A

# Project-II Report

on

# AUTOMATION OF RECRUITMENT PROCESS IN UNIVERSITIES USING CLOUD COMPUTING

Submitted in Partial Fulfillment of

the Requirements for the Degree

of

## Bachelor of Engineering

in

## Computer Engineering

to

## Kavayitri Bahinabai Chaudhari
## North Maharashtra University, Jalgaon

Submitted by

**Hardeep Bhagchand Jethwani**
**Ashwini Kailas Patil**
**Daminee Mahesh Patil**
**Kunda Muralidhar Nehete**

Under the Guidance of

## Ms. Dhanashree S. Tayade

**DEPARTMENT OF COMPUTER ENGINEERING**
SSBT's COLLEGE OF ENGINEERING AND TECHNOLOGY,
BAMBHORI, JALGAON - 425 001 (MS)
2018 - 2019

**SSBT's COLLEGE OF ENGINEERING AND TECHNOLOGY, BAMBHORI, JALGAON - 425 001 (MS)**
**DEPARTMENT OF COMPUTER ENGINEERING**

# CERTIFICATE

This is to certify that the PROJECT-II entitled *Automation of Recruitment Process in Universities using Cloud Computing*, submitted by

**Hardeep Bhagchand Jethwani**
**Ashwini Kailas Patil**
**Daminee Mahesh Patil**

**Kunda Muralidhar Nehete**

in partial fulfillment of the degree of *Bachelor of Engineering* in *Computer Engineering* has been satisfactorily carried out under my guidance as per the requirement of Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon.

**Date:** June 7, 2019
**Place:** Jalgaon

Ms. Dhanashree S. Tayade
**Guide**

Prof. Dr. Girish K. Patnaik
**Head**

Prof. Dr. K. S. Wani
**Principal**

# Acknowledgements

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# Abstract

Training and Placement cell of an institute is responsible for providing placement opportunities to the students for getting placements. Currently most of the T&P cells are dependent on other systems (i.e. Google Forms, excel sheets) for storing data of students in relation with recruitment drives held in the organization. Also most of the work like generating reports and handling student documents is done manually. In the proposed system automation of recruitment process eliminates the degree of dependency on other systems. Automation focuses on sharing of details of various placement drives with eligible students, generating CVs, QR based attendance system and generate reports in form of charts. As a result details of placed students can be monitored and updated. The system is to be hosted on cloud so the issue comes with the security, So to deal with that SHA256 algorithm is used in the form of JWT (Json Web Token) for all the transactions. Resultant system leads to ease in recruiting the students and also reduction in paper work leading to digitization.

# Chapter 1

# Introduction

In todays world everyone is travelling for jobs after Completion of their graduation. It has became need for each and every student ,but for that they need to travel worldwide in searching of jobs.For simplicity of this whole hectic procedures we had proposed Online Training and Placement System because of earlier system is totally done manually by maintaining records,time consuming and very difficult to maintain coordination between student and companies.

Section 1.1 describes Background. Motivation is describes in section 1.2. Section 1.3 describes problem statement. Scope is describes in section 1.4. Section 1.5 describes objective. Organization is describes in section 1.6. Finally Summary is presented in last section.

## 1.1 Background

Cloud computing is a technology that uses the internet and central remote servers to maintain data and applications. Cloud computing allows consumers and businesses to use applications without installation and access their personalles at any computer with internet access. This technology allows for much more efficient computing by centralizing data storage, processing and bandwidth. Iaas, Paas, Saas Architectures.

Web based training and placement system automate the system. This system helps to the student's staff and college There are traditional notice boards in the colleges due to this the no of students can't get the information within the time limit to overcome this limit this system plays and vital role displays the notices within the time limit. The system itself fully automatic it sends SMS, Emails to the students. According to that whatever number of students get placed, the various graphs generates. Students store their information in the system the student's information access by college company. According to the company

criteria, the student selected and notify by the SMS, email. Who students come in the company criteria only that students are eligible for the placement [**?**].

## 1.2  Motivation

The Advanced Training and Placement web portal give easy access to the users that they can add and retrieve information so quickly. The proposed system is fully computerized, which overcome all the drawbacks of existing system. There are mainly four types of users they are Admin, Student, Companies and Forum. The administrator is the master user who performs different functions like approval and authentication.

## 1.3  Problem Definition

Now a day, student joins the college for better education as well as for better placement for their future. The placement activities plays very important role in student career and building college reputation. In the current system all training and placement activities are done manually, there are more chances of error. It is very time consuming activity for collecting, managing, updating student data as number of student increases. The notice board is old method of informing student about the placement activities. The training and placement officer has to short list according to company requirement. It is required to design of a computerized student automation module to speed up capabilities.

## 1.4  Scope

Student can create the account and update their information. Notifications are send to the student about various companies their criteria and placement drive circular, etc. The benefits of this automated system are as follows: Easy to collect and manage student data, To increase the accuracy and efficiency of placement procedure, Reduce the paper work, Analysis of overall placement activities.

## 1.5  Objective

Computers and information technology has a major influence on the society and the last few years have witnessed a tremendous increase in the capabilities and use of technology. Going on is an era of simplifying almost all complicated works using technology. Automation of Training and Placement Office will replace the manual processing of office which makes the mechanism slow and results into problems such as inconsistency and ambiguity on operations.

The proposed system intends user friendly operations which may resolve ambiguity and achieve certainty.

- Automating and Securing the whole System.

- Reduce paper work.

- Place for secure data storage.

- Zero burden on TPOs (Reports).

- Place more and more students.

## 1.6   Identification Of Software Development Process Model

A software process model is a simplified representation of a software process. Each model represents a process from a specific perspective. Were going to take a quick glance about very general process models. These generic models are abstractions of the process that can be used to explain different approaches to the software development. They can be adapted and extended to create more specific processes. A software process (also knows as software methodology) is a set of related activities that leads to the production of the software. These activities may involve the development of the software from the scratch, or, modifying an existing system.

Any software process must include the following four activities:

- Software specification (or requirements engineering): Define the main functionalities of the software and the constrains around them.

- Software design and implementation: The software is to be designed and programmed.

- Software verification and validation: The software must conforms to its specification and meets the customer needs.

- Software evolution(software maintenance): The software is being modified to meet customer and market requirements changes.

## 1.7   Organization Of The Report

Organization the report is follows the development process steps:

In Chapter 1, introduction of the system is explain in detailed along with this it includes the background, motivation, problem definition and objective of project.

In Chapter 2, Literature survey along with proposed system, Feasibility study, Risk analysis, Project scheduling, Effort allocation.

In Chapter 3, system requirements specification which includes software, hardware, functional and non functional requirements.

In Chapter 4, system design with the help of various unified modeling language diagrams, architecture and Dataflow diagrams.

In Chapter 5, Implementation of system is Specified in detail with the Steps and modules of the system.

In Chapter 6, Details for testing and various types of testing are provided along with the test cases used.

In Chapter 7, Results are declared that came out after development of the system.

In Chapter 8, Further future proposals regarding the system are discussed.

## 1.8   Summary

In this chapter,Introduction is presented. In the next chapter, project planning and management is presented.

# Chapter 2

# Project Planning and Management

## 2.1  Literature Survey

On June 7, 2016, Oracle announced the Oracle Cloud. This cloud oering is poised to be the rst to provide users with access to an integrated set of IT solutions, including the Applications (SaaS), Platform (PaaS), and Infrastructure (IaaS) layers. In May 2012, Google Compute Engine was released in preview, before being rolled out into General Availability in December 2013. This paper describes how the different decision tree algorithms used to predict students performance in placement.Decision tree algorithm, tree shaped structure that represent decision sets. They generate Rules which are used for the classification of data. [1].

Yizeng Chen, Xingui Li and Fangning Chen published their Research on various cloud Architectures and the huge increase in use of cloud architectures. Google and Amazon were in a big race in field of Cloud Computing. Various Softwares, Platforms and even Infrastructures were on demand. The core vision of Cloud Computing is to continuously improve the compute power of "cloud", thereby reducing the processing burden and the cost of cloud users, ultimately to simplify the cloud users into an simple Input and Output devices (Infrastructure), and to enjoy. [2].

Ahmed Albugmi, Madini O. Alassaff, Robert Walters and Gary Wills (2016) said that, the major concern in adaptation of cloud for data is security and privacy. It is very important for the cloud service to ensure the data integrity, privacy and protection. Two states of data normally have threat to its security in clouds; Data at Rest which means the data stored in the cloud and Data in Transit which means data that is moving in and out of the cloud. Block ciphers, Stream ciphers and Hash Functions can be used to secure data. [3].

Harpreet Kaur Bhamra, Kawaleen Singh Malhotra and Kanhaiya Chaudhary (2016) in published about Campus Placement Automation in International Journal of Engineering Development and Research. Campus Placements are organized in nearly all colleges by companies from various sectors for recruiting eligible applicants. Organization of placement drives stand in need of particular information of the applicants. This process is exercised manually which is chaotic for both students and the TPO. Automation of Placement system facilitate students in college to register and apply for jobs. [4].

Shay Gueron, Simon Johnson and Jesse Walker described two hashing algorithms SHA256 and SHA512. Both the algorithms used 64 bit architectures. Cryptography in SHA is done such that it is only one way algorithm i.e. the data can only be encrypted but cant be decrypted easily. It Generates encrypted of same length for any length of plain text message. [5].

**Proposed System** The main aim of developing this website was to reduce maximum chances of errors in manual work, Save time for the process, Also students get notified by the SMS instantly. In previous system [6].

**1** Students are informed by sending emails one on one.

**2** Student details are to handled manually after placement.

**3** Hurdles during each drive.

**4** Students don't submit resumes in standard format.

**5** Resumes are to be made manually.

**6** Handling hard copies of documents.

The need of our project Online Training and Placement System are as:

- Emails to students Containing link of Registration(if any).

- Document Storage for students.

- User details stored in Encrypted form.

- Report Generation in form of charts and excel sheets.

- Online Registration for any drive.

- Timeline view of all current open drives.

- Resume Generation in various attractive formats.

- Check in during an interview can be verified using QR code.

