Software Engineering and Web Technologies Laboratory

Integrated Project on

CRACK IT

Bachelor of Engineering

IN

COMPUTER SCIENCE AND ENGINEERING

Submitted By

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Chapter 1
INTRODUCTION

1.1 Preamble

Welcome to our online aptitude test website, Crack It by KLE Technological University. Aptitude skills are important for a variety of reasons. Having strong aptitude skills can help individuals excel in their careers and achieve their professional goals. These skills can also help individuals perform better in school and other educational settings, and can provide a competitive edge in job markets. Aptitude skills are a combination of cognitive abilities and knowledge that allow individuals to learn new skills quickly and apply them effectively in a variety of situations. Developing strong aptitude skills can also help individuals make better decisions, solve complex problems, and adapt to new challenges. Therefore, building aptitude skills is essential for personal and professional success. This website is designed to help you assess your skills and abilities in a variety of areas, including mathematics, logic, critical thinking, and problem-solving. Our tests are carefully designed to challenge and engage your mind, and to provide you with accurate and meaningful results. Whether you are looking to advance in your current field, explore new career opportunities, or simply learn more about yourself, our tests can provide valuable insights and guidance. In order to take tests, you need to sign up and fill the required details. This is a real time application which allows the users to take up aptitude tests and lets admins to create tests. Tests on problem solving, analytical thinking and logical reasoning are available for the users. When you take one of our tests, you will be presented with a series of multiple-choice questions that you must answer within a specified time limit. Your score on the test will be based on how many questions you answer correctly. The minimum threshold set for every test is 40% to clear the test. Your score will be shown with answers for your reference once you finish the test. And, the score will be stored in order to regulate your performance.

1.2 Problem Definition

Crack It is a web application that consists of various tests on the topics problem solving, analytical thinking and logical reasoning. It can be accessed by entering the username and password which is added to the database.

Each quiz consists of a limited number of questions and for each correct answer the user's score is incremented by 1. The final score of the user is displayed and updated in the database.

1.3 Objectives

- To provide a platform that helps the users to prepare multiple choice questions for different examinations.
- To enable user to practice for aptitude tests conducted for admissions and recruitment.
- To facilitate user friendly environment for all users to reduce manual effort.
- To test the aptitude skills of users in a particular subject or area.
- To provide a fun and engaging way for users to develop and improve their aptitude skills.
- To challenge users to think critically and use their problem-solving, logical and analytical skills to solve challenging tasks.
- To assess the aptitude skills of students in an educational setting.
- To identify areas for improvement in the aptitude skills of employees.

Chapter 2
SOFTWARE REQUIREMENT SPECIFICATIONS

2.1 Functional Requirements

1. Authentication of user on trying to login onto the system.
2. User shall be able to search for quiz based on category.
3. Admin shall be able to create a test.
4. Admin shall be able to delete a test.
5. Admin shall be able to modify questions and update answers in a test.
6. User shall be able to take a test.
7. User shall be able to view grades of every test they have taken.
8. New user shall be able to create an account on the website.
9. User shall be able to logout of the website.
10. User shall be able to add quizzes to the liked list.
11. User shall be able to view the number of people who have taken the quiz already.
12. When user completes the test, the result page shall appear.

2.2 Non-Functional Requirements

1. All web pages should load within 4 seconds.
2. User should be able to enter incorrect password for maximum of 3 times.
3. The processing of each request should be done within 10 seconds.
4. The layout should allow users to reach their profile data within 2 clicks from any page.
5. The background theme color for all web pages should be
6. The Graphical User Interface should provide context help while using the system.

2.4 Hardware Requirements and Software Requirements

Hardware Requirements:

1. 4GB RAM
2. Intel I5 8th gen/ Ryzen 5
3. SSD 256GB

Software Requirements:

1. System Type: Windows OS.
2. Platform - Web Browser
3. Front end - HTML, CSS, React
4. Backend - MongoDB, Express, Node

2.5 Test Plan and Test Cases

Test plan and Test cases							
Requirement Id	**Test Case ID**	**Test Case Description**	**Test Steps**	**Test Input Data**	**Expected Results**	**Actual Results**	**Pass /Fail**
FR01	T01	Check User Login with valid Data	1.Go to site http://localhost:9000 2.Enter UserId 3.Enter Password 4.Click Submit	UserId: v@gmail.com Password: 123123	User should Login into an application	Login successful	Pass
FR01	T02	Check Customer Login with invalid Data	1.Go to site http://localhost:9000 2.Enter UserId 3.Enter Password 4.Click Submit	UserId : d@gmail.com Password: 12312	User should not Login into an application	Login unsuccessful	Pass
FR02	T03	After logging in user can use the option of searching based on category	1.Go to site http://localhost:9000 2.Enter UserId and Password 3.Click on search by category	Select one amongst: Problem solving Logical reasoning Analytical thinking	User should be able to see the tests based on selected category	Tests based on selected category are shown	Pass

