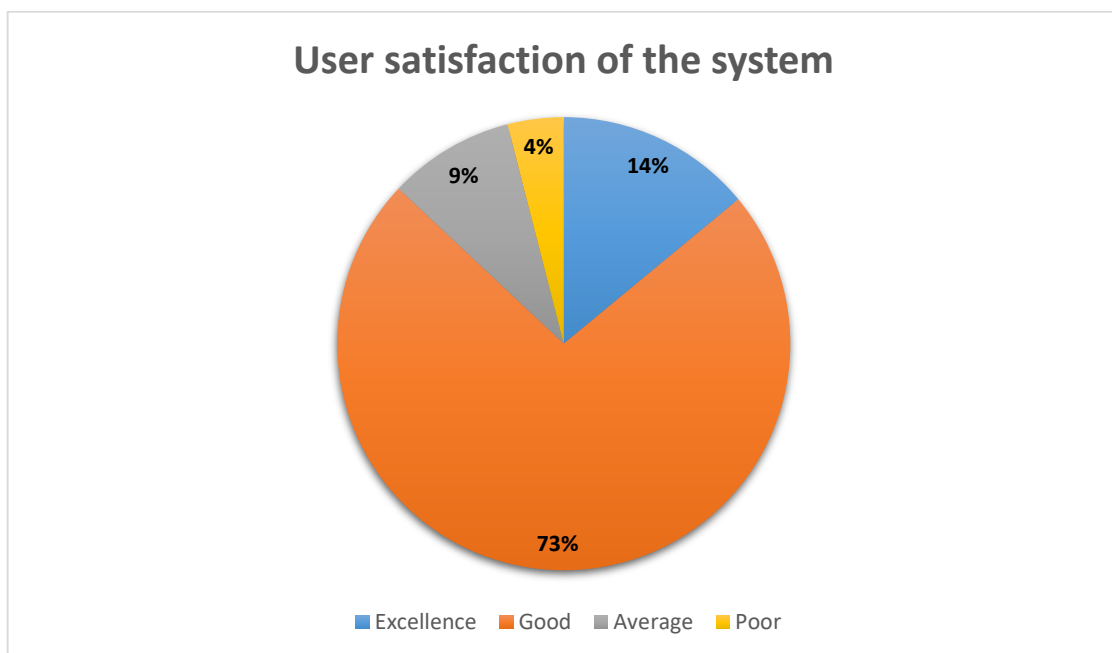
ID	Test Case	Expected Result	Status
01	Press the 'Submit' button without filling data.	Show error message "Please enter all the details !" <b>Please enter all the details !</b>	Pass
02	Enter an invalid email address.	Show error message "This email address doesn't exist" <b>This email address doesn't exist.</b>	Pass
03	Enter an invalid current password.	Show error message "Current Password did not match." <b>Current Password did not match.</b>	Pass
04	Enter less than 6 characters to the password.	Show error message "Password must be at least 6 characters." <b>Password must be at least 6 characters.</b>	Pass
05	Confirm password did not match with the password.	Show error message "Confirm Password did not match with your Password." <b>Confirm Password did not match with your Password.</b>	Pass
06	Add marks twice for the same applicant.	Show success message "New Password has sent to your email" <b>New Password has sent to your email</b>	Pass

## 4.5 User Acceptance Test

User acceptance test (UAT) is one of the critical and very important tests before the software is released on to the live environment. In here, user test whether the system operates according to their requirements. It is useless if the developed system does not operate according to the client's expectations. The user acceptance testing was conducted by the SiLex Solutions (Pvt) Ltd staff members because they are the end-users of the system. If the bugs found by them, it will fix immediately.

## 4.6 User Evaluation

After the user acceptance test, an author has provided the questionnaire for collecting user feedback about the system. The questionnaire is shown in Appendix D. User evaluation shows an overview of how a user is satisfied with the system. According to the above questionnaire each user provided their feedback. The questionnaire has provided to the selected twenty (20) staff members. The whole feedback ratings given by each user were taken and converted into a graphical evaluation chart. Following Figure 4.1 shows the overall feedback.



*Figure 4.1 User satisfaction of the system*

73% of the users said that the developed system is good for the company's recruitment process and it makes smooth their process. 14% of the users said that system is excellence and 9% of the users said that the system is average. As a total, 96% of users are satisfied with the system. Although, 4% of the users are not satisfied with the new system. Because most of them did not have good IT literacy and they are adopted with the manual system.

Analysed answers for each question is attached in Appendix D.

## **4.6 Summary**

This chapter mainly focused on the testing part of the developed software. Initially, units are tested it is called unit testing. Subsequent, units of the system integrated and tested. Consequently, the whole system tested against the user requirements gathered at the beginning. Finally, the user acceptance test is done by the selected users. The chapter also includes test cases, user evaluation form and its analyzed result.

## **Chapter 5: Conclusion**

### **5.1 Introduction**

This last chapter discussed on concludes the lesson learned, problems encountered, limitations and suggestions for any future enhancements.

### **5.2 Lesson Learned**

During the system development process gain the real-world experience of software development life cycle. From the requirement gathering stage to ending point learned each and everything is very helpful to develop the system successfully. Also gain knowledge about programming languages such as PHP, HTML, CSS, Java Script and gain knowledge of how to use Bootstrap templates for interfaces. It was mandated to learn MYSQL and other technologies. Finally, it is like as a one person act many roles such as system analyst, developer and quality assurance person.

Gain knowledge about dissertation writing is also very important. As well as managing time according to the project guidelines and given project schedule is really important.

### **5.3 Problems encountered**

During the system development process following dominant problems encountered.

- Requirement gathering difficulties and sometimes gathered requirements was change. Clients would not be able to clearly represent the requirements what they need.
- Sometime mismatch the gathered requirements due to the misunderstanding and miscommunication.
- Lack of knowledge and experience regarding developing languages are another major issue. Online tutorials were helped to gain the required knowledge.
- It was really difficult to deliver the final product within the given time frame.

### **5.4 Outcome**

The developed online recruitment management system is very user-friendly and easy to use. Without a high level of IT literacy, anyone can access this system. This system has the scope of all the main functions required for a smart recruitment process, such as:

- User Registration
- Job posting
- View, edit & delete job seeker details
- View, edit & delete job vacancies
- View, edit & delete client details
- Email notifications
- Online test module
- Admin can generate reports

- Admin can get backups and restore backups.
- Scheduling interview and selection tests facility
- The website for publishing vacancy - client side

## **5.5 Future Work**

However, there are some improvement and future ideas that can be applied to make a fully functional ORMS. Some of them are,

- Intergrade smart interview room by adding Skype facility.
- Intergrade existing notification facility by adding SMS facility.
- Mobile App.
- Add social media plugins to the system to get more publicity for vacancies.
- Integrated existing online test module with a time limit.
- Applicant tracking facility.