**History Of Cloud Computing** On March 1, 2011, IBM announced the IBM SmartCloud framework to support Smarter Planet.Among the various components of the Smarter Computing foundation, cloud computing is a critical part. On June 7, 2012, Oracle announced the Oracle Cloud. This cloud oering is poised to be the rst to provide users with access to an integrated set of IT solutions, including the Applications (SaaS), Platform (PaaS), and Infrastructure (IaaS) layers.

In May 2012, Google Compute Engine was released in preview, before being rolled out into General Availability in December 2013. In February 2010, Microsoft released Microsoft Azure, which was announced in October 2008.

In July 2010, Rackspace Hosting and NASA jointly launched an open-source cloud-software initiative known as OpenStack. The OpenStack project intended to help organizations offering cloud-computing services running on standard hardware. The early code came from NASAs Nebula platform as well as from Rackspaces Cloud Files platform. As an open source oering and along with other open-source solutions such as CloudStack, Ganeti and OpenNebula, it has attracted attention by several key communities. Several studies aim at comparing these open sources oerings based on a set of criteria.

The 1960s, cloud computing has developed along a number of lines, with Web 2.0 being the most recent evolution. However, since the internet only started to oer signicant bandwidth in the 1990s, cloud computing for the masses has been something of a late developer.

## 2.2 Feasibility study

Feasibility study is an important phase of development life cycle where the proposed system is reviewed and evaluation to determine the usability and feasibility of the system. The proposed system is retrieved considering two feasibility tests. The main objective of the feasibility study is test economical and operational feasibility . An important outcome of the feasibility study is determining the system required is feasible or not. A feasible study is undertaken to determine the possibility of either improving the existing system or developing a completely new system.

### 2.2.1 Technical Feasibility

Technical feasibility of a project, is performing a check whether the development of project is possible with the available technological resources.The technical feasibility is a very important aspect to be considered before the official commencement of the project by the organization.The technical feasibility is checked by pondering over the functional requirements of the user.

### 2.2.2 Economical Feasibility

Economical feasibility study is the part of the resource determination. It considers the cost benefit analysis of the proposed system. Economical feasibility is helpful to find the system development cost. It includes an evaluation of all incremental costs and benefits expected if proposed system is implemented. Costs benefits analysis is to be done during economic feasibility delineates costs for project development and weights them against system benefits. Using the proposed system it generate the economical benefits. Economic feasibility is a cost benefit. Using the proposed system it benefits in storage space is indirectly the cost.

### 2.2.3 Operational Feasibility

Once it is determines the system is both technically and economically feasible. It considers the acceptability of the system. It checks whether system to be used if it is developed and implemented. Operational feasibility determines the proposed system satisfied the user objective and can be fitted into current system operation. If it satisfy the criteria of objectives of the proposed system against existing, it is operationally feasible.

## 2.3 Risk Analysis

Risk analysis is the process of defining and analyzing the dangers to individuals, businesses and government agencies posed by potential natural and human caused adverse events. Risk analysis and management techniques enable the project manager to assess the likelihood of meeting or overrunning project objectives.Project risk is an uncertain event or condition that, if it occurs, has an effect on at minimum one project objective. Risk management focuses on identifying and assessing the risks to the project and managing those risks to minimize the impact on the project [7].

## 2.4    Project Scheduling

Project scheduling is the mechanism to communicate tasks needs to get done and resources are required for completing those task. Project scheduling is process of scheduling the work of project in different phases. Using scheduling, work is divided into communication, planning, modeling, construction and deployment. It is problem in existing system find out the solution is proposed system to overcome the problem. campus placements are conducted in all colleges for all the education fields. Various software and other sector companies are conducting campus recruitment process for selecting candidates. When campus selections are conducted the students have to provide their curriculum vitae to the concern TPO officer for attending the campus interviews. This routine process is maintained manually.The Advanced Training and Placement web portal give easy access to the users that they can add and retrieve information so quickly. The proposed system is fully computerized, which overcome all the drawbacks of existing system. There are mainly four types of users they are Admin, Student, Companies and Forum. The administrator is the master user who performs different functions like approval and authentication. [8].

| Duration & Phases | July | Aug | Sept | Oct | Nov | Dec | Jan | Feb | March | April |
|---|---|---|---|---|---|---|---|---|---|---|
| Research | ███ | | | | | | | | | |
| Management Analysis | | ███ | | | | | | | | |
| Planning | | | ███ | | | | | | | |
| Analysis | | | ███ | | | | | | | |
| Design | | | ████ | | | | ███ | | | |
| Development | | | | | ████████ | | | | | |
| Testing | | | | | | | | ███ | | |
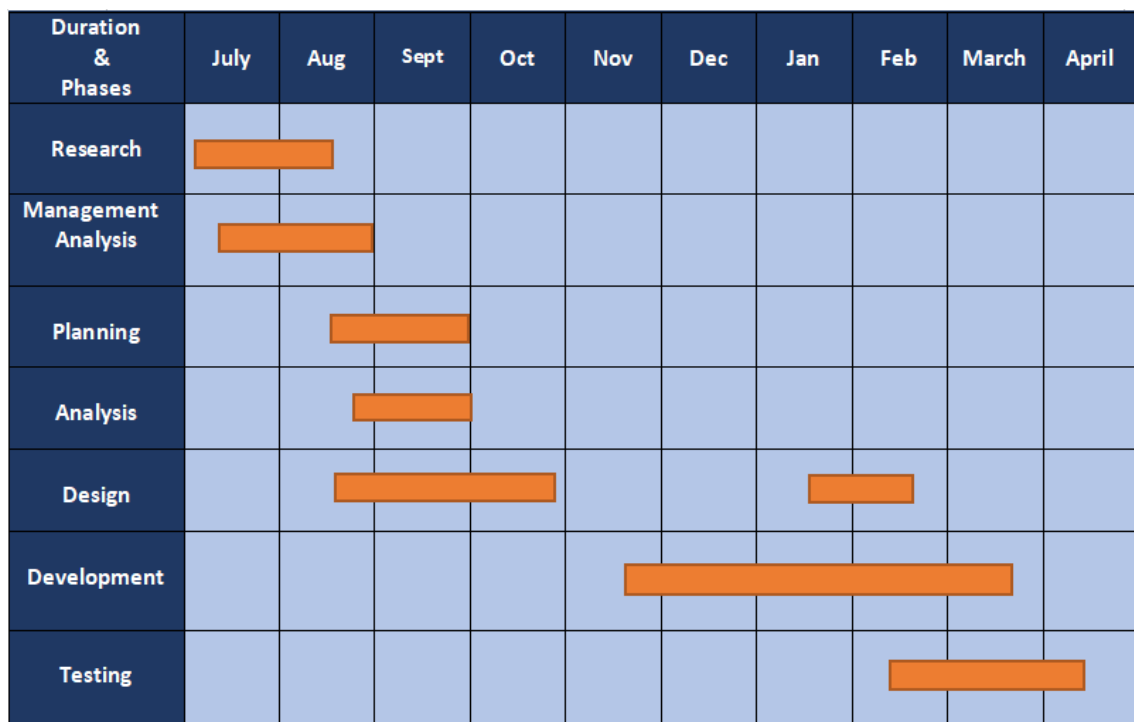
Figure 2.1: Project Development Schedule

| Activities | Hardeep | Daminee | Kunda | Ashwini |
|---|---|---|---|---|
| Planning | 25% | 25% | 25% | 25% |
| Literature Survey | 25% | 25% | 25% | 25% |
| Designing | 40% | 20% | 20% | 20% |
| Code Implementation | 40% | 20% | 20% | 20% |
| Documentation | 20% | 30% | 25% | 25% |

Figure 2.2: Effort Allocation of Team Members
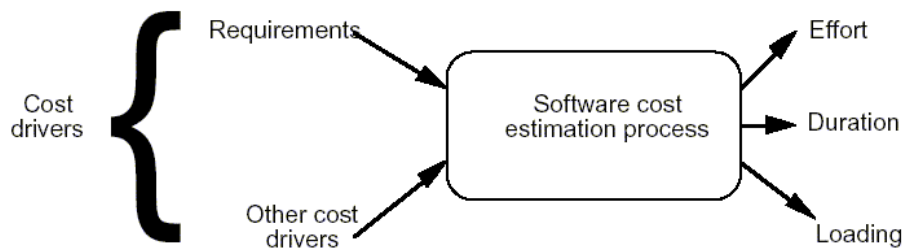


Figure 2.3: Cost Estimation Characteristics

## 2.5 Effort Allocation

Effort Allocation is the division of project work into the team members equally. Using the effort allocation the plan is prepare before development. The the step by step execution of project development goes on is known using effort allocation. In the project development there 5 phases is communication, planning, modeling, implementation and deployment. In allocation documentation is also required for user understanding. It is the manual for uses of software after deployment. The document is called Software Requirement Specification (SRS) is most useful for use of software at client side.

## 2.6 Cost Estimation

Cost of a project is computed on the basis of following key points:

- Number of developers involved.

- How much time each developer gave for development of project.

- Designation of Developer .i.e. senior or junior as the payscale varies for each designation.

- Cost of external resources (Cloud infrastructure, Support Apis etc.).

Employees are paid on hourly basis in any software industry. Charged vary from Rs 80/- per hour to Rs 1000/- per hour. Also for project development we need some cloud infrastructure to deploy the application on cloud so as to provide anytime, anywhere access. Cost for cloud infrastructure varies depending on the amount of storage acquired or the number of requests served by the cloud.

## 2.7 Summary

In this chapter, project planning and management is presented. In the next chapter, analysis is presented.

# Chapter 3

# Analysis

A Software Requirement Specification (SRS) is a document is created when a detailed description of all aspects of the software to be built must be specified before the project is to commence. It is important to note that a formal SRS is not always written. In fact are many instances in effort expended on SRS might be better spent in other software is to be developed by a third party, software is to developed by a third party, a lack of specification would create severe issues, a system is extremely complex or critical, on SRS may be justified.

Section 3.1 describes Requirement Collection and Identification. Hardware and Software requirements describes in section 3.2. Section 3.3 describes Functional and Non-Functional requirements. Software requirement specification describes in section 3.4 . Finally Summary is presented in last section.