FR03	T04	Admin will create a test after logging in	1.Enter adminId and password 2.Click on create test	UserId: k@gmail.com Password: 123123 Enter Questions with options and select the correct option for each question.	Admin should be able to create test	Test is created success fully	Pass
FR06	T05	User after logging in can take tests	1.Go to community quizzes. 2.Take desired test.	Select community quizzes option. Select the desired topic. Click on take quiz.	User should be able to take quiz.	Quiz comple ted success fully.	Pass
FR07	T06	User can view results of the quiz.	1. Go to community quizzes. 2. Take desired test. 3. Submit the test.	Take the desired test. Submit the test.	User is able to view results.	Result is display ed.	Pass
FR08	T07	User can view his perform ance in the home page.	1. Enter userid and password. 2.Click on login.	Userid: k@gmail.com Password: 123123	Home page is displaye d which contains the overall perform ance of the user.	Perfor mance is viewed success fully.	Pass
FR09	T08	New user can create an account in the	1.Click on Signup. 2.Click on submit after entering required credentials.	1.Enter first name. 2.Enter last name. 3.Enter email. 4.Enter password.	Account is created successf ully.	New account created success fully.	Pass

		website		5.Enter gender. 6.Click on submit			
FR10	T09	User cannot use same EmailID to create new account	1.Click on Signup. 2.Click on submit after entering required credentials.	1.Enter first name. 2.Enter last name. 3.Enter email. 4.Enter password. 5.Enter gender. 6.Click on submit.	Account already exists.	Cannot create account since an account exists with same email id .	Pass
FR11	T10	User can like quizzes.	1.Click on take quizzes. 2.Click on like.	1.Click on community quizzes. 2.Click on take quizzes. 3.Click on submit quizzes. 4.Click on like logo.	Quiz added to like list.	Quiz added to liked list success fully .	Pass
FR12	T11	User can view people who are taken the quiz.	1.Click community quizzes. 2.Select the category.	1.Click community quizzes. 2.View number of people attempted. 3.Hover on the quiz to view the number of people who have attempted that particular quiz.	User is able to view number of people attempted.	View people attempted success fully.	Pass