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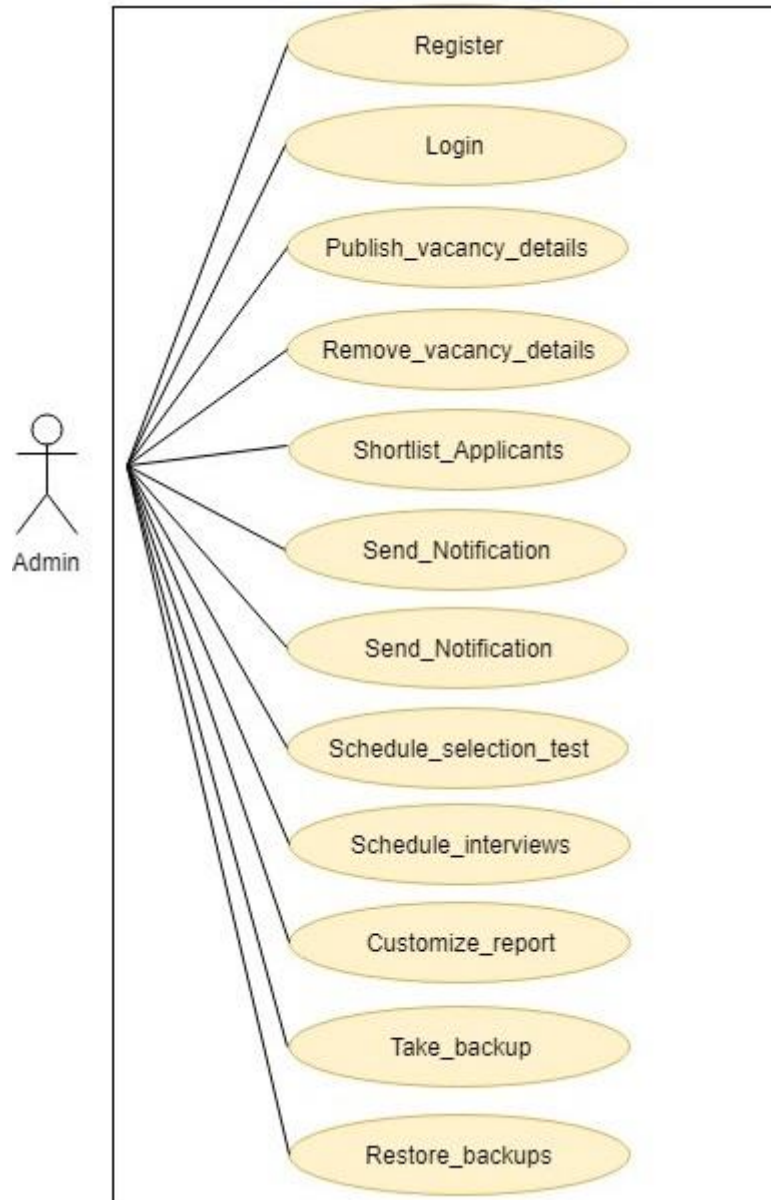
## **Appendix A: Questionnaire**

### **Interview Questionnaire on Recruitment Management System for SiLex Solutions (Pvt) Ltd**

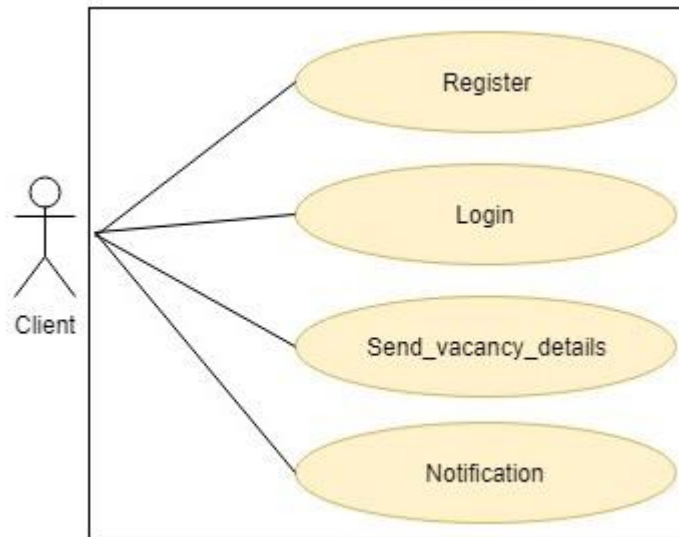
(The data gathered through this interview would be used exclusively for the purpose of academic research only.)

1. What type of client base do you have?
2. What type of vacancies do you process?
3. How do you publish vacancy advertisements?
4. Can you briefly explain the recruitment process?
5. Do you use the same method for all the recruitments?
6. What are the client requirements for recruitments?
7. How long will it take to complete the entire recruitment process for a particular company?
8. How do you get the applications from applicants?
9. How do you shortlist an applicant?
10. How do you prepare selection test papers?
11. How do you schedule interviews and selection test?
12. How do you inform scheduled interviews and selection tests dates for applicants?
13. What are the drawbacks of the current process?
14. Do you wish to use a new system for the recruitment process?
15. How do you prepare reports for analytics?

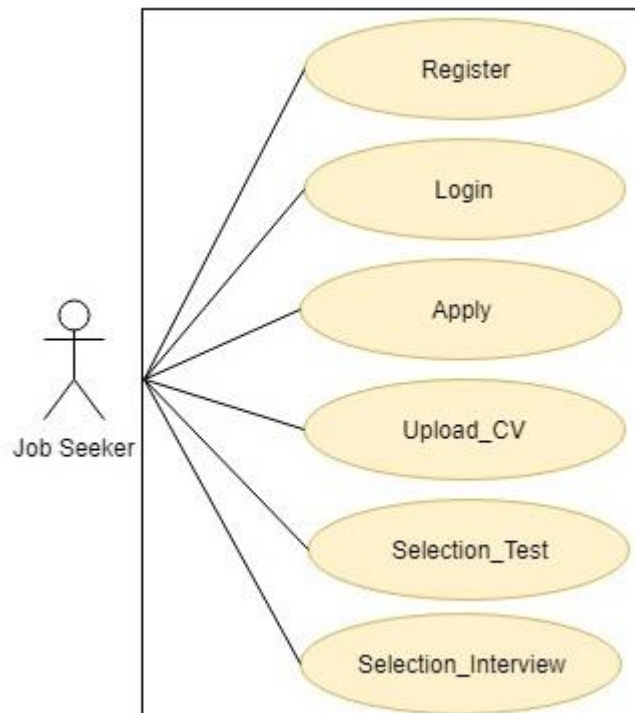
## Appendix B: Use Case Diagrams



*Figure B.1 Use Case Diagram for Admin*



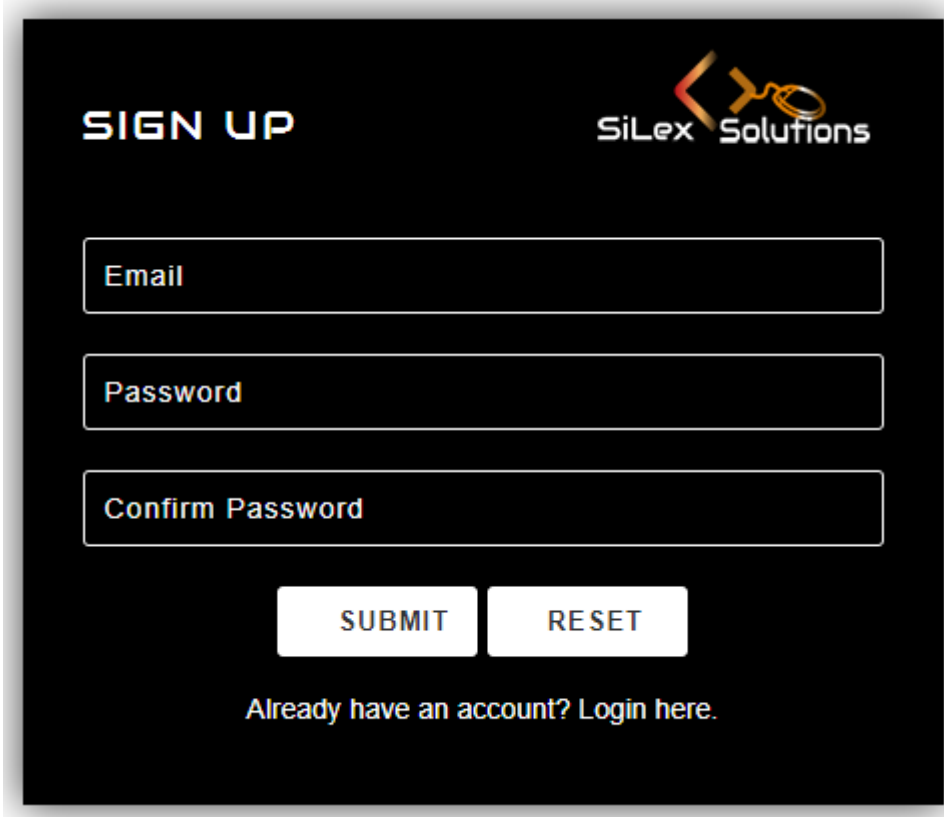
*Figure B.2 Use Case Diagram for Client*



*Figure B.3 Use Case Diagram for Jobseeker*

## Appendix C: User Documentation

The online recruitment management system allows the users to sign up to the system (Figure C.1).



The screenshot shows a 'SIGN UP' form for SiLex Solutions. The form is set against a dark background with white text and input fields. At the top left, the text 'SIGN UP' is displayed in a bold, white, sans-serif font. To the right of this is the SiLex Solutions logo, which consists of a stylized orange and yellow graphic followed by the text 'SiLex Solutions' in white. Below the header, there are three stacked input fields with white borders and labels: 'Email', 'Password', and 'Confirm Password'. At the bottom of the form, there are two white buttons with black text: 'SUBMIT' and 'RESET'. Below the buttons, the text 'Already have an account? Login here.' is displayed in white.

Figure C.1: Sign Up

Online recruitment management system sends an activation link to the user's email address after the sign-up process. Figure C.2 shows the sample email notification. It contains Email, Password and activation code.

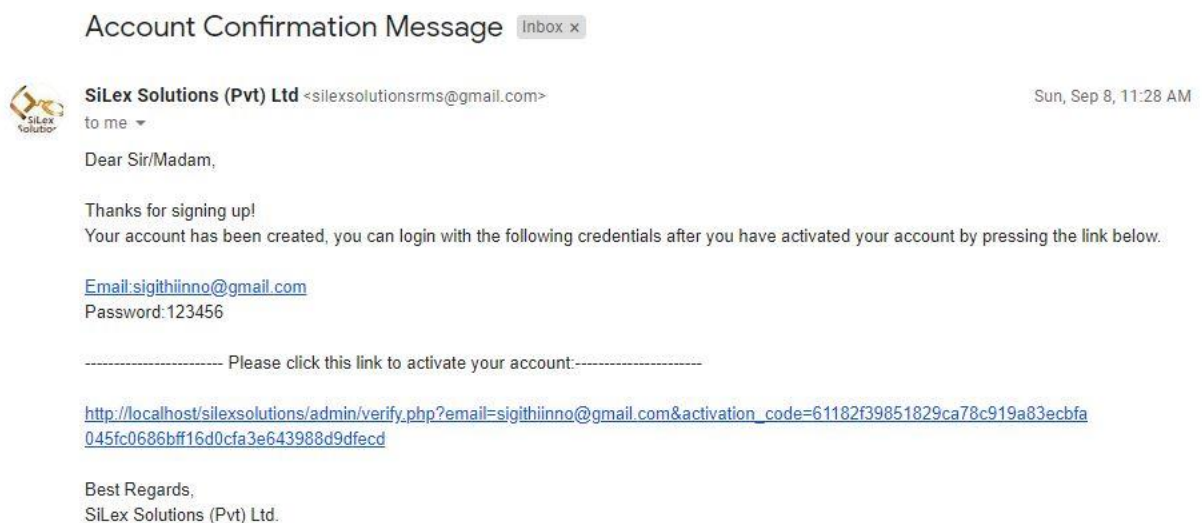


Figure C.2: Email notification

After the link-activated, users can login to the system by providing an email address and password (Figure C.3).

*Figure C.3 Login Page*

If the user forgot the password, then user can reset the password by clicking “Forgot Password link in Login form” (Figure C.4). Auto-generate password has been sent to their email.

*Figure C.4 Forgot Password Page*

After insert email and password admin directed to the system dashboard. From the left-hand side, the navigation menu admin can navigate the different pages. From the top of the right-hand side, change the password and log out menu display as dropdown. Figure C.5 display the dashboard.

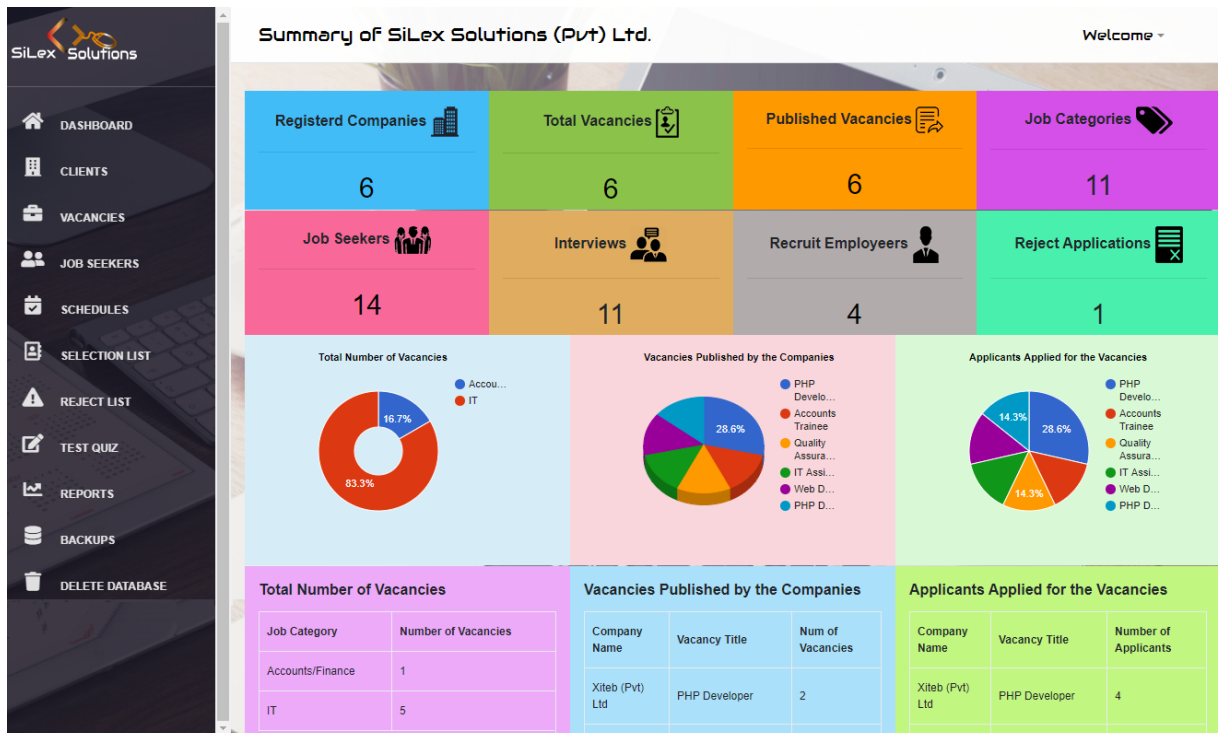


Figure C.5 Dashboard of the system

If the user needs to change password, then user can change their password by clicking on change password link. (Figure C.6)

The form is titled "CHANGE PASSWORD" and includes the SiLex Solutions logo. It contains the following input fields:

- Email
- Current Password
- New Password
- Confirm Password

At the bottom, there are two buttons: "SUBMIT" and "CANCEL".

Figure C.6 Change password form

Client companies need to register by paying the membership fee. Interface for the company registration is shown in Figure C.7.

**Add Company Details for Register**

Company Name\*

Company Address (Line 1)\*

Company Address (Line 2)\*

Company Address (Line 3)\*

Company Address (Line 4)

Company Contact Number\*

Company Email Address\*

\* Compulsory

**Save** **Cancel**

Figure C.7 Register Company

The system facilitates to make payment via online banking and credit cards (Figure C.8).

**Secure Payment Process**

**Online Banking** **Credit/Debit Payment**

Select Bank

-- Select --

**Please Note:** After clicking on the "Pay Now" button, you will be directed to a secure gateway for payment.

A/C Number : xxxxxxxxxxxx

Bank : Sampath Bank

Branch: Ratmalana

**Pay Now**

Figure C.8 Payment form



Companies can send their vacancy details to publishing. Figure C.9 shows the interface of the “Add New Vacancy” form.

The form is titled "Add New Vacancy" and contains the following fields:

- Select Category\***: A dropdown menu with the text "--- Select Category ---".
- Vacancy Title\***: A text input field.
- Company Name\***: A text input field.
- Closing Date\***: A date input field with a placeholder "mm/dd/yyyy".
- Company Logo\***: A file upload field with a "Choose File" button and the text "No file chosen".
- More Details\***: A file upload field with a "Choose File" button and the text "No file chosen".
- Number of Vacancies\***: A text input field.
- Selection Method\***: A dropdown menu with the text "--- Select Option ---".
- Email\***: A text input field.

A red asterisk indicates that all fields are compulsory. At the bottom left, there are two buttons: a green "Save" button and a red "Cancel" button.

Figure C.9 Add new vacancy

Job seekers can apply for the vacancies by registering to the system. Job seekers need to provide their basic information and upload the CV (Figure C.10).

**Apply Now ...**

**Title\***  **Name with Initials\***

**Date of Birth\***  **NIC\***

**Gender\***  Male  Female **Marital Status\***  Single  Married

**Contact Number\***  **Email\***

**Applicant Address\***

**Qualifications\***

**Expected Salary\***  **Upload Your CV\* (PDF files only)**  No file chosen

\* Compulsory

Figure C.10 Apply for the vacancy

Admin can view new vacancies, expired vacancies and complete vacancies in the same window. Admin can publish new vacancy by clicking “Publish” button. Then it appears on the company website. When vacancy is expired, it automatically moved on to the expired vacancy category. Admin can edit vacancy details under the New Vacancy category and Expired Vacancy category. Also, admin can view all applicant details applied for particular vacancy in expired category by clicking on applicants. Furthermore, admin can view selected applicants for the particular vacancy in complete category as well (Figure C.11).

**New Vacancies**

Show 10 entries Search:

Vacancy ID	Category	Vacancy Title	Company Name	Closing Date	Action	Publish or Not
6	IT	PHP Developer	Detec (Pvt) Ltd	2019-10-14	<a href="#">Edit</a> <a href="#">Vacancy</a>	<a href="#">Publish</a>

Showing 1 to 1 of 1 entries Previous 1 Next

---

**Expired Vacancies**

Show 10 entries Search:

Vacancy ID	Vacancy Title	Company Name	Closing Date	Action
5	Web Developer	ABC Solutions Ltd	2019-08-14	<a href="#">Edit</a> <a href="#">Vacancy</a> <a href="#">Applicants</a>
1	PHP Developer	AIT Campus	2019-08-07	<a href="#">Edit</a> <a href="#">Vacancy</a> <a href="#">Applicants</a>

Showing 1 to 2 of 2 entries Previous 1 Next

---

**Complete Vacancies**

Show 10 entries Search:

Vacancy ID	Category	Vacancy Title	Company Name	Company Logo	Action
4	IT	IT Assistant	IT Inno (Pvt) Ltd		<a href="#">Vacancy</a> <a href="#">Applicants</a>
3	IT	Quality Assurance Engineer	QST (Pvt) Ltd		<a href="#">Vacancy</a> <a href="#">Applicants</a>

Showing 1 to 2 of 2 entries Previous 1 Next

Figure C.11 Vacancy details

Admin can view all new applicants and edit their details if required (Figure C.12). Furthermore, admin can select or reject applicants for preliminary selection.

### New Applicants

Show  entries Search:

Applicant ID	Vacancy Title	Company Name	Applicant Name	Action
15	PHP Developer	Detec (Pvt) Ltd	Mrs PC Perera	<a href="#">View</a> <a href="#">Edit</a> <a href="#">Delete</a>

Showing 1 to 1 of 1 entries Previous  Next

Figure C.12 Applicant details

Admin can send bulk emails or individual emails to applicants (Figure C.13).

### Interview Call List

Show  entries Search:

Applicant ID	Vacancy Title	Company Name	Applicant Name	Email		
3	PHP Developer	QST (Pvt) Ltd	Ms S. Weerakoon	saviweer@gmail.com	<input type="checkbox"/>	<a href="#">Email</a>
1	PHP Developer	QST (Pvt) Ltd	Mrs J. Palihawadana	janu89@gmail.com	<input type="checkbox"/>	<a href="#">Email</a>

Showing 1 to 2 of 2 entries Previous  Next

Figure C.13 Email sending facility

Admin can schedule selection test dates and/or interview dates without any clashes by using schedule facility. Figure C.14 shows the create schedule. Likewise, admin can edit and delete schedules.

**Create Schedule**

Vacancy ID: 1  
Vacancy Title: PHP Developer

Company Name: QST (Pvt) Ltd  
Purpose: --- Select ---

Date\*: mm/dd/yyyy  
Start Time\*: ---:--:--  
End Time: ---:--:--

\* Compulsory

Back Add Schedule

Figure C.14 Create a schedule

Admin can add interview marks for each applicant (Figure C.15).

**Add Interview Marks**

Applicant Name: Miss PCDP Coory

Add Marks

Back Add Marks

Figure C.15 Add interview marks

Selection test questions which are given by the client companies can upload to the system and view. Also, admin can delete questions in the table by clicking the Delete button. (Figure C.16).

**Import Excel File into Quiz Database**

Choose File  No file chosen

**Delete Quiz Table**

Click here to delete Quiz table

**View Quiz**

Show  entries Search:

QID	TID	Question	Answer 1	Answer 2	Answer 3	Answer 4	Correct Answer	Action
1	1 IT	What does PHP stand for?	Personal Home Page	Hypertext Home Page	Pretext Hypertext Processor	Preprocessor Home Page	1	<input type="button" value="Edit"/>
2	1 IT	Who is the father of PHP?	Rasmus Lerdorf	Willam Makepiece	Drek Kolkevi	List Barely	1	<input type="button" value="Edit"/>
3	1 IT	PHP files have a default file extension of.	.html	.xml	.php	.ph	3	<input type="button" value="Edit"/>

Figure C.16 Selection test questions upload & view module

Admin can generate reports which are needed to the decision making the process. Figure C.17 display the main interface for report viewer. Also, these reports can be vied as a PDF format and print them (Figure C.18).

**Reports**

<input type="button" value="View Report"/>	Registered Company Details	<input type="button" value="View Report"/>	Selection Test Results	<input type="button" value="View Report"/>
<input type="button" value="View Report"/>	Job Vacancy Details	<input type="button" value="View Report"/>	Selected Applicants for Interviews	<input type="button" value="View Report"/>
<input type="button" value="View Report"/>	Job Seekers Details	<input type="button" value="View Report"/>	Candidate's Interview Marks	<input type="button" value="View Report"/>
<input type="button" value="View Report"/>	Number of Vacancies for Each Job Category	<input type="button" value="View Report"/>	Selected Candidates Details	<input type="button" value="View Report"/>
<input type="button" value="View Report"/>	Number of Applications for Each Vacancy	<input type="button" value="View Report"/>	Reject List of Applicanttts	<input type="button" value="View Report"/>
<input type="button" value="View Report"/>	Candidate List for Selection Test	<input type="button" value="View Report"/>		

Figure C.17 Report Generation module

**Registered company details - 2019-09-29**

ID	Name	Address	Number	Email
1	ABC Solutions Ltd	Sunandarama Road, Kalubowila, Dehiwala	123654789	abcsolutions12@gmail.com
2	QST (Pvt) Ltd	No. 378/5, Nawala Road, Nugegoda	119654785	qst0one@gmail.com
3	IT Inno (Pvt) Ltd	No 301 A, Station Road, Colombo 10	119654123	itinno@gmail.com
4	AIT Campus	No 6/2, Pagoda road, Nugegoda	779654214	apex@yahoo.com

*Figure C.18 Report as a PDF format*

Back up page provides the facility to back up the system details and restore the back up to the system (Figure C.19 & Figure C.20). The system facilitates to get the database back up as full database or table vice by selecting the required tables. Also, the admin can restore the back up by selecting the database file.

**Backup System Data**

\* By pressing Get Backup button, admin will be able to get backup copy of the selected tables in database.  
\* Database will be backup to any Local Disc where selected by Admin.  
\* Admin is responsible for all the data, when doing backup process.

**Select Tables for Backup**

applicants  
 company  
 interview\_marks  
 question  
 result  
 schedules  
 test  
 useranswer  
 userlog  
 vacancy

**Get Backup**

*Figure C.19 System Backup Module*

**Restore Backup Data**

\* By pressing Restore button, Admin will be able to restore the backup copy of database.  
\* Admin is responsible for all the data, when doing restore process.

**Choose Backup File**

Select Sql File  No file chosen

**Restore**

*Figure C.20 Restore Backup Module*



The online selection test module is used to select suitable candidates among applicants. Applicants can log into the system by providing Applicant ID and email address. Further, it provides candidate instructions for candidates. Figure C.21 & Figure C.22 shows the instructions and login page of the selection test.

---

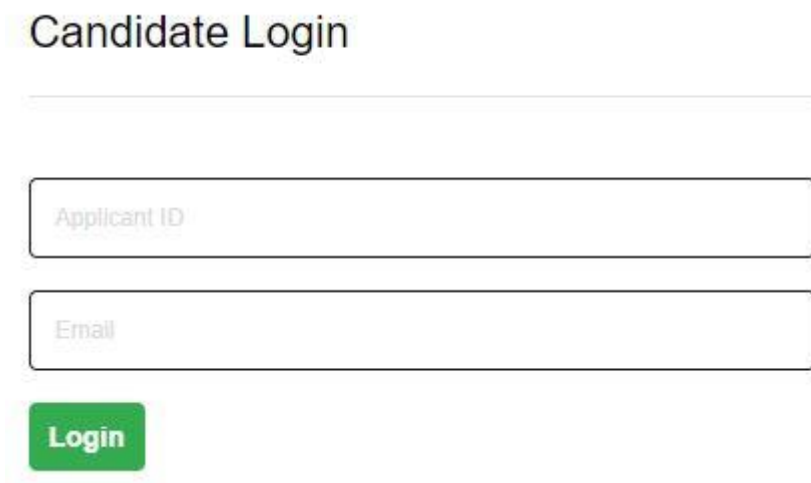
## Welcome to the SiLex Solution's Exam Center

---

**Please read following instructions carefully.**

- You are required to comply with the directions given by the responsible person at the examination venue.
- You must answer all the questions.
- Duration is 1 hour for each paper.
- Use your reference number as Applicant ID which was sent by email and log into the system.
- Once you complete the answering please logout from the system.
- Company has the right to short-list the candidates.
- Good Luck!

*Figure C.21 Instructions to the candidates*



Candidate Login

Applicant ID

Email

Login

*Figure C.22 Candidate login page*

After providing the correct applicant ID and email applicant is directed to the select question type module (Figure C.23). User should select the paper and then he/she directed to question module. Applicant must click any answer to go next question otherwise applicant cannot go the next question. Figure C.24 shows the question module. An applicant can view his/her test marks as well (Figure C.25).

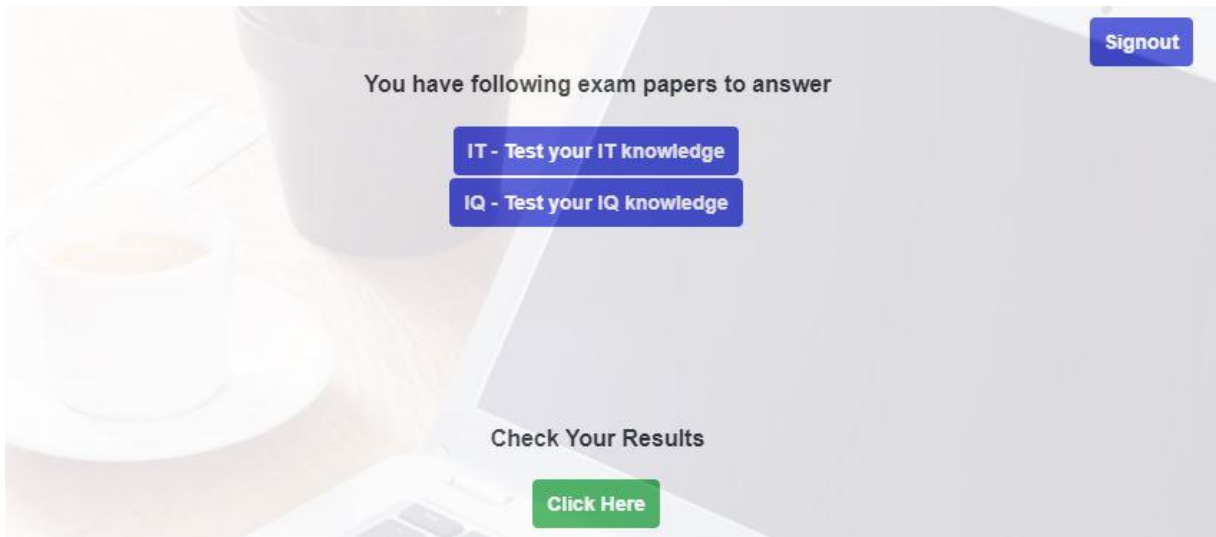


Figure C.23 select question paper

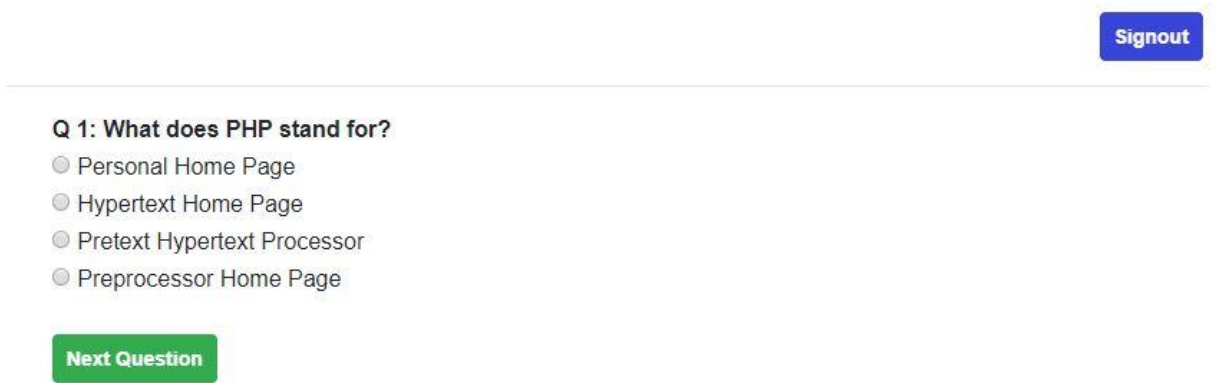


Figure C.24 Question module

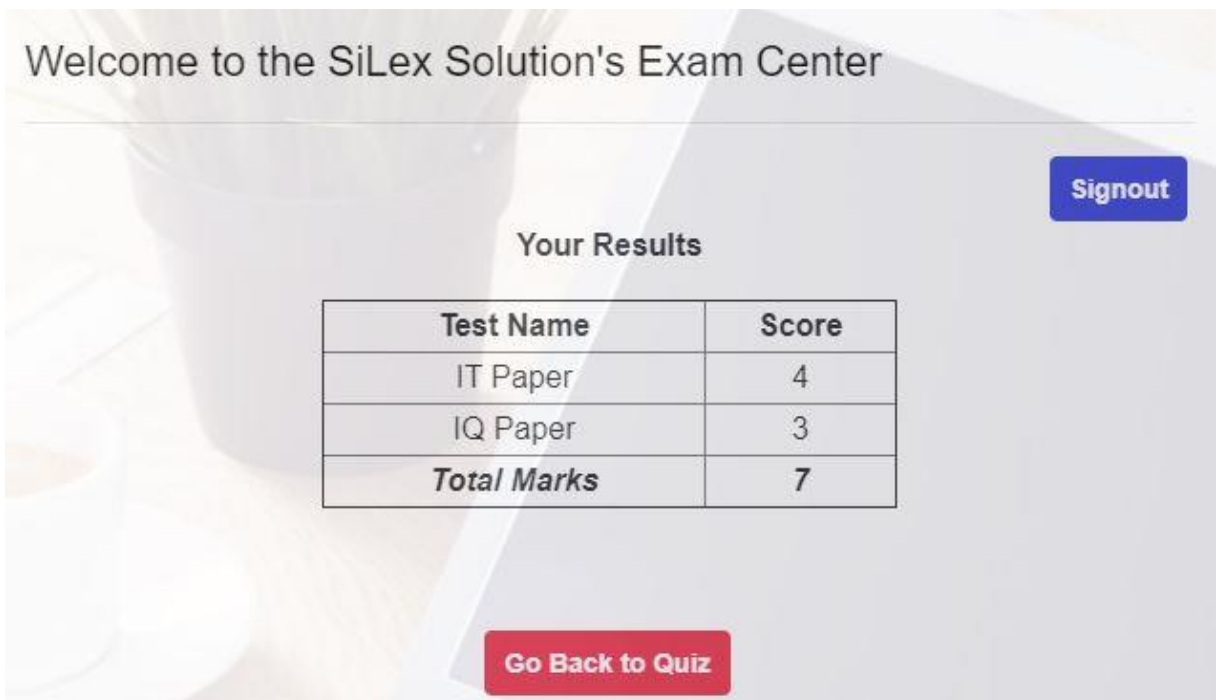


Figure C.25 View applicant test result

## Appendix D: User Evaluation

<b>Online Recruitment Management System</b>				
<b><u>User Evaluation Form</u></b>				
Name :	Designation :			
<i>(Instructions: For each statement, please check whether Excellent = 4, Good = 3, Average = 2 or Poor =1)</i>				
1. Do you agree that the developed system is user-friendly?	<input type="checkbox"/> Excellent	<input type="checkbox"/> Good	<input type="checkbox"/> Average	<input type="checkbox"/> Poor
2. Do you agree that the developed system would be beneficial to your recruitment management process?	<input type="checkbox"/> Excellent	<input type="checkbox"/> Good	<input type="checkbox"/> Average	<input type="checkbox"/> Poor
3. Do you think this system is better than the existing manual approach?	<input type="checkbox"/> Excellent	<input type="checkbox"/> Good	<input type="checkbox"/> Average	<input type="checkbox"/> Poor
4. Do you satisfy with the available features of the system?	<input type="checkbox"/> Excellent	<input type="checkbox"/> Good	<input type="checkbox"/> Average	<input type="checkbox"/> Poor
5. Did you encounter any difficulty while using the system?	<input type="checkbox"/> Excellent	<input type="checkbox"/> Good	<input type="checkbox"/> Average	<input type="checkbox"/> Poor
6. First impression of the website?	<input type="checkbox"/> Excellent	<input type="checkbox"/> Good	<input type="checkbox"/> Average	<input type="checkbox"/> Poor
7. Do you satisfy with the messages (error or success) display in the system?	<input type="checkbox"/> Excellent	<input type="checkbox"/> Good	<input type="checkbox"/> Average	<input type="checkbox"/> Poor
8. Any improvements (if applicable)	<input type="text"/>			

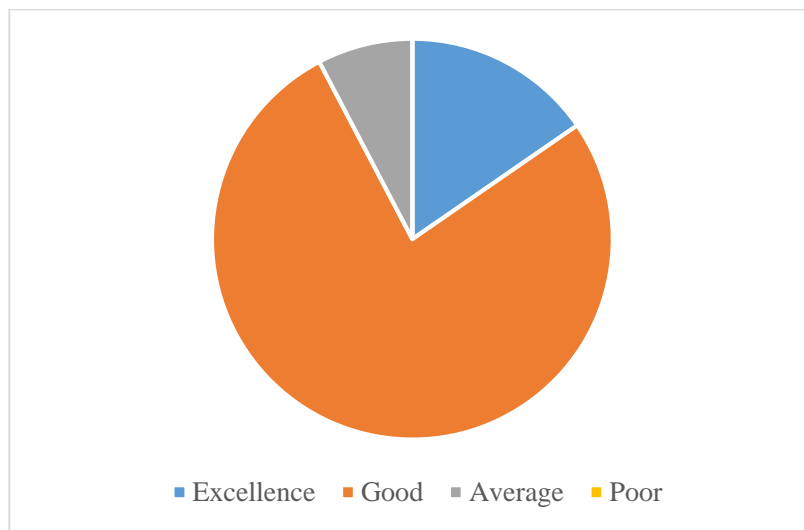
Figure D.1 User evaluation form

Once analyzed the given answers of each question, identified the following results.

*Table D.1 User feedback*

	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7
Excellent	2	1	3	2	3	1	2
Good	10	13	7	9	9	15	10
Average	1	1	3	2	1	1	0
Poor	0	0	2	0	1	0	1

1. Do you agree that the developed system is user-friendly?



*Figure D.2 Question 1*

2. Do you agree that the developed system would be beneficial to your recruitment management process?



*Figure D.3 Question 2*

3. Do you think this system is better than the existing manual approach?

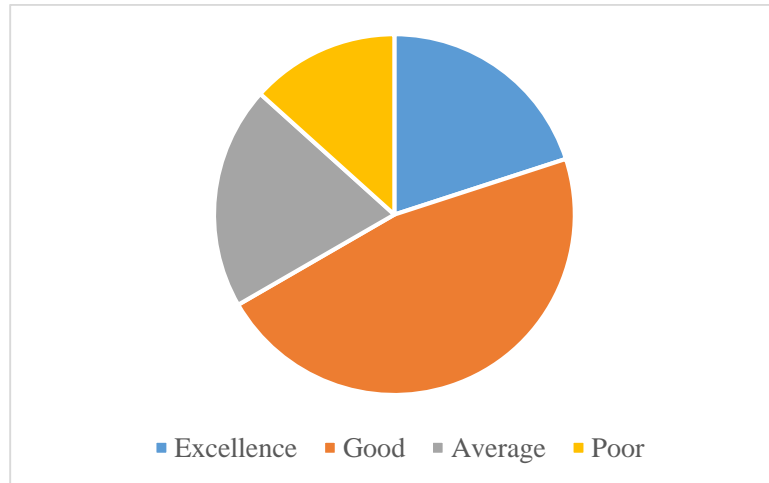


Figure D.4 Question 3

4. Do you satisfy with the available features of the system?

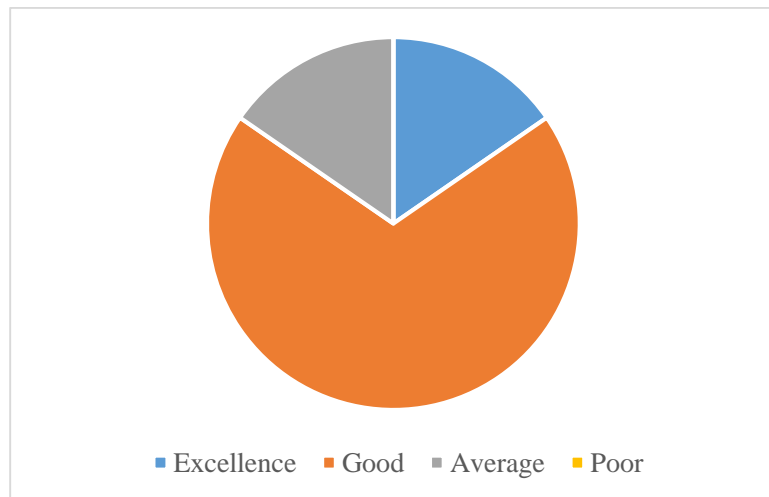


Figure D.5 Question 4

5. Did you encounter any difficulty while using the system?

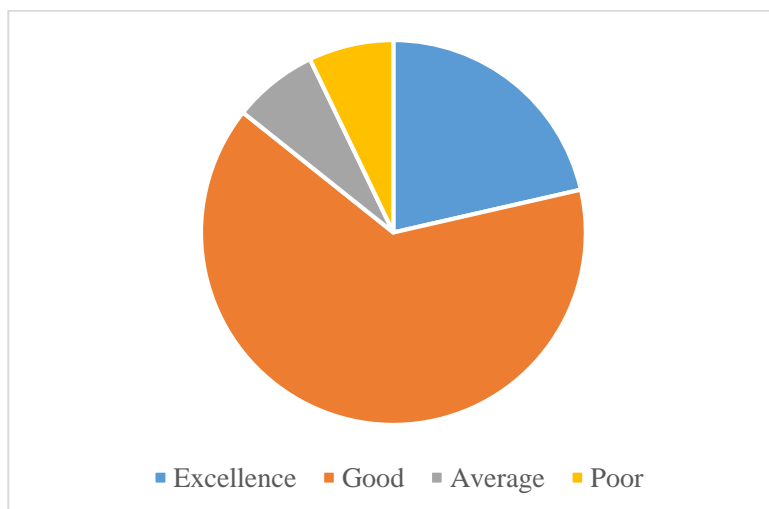


Figure D.6 Question 5

6. The first impression of the website?



Figure D.7 Question 6

7. Do you satisfy with the messages (error or success) display in the system?

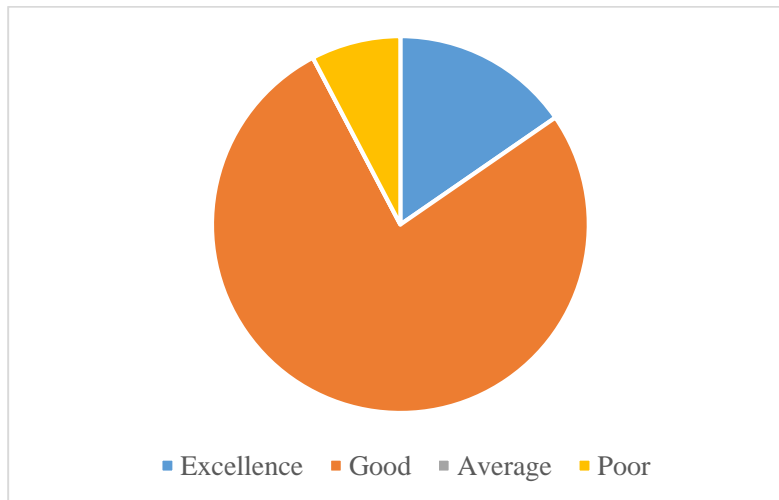


Figure D.8 Question 7

## **Appendix E: System Documentation**

Title: Online Recruitment Management System for SiLex Solutions (Pvt) Ltd.

Date: 30<sup>th</sup> September 2019

Version: 1.0

System: Web application

This documentation provides system implantation information for the system administrators, developers who involve in further system enhancements. Also, those who would like to get the technical information to configure and use the system successfully.

### **Hardware Configuration**

- Intel Core i5 Processor
- 8GB RAM
- 64-Bit Operating System
- 250GB Hard Disk Drive
- Monitor 1366 X 768
- Internet

### **Software Configuration**

- XAMPP (Apache, PHP, MySQL)
- Web browser - Internet explorer/Fire Fox/Google Chrome

### **Configuration of the pre-requisites**

Information related to installation, compilation and execution details of the system is as below.

XAMPP is an open-source freely available software bundle which contains Apache, MySQL, PHP. Using XAMPP can configure the system locally with the webserver and database. XAMPP can install on Windows, Linux or Mac Operating system.

Steps to configure the system:

1. Download and install XAMPP software
2. Start the XAMPP server
3. Copy all the project files into XAMPP Server host folder located in C:/xampp/htdocs
4. Go to the web browser and type “localhost/phpmyadmin” and import the database file to restore the database.
5. Go to the system folder and edit the configuration file  
... sillexsolutions\admin\libs\config.php

6. Edit the database connection for the system
  - 'hostname'  $\implies$  'localhost', Host Name of the Server
  - 'username'  $\implies$  'root' Database User Name
  - 'password'  $\implies$  " Database Password
  - 'database'  $\implies$  'silexrms', Database Name
7. Type following URL on web browser to view the SiLex Solution's website  
<http://localhost/silexsolutions/index/home.php>
8. Type following URL on web browser to access the back end of the recruitment management system  
<http://localhost/silexsolutions/admin/login.php>



# Appendix F: Database Design

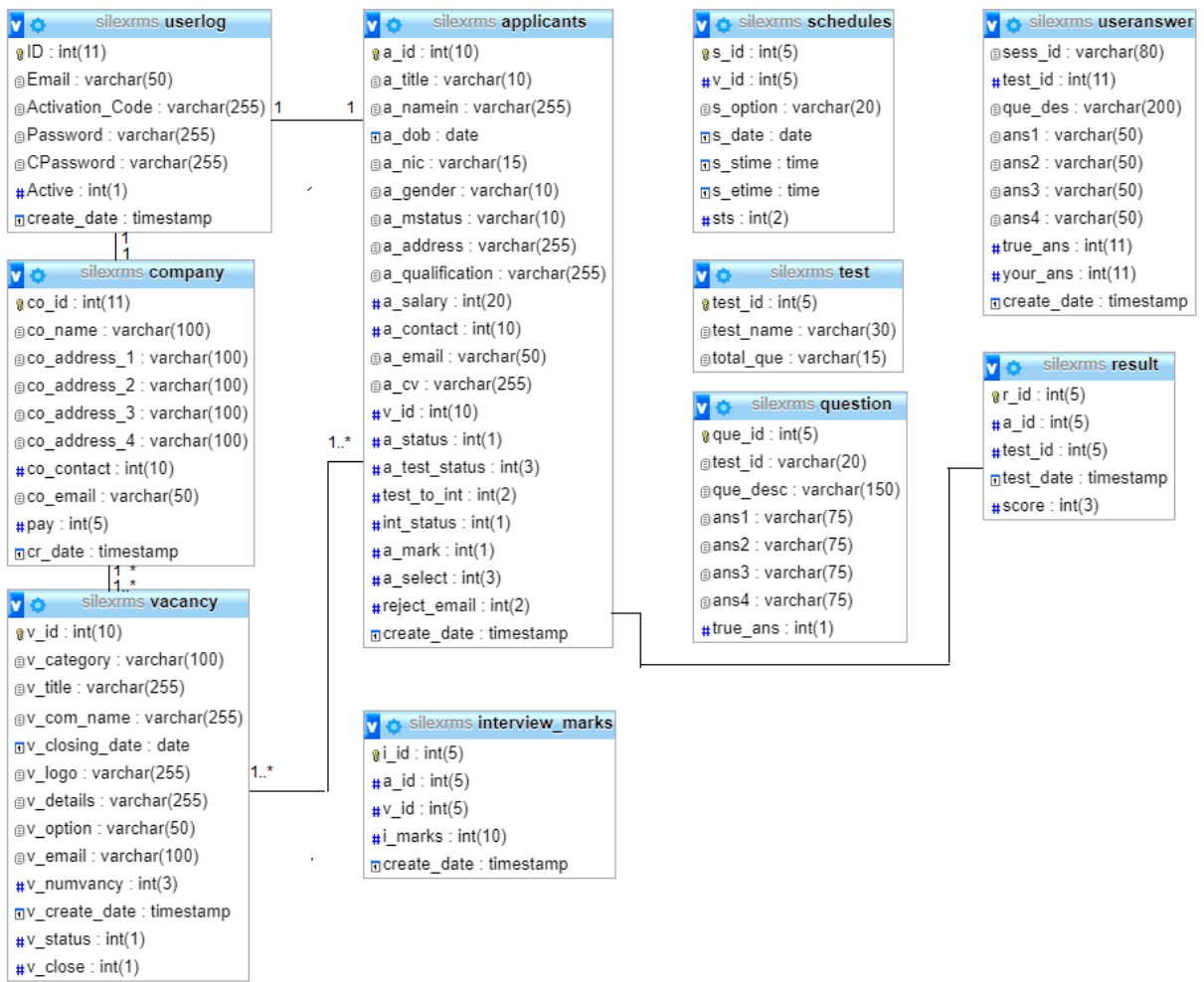


Figure F.1 Database Design