## 3.1   Requirement Collection And Identification

In the scope of systems and software engineering, requirement modeling is increasingly recognized as a separate activity. Its importance grows with the size and complexity of the intended system To carry out requirement modeling, a number of different approaches have been developed, many of which are supported by dedicated CASE tools (to name but a few, Caliber RM, Rational Requisite Pro, Catalyze, etc.). This article outlines the requirement modeling approach based on experience accumulated by cybernatic intelligence in a number of medium to large scale software projects, as well as on the results of the internal research into the requirement modeling.

## 3.2   Hardware And Software Requirement

In this section the hardware and software requirement are described.The requirement of hardware require for computer system for execution.The software requirement is used for

development of the proposed system.

### 3.2.1 Hardware Requirements

Hardware Requirements defines a requirement is requires for development of the proposed system. The requirement of hardware require for computer system for execution. It is use for speed, efficiency, quality, time and storage. The hardware requirement is minimum for the system. Hardware requirements for system is given as follows:

1. Processor: Quad Core to i5

2. RAM: 8 GB

3. Hard Disk: 500 GB

4. Display: Super VGA (800*600) or higher resolution monitor

### 3.2.2 Software Requirements

Software Requirements defines a requirement it is requires for development of the proposed system. The description of software. It is required for developing the system. It is written for developers and users both because developer need this requirement for develop the system and user need it requirement for use on the client side. By using is software requirement knows the nature of system in environment it run or executed. Software Requirements for system is given as follows:

- For Development:-

  - Tools:

    1. MS Visual Studio Code.
    2. Insomnia.
    3. Git(version control system)

  - Dependencies:

    1. Python3.
    2. Rabbit MQ server.
    3. Node Modules.
    4. Node Version Manager(nvm)
    5. axios.
    6. Node Packet Manager (npm).

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7. electron.

8. Docker (deployment tool).

- User End:- Web Browsers with HTML5 and Javascript Support.

## 3.3 Functional Requirements & Non Functional Requirements

In this section the functional and non functional requirements are described.As given below,

### 3.3.1 Functional Requirement

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

1. Emails to students Containing link of Registration(if any).

2. Document Storage for students.

3. User details stored in secured form.

4. Report Generation in form of charts and excel sheets.

5. Online Registration for any drive.

6. Timeline view of all current open drives.

7. Resume Generation in various attractive formats.

8. Check in during an interview can be verified using QR code.

### 3.3.2 Non-Functional Requirements

Non- Functional requirement is a requirement that specifies criteria judge the operation of a system, rather it specific behaviors. Contrasted with functional requirement define specific behavior or functions. The Non- Functional requirements are as follows:

1. It is available for everyone.

2. Ease in report generation.

3. Generate resume Automatically.

### 3.3.3 User Requirement

User requirements is a requirement specifies the optional things is require for quality and if it gives to the system gives better output as per expectation. In proposed system the Advanced Training and Placement Web Portal automates activities of TPO cell of college that provides opportunities to the students to increase selection ratio and it maintains students information automatically.

## 3.4 Software Requirement Specification

A software requirements specification (SRS) is a detailed description of a software system to be developed with its functional and non-functional requirements. The SRS is developed based the agreement between customer and contractors. It may include the use cases of how user is going to interact with software system. The software requirement specification document consistent of all necessary requirements required for project development. To develop the software system we should have clear understanding of Software system. To achieve this we need to continuous communication with customers to gather all requirement.

## 3.5 Summary

In this chapter, Analysis is presented. In the next chapter, design is presented.

# Chapter 4

# Design

System design provides the understanding and procedural details necessary for implementing the system recommended in the system study. System design is the process of defining the architecture, modules, interfaces, and data for a system to satisfy specified requirements. System design is an application of system theory to product development.

Section 4.1 describes System Architecture. Database design describes in section 4.2. Section 4.3 data flow diagram is describes. Interface Design describes in section 4.4. Section 4.5 UML Diagrams are describes . Finally Summary is presented in last section.

## 4.1   System Architecture

Systems Architecture is a response to the conceptual and practical difficulties of the description and the design of complex systems. A description of a software and electronics system in terms of its hardware and software components and their interactions. The system architecture allocates required functionality to hardware and software components. An architecture description is a formal description and representation of a system, organized in a supports reasoning about the structures and behaviors of the system. Systems Architecture is a generic discipline to handle objects called "systems", in a supports reasoning about the structural properties of it objects.

In the System Architecture diagram Initially Company must need to login to the system by entering valid userid and password provided by the administrator module. The recruiter updates his details like his company name, working criteria and information about itself. The Company will see the details about the college posted by the admin module to the system. The Company will also able to see the student details as name, branch, aggregate marks, passed out year etc.Company can change his password if he required by using the change password field. Mailing and messaging option is also available in Company module
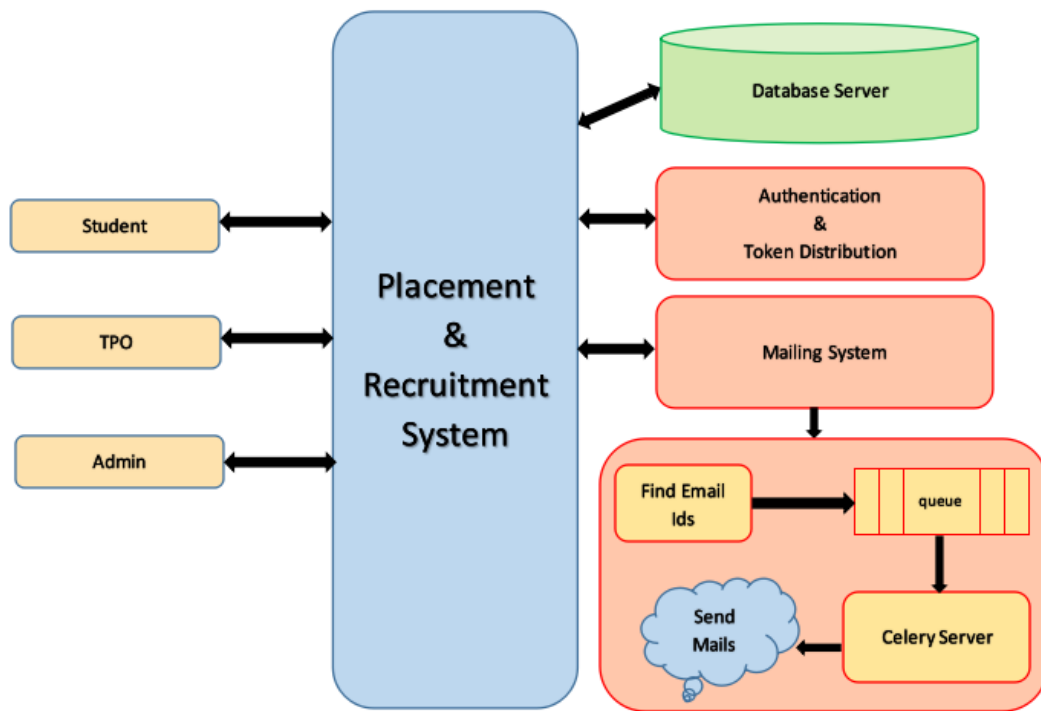
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Figure 4.1: Architecture of Training and Placement System

that contain email /messages received and send by the Admin/TPO. The menu bar at the top can consist of same field as previous module except that the about us field can contains information about the Company module. By clicking on logout field the Company can successfully logout from the system.

### 4.1.1 Interface Design

User interface is the design of user interfaces for software or machines, the look of a mobile app, a focus on ease of use for the user. Many user interfaces are designed a focus on usability and efficiency. Users to achieve it goals as efficiently as possible, focusing to on the user interface itself.

■ *User Interface Design*

User interface is the front-end application view to user interacts in order to use the software. User interface design or UI design generally refers to the visual layout of the elements a user might interact in a website, or technological product. The goal of user interface design is to make the user's interaction as simple and efficient as possible, in terms of accomplishing user goals. User interface design to the design of various types of software and hardware interfaces users interact computers and other technologies. Reff Fig 4.5
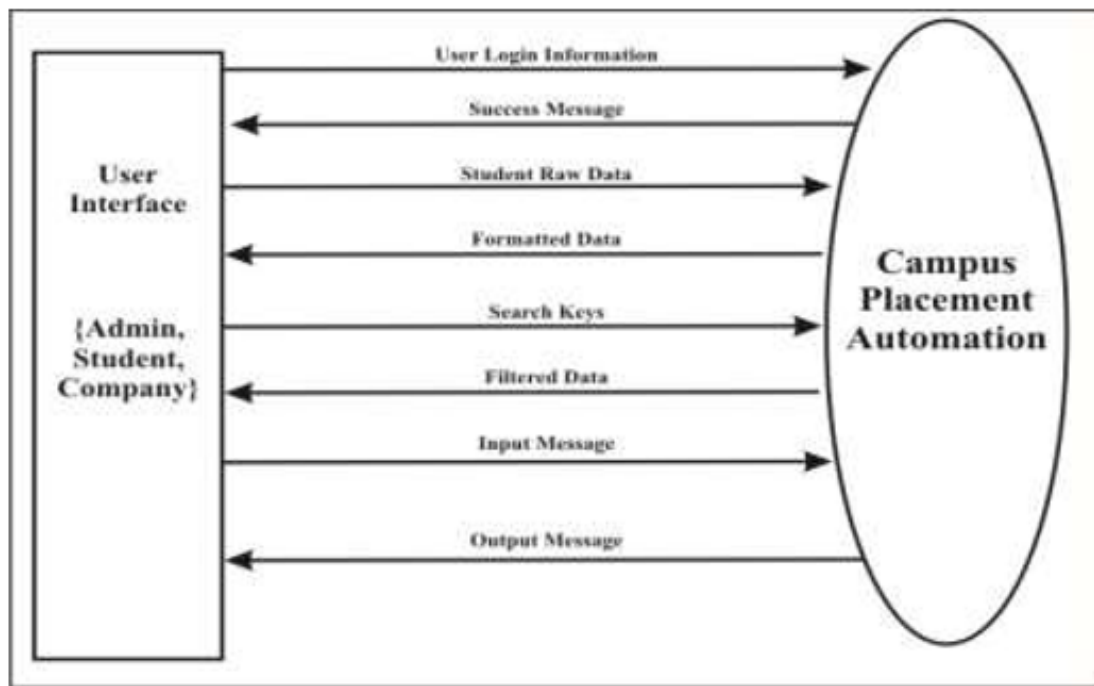
Figure 4.2: User Interface Module

The figure 4.5 describe the flow of system. Firstly, user visit main page. It select browse button for choosing the User Login Information. It show the success message, then student submit raw data. campus placement automation gives formatted data and then follow the steps search keys, filtered data, input message, and last output message.