Table 2.5.1 Test cases with status

Chapter 3
SYSTEM DESIGN AND IMPLEMENTATION

3.1 Layered Architecture

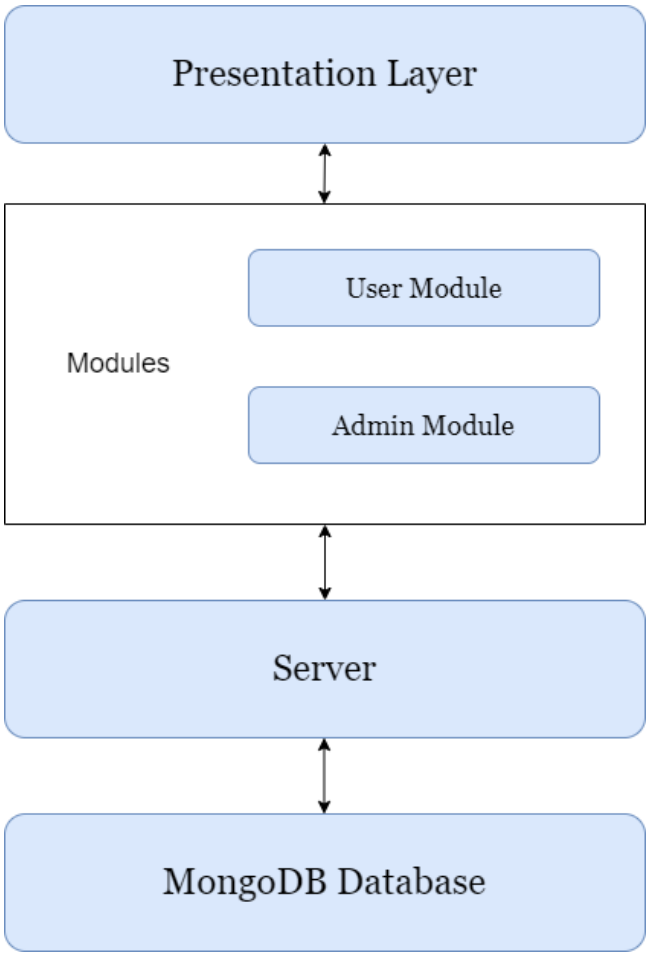

Fig 3.1.1 Layered architecture

3.1 Flowchart

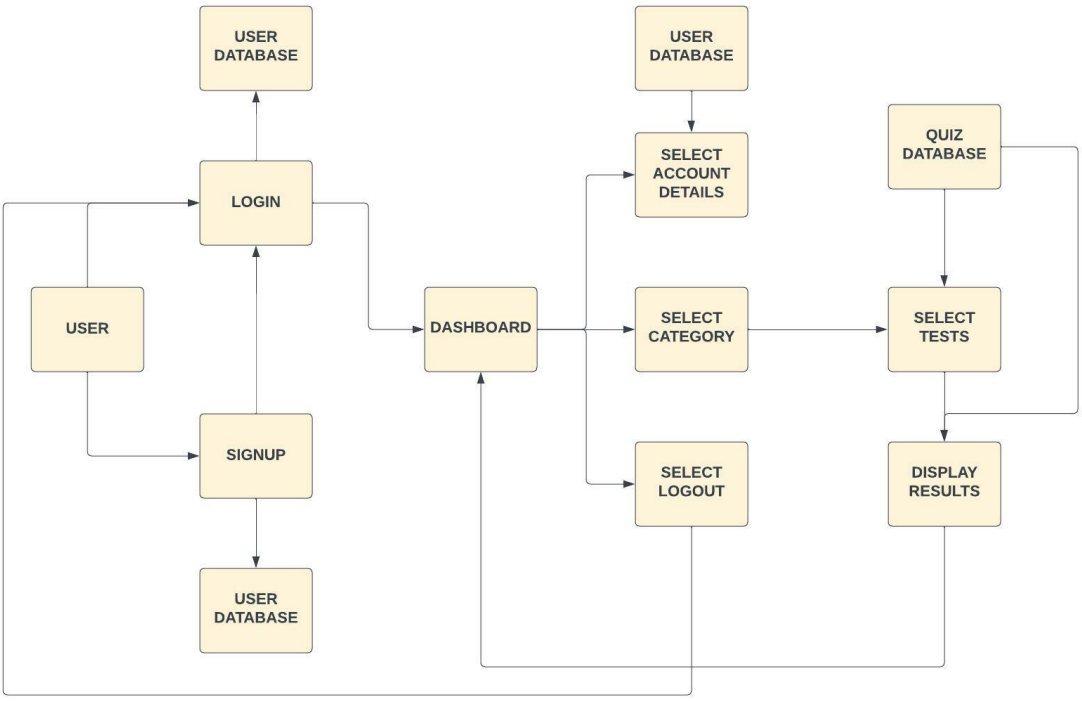

Fig 3.2.1 Flowchart of operations provided

3.2 Database Description

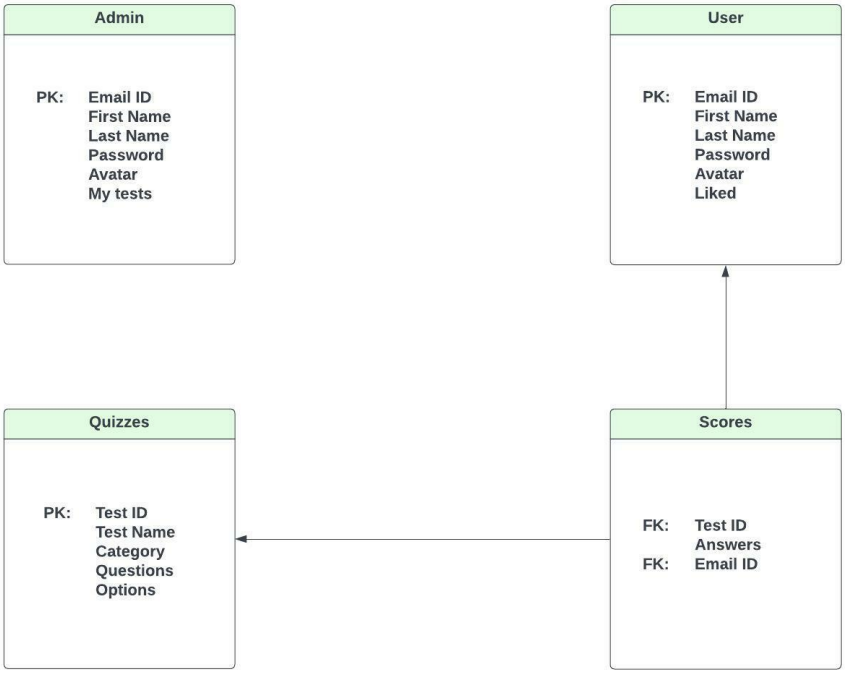

Fig 3.3.1 Database Schema

3.3 Modules description

Module 1: Welcome page

The Welcome page provides the idea of the website for which it is built. It also provides a logo of university with login/signup button.

