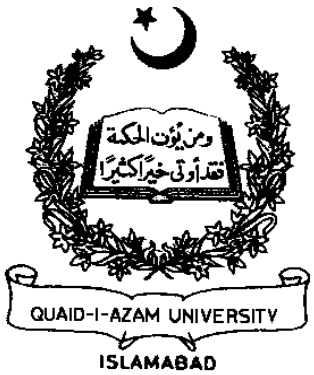
My Jobs Solutions

A web based application that connects the employer and job seekers



By

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D E D I C A T E D

To

My Beloved Mother (Late)

PROJECTBRIEF

Project Title:	My Jobs Solutions
UNDERTAKEN BY:	Rashid Mehmood
INTERNAL SUPERVISOR:	Madam Madiha Haider Syed
DEVELOPMENT TOOL USE:	My Eclipse, My SQL, Microsoft Word 2007. Microsoft Visio Studio 2007, Macromedia Dreamweaver 8.0.
OPERATING SYSTEM:	Windows 7 Ultimate.
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I would like to convey my sincere contentment to my supervisor respected Madam Madiha Haider Syed. I am greatly thankful to her that she supported me a lot from beginning to the end of this project.

I would also thank to all my friends, seniors and classmates for the help and their sincere wishes to complete this project.

Rashid Mehmood

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My Job Solutions

Chapter 1

Abstract:

Job Portals are the most popular and widely used tool by companies and recruitment teams to facilitate the smooth flow of recruitment process in the competitive world. Job Portals provide a platform for the employers to meet the prospective employees. The job aspirants can register in job Portals by creating a user ID. Job Portals allow users to submit and edit their resumes and apply for specific jobs at companies of their choice. Once registered, job aspirants get e-mail job alerts and can respond to job related questions from the employer companies. The companies have the choice to search for their ideal candidate from the resume database using various options and parameters available in the job Portals.

The job portal presents the employers with options to post online questionnaires and latest news to the employees. The portal has the tips to build admirable resume and information on do's and don'ts for the interview. The portal supports the employer from listing of jobs to selecting an ideal candidate. Easy data collection and storage feature of the portal helps in finishing the tasks comfortably and quickly. The employers can get quick returns for their investment as the portal incorporates a simple and quick recruitment method.

1.1 Introduction

Job portals are online platforms where recruiters and job seekers are connected to each other through online listings. Both recruiters and job seekers will register with the website and will be matched according to the recruiter's requirements, as well as the job seeker's qualification and experience**.** The time has changed and so are job-searching

methods. Earlier jobs were searched either through newspaper or through references but now with emergence of job portals, searching of job has become faster, simpler and easier. Experience of searching jobs with job portals is simply magical; it is actually an advantage for job seekers and to find up-to-date jobs.

1.2Existing systems

1.2.1 Newspapers

It is an old and common way to get the knowledge about the jobs that are available in the industry or a firm. Also apart from few major companies, or government job, vacancies are rarely advertised in newspaper these days.

1.2.2 Contacts

We can also get the information about the job via our contacts. Mean if we have a friend in an organization or any relatives that inform that a job is available in an organization. This option again is not open for all candidates.

1.2.3 Groups

We can also get the information about jobs from some kind of groups like Young Group on facebook or Graduate Group etc. but user only gets information about any job posting, He/she won't be able to use extensive search and apply facilities provided by job portals. Also it does not allow employers to search or short list candidates via their profiles.

1.2.4 Manual

It is way to find the job on own effort, to drop your CV in a company or firm by yourself. The way also has some difficulties that candidate has to go by himself to the company which waste his time.

1.2.5 Job Portals

Now a day's most popular way to get information about jobs is job portals. Here job seekers can create an account to get information about latest jobs that are available. And employers can also create an account to post a job on the job portals.

1.3 Problems in existing systems

- There is no feedback for the user about new jobs. There should be feedback that jobs are available.
- It is not separately mentioned that which job is available in which city.
- In my point of view, job that has already been applied for by the candidate should not be posted again.
- And I think that system should maintain a list of jobs on which the user have applied along with the date of application.

1.4 Proposed system

I am going to develop a system that will remove these problems. This Job Portal is a web-based application, which has three main entities – Candidates, Employers and Administrator. Candidates can register themselves, can specify their interests, search and apply for the jobs. Candidates can also upload their resume, update their profile and can view the status of jobs he/she had applied for. Employers can register them, upload logos and edit their profiles, can post jobs, search for candidates, and email to selected candidates. Employers can post vacancies and upload company profiles. Employers can also add a note or some information about their company which would act as advertisement and appear in left menu of Candidate's pages. And some partnership plans which can be rendered in left menu of employer's pages.

In this project I will sort the jobs by their title and by cities. I will introduce a system that can manage jobs in small web sites as well as on big sites. And I will sort the jobs in a way that jobs on which user have applied will not show for candidate. And I will provide fresh jobs for the candidate.

1.5 Overview statement

This project is basically a Web Based Application to help the job seekers as well as the organizations that are finding a good candidate for their organization. This system will provide the facility to the candidate to apply jobs that are available in his/her desired city. Organizations can upload a job and interested candidate can apply for that job.

1.6 Objectives

Objectives of this system are as follows.

- To provide the facility of job search.
- To make job searching global.
- To facilitate the company so that it can find the best candidate available.
- To act as a middle man that will connect the job seekers and the job provider.
- To instantly allow employers to select appropriate candidate and contact them.
- To allow better information and a place in organization.

1.7 Scope

- System should provide all the information about the company and the vacancy which is presented in this portal.
- And this portal has to contain all the information of job seeker like professional detail, educational detail etc.
- This job portal has to processes and evaluates jobs registered by the companies.
- And also has to have the information about the related jobs their expiry and re registration.
- This job portal should have an administrator who will schedule and will perform the administrative work.

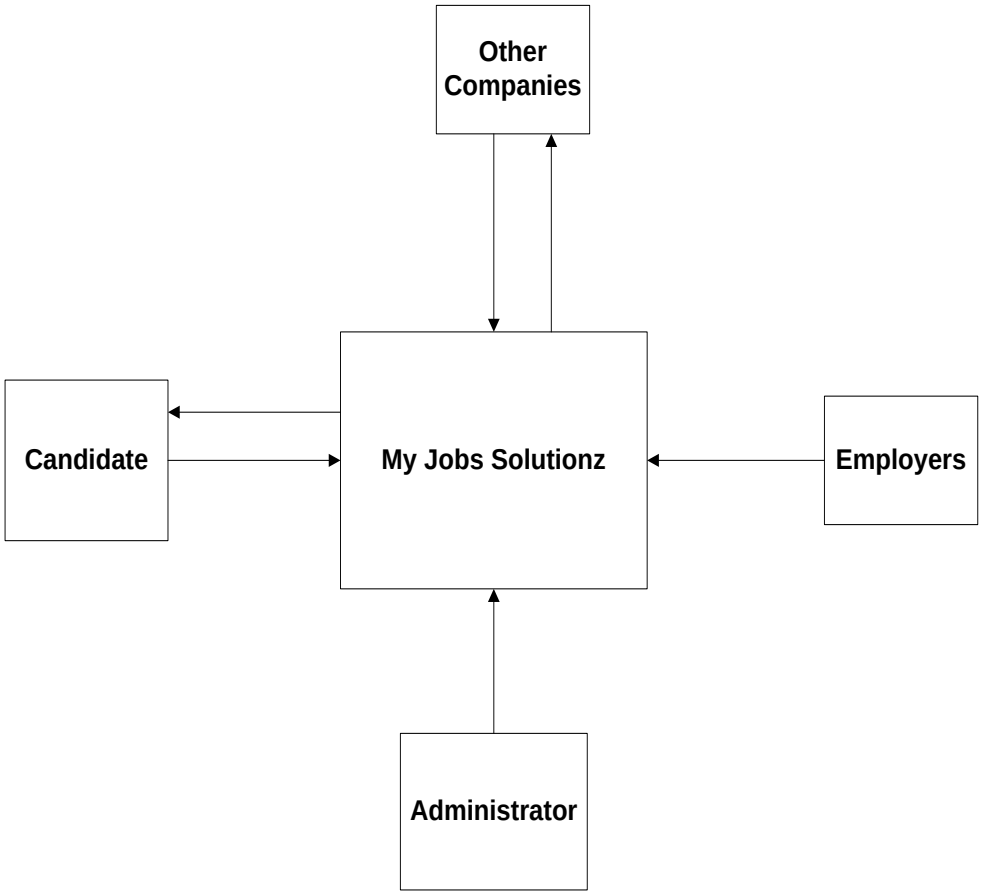


Fig 1.1 Context diagram

1.8 Function and Performance

- This system will perform the functionality of login to the candidate and employers to access the website by giving login details such as username and password.
- It will provide information about the new jobs that are available in the company or firm.
- It will allow candidate and employers to register account on the site by giving proper details about him/her and information.
- Information of new jobs available in company will be provided to the candidates. And information about candidates will be provided to the company by this application.
- It provides contact information of candidate like email etc.
- All records of jobs, candidate records and company records will maintain in the data base.

- The functionality will be provided for candidates that they can upload their resumes and could search for job by title and by city.
- All the information, data about the candidate, Company records are accessible to the administrator.

1.9 Resource Identification

I have identified the following resources that would be required employed in this project.

1.9.1 Human resources

This project would be developed by me, under the supervision of **Madam Madiha Haider syed,** Assistant professor, Institute of Information Technology QAU Islamabad. And from outside the university **Mr. Rana Mansoor Ali** Software Engineer at Jabs Solutions, Islamabad, has kindly agreed to provide technical guidance.

1.9.2 Software resources

1	Operating System	Microsoft Windows 7 Ultimate
1.	Database Tools	My SQL
2.	Web server	J2EE Server
3.	Presentation	HTML, Java Server Pages.
4.	Client	MS Internet Explorer, Mozilla Firefox
5.	Development Tools	My Eclipse, Dreamweaver 8.0, Microsoft Visio 2007

1.9.3 Hardware resources

1	System	HP Core 2 Duo

2	Processor	2.10 GHz
3	Hard Disk	120 GB
4	RAM	4 GB

1.10 Selection of Process Model

I have selected V-model for the proposed system. The V Model follows the principles that the development stages of the software each have corresponding testing stages. I have select this model because it minimize the of project risks. And it also improves the guarantee of quality. It reduces the total cost of the entire project. It improves the communication between all stakeholders. So I have selected this model.