∎ *Module to Module Interaction*

A collaboration diagram shows the objects and relationships involved in an interaction, and the sequence of messages exchanged among the objects during the interaction. The sequence diagrams, collaborations are used by designers to define and clarify the roles of the objects perform a particular flow of events of a use case. The primary source of information used to determining class responsibilities and interfaces. A collaboration diagram is a type of visual presentation that shows how various software objects interact other within an overall It architecture and users can benefit from collaboration. A collaboration diagram often comes in the form of a visual chart it resembles a flow chart.

## 4.2 Data Flow Diagram

A data flow diagram is a flowchart can help you visualize the data pipeline of a system you can trace happens to the data as it moves between components. It is a great to find redundancies and optimize the speed and responsiveness of software. A DFD is often used

as a preliminary step to create an overview of the system going into great detail, it can later be elaborated. DFDs are used for the visualization of data processing (structured design). A DFD show kind of information input to and output from the system, the data will advance through the system, and it the data will be stored. It represented information of process timing processes will operate in sequence or in parallel, unlike a traditional structured flowchart which focuses on control flow, or a UML activity workflow diagram, which presents both control and data, flows as a unified model.

A data flow diagram can dive into progressively more detail by using levels and layers, zeroing in on a particular piece. DFD levels are numbered 0, 1 or 2, and occasionally go to even Level 3 or beyond. The necessary level of detail depends on the scope of what you are trying to accomplish.

## 4.2.1 DFD Level 0
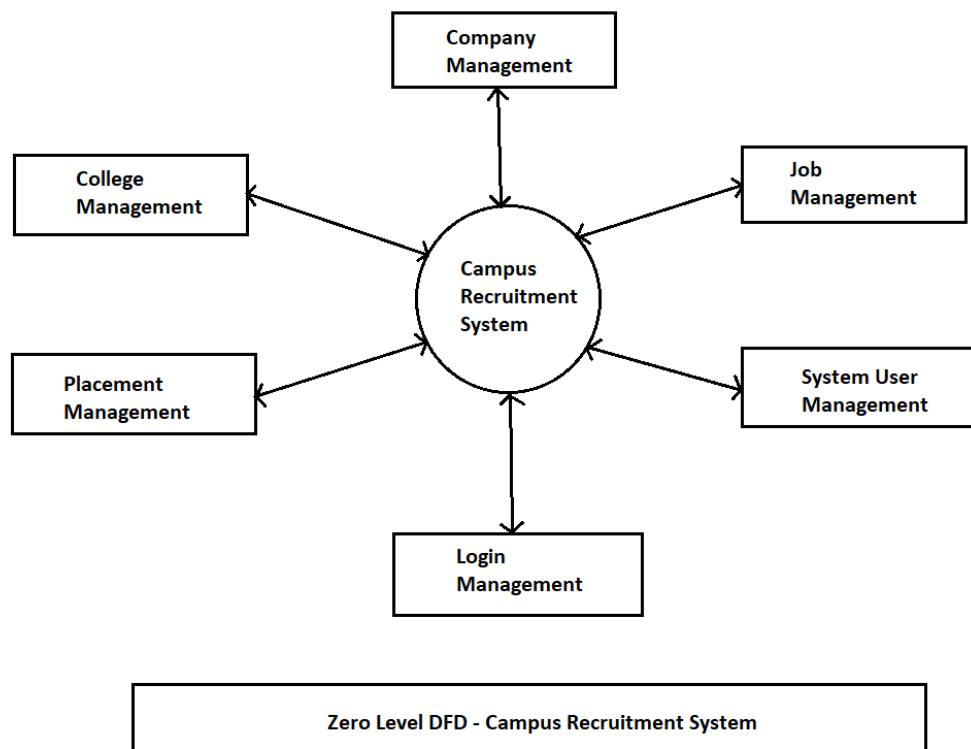


Figure 4.3: DFD Level 0

DFD Level 0 is also called a Context Diagram. It is a basic overview of the whole system or process being analyzed or modeled. It is designed to be an at a glance view, showing the system as a single high-level process, with its relationship to external entities. It easily understood a wide audience, including stakeholders, business analysts, data analysts and

developers. In figure 4.2 the DFD Level 0 is gives the overview of The Advanced Training and Placement web portal . Reff Fig 4.2

### 4.2.2 DFD Level 1

DFD Level 1 provides a more detailed breakout of pieces of the Context Level Diagram. It highlight the main functions carried out by the system, it break down the high-level process of the Context Diagram into its sub processes. In the Figure 4.3 the DFD Level 1 is gives the main function which is automation of the advanced training and placement system. Reff Fig 4.3
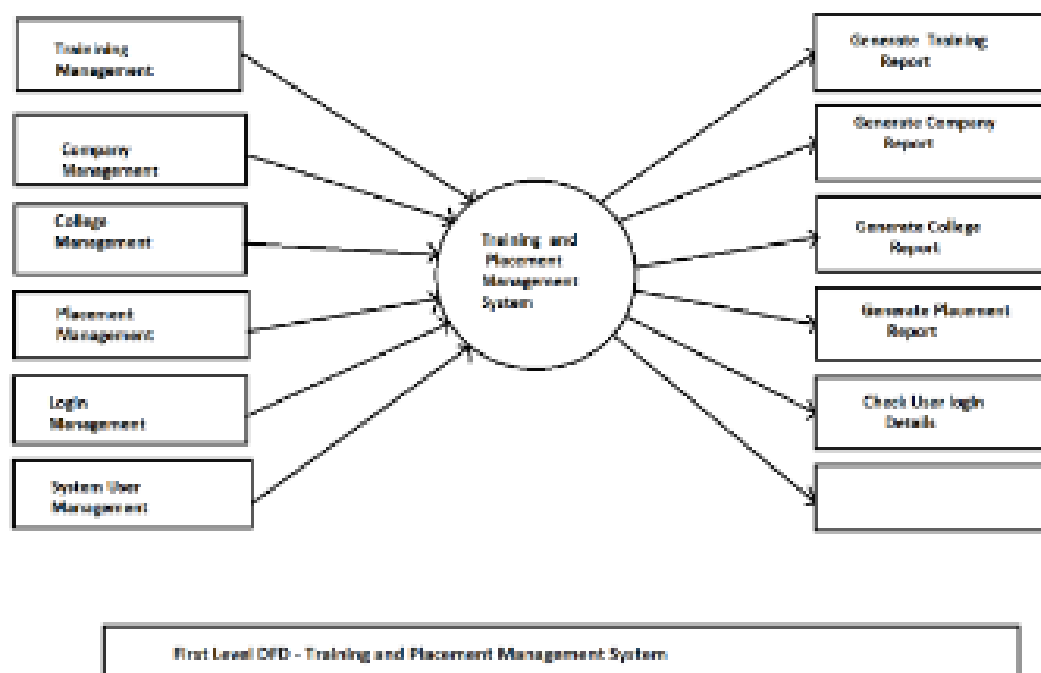


Figure 4.4: DFD Level 1

### 4.2.3 DFD Level 2

DFD Level 2 then goes one step deeper into parts of Level 1. It may require more text to reach the necessary level of detail the system is functioning. In the Figure 4.4 it deep information of level 1 function. Reff Fig 4.4

## 4.3 UML diagrams

The Unified Modeling Language (UML) created to forge a common, semantically and syntactically rich visual modeling language for the architecture, design, and implementation
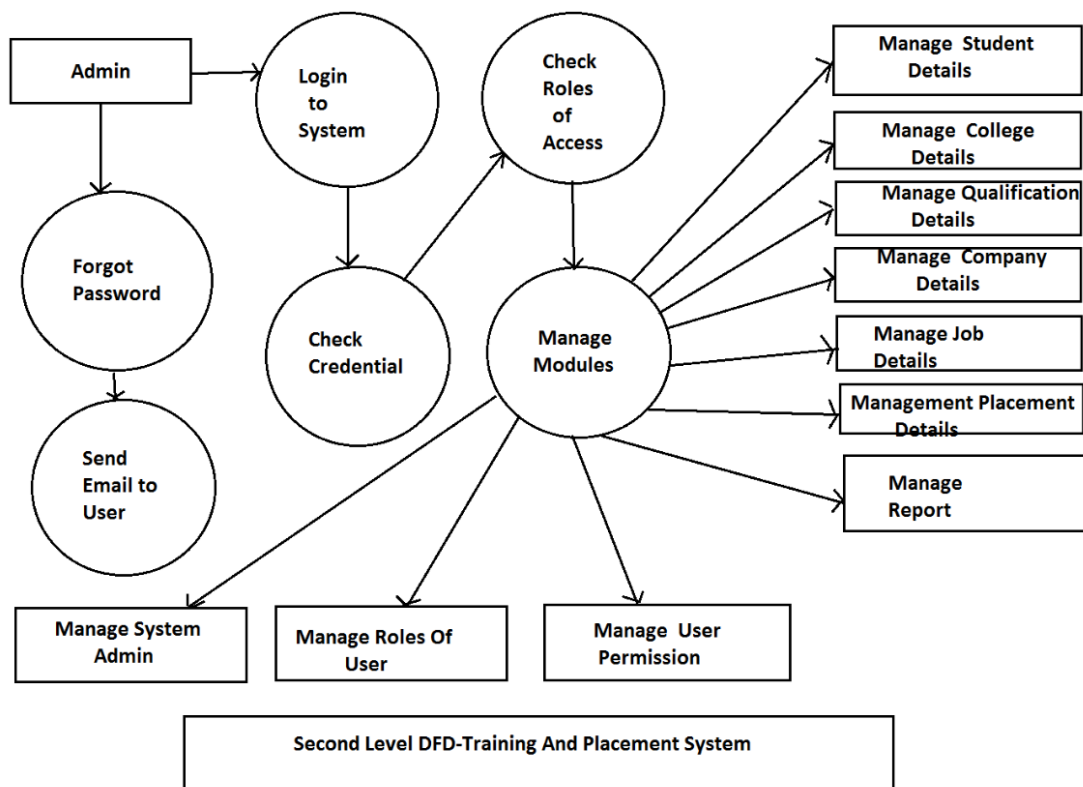
Figure 4.5: DFD Level 2

of complex software systems structurally and behaviorally. UML has applications beyond software development, such as process flow in manufacturing. It is analogous to the blueprints used in other fields, and consists of different types of diagrams. In the aggregate, UML diagrams describe the boundary, structure, and the behavior of the system and the objects within it. UML not programming language it are tools used to generate code in various languages using UML diagrams. UML has a direct relation of object-oriented analysis and design.