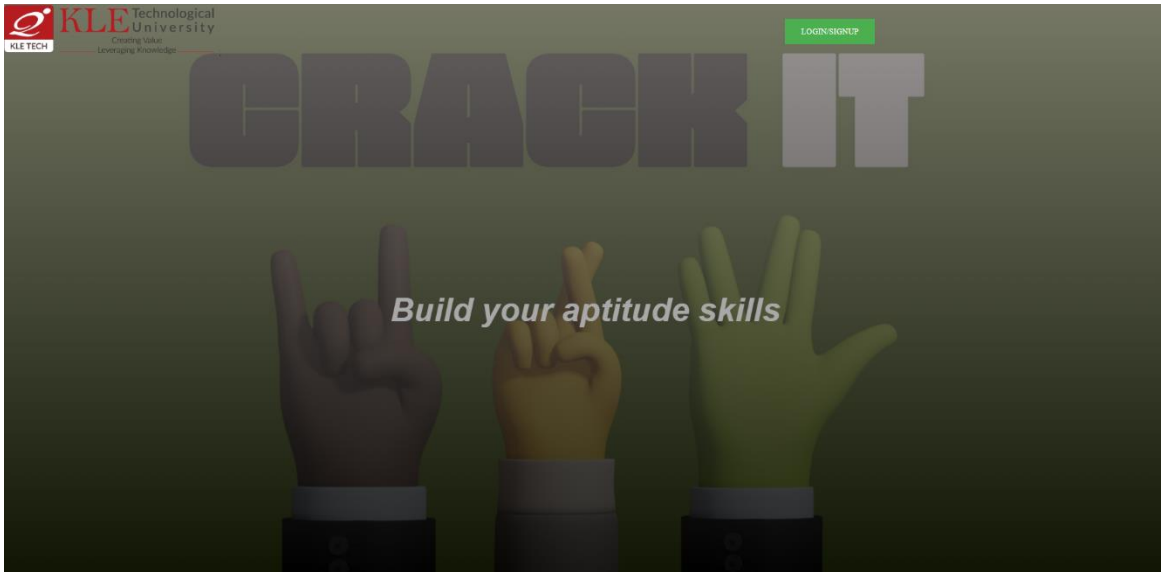

Fig 3.3.1 Welcome page

Module 2: Login/SignIn page

Login Page:

The login page allows the user to gain access to the application by entering their email and password. This page contains blocks to enter the username, password and a login button. If a user is new to the website, then a sign-up link is provided which takes the user to the sign-up page to register themselves.

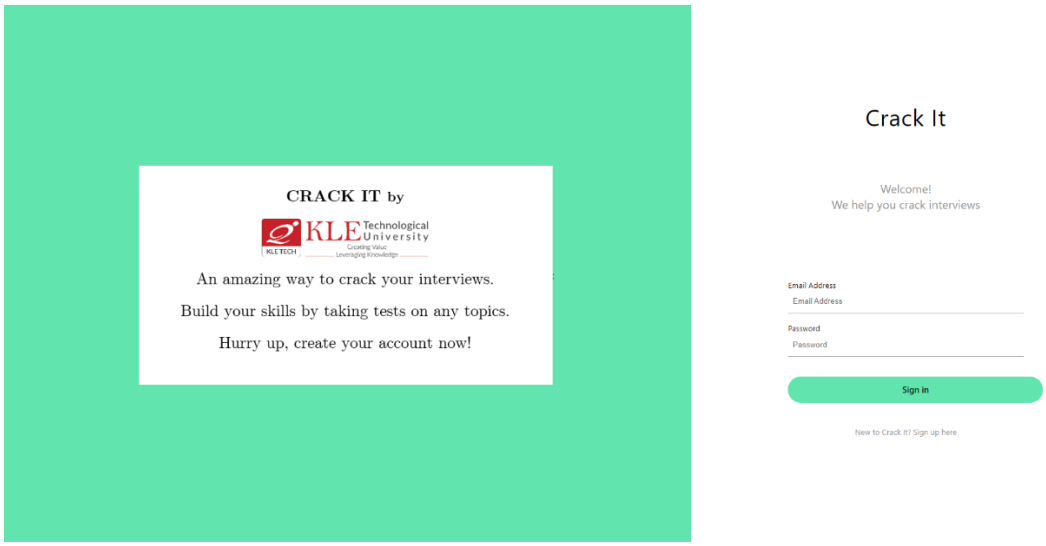

Fig 3.3.2 Login page

Sign Up Page:

The sign-up page lets the new users to register themselves onto the website. This page contains blocks to enter email, password, first name, last name. It also contains a sign-up button at the end which registers the user when clicked.