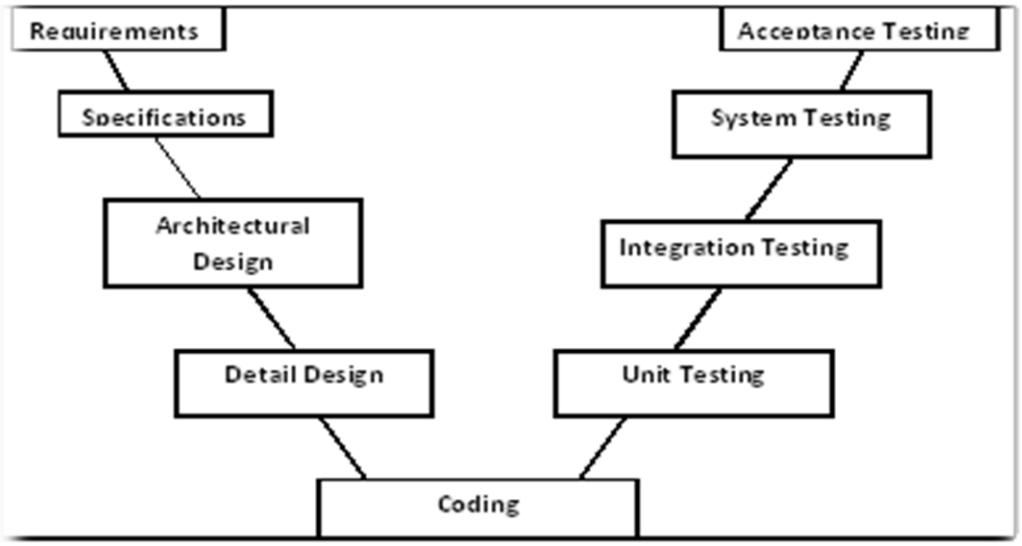


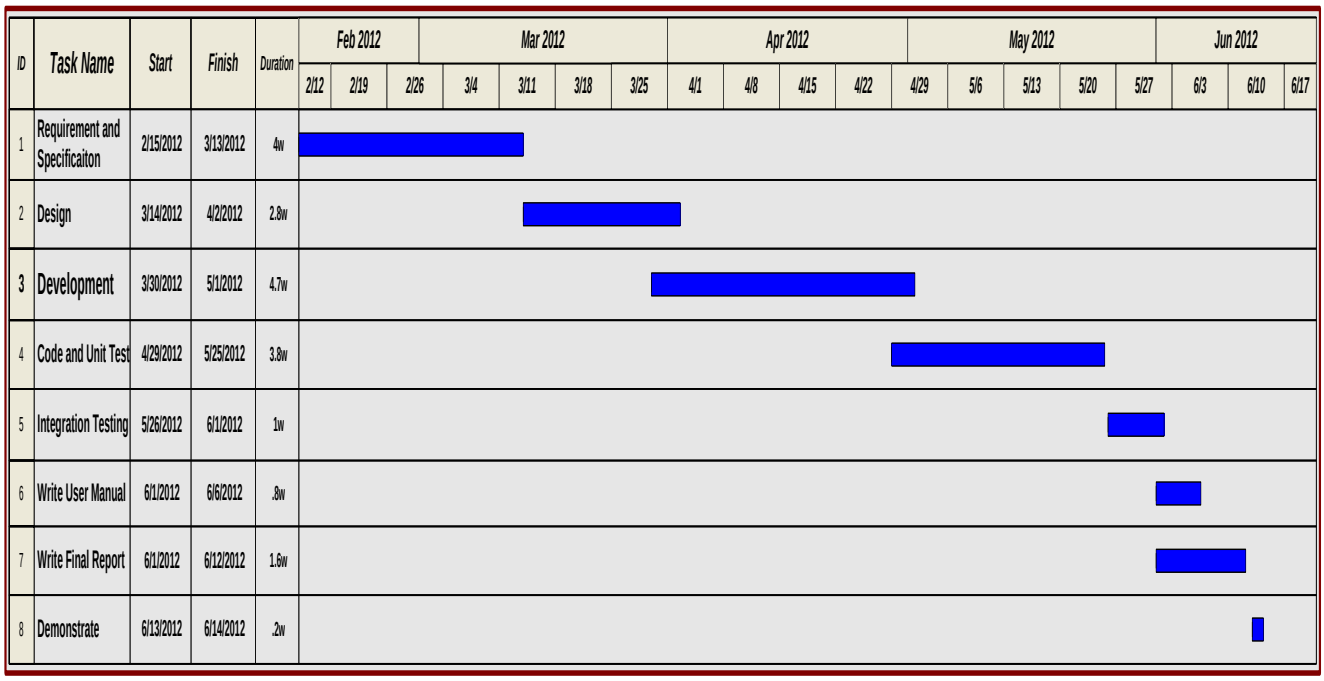
Fig 1.2- V Process Model

1.11 Risk management

No	Risks	Category	Probability	Impact

1	Number of Users	Product size risk	8%	Critical
This risk can be avoided by selecting a suitable web server and DBMS.				
2	Technology Expectation	Technology Risk	7%	Marginal
Technology of the project will meet the future requirements as new framework and software model has been used, this will reduce the risk.				
3	Training	Technical Risk	15%	Marginal
Professional training will be gained from the professionals to remove their deficiencies in tool.				
4	Changing Requirements	Technical Risk	22%	Marginal
Weekly meeting will be done by customer to counter this risk.				
5	Inability to meet deadline	Project Risk	13%	Critical
Delivery date might be tightened because of the delays caused by the session tests and the assignments. Project plan will help us to manage the available time up to the maximum extent for the project to avoid possible delays.				
6	End user	Customer Risk	6%	Marginal
End user requirements will keep in mind that he does not have any difficulty in using the software, so the system will be user friendly.				
7	System Crashing	Development Risk	4%	Catastrophic
Periodic Backups will be taken during the development phase to avoid this risk and the arrangements will likely to be made for that system's recovery.				
8	Inadequate Help	Development Risk	5%	Marginal
Proper help will be available for each tool through online tutorials and professionals thus reducing the risk involved in the development of the project.				
9	Integration of Software Tools	Development Risk	10%	Marginal
In order to avoid this risk, I would try integration of software tools on simple test project, resolve only issue that I might encountered.				

1.12 Project Schedule



ID	Task Name	Start	Finish	Duration
1	Requirement and Specificaiton	2/15/2012	3/13/2012	4w
2	Design	3/14/2012	4/2/2012	2.8w
3	Development	3/30/2012	5/1/2012	4.7w
4	Code and Unit Test	4/29/2012	5/25/2012	3.8w
5	Integration Testing	5/26/2012	6/1/2012	1w
6	Write User Manual	6/1/2012	6/6/2012	.8w
7	Write Final Report	6/1/2012	6/12/2012	1.6w
8	Demonstrate	6/13/2012	6/14/2012	.2w

1.13 Existing Job Portals

- **ROZEE.PK** is the one of the job portal that provides the facility to the candidate to search the jobs are available as well as to the companies about the candidates.
- **NaukriJunction** is also a job portal that provides the same kind of functionality as ROZEE.PK.
- **WorkForce.com.pk** job portal is also available for this purpose.
- **Mustakbil.com** is another famous job portal.

1.14 Thesis Organization

The first chapter is an introductory chapter. In second chapter the functional and non functional requirements will be discussed and the use cases and their description will be defined. Third chapter focuses on the design of the system. In fourth chapter is about implementation of the system. In fifth chapter the testing of the system will be provided. In sixth chapter Evaluation and future enhancement will be given in last chapter, followed by appendices.

Chapter 2

System Analysis

2.1 Introduction

A system is composed of interacting parts that work together to attain some objective or purpose. It is planned to attract inputs, process them in some way and generate outputs defined by goals, objectives or common purposes.

Complex systems cannot be understood by studying parts in isolation. The real meanings of the system lie in the communication between parts and the overall performance that emerges from the interactions. The system must be analyzed as a whole.

Systems analysis is a systematic examination of a real or planned system to establish the functions of the system and how they relate to each other and to any other system. Its objective is to provide information to decision-makers or system analyst that would sharpen their judgment and provide the basis for more knowledgeable choices.

2.2 Requirements Definition

2.2.1 Functional requirements

Functional requirement defines a function of a software system or its component. A function is described as a set of inputs, the behavior, and outputs.

2.2.2 Non Functional

Non-functional requirement is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors.

2.3 List of Functional requirements

2.3.1 Candidate Requirement

Candidate's requirements of the job portal system are as following:

- Candidate should be able to use the application from any Web browser supporting HTML and cookies.
- New candidate of the web portal should be able to register themselves by their unique ID and password.
- Candidates should be able to upload their resumes.
- Updates to candidate about the recent jobs.
- The performance of the job portal system should not degrade with an increase in the number of candidates.
- Candidate should be able to view a complete list of jobs available through the site.
- Candidate should be able to search for jobs in their desired city and title.

2.3.2 Administrative Requirements

Administrative requirements of the system are as following:

- Administrators of the job portal system should be able to manage using Web browsers.
- Administrative should have all record of candidate as well as the record of the company to identify the functional areas that should require improving.
- An interface should be provided to administrator to update the database and viewing all the records.
- He should be able to manage jobs by their title and city.
- Administrative should be able to notify the candidate about the new jobs.

Some other important functionalities for the administrator are:

1. Save Information

Administrator should be able to save information to update the database.

2. Generate Report

Functionality should be provided to generate a report about the new jobs.

3. View Report

He should be able to view the report to check and to refresh the jobs.

4. Administrative Page

There should be an administrative page to update the information about jobs and to delete the jobs that has been applied by the candidate. Or that has been occupied.

2.4 Navigation

The web sites should provide direct links to other sources of information, including self-determining databases. Navigation path should be displayed for candidate when he wants to go back to a section.

2.5 Candidate Interface Requirements

The candidate interface of the job portal system should be as common as possible to candidates who have used other web applications and Windows desktop applications. The following candidate interface priorities will be measured as for this type of application.

- Interface should have a professional look and feel
- Given that the ability to undo any choice easily.
- Utilize of Graphical tool to show calculated data to candidate.
- Reports exchangeable in XLS, PDF or any other desired format.

2.6 List of Non Functional Requirements

2.6.1 Security

- Protected registration and profile management facilities for candidate.
- Access will be restricted with candidate names and passwords.
- Only administrator users will have access to administrative functions not anyone else.

2.6.2 Speed

- All queries, information and other data transfer operations should complete within seconds.
- Prompt browsing through the website to complete any task.

2.6.3 Usability

- The system should allow the candidate easy access to information about the jobs that are listed.
- All the access should be provided by just clicking on the require option instead wasting time in writing commands.

2.6.4 Maintainability

- The application should be maintainable. The changes should be permitted in web pages and other sections of the application.
- It will be addressed by carefully documenting the design, code and implementation.

2.6.5 Efficiency

- The system should be very efficient for inspection of the information about candidate, employer.
- Candidate and employer's data shall be stored in a format that is still accessible.

2.6.6 Future Enhancement

The system will be designed in such way that we can accommodate the future enhancement.

2.6.7 Reliable

The system should be reliable that it provides the accurate functionality.

2.6.8 Availability

- System should be available to candidates at all time.
- Better component design to get better performance at peak time.

2.6.9 Upgradability

The system should have the ability to cost effectively deploy new version.

2.7 Retrieval of information from Data Base

- The job portal system will store all data in a standard SQL database, where it can be accessed by other programs.
- The system must have a useful and fast retrieval of the essential information from the data base.

2.8 Requirements Validation

I have found these requirements (given above) for the job portal system and my supervisor as well as **Mr. Rana Mansoor Ali** external supervisor also verified these requirements that these are valid for my system which I am going to develop.

2.9 Object Oriented and Analysis Design

2.9.1 Actor Identification

- Administrator
- Candidate

- Employers

2.9.2 Use Case Identification

1 Administrator's use cases are given below

- Add new jobs
- Delete job occupied
- Verify Employer

2. Candidate's use cases

- Sign up
- Login
- Upload/ update Resume
- Search a job by title
- Search a job by city
- Apply for job

3 Employer's use cases

- Sign up
- Login
- Upload/update company profile
- Post jobs
- Delete occupied jobs
- Select best candidates
- View candidate profile

2.9.3 Use case diagram

In software Engineering a use case diagram is a step wise procedure that enables a software engineer to identify interaction among candidate and the system to achieve some specific goals. That may be a human being or another software system.

The use cases are used at high level in the system engineering than in software engineering. It describes the missions of the stakeholders. The use case diagrams are the impression of the usage requirements for a system. They are functional for

presentations to management and/or project stakeholders, but for actual development you will find that use cases provide significantly more value because they describe "the meat" of the actual requirements. Use case diagram of the system is attached in appendix B.

2.9.4 Activity Diagram

The graphical representation of a software system is called activity diagram. The activity diagram is used for business process modeling, a use case that has captured logic to model this logic activity diagram is used, and also the detailed logic of the business rule or software system. Activity diagram could also model internal logic of the complex operation of the system.

In its basic form, an activity diagram is an easy and natural design of what happens in a workflow, what activities can be done in parallel, and whether there are substitute paths through the workflow. Activity diagrams of the system is attached in Appendix B.

2.10 Use case description

Use case table 2.1

Use Case name: add new job	
Primary actor: Administrator, Employer	
Goal: To provide the fresh jobs for candidates.	
Pre-condition: The Administrator should be logged in and on the administrator/ employer page.	
Steps: MJS web site →Home Page →administrator/ employer login →add new job	
Actor's Action	**System Response**
1. Administrator will click on add new job. **3.** administrator will add the job	**2.** System displays the form to post a job. **4.** System successfully will add new job and will display on the portal.

Post-condition: administrator/ employer should see the job posted by administrator.
Purpose: The use case will be used when administrator/ employer update the job list.

Use case table 2.2

Use Case name: Delete occupied job.	
Primary actor: Administrator, employer	
Goal: To update the job list.	
Pre-condition: Administrator should be login.	
Steps: MJS web site → Home Page → administrator/ employer login → delete a job	
Actor's Action	**System Response**
1. Administrator/ employer will click on delete the occupied job. **3.** administrator will confirm the deletion	**2.** System will provide option to confirm the deletion. **4.** The system will successfully delete the occupied job on the portal.
Post-condition: Administrator/ employer should be able to see the job deleted.	
Purpose: The use case will be used when administrator/ employer update the job list.	

Use Case Table 2.3

Use Case name: Verify the employer
Primary actor: Administrator
Goal: To provide the approved organization list to the candidate.
Pre-condition: Administrator should be login.

Steps: MJS web site → Home Page → administrator login → approve employer	
Actor's Action	**System Response**
1. Administrator will click on verify employer button. **3.** Administrator will confirm the approve employer.	**2.** System will provide option to confirm the employer. **4.** The system will successfully approve the employer.
Post-condition: Employer should be able to use the job portal website.	
Purpose: The use case will be used when administrator need to approve the employer.	

Use Case table 2.4

Use Case name: Create Account or Sign up.	
Primary actor: Candidate, employer	
Goal: Candidate/ employer create the on MJS to utilize services.	
Pre-condition: Candidate should select the option for create account or sign up.	
Steps: MJS web site → Home Page → Create Account → Enter required registration details → Submit.	
Actor's Action	**System Response**
1. User will push the create account button. **3**. Candidate/employer will enter name, password and email. **5.** Candidate/employer will fill the required registration details. **7.** Candidate/employer then will submit the form.	**2.** System will display the page with required details. **4.** System will check the inputs and will store the inputs as record. **6.** System will check and store the given details. **8.** System will give the ID to the Candidate/employer.
Alternative to line 3: If	**9.** System displays the error message.

Candidate/employer enters an incorrect input.	
Post-condition: Candidate/employer successfully creates his account.	
Purpose: This use case will be use whenever Candidate/employer wants to create an account.	

Use Case Table 2.5

Use Case name: Log In.	
Primary actor: Candidate, employer, administrator	
Goal: Access to the system.	
Pre-condition: Candidate, employer, administrator should have to be registered and should be on the login page.	
Steps: MJS web site → Home Page → Log In → Enter Name → Enter Password.	
Actor's Action	**System Response**
1. User will push the log in button. **3.** User will provide his name and password in the given space.	**2.** System will provide the login facility to the candidates. **4.** System will verify username, password and log in the user.
Alternative to line 2: By entering an incorrect name or password.	**5.** System displays the error message.
Post-condition: user successfully log in to the system.	
Purpose: The use case will be used whenever log in box will be select.	

Use Case Table 2.6

Use Case name: Upload/Update resume
Primary actor: Candidate
Goal: Access to his own information or Profile.
Pre-condition: Candidate should be registered and on his own page or main

interface.	
Steps: MJS web site →Home Page →Log In →Enter Name →Enter Password→Upload/update resume.	
Actor's Action	**System Response**
1. Candidate will push the upload/update resume button. **3.** Candidate will upload/update his resume.	**2.** System will provide the facility to the candidate. **4.** System will made changes according to the Candidate.
Post-condition: Candidate can successfully make change to his profile.	
Purpose: The use case will be used whenever candidate will update/upload resume.	

Use Case Table 2.7

Use Case name: Search job by title and city.	
Primary actor: Candidate	
Goal: Access to the system and awareness to the jobs.	
Pre-condition: Candidate should have to be registered and should be on main page or main interface.	
Steps: MJS web site →Home Page →Log In →Enter Name →Enter Password →Search job by title or city	
Actor's Action	**System Response**
1. Candidate will push the search by title or by city button. **3.** Candidate will enter the title or city of job.	**2.** System will provide the facility to the candidate. **4.** System will display the list of specific jobs.
Post-condition: Candidate can successfully find the jobs.	
Purpose: The use case will be used whenever candidate will search job by title and city.	

Use Case Table 2.8

Use Case name: upload/update company profile.	
Primary actor: Employer	
Goal: Access to his own company information or Profile.	
Pre-condition: Employer should have to be registered and should be on the main page or main interface.	
Steps: MJS web site → Home Page → Log In → Enter Name → Enter Password → Upload/update company profile.	
Actor's Action	**System Response**
1. Employer will push the upload/update profile button. **3.** Employer will upload/update his company profile.	**2.** System will provide the facility to the employer. **4.** System will made changes according to the employer.
Post-condition: Employer can successfully make change to his company profile.	
Purpose: The use case will be used whenever employer will update/upload company profile.	

Use Case Table 2.9

Use Case name: Select best candidate	
Primary actor: Employer	
Goal: To find a candidate that can make good efforts to the company.	
Pre-condition: Employer should be login.	
Steps: MJS web site → Home Page → Employer login → email to selected candidate.	
Actor's Action	**System Response**
1. Employer will click on email to	**2.** The system will provide option to send

the candidate. **3.** Employer will send an email to the candidate that has been selected.	an email. **4.** The system will successfully send an email to the candidate.
Post-condition: The candidate should get the job email.	
Purpose: The use case will be used when Employer select a candidate for his company.	

Use Case Table 2.10

Use Case name: view candidate profile	
Primary actor: Employer	
Goal: Access to the candidate profile and to find best candidate.	
Pre-condition: Employer should have to be registered and should be on the main page or main interface.	
Steps: MJS web site → Home Page → Log In → Enter Name → Enter Password → View profile of candidate.	
Actor's Action	**System Response**
1. Employer will push the view profile button and will get the information of candidate.	**2.** System will provide the facility to the employer to see the profile of the candidate on the portal.
Post-condition: Employer can make sure that this candidate is best for the job on that he has applied.	
Purpose: The use case will be used whenever employer needs to get the information about candidate.	

2.11 Conclusion

In this chapter I have completed the functional and non functional requirements. I have identified the actors and their activities. I have defined the use cases and their description. The analysis of the system has completed, now I will move towards system design description in the next chapter.

Chapter 3

System Design

3.1 Introduction

The process of defining the component, interface, architecture, interface and data for a system to assure particular requirements is called system design. The design phase is the main part of Software Development Life Cycle (SDLC). The system design is the connection from side to side which requirements are changed into the tangible software. The design phase is important for both developer and customer. Something wrong in the requirements that would leads to faulty design. So the design has a significant effect on the software which is going to be developed.

The main purpose of the system design is to develop an approach that converts the requirements into a working product. The design of a system tells an order of integrated engineering plan for the system which is being proposed, it also tells us that how to explore trade-offs, understand the technical risks and determine estimates for performance and cost to complete the system (project). And most important the design phase enables the developer to produce some kind of model of the application that fulfills the requirements made by the customer. Then all the requirements decomposed into their interfaces and modules. It is the phase that converts the problems into the functional software.

The design describes the all aspects of the object and provides information base architecture of software. It is a working product or the process that is the successive explanation of the requirements. The process of design takes the user opinion and needs practical approaches to complete the project (software). The design has three major categories which are the followings.

- Database Design
- Physical Design
- Logical Design

3.2 Database Design

The procedure of making a complete data model of a database is called the database design. Data base design term can also be use to explain many different parts of the design of an overall database system. A watchfully planned design of the data base is the basis for future success. It also helps the objectives and operations of the system because it includes all entities and their analogous relationships.

- Data and their relationships are represented in database design.
- The data model that supports all transactions is required when all the data has been provided.
- The design is particular that is made to achieve the required performance for the system.

The process of converting the conceptual data into a logical data model is called Database design. To achieve this target mostly and commonly way is Entity Relationship Diagram.ERD shows all the relationships between the entities of the system.

3.2.1 Entity Relationship Diagram

A data modeling technique that shows a graphical image of the all entities of the system, relationship among these entities within a system is called Entity Relationship Diagram. The main intension of the Entity Relationship Diagram is to make a correct indication of the real world concept into the database. Entity Relationship Diagram is describes three things.

1. Which entities are involved?
2. Which entities are related to each other?
3. What kind of relation the entities have or the number of relationship they have (Cardinality).

ERD of the system is attached in appendix B.

3.2.2 What is an Entity

Entity may be an object, place or a person for which the data is being collected. For example in hospital management system Doctor, Patient, appointment and tests are the entities. A plan or arrangement for the set of entities that use the same kind of attributes. It is indicated in the Entity Relationship Diagram as a rectangular box and the matching attributes are exposed in the ovals attached to the entity type by direct line.

3.2.3 Relationship

An association between the instances of one or more entity type is called relationship. When two entities have a mandatory relationship the modality of the relationship is 1.

And the relationship has the modality 0 when there is no need of relationship between two entities. The relationship will also be 0 when the relationship between two entities is an optional.

3.2.4 Cardinality

Relationship between entities in the term of number is called cardinality. The relationship is optional it may have single relation to the other entity or may have more than one relation. For example in an online shopping system customer may not place any order he just check the variety and don't place any order or he can place more than one order. The number of relationship two entities have is called the cardinality. Types of cardinalities are as bellow

- Optional One
- Optional Many
- Mandatory One
- Mandatory Many

3.3 Physical Design

The step in the standard design cycle that follows the circuit design is called the physical design. The whole components (interconnects and devices) are represented as circuit are then converted to into exact representation of shapes. These shapes will ensure the necessary functionality of the component. And the most important physical data structure is customized whenever it is necessary to meet performance requirements and size.

3.3.1 Database Structure

The design of the database can be use to explain many different parts of the design of the overall database system. It is mostly and principally can be consider as the logical design of the base data structures used to store the data. These are as table and views in the relational model. Entities and relationships are map openly to objects classes and named relationship in the object database. And also the term of the database design could apply to the generally process of designing, not only the base data structures but also the forms and queries used as a part of the overall database application within database management system.

Table 3.1

Table Name: Person

Primary Key: NIC_ Number

Purpose: Everyone on the Job Portal should have his own ID.

Field Name	Type	Width	Constraint	Description
NIC_ Number	Int	20	Not Null	Primary Key
Name and Address	Char	30	Not Null	Information about person
Email	Varchar	30	Not Null	Email will be required for online

				information to the person.
Phone Number	Int	20	Null	Phone number will be required for later use.
City	Varchar	30	Not Null	The place where a person lives. City of the person.
Password	Varchar	20	Not Null	Password field provided and then checked for security reasons

Table 3.2

Table Name: Candidate

Primary Key: Candidate_ ID

Purpose: Every Candidate has the individual account.

Field Name	**Type**	**Width**	**Constraint**	**Description**
Candidate_ ID	Int	10	Not Null	Primary Key
Candidate Name	Char	30	Not Null	Name of Candidate.
NIC Number	Int	20	Not Null	Candidate Identity
Email	Varchar	30	Not Null	Email required for candidate for online information about jobs.
Phone Number	Int	20	Null	Candidate's Phone number required for later use.
City	Varchar	30	Not Null	Candidate's city.
Password	Varchar	20	Not Null	Password field provided and then checked for security reasons.

Table 3.3

Table Name: Employer

Primary Key: Employer_ ID

Purpose: Every employer has the individual account.

Field Name	Type	Width	Constraint	Description
Employer_ ID	Int	10	Not Null	Primary Key
Employer's company Name	Char	30	Not Null	Information about the employer's company.
NIC Number	Int	20	Not Null	Identity of the employer.
Email	Varchar	30	Not Null	Email required for employer for online information.
Phone Number	Int	20	Null	Company's Phone number required for later use for the candidates.
City	Varchar	30	Not Null	Location of the employer's company.
Password	Varchar	20	Not Null	Password field provided and then checked for security reasons.

Table 3.4

Table Name: Administrator

Primary Key: Administrator_ ID

Purpose: To manage the website and perform administrator's responsibilities.

Field Name	Type	Width	Constraint	Description
Administrator_ ID	Int	10	Not Null	Primary Key
Administrator name.	Char	30	Not Null	Information about the Administrator.

NIC Number	Int	20	Not Null	Identity of the Administrator.
Email	Varchar	30	Not Null	Email required for Administrator so the candidate and employer can contact him via mail.
Phone Number	Int	20	Null	Administrator's Phone number required for later use for the candidates and the employers.
City	Varchar	30	Not Null	Location of the administrator that in which city he lives.
Password	Varchar	20	Not Null	Password field provided and then checked for security reasons.

Table 3.5

Table Name: Job

Primary Key: Job_ ID

Purpose: To provide facility to candidate to find job easily in his desire city.

Field Name	**Type**	**Width**	**Constraint**	**Description**
Job_ ID	Int	10	Not Null	Primary Key
Job Title	Char	30	Not Null	Information about the job that what job is available.
City	Varchar	30	Not Null	Location of the job in which city it is available.
Job description	Varchar	20	Not Null	It provides the information that in which field this job is available.

3.4 Logical Design

A conceptual plan of a software application that explains the processes, relationships, entities and the rules is called a logical design. It describes the user's view of the system. Interface design of a website is described in the logical design phase. It mentions the major methods of communication in term of menu structures and command structure. It tells how the application communicates within itself for interface and show the result as output of the input. It also tells that problem has been solved, the process of getting answer to the problem if known as logical design.

Information about the logical design of the arranged deployment scenario is described in this section of the design. It is the first footstep in transforming the functional requirements and components into a physical design that you can organize in your data center.

3.5 Interface Design

The design of computer, electrical devices, applications of software and website with the focal point of the user experience and communication is called the interface design. The purpose of the user interface design is to make the user communication as easy and well organized as possible. To complete the user goals it is frequently called user centered design. Ability of good interface design that facilitates the task to finish without illustrates needless concentration to itself.

If a system has a complex interface or the information is provided in a confusing way the user may not be able to make sense of the information is presented. For every interface design some principles are followed which listed below:

3.5.1 User Familiarity

The user interface should have to use the conditions (terms) which are drawn from the knowledge of the expected group of the user. Most of the feature I am using in this system, are familiar to the user.

3.5.2 Consistency

The system should be consistent in performing the operations that are provided on the interface. And the most importantly, major functionality of the system should be operational through links. All the information or operations that are provided should perform the same functionality whenever the user needs to use these functionalities.

3.5.3 Minimal Surprise

User should not be surprised by the interface there should not appear error in the system. There should be less probability of error.

3.5.4 Recoverability

Interface must be designed in a way that the user should be able to recover the error by himself.

3.5.5 User Guidance

User interface should be able to guide the user in a way that tell the user what to do next. Or there should be a Help button to guide the user.

3.5.6 Security

The system should be resistent to the unwanted attacks. The Job Portal Management will be design in this way that will not allow unauthenticated user to acess the system.

3.6 MJS User Interface

The user interface of Job Portal Management System will be provided via a set of the pages facilities that are provided in the interface the pages are as following:

3.6.1 Home Page

The Home Page of the MJS will show the information about the system that is associated to the home page. The links following elements will be on this page.

3.6.2 Sign Up

This section of the user interface will provide the facility to the user that will made him the permanent member of the Job Portal Management System.

3.6.3 User Login /Logout

This part of the user interface will provide the facility to user to access the website by using his username and password.

3.6.4 Add a New Job

This part will provide the facility to the administrator and the employer to post a new job that is available in the company.

3.6.5 Delete the occupied job

It will provide the facility to the administrator and the employer to delete those jobs that has been occupied by the candidate to provide the fresh list to the candidate.

3.6.6 Update /Upload Resume

This section will provide the facility to user to upload or update resume, So that the companies should be able to know the qualification and the work experience of the candidate.

3.6.7 Search Job

It will provide the facility to the user to find a job by its title and by city in which this job is available.

3.6.8 Update /Upload company profile

This part of the interface will provide facility to the employer to upload /update his company profile that will tell the candidate and the administrator to get knowledge about the company.

3.6.9 Select best candidate

This section will provide the ability to the employer, he can select best candidate for his company by viewing the resume of the candidate.

3.6.10 Contact Us

This part will provide the facility to the candidate and the employer to contact with the administrator.

3.7 Conclusion

In this chapter I have completed the design of the system. Database design, physical design and the logical design is discussed. Interface design and the entity relationship table are also designed. Now I will move to the implementation of the system in the next chapter.

Chapter 4

System Implementation

4.1 Introduction

Next phase in application or a project development is the system implementation. In which the software may be modified to collect local functional requirements, data mapping, the targeted application or project is developed and tested, the software system are installed, all the basic requirements are mentioned and a comprehensive report is produced and the complete application is tested earlier than being accepted.

Within the completion of the design phase of the software the development phase is starts. To transfer the design into an executable computer application or software is the main purpose of the development. The system is constructed to fulfill the requirements.

This part add some extra issues that should be determine earlier than or during the system implementation. The software tools and the performance of the hardware devices are also included in this phase as they help out the development and problems that arises during the software installation.

4.2 Application Architecture

The Job Portal Management System is developed as a web application. This application is functionalized through JAVA platform using MYSQL at backend.

4.3 Programming Language Selection

It is a very important decision to select the programming language to develop the software. The selection of the suitable programming language and tool is necessary for avoiding difficulties in the next stages of the system life cycle. So, keeping these things in mind I have selected the following technologies to develop the My Jobs Solutions:

4.3.1 Java

Java is generic programming language. It is the object oriented language which based on classes to design an application. It is specially used to have minimal implementation dependencies. Java is a power full programming language because libraries are available to help the programmer and it's a platform independent language.

4.3.2 Java History

Java is a high level object oriented language by Sun Microsystems. A platform independent language Oak was developed in early 90's. It was designed to handle the device and set top boxes. The Oak was then renamed as Java and customized to take the benefits of the WWW (World Wide Web) that was growing rapidly. Sun Microsystems documented the very first programming language with java that was not attached to any microprocessor or operating system. Application written in java can run on any operating system. To develop the consumer projects (application) is the main principle of the Java.

On December 7, 1995 a big step was engaged when Microsoft and Sun agreed to sign a letter of interest for a java technology source license. And Microsoft also agreed to provide Sun Microsoft's reference implementation of the java virtual machine, and also the application programming interface (API) for Windows.

4.3.3 Why Chose Java

First of all you have to decide that on which platform your application is going to run, if your application is going to run on Android Java is the best and if it is going to run at iOS (internetwork Operating System) it's essentially Objective C with C++ and pure C. and the desktop applications have more choices OS X (unit base graphic interface) is objective another time, C# is mostly used for Windows but Linux uses C and on all these platform that have been described can also use the C++. Few reasons which lead to selection of java as programming language for development of this system are listed below.

- Java is a simple language it has an easy syntax.
- Java is a platform independent language. We make an application on a platform and can run on another platform.
- Java has a very wealthy standard library and these libraries are easy to use. This also makes Java language easy to use.
- Now a day the most popular programming language is Java. Most of the applications are developing in Java.
- Java server provide run time environment so it is one of the fastest programming languages.

4.4 Java Features

Java is a simple language that is use to develop many application and websites. Java is a language that any programmer can easily use. Java is a generic programming language. Some features are as followings:

4.4.1 Robust

Java has built-in exception handling, it check the type strongly that all data is stated as unambiguous type) it describes that all local variable must be initialized.

4.4.2 Automatic Memory Management

Java is a type of language that automatically collects garbage. Java virtual machine handles the memory management.

4.4.3 Dynamic Binding

In java data linking and method where they are positioned it is done at the run-time.

4.4.4 Good Performance

Understanding of the byte code made the performance slow in early versions. But virtual machine along with adaptive and fast compilation and other techniques now

provide performance more than C++, it provide up to 50% to 100% more speed than C++ program.

4.4.5 Built-in Networking

There were made many support classes to develop difficult internet communications when the java was designed.

4.4.6 Compiler/Interpreter Combo

JVM compiled the code into the byte code. That provides the facility to attach the machine that is written in virtual machine.

4.4.7 Platform Independent

Java is a platform independent language that provides the facility to develop an application on one platform and then use this application on any other platform.

4.4.8 Object Oriented

Java is an object oriented language you can code in the class not outside the class, instead of main. A wide class library is available to access the language packages.

4.5 Java Server Faces (JSF)

Java Server Faces points the existing standard UI and web tier concepts which has no limits for the developers to a trick markup language, client devices or protocol. All the user interface classes are integrated with the java server faces technology. It sum up the functionality of the component, it also combines the functionality to the user interface. Java Server Faces technology provides a custom renderer and a JSP custom tag library for rendering to an HTML client, allowing developers of Java Platform, Enterprise Edition (Java EE) applications to use Java Server Faces technology in their applications. Some of the features of JSF are given below:

- It allows the programmer to create the interface using a set of standards and reusable server side components.

- To make the access easy to the component it provides the JSP tags.
- A framework is also provided to implement custom components.
- Save the state information and display it when forms repopulate.

4.6 Java Servlet

A class of Java programming language is called the java servlet that use to expand the abilities of the server that host application access through a programming model named request-response. While the servlet can take action to any kind of the request that are generally used to expand the application that is hosted by a web server. So, it can be said that java program not runs on browser it runs on the server.

A servlet is based on java and it is a server side web technology. It provide service, it serves as client request and obtains the reply from the server. In Java EE servlet is a java class that conforms to the Java Servlet API, it is a protocol in which java class or servlet can respond to the requests. They are not bounded up to a particular client server protocol, but mostly used along with the HTTP protocol. Consequently, the word servlet is frequently used in the meaning of the "HTTP Servlet" a programmer can use a servlet to insert a dynamic content using the java platform, to a web server. The content which it is going to add is commonly XML or the HTML.

4.7 J2EE Architecture

- Server of J2EE provides the following services:
- Naming and Directory enable the programmer to place services and components via interface of the Java naming and Directory (JNDI) API.
- EJB enable the web browser to contact JSP and Servlets.
- To access servlet and JSP, HTTP Enables Web browser.
- Authentication impose security by have need of the users to log in.

Java has basically three tiers:

- **Client tier:** In this tier, components of the web, such as Java Server Pages. Can be a java application that stands alone to provide a dynamic interface to the middle tier.
- **Middle tier:** In middle tier or the server tier web services and enterprise beans sum up distributable, reusable business logic for application. Server tier components are enclosed on the J2EE application server that provides the platform for this kind of components to store data and perform actions.
- **Enterprise tier:** In this tier data is stored and continue, typically in a relational database.

4.8 EJB Container

Instances of enterprise bean runs inside an Enterprise Java Bean (EJB) container. This container provides the runtime environment which manages the enterprise bean and presents them by important system level services. The services that are provided by this container are following:

4.8.1 Transaction Management

When a method is invoked by the client in an enterprise bean, then this container interfere to manage the transaction. Because this container is responsible to manage the transactions, in enterprise bean you don't have code the transaction limits. To control the distributed transactions then the code is required, it can be quite difficult.

4.8.2 Remote Client Connectivity

The low level communication also manages by this container, the communication between enterprise bean and the client. Following this an enterprise bean has been created, then the client call up methods on it as if it were in the same virtual machine.

4.8.3 Database Connection Pooling

One of the very costly resources is the database connection. It is the time consuming and the number of connections can be limited. Alternate of this problem is that the container manages a poll of database connections. An enterprise bean has the ability

to obtain the connection from the pool quickly. This connection may be re use by another bean after particular bean release the connection.

4.8.4 Security

An authorize client can invoke an enterprise bean's method. A particular role is assigned to each client, and each role has the authority to invoke the certain methods it has no access to the other methods.

4.8.5 Life Cycle Management

During its lifetime an enterprise bean exceed through many states. Firstly the container creates the enterprise bean, then moves it between the pool of the available instances and the energetic state, and at the end removes it.

4.9 Database selection

One of the very important decisions in project is to select the database. In system implementation it is to decide that which demanding software is proficient to assemble the requirements of the system. After keeping a number of database tools in mind I have selected the MySQL as backend database.

4.10 My SQL

The SQL stands for Structure Query Language. MySQL is the most accepted, publically available SQL database management system, it is developed, distributed and maintained by oracle corporation.

4.10.1 Relational

In a relational database data is stored in tables rather than into a storeroom. In this kind of the database the structure of the databases is ordered into the physical files that is enhance to increase the speed. It is a logical model that is consists on the views, columns, tables, rows, so that it provides bendable programming environments. Firstly developer defines the rules that are essential to define the

relationship between different kinds of data fields. The relationship may be one-to-many, one-to-one, many-to-many or may be a unique. The relationship may be required or optional. The database should be design well, so that your application never faces the duplicate, out of date, inconsistent or missing data.

4.10.2 Client/server or embedded systems

MySQL database software is basically a client/server system which is made up with the multi threaded SQL server which helps many back ends, numerous diverse client program and libraries, administrative tools and an extensive variety of application programming interfaces (APIs). In addition MySQL server is like an embedded multi threaded library that can connect your application to obtain the faster, smaller and easy to manage standalone product.

4.10.3 Open Source

MySQL is open source software so that anyone can use the software and can modify it. You can download the MySQL software and can use it without paying its price. And if you have to use it in your own project or product you can modify it as required.

4.10.4 Database Management System

Structured collection of data is called a database. It can be anything from an insurance policy list or data from the school management system. To access the data that is stored in the database, to delete or add data, a database management system is required such as MySQL server.

4.10.5 Fast, Reliable, Scalable and Easy to use

MySQL server alongside with project or applications can run on laptop or desktops. It allows user to change the setting to obtain benefits of the CPU power, I/O capacity and the memory that is available. It can also increase the size up to group of machines, combined together.

4.11 Advantages of MySQL

Some of the advantages of the MySQL are as followings:

4.11.1 Java Database Connectivity

MySQL provides the connectors that are used, database connectivity in java.

It also presents the standardized drivers for java database connectivity. That is used to build the database application of their personal.

4.11.2 Cross-Platform support

MySQL provides the **facility that makes** the program on the on platform and can run it on another platform.

4.11.3 Availability of Source

MySQL code is always available so that you can recompile the code.

4.11.4 Data recovery

SQL has a major advantage over MySQL, that if data is lost due to power short circuit the data can be recover because the data travels through the many checkpoints, the SQL server keeps the track of the data which is passing through the checkpoints, Even the system shut down unexpectedly, It has checkpoints so data can be recover easily.

4.11.5 Database Security

MySQL offers the data security. All the users maintained through the database.

Grant tables are available to keep the track of the users.

4.11.6 Reliability and Performance

MySQL has the efficient performance and it is reliable too.

4.12 User Interfaces

Home Page

Home page of the My Job Solutionz provides the facility to the visitor of the web to search jobs in his desired field, city and title. List of the jobs will display after he push the search button.

User Login

User login page provides the facility to the candidate, employer and the administrator to login to the site and use the services provided by the Job Portal.

User Registration

It provides the facility to make an account and to be updated with new job that are available in the market.

Employer Registration

This page provides the facility to the employer to make his account on the portal so that he can post job or select candidates for his organization.

Chapter 5

System Testing

5.1 Introduction

The process to identify the quality of developed application or software, to check the correctness and completeness of the software. Testing cannot totally set up correctness of the software, that you have something in mind.

Once you have complete the development of the application the next step to the software completion is the testing of the developed application or the software. Testing is done to check that either the software is working as desire or not. Or it meets the requirements that were the intent to complete.

Testing is made to find the error in the developed software. If the testing is made effectively it will find out the defects in the software. Testing has another advantage, it will express that the required functionality have been met. All the testing process of the Job Portal Management System is explained there.

5.2 Software Testing

Testing of software is an achievement that is intended to calculate capacity or attribute of the system, and essentially to check that it meets the mandatory consequences. It provides the motive; recognize the danger of the implementation and independent vision of the system that is being purposed.

Under the restricted circumstances, operating the software is called the software testing. Testing is done to validate requirements of the software that it works as desired. During the implementation of the software the requirements and the specifications are validated and verified. Testing engage validation and verification which are defined as bellow:

5.2.1 Verification

Verification of the software is an extensive and more compound regulation of the software engineering, which have the goal to guarantee that software requirements are correct.

5.2.2 Validation

Software validation is made to guarantee that the software is fully functional as the requirements were defined. Running and executing the test cases that are defined earlier, and matching the result with the expected result.

5.3 Software Testing Life Cycle

Software testing life cycle (STLC) recognize which test activities has to done and what is suitable time for those activity, to complete those test activities. Still testing is fluctuating among organizations, testing has a life cycle.

Testing level is the primary focus of the drivers and the system, from in which way a software planned and constructed, it is called as "V-Model". I have selected V Model to develop this project so the testing is also done as the specifications of the V Model. It involves a type of testing for every phase of the development.

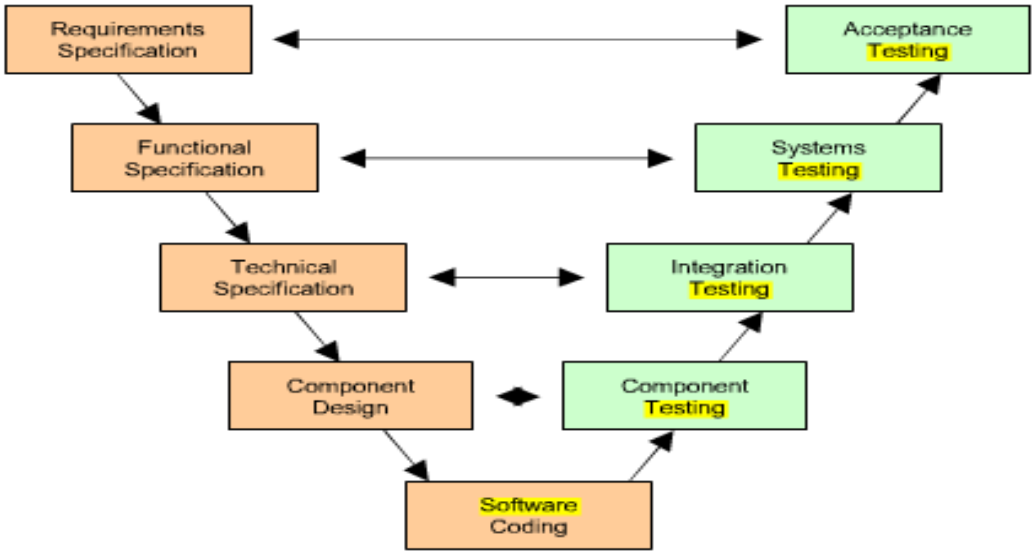


Fig 5.1 Software Testing

5.3.1 Component Testing

In this testing each component of the software is tested to check whether it is performing its function or not. In V Process Model of software development testing of a unit is involve the very first phase of the dynamic testing process. Testing of component is white box testing. Analysis of the code that is written with the objective to get rid of the errors is involved.

I perform the unit testing after completing every unit which participates in this system. For example: a check is made to control the candidate activities that are if he is not login he cannot apply to any job that is posted on the Job Portal Management System.

5.3.2 Integration Testing

Integration stage is a part of the software testing, in which two or more than two components are integrated to each other into the same module. This phase comes after unit or component testing. Modules are taken as inputs that have been tested as a unit,

and then grouped them into the larger collection, tests are applied on them that are planned for them, and output of this test is that it is available for the system testing.

In this testing code is not checked so it is the form of the black box testing. In this project this test is performed by me whenever I integrated two components of the Job Portal Management System.

5.3.3 System Testing

Testing that is conducted on a complete integrated system is called the system testing. It is done to check that the whole system is performing as it was required. This testing is also a technique of the black box testing. It does not require the internal knowledge of the system design, code or logic.

System testing is also referring to the functional and non functional requirements of the system.

1. **Functional Testing**

I have tested all the requirements using the document of the requirements analysis.

2. **Performance testing**

In performance testing of the system, it is to check that system is working as it was required, to check the non functional requirements of the system like maintainability, availability, reliability, security and speed of the system. By applying the performance testing I have checked the non functional requirements to uncover the system error.

5.3.4 Acceptance Testing

Acceptance tests are created from the Candidate requirements. It is made to perform to ensure that Candidate requirements have been implemented as the Candidate defined. Many acceptance tests can be made for a single story or Candidate

requirement, anything that it is taking to ensure the functionality is working. These are given later in this chapter.

5.3.4 Regression Testing

This testing is made after we uncover some error and made change to them. We check functional and non functional region of the system after changes, or some enhancement. This form of the testing engages recognition of the errors, removal of them and made a test after making changes.

5.4 Web Testing

In software testing web testing is focused to test the web application. Web application testing refers to test that web has no any address issue before the application is exposed to the public on the net, issues of the functionality of the web, security and the accessibility. This testing is made to check that Candidate has no any difficulty to use the web and ability to serve the expected number of the Candidates. These two are the kind of the load testing.

5.4.1 Application Testing

Application testing refers to test whole application that it meets the requirements or not. The application should have to implement all situations before it is available for the customer for use. After all the conditions are measured, application testing indicates the size of the testing done by the industry.

- To check that test request sent to the database properly and accurate output is shown to the client.
- Test is made to check that if errors are present must be fixed by the application. The errors should be shown to the administrator Candidate have no any concern to the errors.
- Whenever connection among the layers cannot be made the system should display suitable message to the Candidate.

5.4.2 Interface Testing

Testing of the Candidate interface is a process to test an interface of the product to make sure that it collects its all written specifications. Interface testing is interconnected to the server side interface and the client side interface.

1. Client side Testing

Using various browsers like Mozilla Firefox and Google Chrome client side compatibility is also tested in different platforms.

2. Server side Testing

Server side test is made to check that server is compatible with Candidate interface; it checks that server is connected to the network, hardware, application and the database. Whenever the client values are required to process from the databases, the server side test is required to ensure that server is able to perform the task.

5.4.3 Database Testing

Testing of the database includes tests of the retrieval of the exact value from the database which are retrieved by desktop application or by the web. Records are stored in the database and the retrieved data should be match with the store values.

One of the major testing is the database testing which needs a tester that should be expert in table checking table, writing queries and procedures. In web application and desktop the testing can be performed, databases that are mostly used are SQL and Oracle can be use in this kind of the application. How to test a database is described as bellow:

- The first step to test a database is that tester should be able to understand the application, and testing application uses which database.
- Then to make all the tables that are exists in the application and should have to write the queries for these table to retrieve the data.

- If it is more complex you can have some assistance from the developer and write the queries. The entire added table should be test carefully.

5.4.4 Security Testing

In web it is important to test the security of the application. Test should ensure that the application is secure to use and it don't allow any unauthenticated Candidate to access the web information. The application protects the data and the main functionality.

5.5 Testing Technique Used

For my proposed system I have used black box testing. Black box testing is also known as functional testing. In black box testing the internal mechanism of the application is not known by the tester, he just knows the inputs and output, he has no concern with the program how it arrives at this output, and the tester will not check the further specification of the program.

Black box testing uses the internal structure of the application or software, design, and the requirements to make the test cases. The tests can be of both types functional and non functional but the black box testing typically uses the tests that are functional. We can accept a valid or invalid input in black box testing and establish the accurate output. Advantages of the black box testing are as bellow:

- As the specifications are complete the test cases can be designed.
- The tester doesn't need to have the knowledge of the programming language.
- The designer has no concern with the test it is made by the view of the Candidate.
- The test is balanced because the tester and the designer are liberate from each other.

Black box testing encounter type of error as described below:

- Initialization and termination errors.
- Performance errors.
- Interface Errors.

- Incorrect or missing functions.
- Errors in data structure or database access.

5.7 Black Box Test Cases

Table 5.1

Test Case ID	MJS-01
Tester	Rashid Mehmood
Test Type	Manual-Black Box
Test Case Name	Sign up
Description	Candidate requests to create the account to use the web site in proper way.
Procedure	1. Candidate will click on the sign up button create the new account. 2. Candidate will provide the required information. 3. Candidate will press the submit button to create the new account.
Expected Result	The account of the Candidate successfully made to access the website.
Actual Result	Account is created
Status	Success

Table 5.2

Test Case ID	MJS-02
Tester	Rashid Mehmood
Test Type	Manual-Black Box
Test Case Name	Log In
Description	Reason of this test is to check whether candidate is logged in or not.
Procedure	1. Click on the log in button. 2. Enter the username or password. 3. Click the login button.

Expected Result	Candidate is logged in and he can perform his activities.
Actual Result	Logged in
Status	Success

Table 5.3

Test Case ID	MJS-03
Tester	Rashid Mehmood
Test Type	Manual-Black Box
Test Case Name	Upload/ Update Resume
Description	Purpose of this test case is that candidate can add his qualification and work experience to his profile.
Procedure	1. Candidate click on the upload/ update resume button. 2. Add the qualification and work experience. 3. Click on the save button.
Expected Result	The changes that have been made by the candidate are saved.
Actual Result	The resume is uploaded/ updated.
Status	Success

Table 5.4

Test Case ID	MJS-04
Tester	Rashid Mehmood
Test Type	Manual-Black Box
Test Case Name	Search job
Description	Purpose of this test case is that candidate can search job in his field and desire city.
Procedure	1. Candidate click on the search job button. 2. Add title and desire city. 3. Press enter.
Expected Result	The changes that have been made by the candidate are saved.

Actual Result	The resume is uploaded/ updated.
Status	Success

Table 5.5

Test Case ID	MJS-05
Tester	Rashid Mehmood
Test Type	Manual-Black Box
Test Case Name	Upload/ update company profile
Description	Purpose of this test case is that employer can upload/ update his company profile.
Procedure	1. Candidate click on the upload/ update profile button. 2. Add his company profile or upload profile. 3. Press enter.
Expected Result	The changes that have been made by the employer are saved.
Actual Result	The company profile is uploaded/ updated.
Status	Success

Table 5.6

Test Case ID	MJS-06
Tester	Rashid Mehmood
Test Type	Manual-Black Box
Test Case Name	Post job by administrator or employer
Description	Purpose of this test case is that administrator or employer can post a job on the job portal.
Procedure	1. Administrator or employer clicks on the post job button. 2. Add the title and description of the job. 3. Press enter.
Expected Result	The job that has been post is successfully added to portal.
Actual Result	The job is posted on the portal.

Status	Success

Table 5.7

Test Case ID	MJS-07
Tester	Rashid Mehmood
Test Type	Manual-Black Box
Test Case Name	Delete job by administrator or employer
Description	Purpose of this test case is that administrator or employer can delete a job from the job portal.
Procedure	1. Administrator or employer clicks on the delete job button. 2. Will confirm the deletion. 3. Press enter.
Expected Result	The job that has been post is successfully deleted from portal.
Actual Result	The job is deleted from the portal.
Status	Success

Table 5.8

Test Case ID	MJS-08
Tester	Rashid Mehmood
Test Type	Manual-Black Box
Test Case Name	Select best candidate.
Description	Purpose of this test case is that the employer can select the suitable candidate for his company.
Procedure	1. View the profile of the candidate. 2. Mail him for the confirmation of the job. 3. Press enter.
Expected Result	The candidate is selected successfully.
Actual Result	The candidate is selected successfully.
Status	Success

Table 5.9

Test Case ID	MJS-09
Tester	Rashid Mehmood
Test Type	Manual-Black Box
Test Case Name	View candidate profile
Description	Purpose of this test case is that the employer can view the profile of the candidate.
Procedure	1. Will click the view profile of the candidate button. 2. The profile is shown to the employer.
Expected Result	The candidate's profile is shown to the employer.
Actual Result	Profile is shown to the employer.
Status	Success

Table 5.10

Test Case ID	MJS-10
Tester	Rashid Mehmood
Test Type	Manual-Black Box
Test Case Name	Verify the employer.
Description	Purpose of this test case is that either administrator is able to verify an employer or not.
Procedure	1. Administrator will click on the verify employer button. 2. He will confirm the verification. 3. Press enter.
Expected Result	The employer is added to the portal successfully.
Actual Result	The employer is added to the portal successfully.
Status	Success

5.8 Conclusion

In this chapter I have tested all the functionality of the job portal management system. Unit testing, integration testing, system testing, acceptance testing, regression testing, web testing, interface testing, client side testing, server side testing, database testing, security testing is applied. And black box technique was used to perform the testing. And found it to be working in each aspect. This has been shared list and verified by supervisor from the organization and the university.

Chapter 6

System Evaluation and Future Enhancement

6.1 Introduction

This section is about evaluation after system to ensure that all the implementation and the design of the application is working. Firstly, I examined the baseline performance of the application and expenditure of the application, and show that this application is performing in a progressive way.

It is the systematic, objective process to determining the achievement of a program or the application. It means what are the weaknesses in the system and which goals have been achieved successfully by the system. I have evaluated system against all objectives that user set which I started working on this system. Results have been summarized in the table given bellow.

Table 6.1 System Evaluation

Number	Functional Requirement Name	Evaluation
1	Candidate Requirement	Fulfilled
2	Employer Requirements	Fulfilled
3	Administrative Requirements	Fulfilled
4	Log In –Log Out Facility	Fulfilled
5	Retrieval Information From Database	Fulfilled
6	Navigation	Fulfilled
7	User Interface Requirements	Fulfilled

6.2 Future Enhancement

Future enhancement in My Jobs Solutionz System as bellow:

- Graphical User Interface can be made more attractive functionality could be added.
- Every job that is posted by a company or employer it may have a notification to all candidates.
- System will check the candidate address and will send job notification that is available in his city.
- For employer, once they select the candidate there should be automatic email to candidate.

APPENDICES

Appendix A

A.1 Process Model

1. V-Model

The development of the system traditionally follows the Waterfall model where each development and testing stage follows the next. It does not imply that any of the steps have to be completed before the next step starts. The V Model follows the principles that the development stages of the software each have corresponding testing stages.

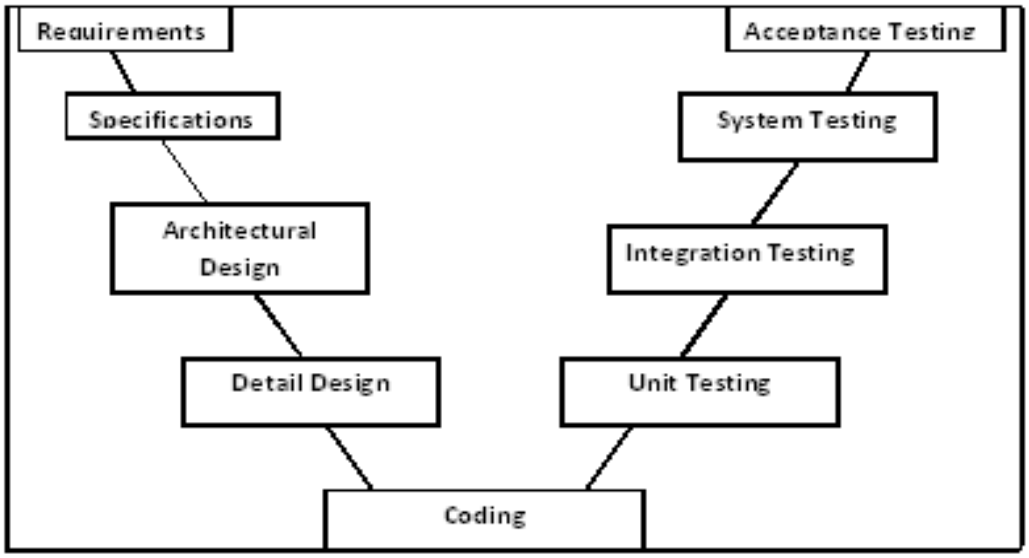


Figure 1 V-Model

The time in which the V-model evolved was also the time in which software testing techniques were defined and various kinds of testing were clearly separated from each other. This new emphasis on software testing (of course along with improvements and

new techniques in requirements engineering and design) led to the evolution of the waterfall model into the V-model. The tests are derived directly from their design or requirements counterparts. This made it possible to verify each of the design steps individually due to this correlation.

Phases of V-modelare:

1.1.Requirement Analysis & Definition

All requirements of the system which has to be developed are collected in this step. Like in other process models requirements are split up in functional requirements and constraints which the system has to fulfill. Requirements have to be collected by analyzing the needs of the end user and checking them for validity and the possibility to implement them. The aim is to generate requirements specification document which is used as an input for the next phase of the model.

1.2.System Design

The system has to be properly designed before any implementation is started. This involves an architectural design which defines and describes the main blocks and components of the system their interfaces and interactions. The software components have to be defined to meet the end user requirements and to meet the need of possible scalability of the system. The aim of this phase is to generate a system architecture document this serves as an input for the software design phase of the development, but also as an input for hardware design or selection activities. Usually in this phase various documents are generated, one for each discipline, so that the software usually will receive a software architecture document.

1.3.Software Design

Based on the system architecture which defines the main software blocks, the software design will break them further down into code modules. The interfaces and interactions of the modules are described, as well as their functional contents. All necessary system states like startup, shutdown, error conditions and diagnostic modes have to be considered and the activity and behavior of the software has to be defined. The output of this phase is a software design document which is the base of the following implementation work.

1.4.Coding

Based on the software design document the work is aiming to set up the defined modules or units and actual coding is started. The system is first developed in smaller portions called units. They are able to stand alone from a functional aspect and are integrated later on to form the complete software package.

1.5 Software Integration & Verification

Each unit is developed independently and can be tested for its functionality. This is called Unit Testing. It simply verifies if the modules or units to check if they meet their specifications. This involves functional tests at the interfaces of the modules, but also more detailed tests which consider the inner structure of the software modules. During integration the units which are developed and tested for their functionalities are brought together. The modules are integrated into a complete system and tested to check that all modules cooperate as expected.

1.6 System Verification

After successful integration, including the related tests the complete system has to be tested against its initial requirements. This will include the original hardware and environment, whereas the previous integration and testing phase may still be performed in a different environment or on a test bench.

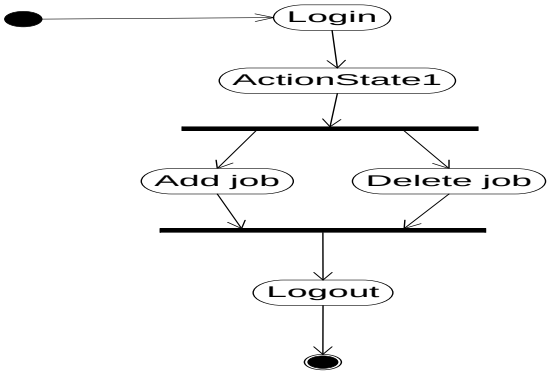
1.7 Operation & Maintenance

The system is handed over to the customer and will be used the first time by him. Naturally the customer will check if his requirements were implemented as expected but he will also validate, if the correct requirements have been set up in the beginning. In case there are changes necessary it has to be fixed to make the system usable or to make it comply with the customer wishes. In most of the "V- Model" descriptions this phase is

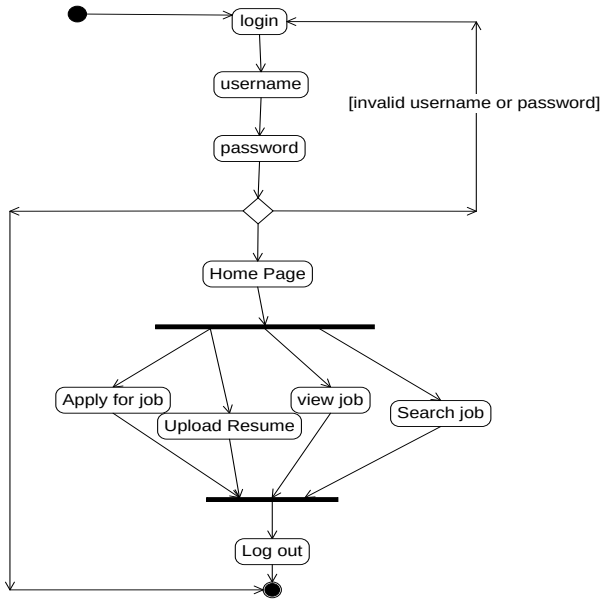
extended to a never ending phase of "Operations & Maintenance". All the problems which did not arise during the previous phases will be solved in this last phase.

Appendix B

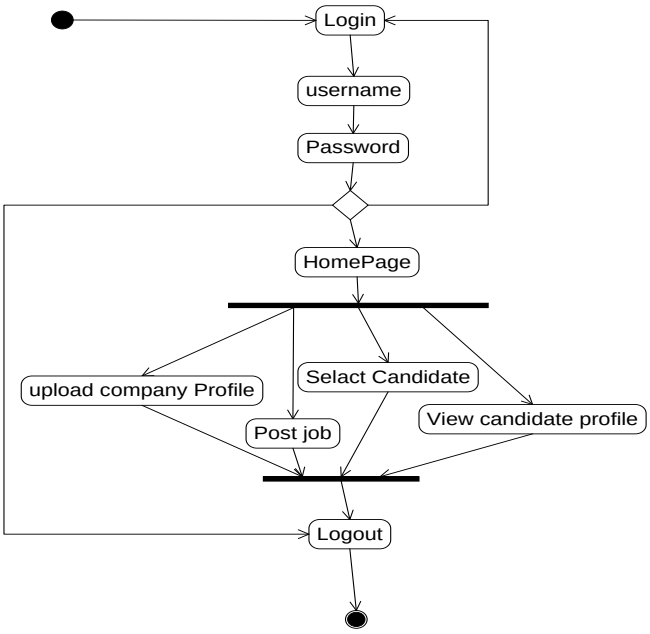
Administrator Activity



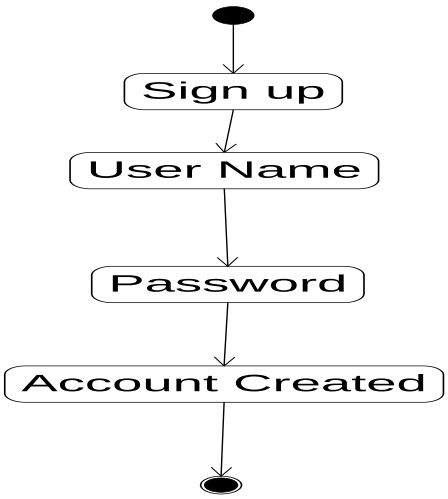
Candidate Activity



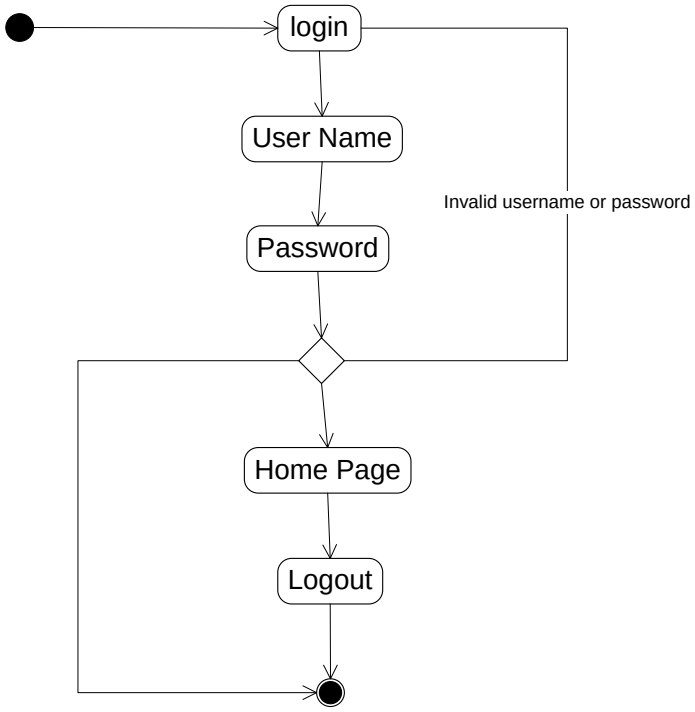
Employer Activity



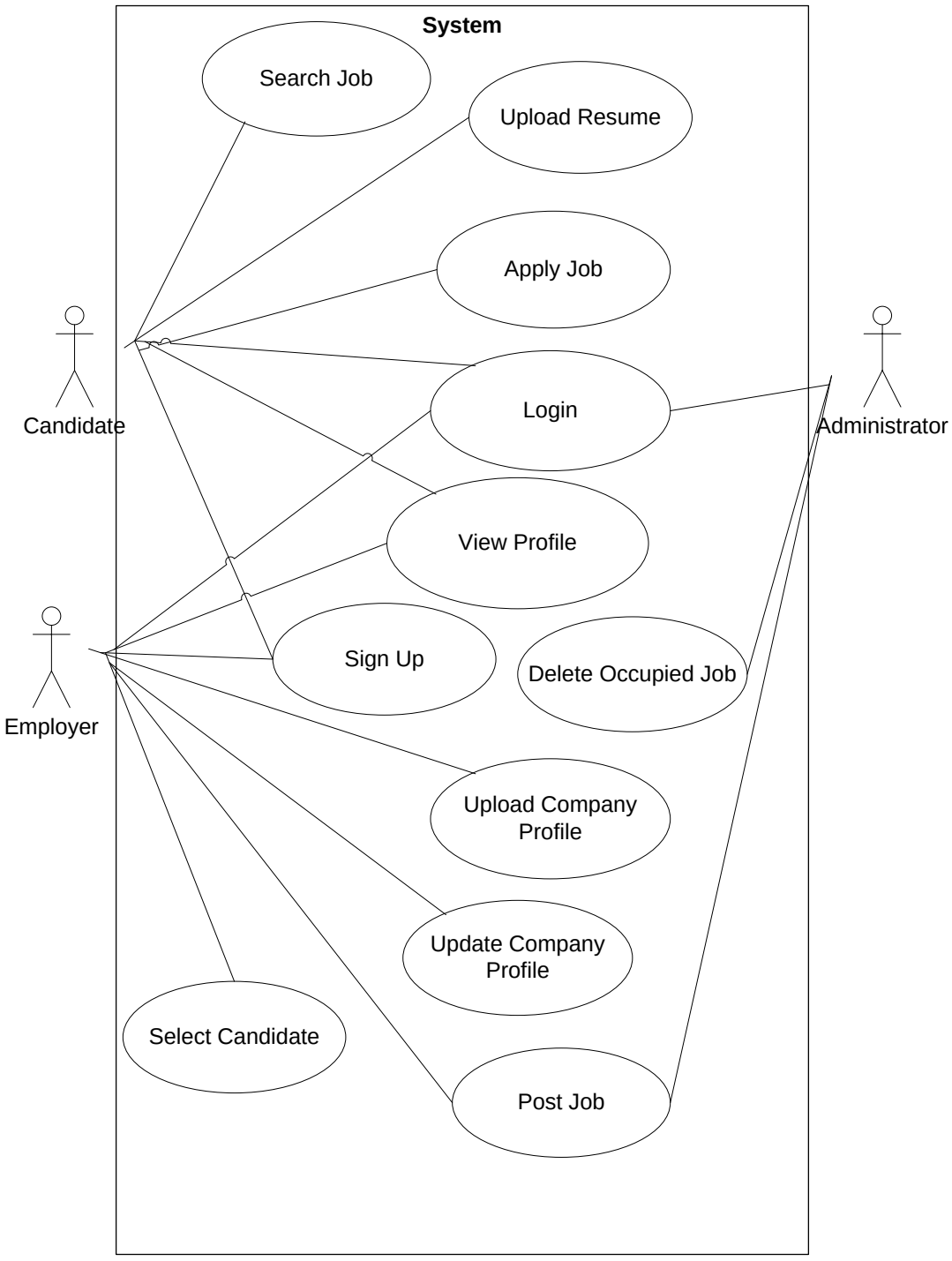
Sign Up Activity



Login Activity

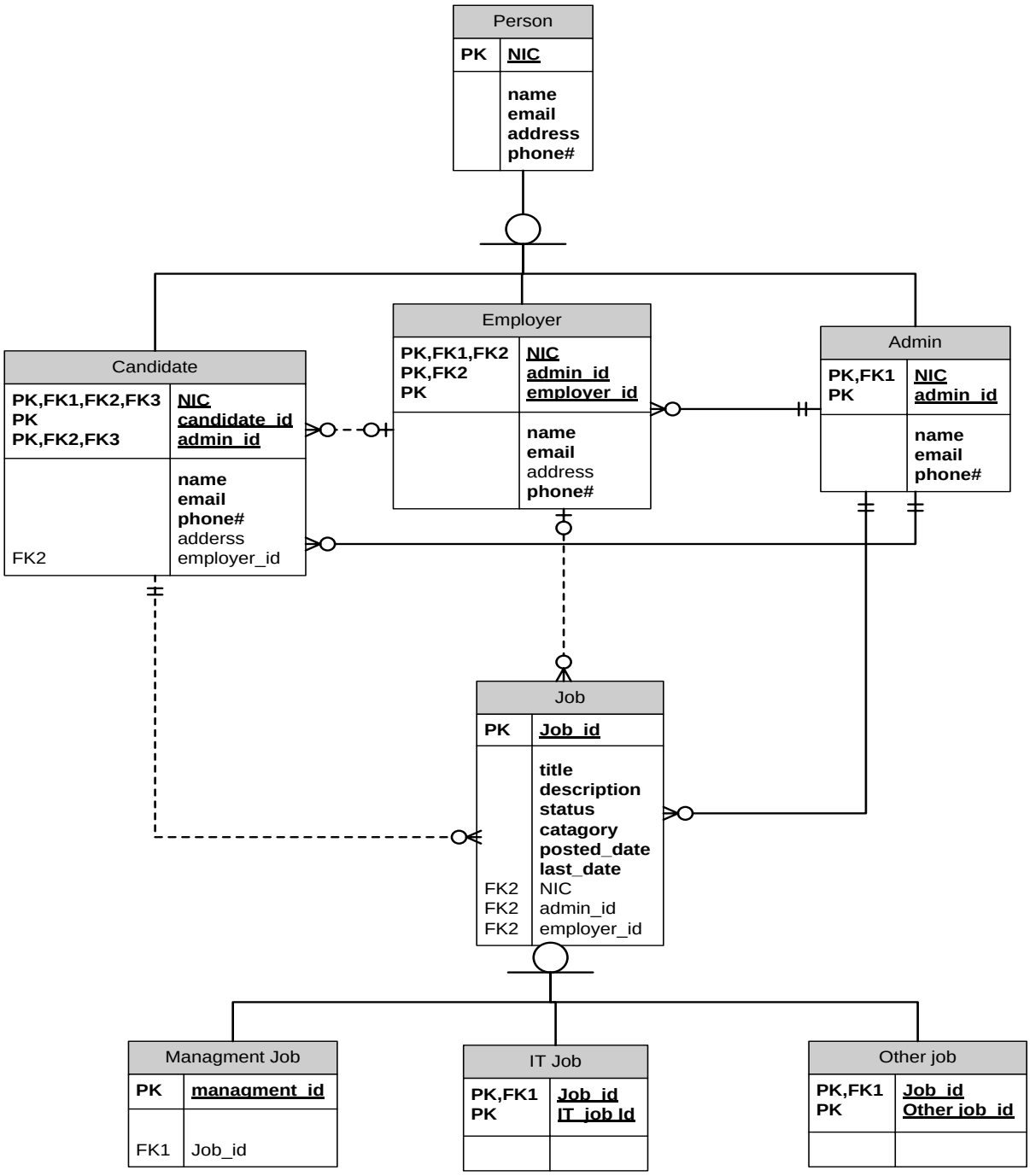


Use Case Diagram



Appendix C

ER Diagram



References

Bibliography

1. **Core C++- A Software Engineering Approach 2000 By Victor Shtern.**
2. **Building Web Application with UML ByConallen.**
3. **Software Engineering 8th Edition ByIan Sommerville.**
4. **Software Engineering: A Practitioner's Approach By Roger S. Pressman.**

Webliography

1. **http://www.dis.anl.gov/exp/sa/index.html**
2. **http://en.wikipedia.org/wiki/Database_design**
3. **http://www.jiscinfonet.ac.uk/InfoKits/system-implementation/what-is**
4. **http://papa.det.uvigo.es/~theiere/cursos/Curso_Java/history.html**
5. **http://www.particle.kth.se/~lindsey/JavaCourse/Book/Part1/Java/Chapter01/features.html**
6. **http://en.wikipedia.org/wiki/Java_Servlet**
7. **http://en.wikipedia.org/wiki/JavaServer_Faces**