### 4.3.1    Use Case Diagram

A use case illustrates a unit of functionality provided by the system. The main purpose of the use-case diagram is to help development teams visualize the functional requirements of a system, including the relationship of "actors" to essential processes, the relationships among different use cases. In the Use Case diagram 4.6, there will be three actors (System Users) i.e., TPO, Comapny and Student. Usecases will be as following :-

■ *Create Account*

Account for TPO (Training and placement officer) have to be made manually as they will be the superusers of the system whereas students and Company can Make there accounts

by registration Facility.

■ *Login*

All the three users will be given a login interface.

■ *Manage Data Sets*

TPO will be responsible to handle data set of the college students.

■ *Request For Recruitment*

Any Company can request to recruit students from the institute and it will be the responsibility of TPO that whether to allow the Company or not.

■ *Send Mails*

TPO will inform students about any particular recruitment drive by sending mails to all the registered students at a single click.

■ *View Timeline*

Students can see all the available job opportunities using the system timeline.

■ *Register for interview*

Any Student can register for a particular drive using the link sent through the mail or by using the timeline. After Registering for interview student will be provided a QR code that will be needed for attendence at the time of interview.

■ *Generate Report*

Placements report in the form of Pie Charts, Excel sheets will be generated by TPO's.

■ *Manage Database*

TPO will manage the database entries using the Admin panel.

### 4.3.2 Class Diagram

Class diagram represent the static structures of a system, including its classes, attributes, operations, and objects. A class diagram can display computational data or organizational data in the form of implementation classes and logical classes, respectively. Classes are

Figure 4.6: Use Case Diagram For Training and Placement System.

represented a rectangular shape is split in three parts. The top section displays the class name, the middle section contains the class attributes. The bottom section features the class operations. The class diagram the different entities relate to an other words. In the class diagram 4.7 the classes are Student, Company, Admin, Administration Center, Registration, Post job , Apply Job ,Test The relation in the classes is use the functionality or values of each other to implement the functionality.

### 4.3.3 Sequence Diagram

Sequence diagrams a detailed flow for a specific use case or just part of a specific use case. A sequence diagram has two dimensions: The vertical dimension represented the sequence of messages/calls in the time order occur; the horizontal dimension shows the object instances which the messages are sent.To create a sequence diagram, write the class instance name and class name in a rectangular box. Draw lines between class instances to represent the sender and receiver of messages. Use solid arrowheads to symbolize synchronous messages, open arrowheads for asynchronous messages, and dashed lines for reply messages. In the sequence diagram 4.8 show the flow for Automation of Training and Placement System is as following:-

1. Company will create its account so as to recruit students.

2. Students have to create their account to register for any drive.

3. To take part in any drive, student will first have to register for it.
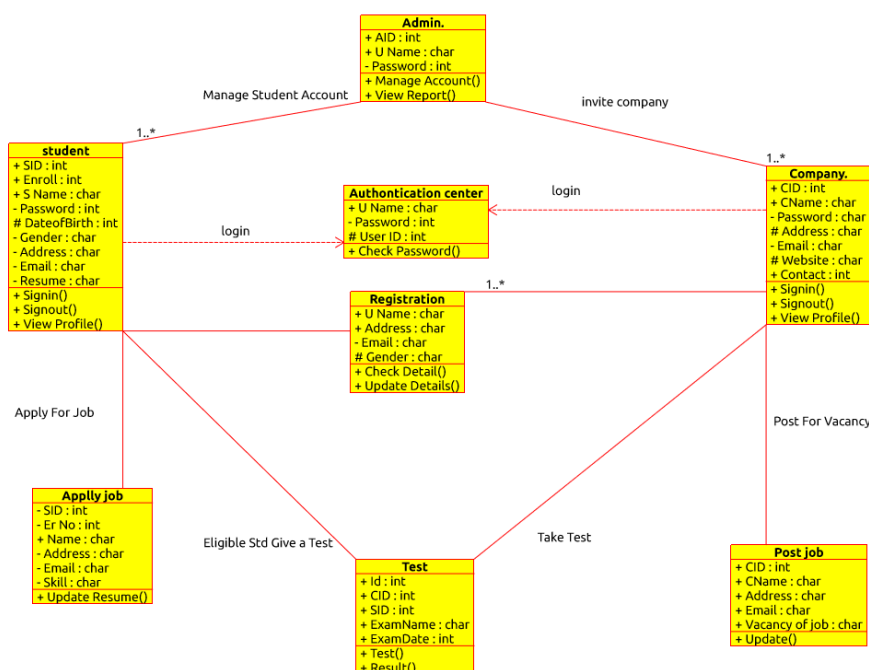
Figure 4.7: Class Diagram for Training and Placement System

4. Resume and other documents have to be submitted by the student.

5. Student details will be matched up with company requirements.

6. If the requirements are matched then students registration will be successful and so a QR code will be generated.

7. QR code will be scanned for checking registration status at the time of drive interview.

8. Student will be alerted for drive.

9. Admin/TPO will get notified about the registered students.

10. Admin will have to manage the Dataset for better working.

### 4.3.4   State Diagram

The state diagram models the different states a class in and class transitions from state to state. It argued every class are state, every class not a state diagram. The notation set of the state diagram are five basic elements the initial starting point, is drawn using a solid circle a transition states, drawn using a line an open arrowhead a state, it is drawn using a rectangle with rounded corners a decision point, it drawn as an open circle; and one or more termination points, it drawn using a circle with a solid circle inside it.

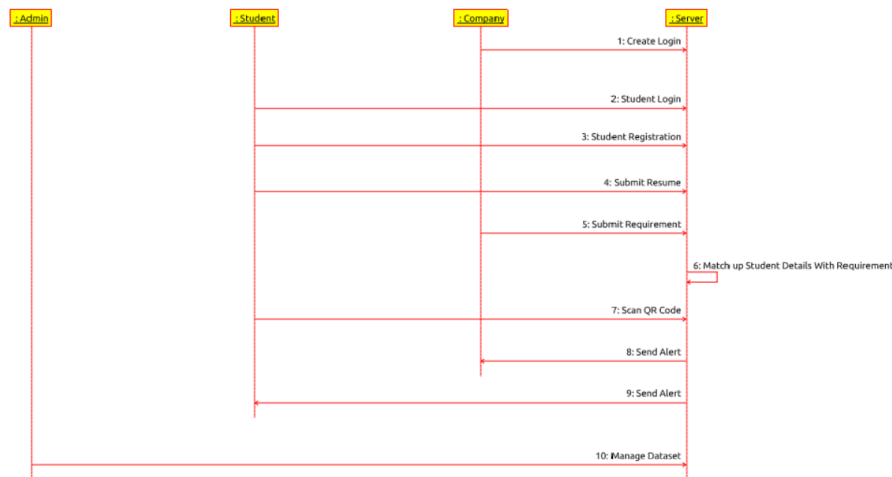Figure 4.8: Sequence Diagram for Training and Placement System

State Diagram 4.9 demonstrates the student registration for any drive. At the first state, student will have to login and register for the drive. In the next state the Dataset will get updates and further the Students will get selected for the drive after checking the students eligibility.

## 4.3.5 Activity Diagram

Activity diagrams show the procedural flow of control between two or more class objects processing an activity. Activity diagrams used to model higher-level business process at the business unit level, or to model low-level internal class actions. Activity diagrams are best used to model higher-level processes. The diagrams are made of specialized shapes, and connected with arrows. The notation set for activity diagrams is similar to for state diagrams. In the Activity diagram 4.10 the procedural flow of Training and Placement System is shown.

In the flow it is shown that whenever the students will be register for any drive then the Database entry for that particular drive will get updated. Before confirming the registration, students eligibility will be checked by matching up the Company Requirements with student's profile. If student comes under the eligibility criteria of that drive then the registration for that drive is confirmed else it gets rejected.

## 4.3.6 Component Diagram

A component diagram provides a physical view of the system. It purpose is to show the dependencies that the software has on the other software components (e.g., software
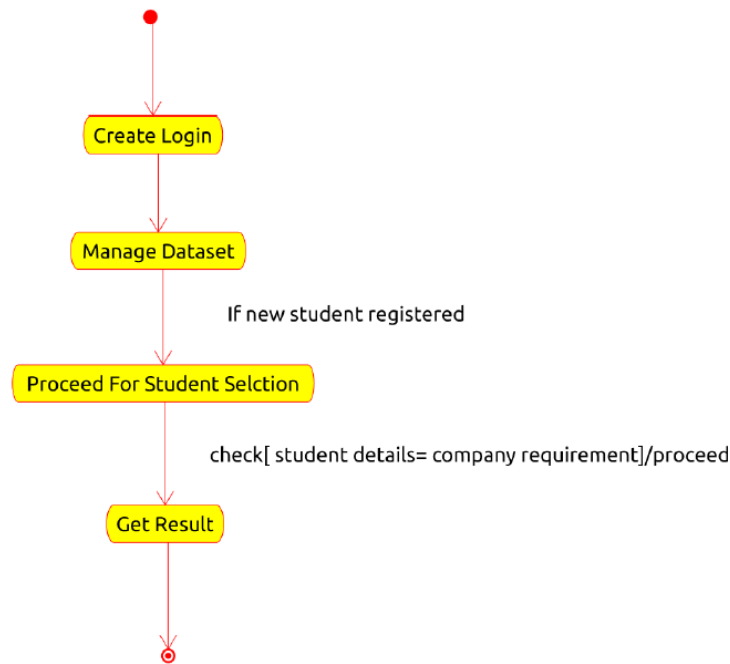
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Figure 4.9: State Diagram for Training and Placement System

libraries) in the system. A component is something required to execute a stereotype function. A component stereotype of executables, documents, database tables, files, or library files. The diagram shown at a very high level, just the large-grain components, or shown at the component package level. Component diagrams show how components are combined to form larger components or software systems. In the component diagram 4.11 components are shown for the proposed system.