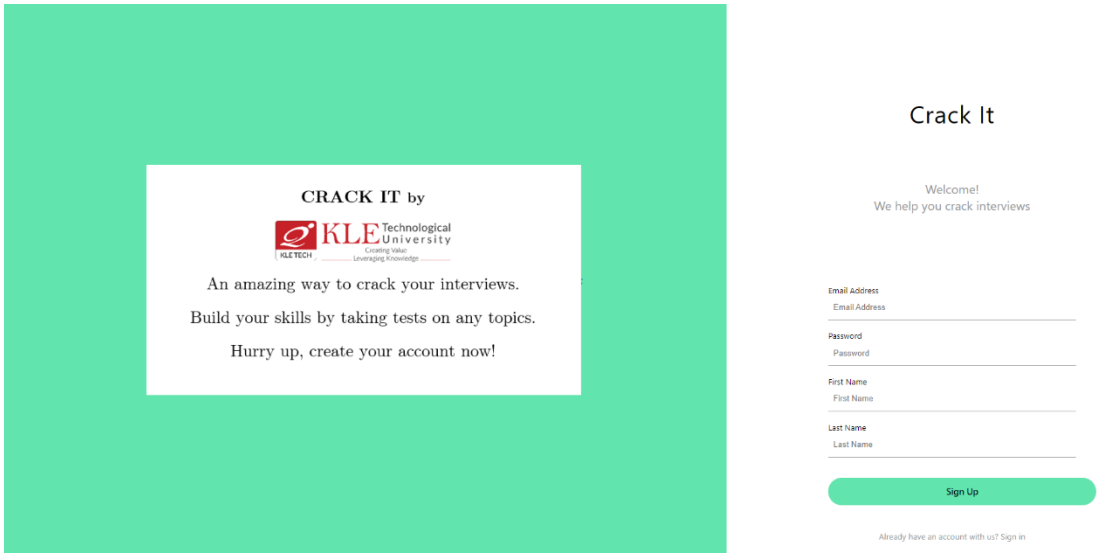

Fig 3.3.3 SignUp page

Module 3: Home Page

Home page provides links to all the other modules. The sidebar present on this page contains all the links. This page also contains name and image of the user if provided. The statistics of the tests taken by the user is displayed.

Fig 3.3.4 Home page after logging in

Module 3: Create Test Page

The create test page enables the admin to create a test. The admin needs to provide the details of the test like quiz name, image URL and topic to create a test. It contains a ‘save quiz’ button at the end. This page is available only to the admins.

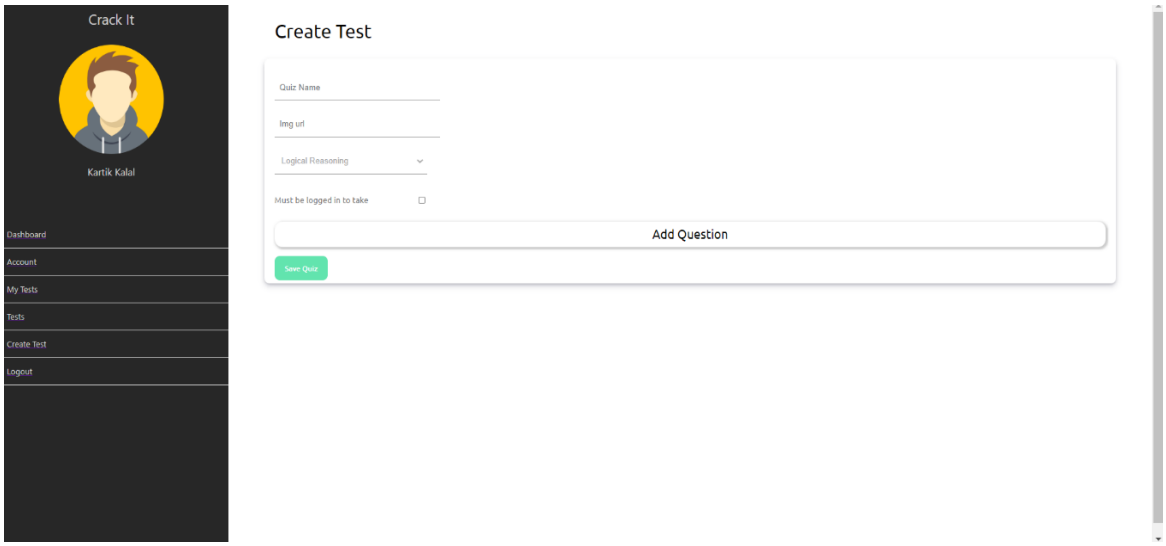

Fig 3.3.5 Create test page for admin

Module 4: Test Page

Test page contains all the tests available for the user. It contains the description of the test and a ‘Take quiz’ button for every quiz present on the page.

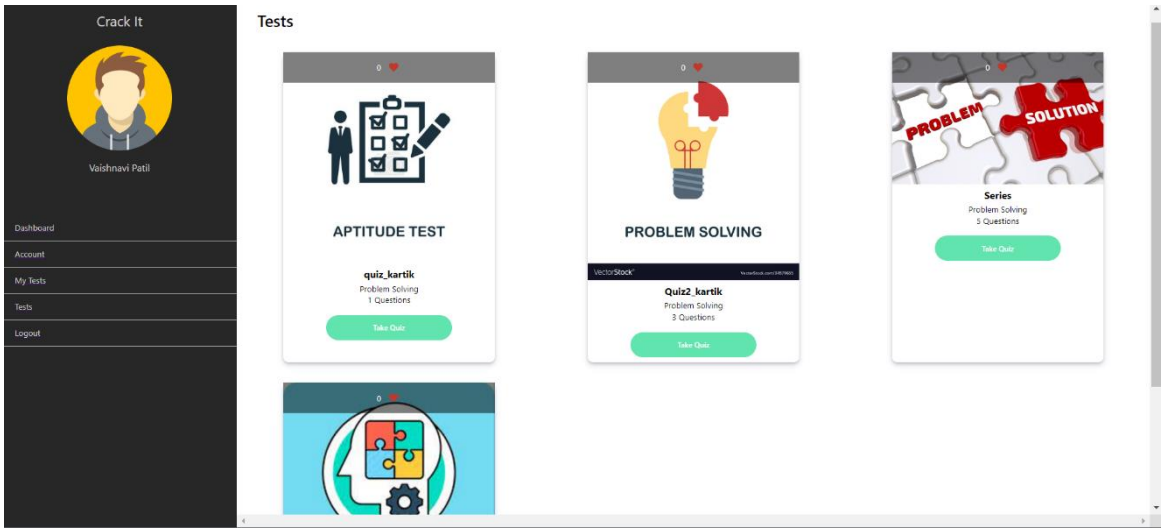

Fig 3.3.6 Tests’ list page for users

Chapter 4
RESULTS AND DISCUSSIONS

4.1 Testing Tool

Selenium Maven

● Maven is the latest build testing tool. It has several new features compared to Ant, like dependency, etc.

● Maven is a project build or project management tool. It is used to check the compilation issues between framework components whenever multiple test engineers integrate their files into the same framework.

● It always maintains the monitor, framework components, or build, and it provides build status modification, whenever modification happens in the framework.

● It provides a 'build success' message if there are no compilation issues in the framework or else provides a 'build failure' message.