### 4.3.7 Deployment Diagram

A deployment diagram models the physical deployment and structure of hardware components. Deployment diagrams demonstrate and the components of a system are operate in conjunction with each other. The deployment diagram shows how a physically deployed in the hardware environment. It purpose is to show the different components of the system physically run and how communicate with each other. The diagram models the physical runtime, a system is production staff make considerable use of a diagram.

The notation in a deployment diagram includes the notation elements used in a component diagram, couple of additions, including the concept of a node. A node represents either a physical machine or a virtual machine node (e.g, a mainframe node). To model a node, simply draw a three-dimensional cube the name of the node at the top of the cube. In 4.12
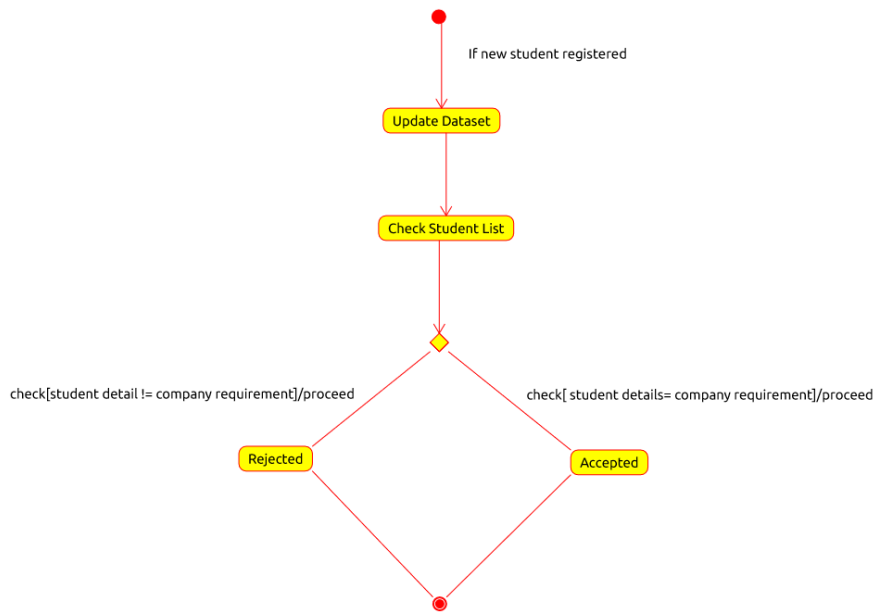
Figure 4.10: Activity Diagram for Training and Placement System
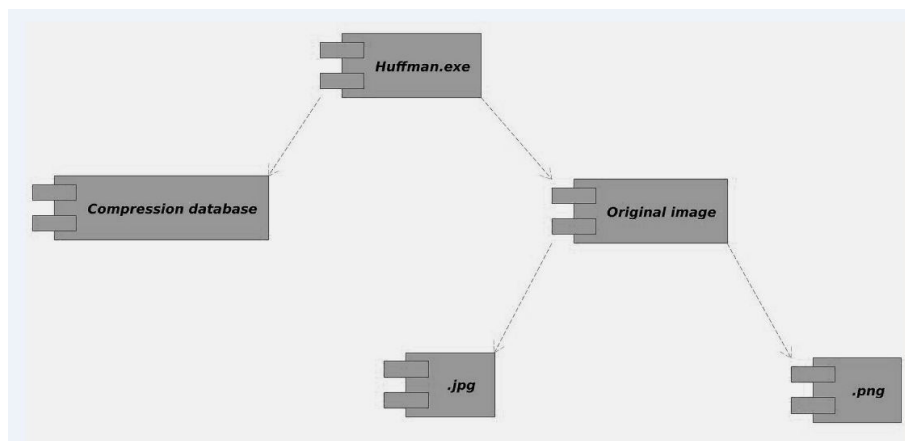


Figure 4.11: Component Diagram of Training and Placement System

the nodes are given.

## 4.4 Summary

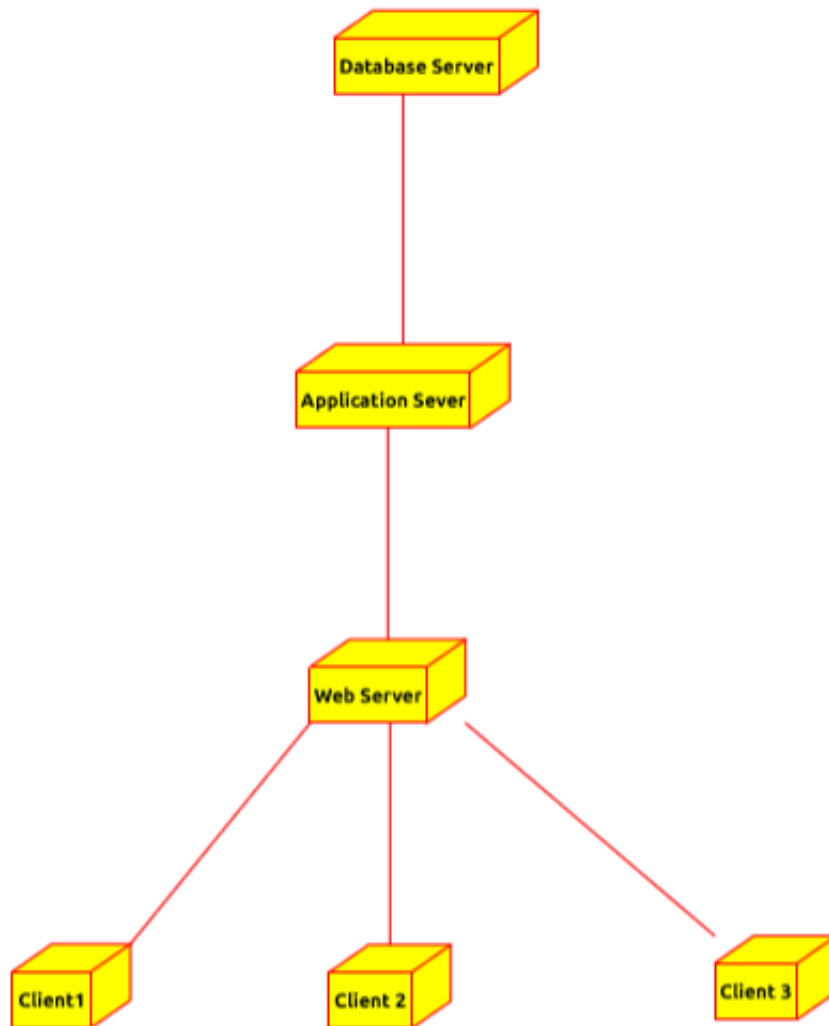In this chapter, design of the system are presented. In the next chapter, implementation are described.

Figure 4.12: Deployment Diagram of Training and Placement System

# Chapter 5

# Coding and Implementation

System is implemented using Django and VueJS. Django uses a object based querying language so as to provide a Object oriented concept. All the logic to handle data and authentication are implemented using Django. As Python language has a vast future scope so this system can be extended to a level of Artificial Intelligence also. Django gives facility to use Email-Multi-Alternatives, Multi-Value-Attributes which is useful to divide students according to their eligibility. Also it provides a admin template to handle the users (i.e., Student and TPO). Users are put up in two groups. Developer is responsible to create a superuser and provide credentials to admin or make the admin learn to do so if required. Data from client side is received in form of Json. Json format just consist of a key and value pair. Parameters in the Json data are loaded into a variable and then later on various elements are fetched out of that variable.

VueJs provides a better designing and dynamic designs for better User Experience and exchange of data using axios. Vue-Bootstrap is mixed framework of VueJs and Bootstrap that provides better responsive designs and more alternatives for designing. All of the onload functions (i.e, on loading of a page) are handled by computed section whereas other data sending and operational functions are handled in method section.An algorithm is a step by step method of solving a problem. It is commonly used for data processing, calculation and other related computer and mathematical operations. An algorithm is also used to manipulate data in various ways. Also some steps need to be followed for performing any operation on the system or by using the system on any other data.

## 5.1 Algorithm

In this section the algorithm for the automation of recruitment process.

### 5.1.1  Authentication System

**Lets take A as a user**

    **Step-1 :** "A" Logs in to the account and becomes authenticated.

    **Step-2 :** JWT is generated and stored into the local storage on the browser for reference of "A".

    **Step-3 :** "A" sends request for any operation (register for drive, update profile etc.) JWT stored at the local storage is also sent along with the request.

    **Step-4 :** Decode JWT.

    **Step-5 :** Check

if (**A** in user list && authenticated)

If (authenticated)

Perform operation;

Return response data;
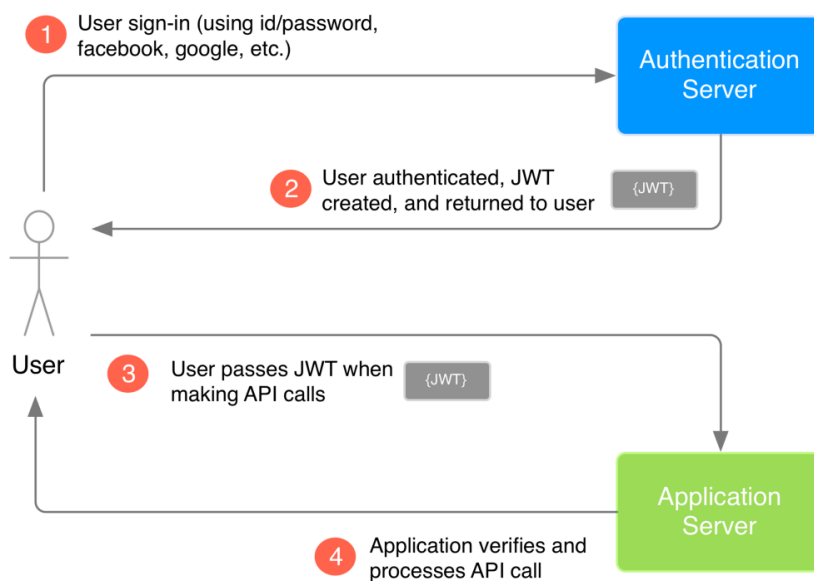


Figure 5.1: Authentication using JWT

### 5.1.2  Asynchronous Mail sending

Suppose TCS is coming to hire candidates from IT and computer department who are holding an aggregate of more than 65%.

    **Step-1 :** TPO creates a drive registration form filling up all the details and eligibility criteria of the student and sends a request over django server to create a drive and send mails to all the eligible students only (65% aggregate and from IT & Computer Department).

    **Step-2 :** Student whose department is among the given departments and overcomes the eligibility criteria are selected.

**Step-3 :** Emails of selected student are appended to a list.

**Step-4 :** Task of sending emails is assigned to celery server that sends mails to all the email ids in the background.

**Step-5 :** After assigning the task, response of drive registration is sent to the TPO where as the email sending task keeps on working in the background.

### 5.1.3   SHA (Secured Hash Algorithm 256)

SHA-256 is a member of the SHA-2 cryptographic hash functions designed by the NSA. SHA stands for Secure Hash Algorithm. Cryptographic hash functions are mathematical operations run on digital data; by comparing the computed "hash" (the output from execution of the algorithm) to a known and expected hash value, a person can determine the data's integrity. A one-way hash can be generated from any piece of data, but the data cannot be generated from the hash.
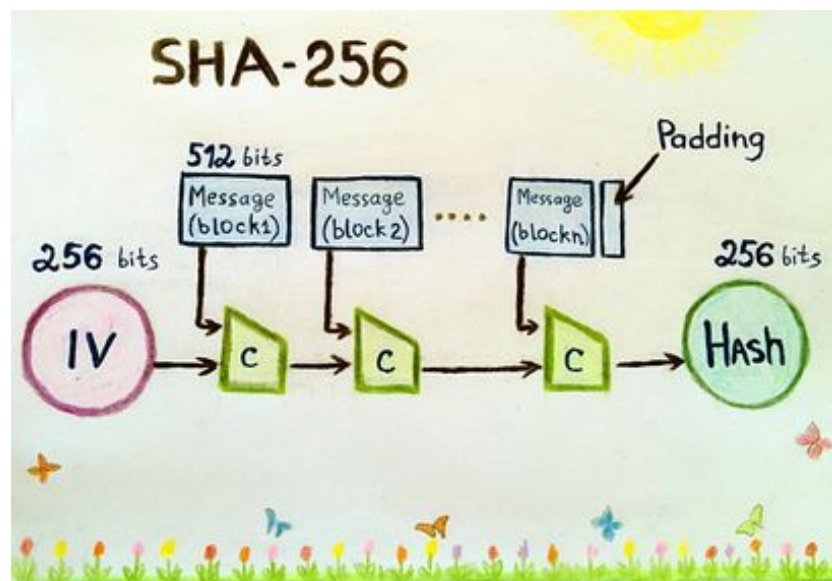


Figure 5.2: SHA flow

The SHA-256 compression function operates on a 512-bit message block and a 256-bit intermediate hash value. It is essentially a 256-bit block cipher algorithm which encrypts the intermediate hash value using the message block as key. Hence there are two main components to describe the SHA-256 compression function, and the SHA-256 message scheduling

## 5.2   Required Software and Hardware for development

In the section describes the required software and hardware for development.
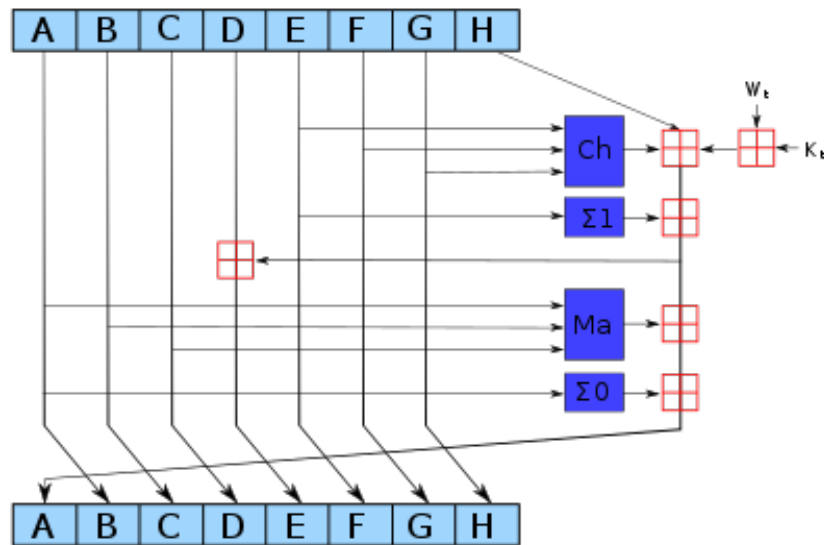
Figure 5.3: A round in SHA

### 5.2.1 Tools

■ *Visual Studio Code*

Visual Studio Code combines the simplicity of a source code editor with powerful developer tooling, like IntelliSense code completion and debugging. First and foremost, it is an editor that gets out of your way. The delightfully frictionless edit-build-debug cycle means less time fiddling with your environment, and more time executing on your ideas. Visual Studio Code supports macOS, Linux, and Windows - so you can hit the ground running, no matter the platform.

At its heart, Visual Studio Code features a lightning fast source code editor, perfect for day-to-day use. With support for hundreds of languages, VS Code helps you be instantly productive with syntax highlighting, bracket-matching, auto-indentation, box-selection, snippets, and more. Intuitive keyboard shortcuts, easy customization and community-contributed keyboard shortcut mappings let you navigate your code with ease.

For serious coding, you'll often benefit from tools with more code understanding than just blocks of text. Visual Studio Code includes built-in support for IntelliSense code completion, rich semantic code understanding and navigation, and code refactoring.

■ *Insomnia*

API endpoint testing is one of the most important things we do as web developers. If the routes to reach our data are incorrect, the required parameters are not included, the authorization is missing, or a host of other things arent correctly hooked up, your app

doesnt work. If your app doesnt work, your customers cant use it. If your customers cant use it, its going to be a really bad day for you, your team, your boss, and so on and so forth.

Insomnia is a free cross-platform desktop application that takes the pain out of interacting with HTTP-based APIs. Insomnia combines an easy-to-use interface with advanced functionality like authentication helpers, code generation, and environment variables. Which is why we have things like API testing tools. These tools allow us, as web developers, to test that when we pass a specific set of data (or not) to our application it will return the response we expect. Its a pretty simple idea, but it makes our lives (and development cycles) so much easier.

### 5.2.2  Technologies

■  *Django*

Django is a free and open source web application framework written in Python. A framework is nothing more than a collection of modules that make development easier. They are grouped together, and allow you to create applications or websites from an existing source, instead of from scratch.

This is how websites - even simple ones designed by a single person - can still include advanced functionality like authentication support, management and admin panels, contact forms, comment boxes, file upload support, and more. In other words, if you were creating a website from scratch you would need to develop these components yourself. By using a framework instead, these components are already built, you just need to configure them properly to match your site.

■  *VueJS*

Vue (pronounced :vju; like view) is a progressive framework for building user interfaces. Unlike other monolithic frameworks, Vue is designed from the ground up to be incrementally adoptable.

The core library is focused on the view layer only, and is easy to pick up and integrate with other libraries or existing projects. On the other hand, Vue is also perfectly capable of powering sophisticated Single-Page Applications when used in combination with modern tooling and supporting libraries.

Vue is a very popular JavaScript front-end framework, one thats experiencing a huge amount of growth. It is simple, tiny (nearly equal to 24KB), and very performant. It feels different from all the other JavaScript front-end frameworks and view libraries.

### 5.2.3  Dependencies

▪ *Node Packet Manager (NPM)*

NPM is the world's largest Software Registry. The registry contains over 800,000 code packages. Open-source developers use npm to share software. Many organizations also use npm to manage private development.

Node.js makes it possible to write applications in JavaScript on the server. Its built on the V8 JavaScript runtime and written in C++ so its fast. Originally, it was intended as a server environment for applications, but developers started using it to create tools to aid them in local task automation. Since then, a whole new ecosystem of Node-based tools (such as Grunt, Gulp and Webpack) has evolved to transform the face of front-end development.

▪ *Docker*

Docker is a tool designed to make it easier to create, deploy, and run applications by using containers. Containers allow a developer to package up an application with all of the parts it needs, such as libraries and other dependencies, and ship it all out as one package.

In a way, Docker is a bit like a virtual machine. But unlike a virtual machine, rather than creating a whole virtual operating system, Docker allows applications to use the same Linux kernel as the system that they're running on and only requires applications be shipped with things not already running on the host computer. This gives a significant performance boost and reduces the size of the application.

## 5.3  Modules

Modules are divided based on users:

### 5.3.1  Training & Placement Officer (TPO)

▪ *TPO Registration*

Account of TPO is to be created manually by the System Administrator using the admin panel.

▪ *Create Recruitment Drive*

TPO can create a recruitment drive. On creation of drive mails will be sent to eligible students regarding the drive.

■ *View Drives*

Tpo can take a view of currently active drives and look up at the list of registered students for the drive.

### 5.3.2 Student

■ *Create Account*

Student will have to register on the portal so as to use further services. Student will have to enter all of his academic as well as personal details during registration.

■ *Register for a Drive*

Student is able to see the current active drives and can register for the same on single click.

### 5.3.3 Placement And Requirement System

■ *Authentication*

Whenever the user will log in to the system, an Encrypted token will be generated that will be used to manage user session.

■ *Generate QR code*

While registration of student for a particular drive will be done, system will generate a QR code which will contain the details of student as well as the student in encrypted format. QR code will be used as a attendance tag on the day of drive.

■ *Filter data*

System will be responsible to filter data using the object based queries written.

### 5.3.4 Admin

■ *Manage Users and Data*

Admin will have rights to maintain all the users and their rights also the admin will be able to manage all the data related to them.

## 5.4 Summary

Chapter described the algorithms that are used to implement the overall system also it shows a brief scenario of way it is developed.

# Chapter 6

# Testing

**S** oftware testing is defined as an activity to check whether the actual results match the expected results and to ensure that the software system is Defect free. It involves execution of a software component or system component to evaluate one or more properties of interest.This chapter briefs about various testing approaches and test cases of the project.

**S** ection 6.1 describes black box testing. White box describes in section 6.2 . Section 6.3 describes manual testing . Test cases identification and execution describes in 6.4. Finally Summary is presented in last section.

## 6.1 Black Box Testing

Black Box Testing, also known as Behavioral Testing, is a software testing method in which the internal structure/design/implementation of the item being tested is not known to the tester. These tests can be functional or non-functional, though usually functional. This method is named so because the software program, in the eyes of the tester, is like a black box; inside which one cannot see. This method attempts to find errors in the following categories:

- Incorrect or missing functions

- Interface errors

- Errors in data structures or external database access

- Behavior or performance errors

- Initialization and termination errors

Black Box Testing is not a type of testing; it instead is a testing strategy, which does not need any knowledge of internal design or code etc. As the name black box suggests,
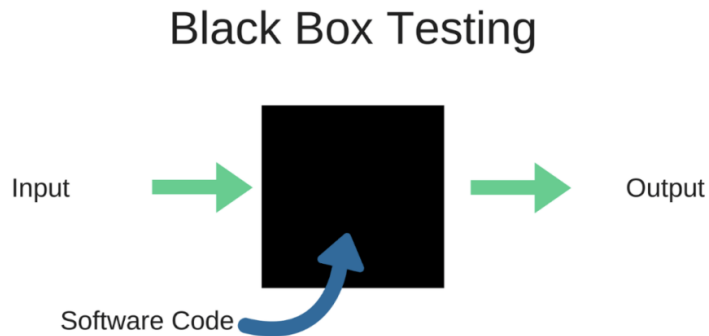
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# Black Box Testing



Figure 6.1: Black Box Approach

no knowledge of internal logic or code structure is required. The types of testing under this strategy are totally based/focused on the testing for requirements and functionality of the work product/software application. The base of the Black box testing strategy lies in the selection of appropriate data as per functionality and testing it against the functional specifications in order to check for normal and abnormal behavior of the system.

- **Functional Testing :-** In this type of testing, the software is tested for the functional requirements. The tests are written in order to check if the application behaves as expected.

- **Stress Testing :-** The application is tested against heavy load such as complex numerical values, large number of inputs, large number of queries etc. which checks for the stress/load the applications can withstand.

- **Load Testing :-** The application is tested against heavy loads or inputs such as testing of web sites in order to find out at what point the website/application fails or at what point its performance degrades.

- **Recovery Testing :-** Recovery testing is basically done in order to check how fast and better the application can recover against any type of crash or hardware failure etc. Type or extent of recovery is specified in the requirement specifications.

- **User Acceptance Testing :-** In this type of testing, the software is handed over to the user in order to find out if the software meets the user expectations and works as it is expected to.

## 6.2  White Box Testing

WHITE BOX TESTING (also known as Clear Box Testing, Open Box Testing, Glass Box Testing, Transparent Box Testing, Code-Based Testing or Structural Testing) is a software testing method in which the internal structure/design/implementation of the item being tested is known to the tester 6.2. The tester chooses inputs to exercise paths through the code and determines the appropriate outputs. Programming know-how and the implementation knowledge is essential. White box testing is testing beyond the user interface and into the nitty-gritty of a system.

This method is named so because the software program, in the eyes of the tester, is like a white/transparent box; inside which one clearly sees. White Box Testing method is applicable to the following levels of software testing:

- **Unit Testing:** For testing paths within a unit.

- **Integration Testing:** For testing paths between units.

- **System Testing:** For testing paths between subsystems.
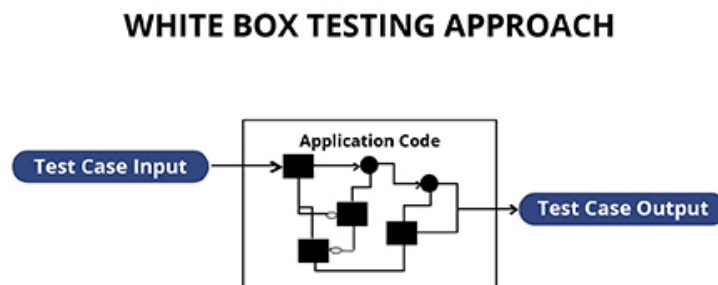


Figure 6.2: White Box Testing Approach

## 6.3  Manual Testing

Manual testing is the process of using the functions and features of an application as an end-user would in order to verify the software is working as required. With manual testing, a tester manually conducts tests on the software by following a set of pre-defined test cases. Lets take a close look at how this is done.

In order to successfully conduct manual tests, you first need to understand the requirements of the software. By understanding the requirements, youll know what needs to be

tested and what classifies a defect. This is a crucial part of manual testing as the main goal is to make sure the software is bug-free.

## 6.4 Test Cases Identification and Execution

Once you understand the requirements, you can write test cases  another crucial part to manual testing. Test cases guide the tester through a sequence of steps to test functions and different scenarios within the software application. Writing good test cases is important as they make executing the tests go smoothly and ensures good test coverage. Good test cases should also be repeatable, which allows future testers to go in and conduct the tests without having to ask an additional questions.

Once the test cases are written and the testing environment is prepared, its time to begin testing. Using TestLodge, you can follow the test cases and mark each test as passed, failed, or skipped. When doing manual testing, its important to keep notes on what happens when a test fails. TestLodge makes it easy for you to add in these details directly during the test execution.

| Test Id | Test Case | Test Case Description | Test Case Expected Result | Test Case Actual Result | Test Case Pass OR Fail |
|---|---|---|---|---|---|
| 1 | Firm name | Enter firm name | Accept only alphabets | Accept only alphabets | Pass |
| 2 | Username | Enter Username | Accept alphabets and numbers | Accept all username | Pass |
| 3 | Password | Enter password | Accept alphabets and numbers | Accept alphabets and numbers | Pass |
| 4 | Email id | Enter email id | Accept only valid email id | Accept all email id | Fail |
| 5 | Address | Enter address | Accept as a string | Accept as a string | Pass |
| 6 | Mobile | Enter mobile number | Accept only numeric values | Accept only numeric values | Pass |

Figure 6.3: Test Case Table for Drive Registration

After running tests, its good to know the results of the tests at a high level. How many tests were run? How many tests failed? How many tests were skipped? TestLodge makes it easy to get a quick glance of these metrics

| Test ID | Test Case | Expected output | Actual Output | Result |
|---------|-----------|-----------------|---------------|--------|
| 1 | Authenticate | generate session token | generated session token | Pass |
| 2 | Login | accept correct username and Password | Accepted correct combination | Pass |
| 3 | Registration for interview drive | generate QR with firm details | generated QR with firm details | Pass |
| 4 | Sending Mails | Send Mails to only eligible students | Only Eligible students received mail | Pass |

Table 6.1: System operation test cases

## 6.5 Summary

In this chapter have discussed on different types of testing and various test cases of this project along with the outputs of test cases.

# Chapter 7

# Results and Discussion

For each and every software service the most concentrated thing is the speed that is calculated in terms of response time of the service. Response time means in how much time the particular operation is completed and give back the results. Response time of some of the functionalities is given in 7.1 :

In the previous traditional systems use of excel sheets and google forms was made. Attendance sheets were signed manually. This system provides much better solution as described in table 7.1

| Sr. No. | Task | Previous System | Current System |
|---------|------|-----------------|----------------|
| 01. | Collecting Student data for Drive | Use of Google Form and whole data has to be entered again | Student Just need to register by clicking on a button, data will be taken from profile |
| 02. | Sorting Eligible students | Done manually or use Excel | Automated |
| 03. | Inform Students for Drive | Using Whatsapp | Automated mail sending |
| 04. | Attendance | Attendance Sheets | QR based Attendance system |
| 05. | CVs | CVs of different formats that can be standard or non standard | Standard CV generation with same format for all student |
| 06. | Collecting Documents | At the time of interview each student used to carry his file | Documents will be uploaded on the system itself |

Figure 7.1: Difference between traditional and current placement systems

Every system has its advantages and may have some limitations too. Same the system has as described in sections below:

- Advantages

| Sr. No | Operation | Response Time |
|--------|-----------|---------------|
| 01 | User Log in & Authentication | 100 |
| 02 | User Registration | 250 |
| 03 | Send Mails | 100 per mail |
| 04 | View Drive Details | 500 |

Table 7.1: Resultant response time in Milliseconds

- Paperless work for T&P Staff and Students.

- Avoid fake entry.

- Ease in report generation.

- Generate Resume in similar standard format for all the registered students.

- Secure Place for Document Upload.

- Limitations

- System reachability depends on availability of cloud service provider servers.

- Speed of execution depends on quality of internet connectivity.

## 7.1 Summary

In this chapter we have discussed advantages and disadvantages along with resultant responses of some functionalities.

# Chapter 8

# Conclusion and Future Work

In the Existing systems, most of the tasks are to be performed manually such as report generation, Attendace, Resume Generation, Sending mails etc. Proposed solution will somehow lead to reduction of time consumption and stress too. Also it can be opted for secured storage of documents. Automation of the placement system will also result in better enhanced job opportunities for students.

The project can also be extended further :- In the proposed system can be extended for commercial purpose to provide financial profit to the organisation. This can be done by extending the user access for the students of other organizations and asking them to pay a small amount as donation for the organisation. Payment gateways need to be integrated to the system registration module.

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