Login failed: Incorrect credentials

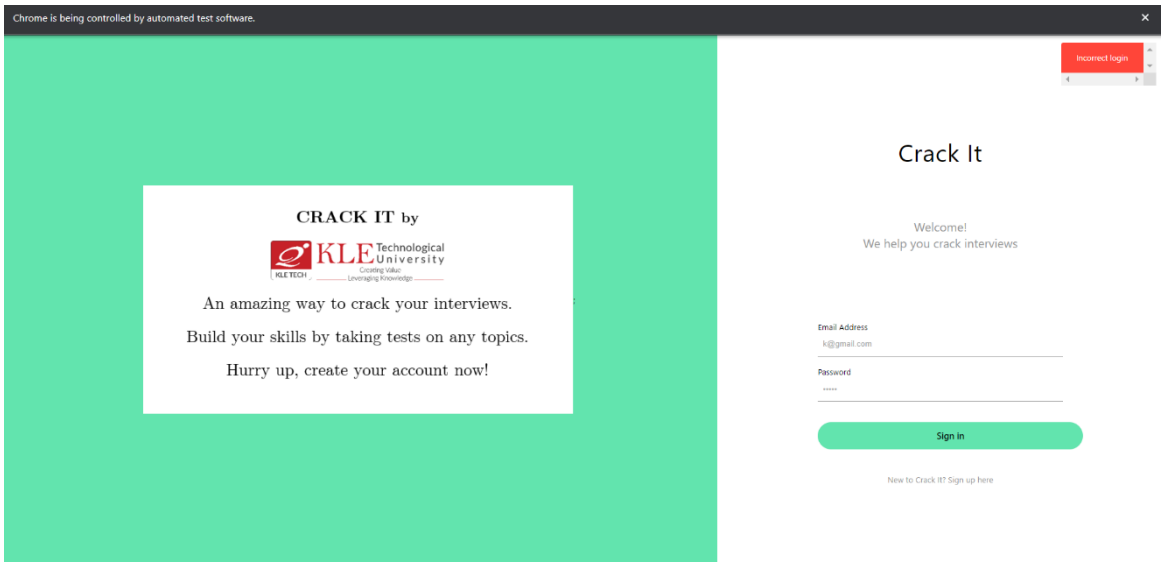

Fig 4.1.1 Login failed

```
const {Builder,By,Key} = require("selenium-webdriver");

async function example(){
    //launch the browser
    let driver = await new Builder().forBrowser("chrome").build();
    //navigate to our application

    await driver.get("http://localhost:3000/")
    //add a todo
    Await
driver.findElement(By.id("email")).sendKeys("k@gmail.com",Key.RETURN);
    await
driver.findElement(By.id("password")).sendKeys("12312",Key.RETURN);
    await driver.findElement(By.id("signin")).click();

    //close the browser
}

example()
```

Code used for testing

Logging in user and routing to accounts

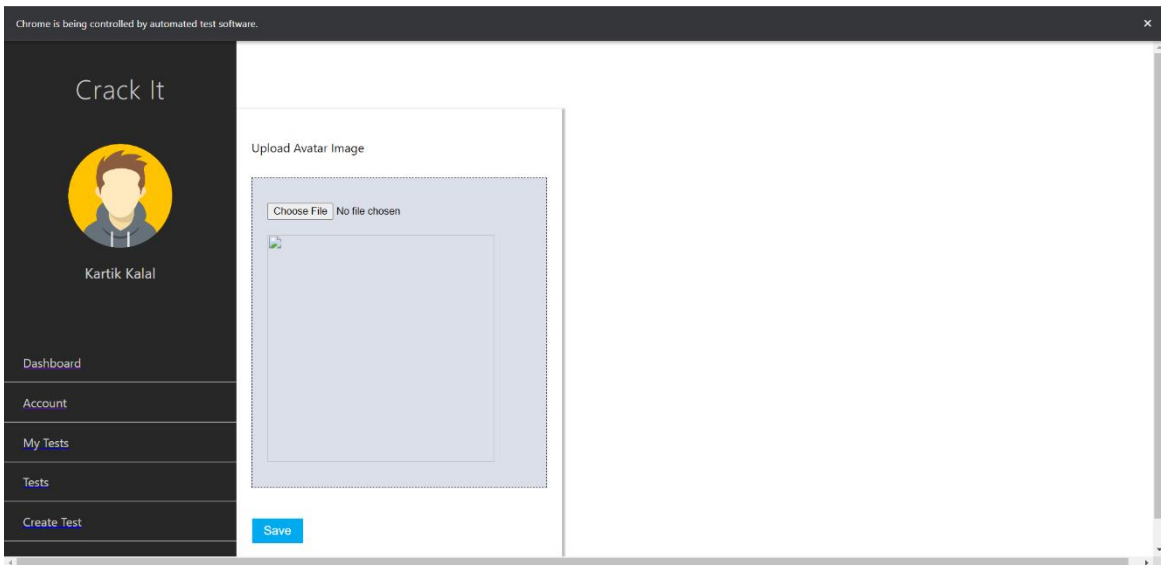

Fig. 4.1.2 Logging in and routing to user account page

```
const {Builder,By,Key} = require("selenium-webdriver");

async function example(){
    //launch the browser
    let driver = await new Builder().forBrowser("chrome").build();
    //navigate to our application

    driver.get("http://localhost:3000")
    //add a todo
    await
driver.findElement(By.id("email")).sendKeys("k@gmail.com",Key.RETURN);
    await
driver.findElement(By.id("password")).sendKeys("123123",Key.RETURN);
    await driver.findElement(By.id("signin")).click();
    var millisecondsToWait = 5000;
    setTimeout(function () {
        driver.navigate().to("http://localhost:3000/account");
    }, millisecondsToWait);



    //close the browser
}

example()
```

Code used for testing

Admin login success

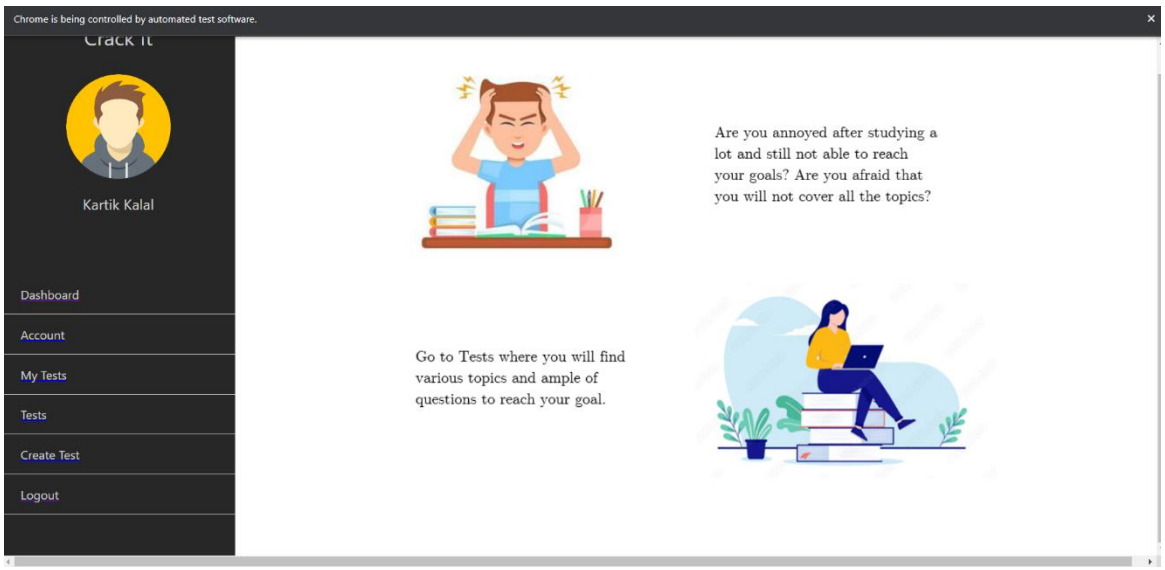

Fig. 4.1.3 Admin login success

```
const {Builder,By,Key} = require("selenium-webdriver");

async function example(){
    //launch the browser
    let driver = await new Builder().forBrowser("chrome").build();
    //navigate to our application

    await driver.get("http://localhost:3000/")
    //add a todo
    await
driver.findElement(By.id("email")).sendKeys("v@gmail.com",Key.RETURN);
    await
driver.findElement(By.id("password")).sendKeys("123123",Key.RETURN);
    await driver.findElement(By.id("signin")).click();

    //close the browser
}

example()
```

Code used for testing

4.2 Continuous integration and continuous delivery

Jenkin tool

● CI/CD is the way to continuously check the build quality as soon as any change is made using unit, component, and end-to-end tests and deploy the successful build to the application server.

● To achieve this CI/CD, Jenkins is a popular CI orchestration tool that is self-contained and contains all the necessary components to automate the build process.

● Jenkins can be used to automate building an application, running tests, and deploying the application. It can be easily installed through native system packages, Docker, or even run standalone by any machine with a Java Runtime Environment (JRE) installed.

● Jenkins is a popular open-source automation server that is used for building, deploying, and managing software projects. It is written in Java and provides a web-based interface that allows users to define and execute tasks, as well as monitor their progress.

● Jenkins is commonly used for continuous integration (CI) and continuous delivery (CD), which are processes that help software teams rapidly and reliably deliver code

changes to users. In a CI/CD workflow, developers push their code changes to a central repository, and Jenkins automatically builds and tests the code, providing feedback on any errors or failures.

● One of the key features of Jenkins is its ability to integrate with a wide range of tools and services, such as version control systems (e.g., Git), testing frameworks, and deployment tools. This allows users to automate almost every aspect of their software development and delivery process, from building and testing code, to deploying it to production environments.

● In addition to its core functionality, Jenkins also offers a rich ecosystem of plugins that extend its capabilities even further. These plugins provide additional features, such as support for different programming languages, integration with popular tools and services, and enhanced reporting and visualization.

● Overall, Jenkins is a powerful and flexible tool that is widely used by software teams to automate their development and delivery processes. It allows them to deliver high-quality software, helping them to reduce errors, improve efficiency, and speed up time-to-market quickly and reliably.

Chapter 5
CONCLUSION AND FUTURE SCOPE

The frontend framework used in this project is ‘React.’ ‘Express’ is employed to link the website with the MongoDB database at the backend. This project is coded in VS Code with the help of HTML, CSS, and JavaScript.

The web application allows the admin to create quizzes which will be then stored in the MongoDB Server database and lets the users to take up the tests. The marks of user will be calculated according to questions they attempt and will be displayed at the end of the test.

This project is only for MCQ test but it can be extended to support subjective type of questions with more functionalities. This project currently runs on the local host, it can be further deployed on the world wide web and can be used anywhere any time. This web application can be turned into mobile application in the future.

Appendix

Photos of meeting with customers: