

# Project Report

<b>Project Title</b>	Design, Develop, Implement, Test & Document Used Car Sales Portal Website
<b>Qualification Name (NICF)</b>	Advanced Certificate in Software Applications (Development and Process)
<b>Product Name</b>	ABC Cars Pte Ltd Portal
<b>Module Name (NICF)</b>	Application Development & Process

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<b>Date issued</b>	<b>Completion date</b>	<b>Submitted on</b>
09/05/2023		09/05/2023

<b>Project title</b>	Design, Develop, Implement, Test & Document Used Car Sales Portal Website
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## Learner declaration

I certify that the work submitted for this assignment is my own and research sources are fully acknowledged.

Student signature:

Date: 09/05/2023

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## **1. Project Background**

ABC Cars Pte Ltd commissioned the development of a used car sales portal. The website to be developed includes functional requirements or registration, searching for cars by make, model, registration and price, displaying car details after searching, registering and listing cars for sale. In the used car sales portal, he has two types of access: user and administrator. Users must be able to update their profile, book a test drive, post a bid, disable automatic posting, and perform the aforementioned functions. In addition to the basic functions of the used car portal, admin functions include marking users as admins, approving bookings based on bids, and processing sales at the right price. ABC Car Portal is a design implemented with Spring Boot Framework including Spring Security, Spring Data JPA and MySQL server, documented and tested using Risk Based Testing (RBT). Spring Boot can create standalone applications with the main features of auto-configuration. This feature allows you to develop your website faster and easier by reducing the boilerplate code or the same code that you have to insert in many places. Spring Security provides features to protect against common attacks through authentication and authorization. Spring Data JPA simplifies the data access layer and reduces boilerplate code by building a Java interface that includes data access technologies such as custom lookup methods. MySQL Server is a relational database management system (RDBMS). Based on Structured Query Language (SQL). It is a key component for ensuring the management of data stored and retrieved and the ability to connect to client systems. RBT is used as a framework for creating well-defined test plans and strategies to validate customer functional and non-functional requirements or end-to-end business flows. Testing prioritizes high-impact features that are more likely to cause failure by critically assessing risk based on likelihood, complexity, urgency, etc.

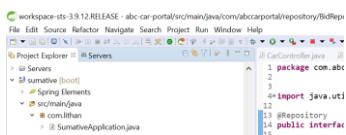
## 2. Project Objective

The objectives of this project include performing the following:

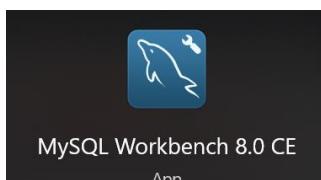
- To design, develop a used car sales portal using Spring Boot framework, Spring Security, Spring Data JPA and MySQL server.
- To implement the Risk Based Testing (RBT) strategy or spiral SDLC model on the used car sales portal to prepare the testing plan for validation of the client requirements.
- To document the used car sales portal website based on spiral model and execute and recording necessary testing under RBT.
- To identify and analyze the risks associated with the used car sales portal and solving the problems based on the RBT test plan.

## Tools & platform used

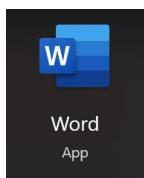
### 1. Spring Tool suite 3



### 2. MYSQL Workbench



### 3. Word



### 4. Microsoft Edge



### **3. Project Requirements Specifications**

#### **3.1 Project Scope**

There are 2 types of users in this Used Cars Sales portal. They are

- Users
- Administrator

#### **User**

- i) Register Page
- ii) Login Page
- iii) Post the Car for sale
- iv) View Car Details
- v) Visit Home Page
- vi) View Car Listing
- vii) Search Car by make, model, registration & Price Range
- viii) Bid for the car
- ix) View About Us Page
- x) View Contact Us Page
- xi) Logout

#### **Admin**

- i) Login into administrator panel
- ii) Manage Car
- iii) Logout
- iv) Visit Home Page
- v) View Car Listing
- vi) View About Us Page
- vii) View Contact Us Page
- viii) Search Car by make, model, registration & Price Range

#### **3.2 Functional Requirement**

The following pages will be developed and displayed in the project:

- 1) Registration Page
- 2) Login Page
- 3) About Us Page
- 4) Home Page
- 5) Post Car Page
- 6) Car List Page
- 7) Biding Page

## 4. Task 1

### Task Statement:

Create the following items Under “Business Process Section” in Project Presentation

1. Explain the Business Processes the Software is supporting
  - a. Document 2 Business Process
2. Document 2 Module functionality
  - a. UI Screenshots
  - b. Functionality of each of the Screen

### Solution:

#### 1.1 Explain the Business Processes the Software is supporting

##### a. Document 2 Business Process

###### i. Scenario 1 - Post Car

1. Enter the URL <http://localhost:8080> to access the used car sales portal
2. Click ‘Register’ and enter name, username, email and password to register as new user
3. User will see a register success message with link to login page
4. Enter registered username and password in the login page
5. User will then see the home page with the list of all cars posted by other user
6. Click ‘Sell Now’ in the home page to post a car for sale and enter car name, model, price, make year, registration date and photo and then click on ‘Post’
7. User will see a post success message with link to the car detail page

###### ii. Scenario 2- Search Car

1. Enter the URL <http://localhost:8080> to access the used car sales portal
2. Click ‘Register’ and enter name, username, email and password to register as new user
3. User will see a register success message with link to login page
4. Enter registered username and password in the login page
5. User will then see the home page with the list of all cars posted by other user
6. User can search for car by navigating to the search bar on the header
7. User can search for car by make, model, registration and price
8. Search for car make year ‘4000 and click ‘search’
9. User will see a search result page containing all list of cars matching the search keyword

## 1.2 Document 2 Module functionality

### a. UI Screenshots

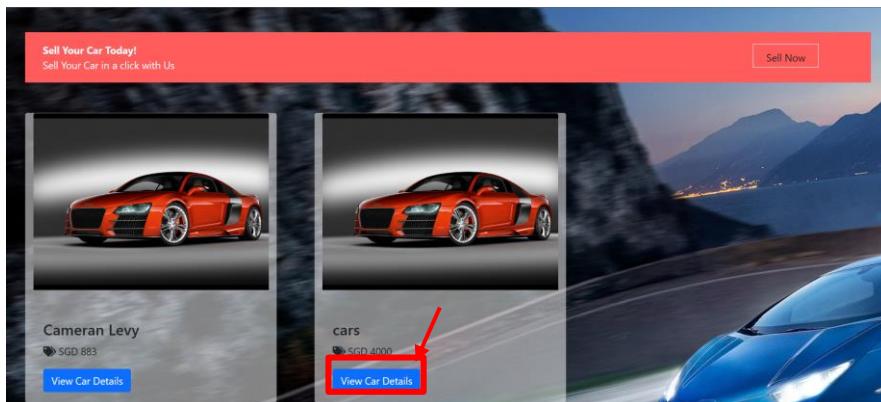
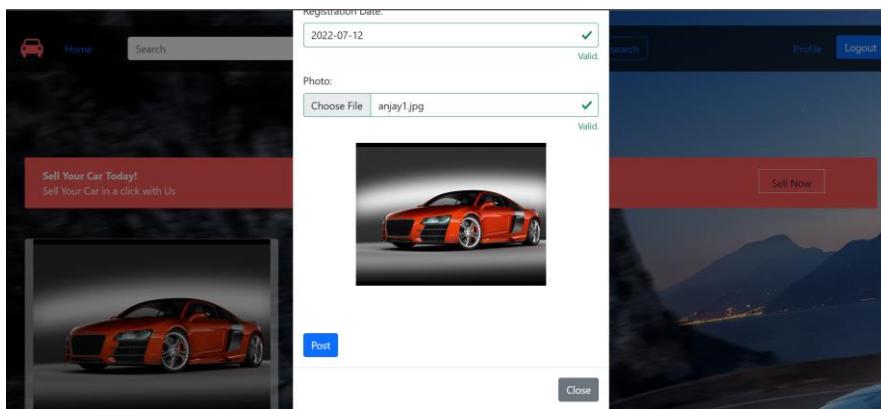
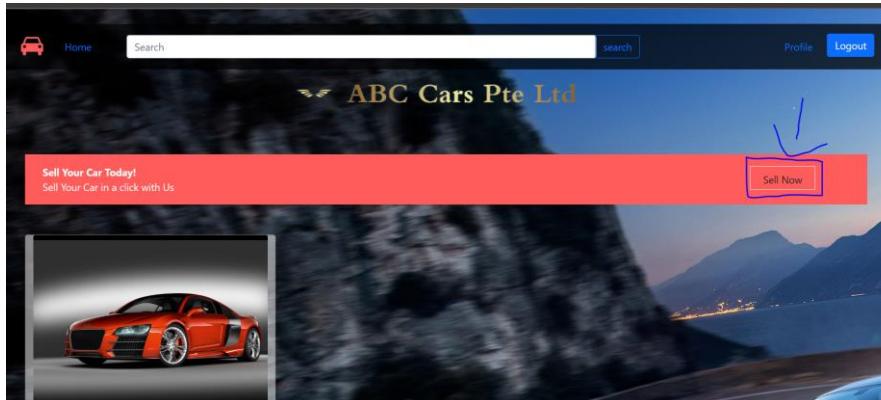
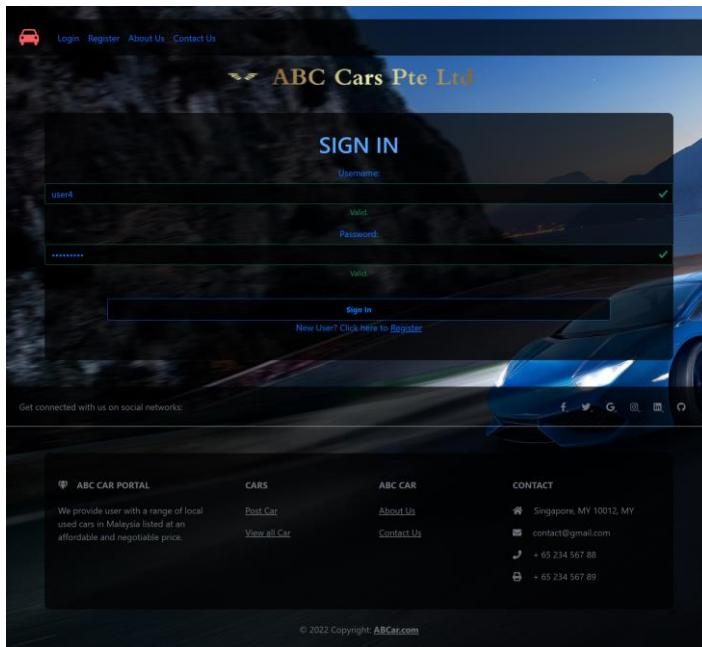
#### 1. Scenario Post Car

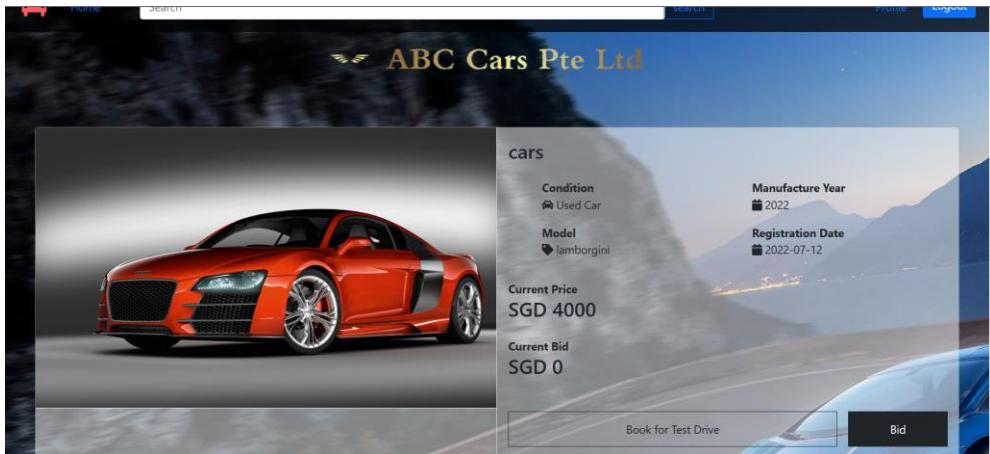
The screenshot shows the 'REGISTER' form on the ABC Cars Pte Ltd website. The form fields are filled with the following values:

Field	Value
Name	user4
Valid	Valid
Username	user4
Valid	Valid
Email	user4@user.com
Valid	Valid
Password	*****
Valid	Valid

The 'Register' button is at the bottom of the form. The background features a dark blue gradient with a blurred image of a car.

The screenshot shows the 'REGISTER' form on the ABC Cars Pte Ltd website. A green header bar at the top displays the message "Registration Successful! Click here to [Sign In](#)". The rest of the form and layout are identical to the previous screenshot, showing the same registration details and the 'ABC Cars Pte Ltd' logo at the top.





## 2. Scenario Search Car

ABC Cars Pte Ltd

### REGISTER

Name: user4  
Valid ✓

Username: user4  
Valid ✓

Email: user4@user.com  
Valid ✓

Password: .....  
Valid ✓

Register

Get connected with us on social networks:

F T G B

ABC CAR PORTAL

We provide user with a range of local used cars in Malaysia listed at an affordable and negotiable price.

CARS

Post Car View all Car

ABC CAR

About Us Contact Us

CONTACT

Singapore, MY 10012, MY  
contact@gmail.com  
+65 234 567 88  
+65 234 567 89

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ABC Cars Pte Ltd

Registration Successful Click here to [Sign In](#)

## REGISTER

Name: user4 Valid

Username: user4 Valid

Email: user4@user.com Valid

Password: ..... Valid

[Register](#)

Get connected with us on social networks: [f](#) [t](#) [g](#) [o](#)

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ABC Cars Pte Ltd

SIGN IN

Username: user4 Valid

Password: ..... Valid

[Sign In](#)

New User? Click here to [Register](#)

Get connected with us on social networks: [f](#) [t](#) [g](#) [o](#)

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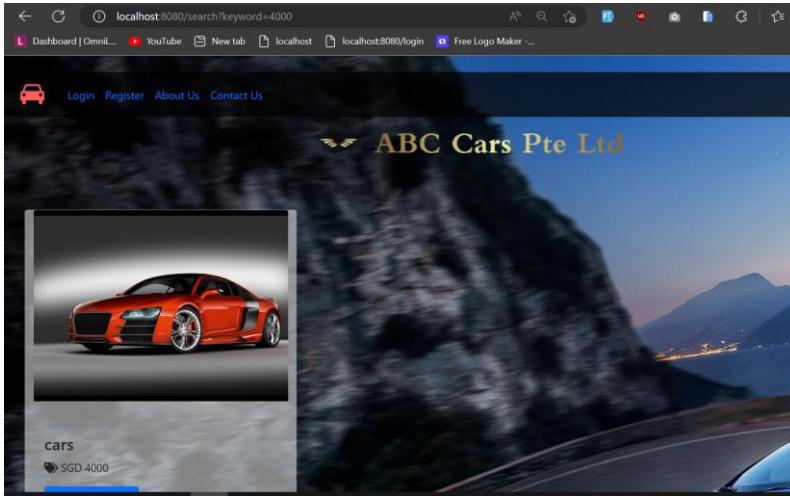
Home

Profile Logout

Sell Your Car Today!  
Sell your Car in a click with Us

[Sell Now](#)

ABC Cars Pte Ltd



*b. Functionality of each of the Screen*

Pages	Functionality
1. Register	to create an account so that users can enter the abc cars portal
2. Login	To validate user registered credentials, username and password before user can access the abc car portal home page
3. Home	Page seen by user after successful login containing the list of all car posted and post a car sale form
4. Car Detail	Allows user to see full car detail after posting a new car for sale or selecting the view car detail button from selected list of all car in home page or search results
5. Search Result	Page seen by user after searching by make, model, registration or price in the search bar located on the header and showing the list of car matching to the search keyword
6. Update Profile	To allow user to update profile information such as mobile and address. Also, allow user to track posted car sale and booking status or removing the posted car for sale
7. User Management	To allow administrator to view list of registered users, mark a user as administrator or update their profile or delete the user
8. Car Management	To allow administrator to view list of cars posted, dele car post, update status for user booking based on bidding or updating status for car sale
9. About Us	Page seen by user containing description about the abc used car sales portal
10. Contact Us	User-viewed page with contact details for the ABC Used Car Sales Portal company

## 5. Task 2

### Task Statement:

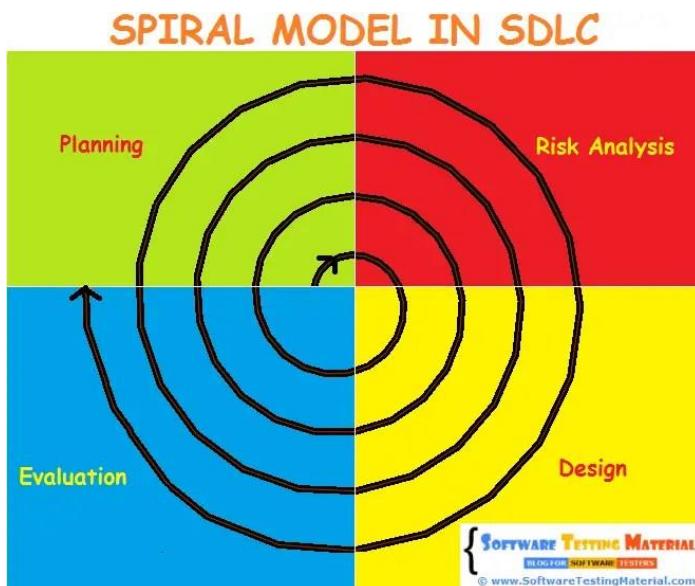
Create the following items in "Project Plan in Project Presentation"

1. Detail the Software Development Methodology to be used for developing system
2. List the various tasks to be done during various phases
3. Create the Project Plan detailing the various steps to be carried out along with dates and Timelines

### Solution:

#### 2.1 Detail the Software Development Methodology to be used for developing system

##### 2.1.1 Spiral model.



The spiral model, depicted in the diagram, is an iterative development model and also a waterfall model, as each phase must be completed before moving on to the next phase, while allowing for changes at each iteration.

This model was chosen because it can help in handling risks through risk analysis at each phase. By using this model, the development of a used car sales portal can be done more quickly and systematically, with features such as registration, login, search, etc. being added in stages. The ability to implement changes faster can also satisfy customers quickly, such as if a customer is not satisfied with the registration function at the evaluation stage, then changes can be made by returning to the development and testing stage until customer satisfaction is achieved.

Another advantage of the spiral model is that cost estimation becomes easier because prototyping is done in small components. In the development phase, one function such as registration should be completed first, and after successful evaluation, other functions such as login, posting, or others can be performed. Therefore, the cost required for development will be less in each cycle.

## 2.2 List the various tasks to be done during various phases

### 1. Planning:-

#### Planning & Requirements Gathering

- i. Arrange a meeting with the client to gather the business requirement for the website
- ii. Prepare the Statement of Work (SOW) or scope document which documents all requirements expected from the client
  - i. Scope
    - i. To design and develop, implement, test & document used car sales portal website
  - iii. Prepare the Project Initiation Document (Project Initiation Documents, n.d.)
    - i. Set Project Objective
      - i. To design, develop a used car sales portal using Spring Boot framework, Spring Security, Spring Data JPA and MySQL server.
      - ii. To implement the Risk Based Testing (RBT) strategy or spiral SDLC model on the used car sales portal to prepare the testing plan for validation of the client requirements.
      - iii. To document the used car sales portal website based on spiral model and execute and recording necessary testing under RBT.
      - iv. To identify and analyse the risks associated with the used car sales portal and solving the problems based on the RBT test plan.
    - ii. Estimate Project Cost
      - i. Construct a Cost-Benefit Analysis for the used car sales portal
    - iii. Resource Planning (Deshmukh, 2021)
      - i. Acquire guidance from stakeholders, team members, project managers on the estimated number of resources or refer to published reports on the number:
        - i. How many resources needed for the used car sales portal project?
        - ii. What skills are relevant for the project?
        - iii. Do I have enough resource capacity?
    - iv. Prepare the Project Plan Document (PPD)
      - i. Finalize the schedule
        - i. Gantt chart to visualize the used car sales portal timeline.
    - v. Prepare the System Requirement Specification (SRS) document (Lane & Krüger, 2021; Martin, 2022)
      - i. Define used car sales portal purpose based on SOW and project initiation document
      - ii. Provide specific requirements for:
        1. Functional requirement
          - User should be able to register and create a new account in the used car sales portal
          - User should be able to log in to the car portal
        - ii. Non-Functional requirement
          - Security
          - Performance etc

### 2. Risk planning

- i. Prepare a Risk Management Plan Document (Parker, 2004; BCcampus Open Publishing, n.d.)
- ii. Arrange a meeting to identify potential risk, the type of risks involved and listing the list in a risk breakdown structure (RBS) for the used car sales portal
- ii. Prepare a risk analysis chart or risk strategy and assess the risk – Qualitative risk analysis chart
- iii. Prepare a risk mitigation plan – mitigate the risk and report the risk
- iv. Prepare a contingency plan – mitigate the unexpected risk predicted to be rarely occurring for example backing up website data in case the used car sales portal was hacked

### **3. Design, development and testing**

#### **i. Prepare the System Design Document**

##### **i. Technical specification**

###### **i. Hardware**

- Processor: INTEL CORE I7 8550U with Radeon Graphics 2.38 GHz
- Installed RAM: 8.00 GB
- System type: 64-bit operating system, x64based processor

###### **ii. Software**

- Web server: Apache server
- Web browser: Google Chrome
- Development environment: JDK 1.8.0
- Framework: Spring 3.9.10
- iii. Database
- Database server: MySQL
- Database scripting: SQL script
- Database client: phpMyAdmin / MySQL Workbench

###### **ii. User Interface**

- a) Wireframes
- b) Process Flow

###### **ii. Process Flow**

###### **iii. Storyboard**

#### **iii. Prepare a software development document**

##### **i. Front-End implementation**

- i. Document all JSP pages source code
- ii. Document all CSS pages source code

##### **ii. Database implementation**

- i. Document DB Schema

##### **iii. Prepare integration document**

- i. Business logic implementation (Frankenfield, 2020)
  - i. Define the business rules
  - i. Only User can post a car for sale
  - ii. Define data exchange method from database to user interface
    - i. Direct database connection using JSP ( Hartman, 2022)

##### **iv. Prepare test case document (Mustafeez, n.d.; Hamilton, How to Write Test Cases: Sample Template with Examples, 2022)**

###### **i. Define the test case for unit testing**

- i. Validate registration function
- iii. Conduct unit testing

###### **i. Review the test case**

###### **ii. Run the test cases**

###### **iii. Record the result**

- i. Compare expected to actual result

- ii. Record the result status either successful or fail

###### **iv. Check the accuracy and debug**

- v. Make relevant changes to the front-end web pages
- v. Conduct user acceptance testing (UAT) with the client (Hamilton, What is User Acceptance Testing (UAT)? with Examples, 2022)
  - i. Define the UAT test case
  - ii. Run the UAT test case
  - iii. Record the result

#### 4. Customer evaluation

- i. Prepare website demo to the customer
- ii. Retrieve feedback from customer and satisfaction
- iii. Make changes to the website based on customer feedback by going back to the development and testing phase if customer approval was not achieved
- iv. Proceed to next phase of planning after customer approval until website are fully developed
- v. Confirm website has develop as per SRS document
- vi. Project sign-off between client and project manager
- vii. Product ready for deployment
  - i. Upload develop used car sales website on web server

### 2.3 Create the Project Plan detailing the various steps to be carried out along with dates and Timelines <less than a month> 20-30

Phases	Activity	Start Date	End Date
Planning	Arrange a meeting with the client to gather the business requirement for the website	26/4/2023	26/4/2023
	Prepare the Statement of Work (SOW) – Project scope	27/4/2023	27/4/2023
	Define Project Objective	27/4/2023	27/4/2023
	Identify the functional and non functional requirement	27/4/2023	27/4/2023
	Identify the constraint (Budget, Time, etc)	27/4/2023	27/4/2023
	Resource planning	27/4/2023	27/4/2023
	Identify the needs	27/4/2022	27/4/2023
	Develop a plan	28/4/2023	28/4/2023
Risk Analysis	Arrange a meeting and Identify what could be the risk that will impact the project.	28/4/2023	28/4/2023
	Prepare risk strategy & assessment – Qualitative risk analysis chart	28/4/2023	28/4/2022
	Mitigate the risk	28/4/2023	28/4/2022
Development & Testing	Define Technical specifications	29/4/2023	29/4/2023
	Prepare user interface	29/4/2023	29/4/2023
	Prepare database design	29/4/2023	29/4/2023
	Front-end implementation	29/4/2023	30/4/2023
	Database implementation	30/4/2022	30/4/2023
	Business logic implementation	30/4/2022	1/5/2023
	Prepare test cases for testing	1/5/2022	2/5/2023
	Conduct UAT	2/5/2022	2/5/2023
	Record testing result	2/5/2022	2/5/2023
	Check accuracy and debug	2/5/2022	2/5/2023
	Make relevant changes to front-end	2/5/2022	2/5/2023
Evaluation	Prepare website demo for customer	3/5/2023	3/5/2023
	Retrieve feedback from customer	3/5/2023	4/5/2023
	Project sign off between client and project manager	4/5/2023	4/5/2023
	Used car sales portal ready for deployment	5/5/2023	5/5/2023

## **6. Task 3**

Create the following items under “Testing Concepts” in Project Report

1. Explain risk-based testing concepts and requirements with the following details

a. Stages involved in RBT model

b. Types of risks and its impact

Solution:

### **3.1 Stages involved in RBT model**

#### **3.1**

##### **3.1.1 What is the risk?**

Risk is the chance that something bad will happen as a result of a decision or action you take. The greater the risk that something bad will happen, and the more severe the consequences, the higher the risk.

##### **3.1.2 RBT stages**

Risk-based testing (RBT) is a method of testing that involves the use of risk management principles to guide the testing process.

###### **3.1.2.1 Risk identification**

Various ways to identify risks in software development:

1. Brainstorming
2. Requirement analysis
3. Historical data analysis
4. Interviewing etc.

Risks can also be classified into 3 categories:

###### **1. Known Risks:**

These are known risks and can be identified and assessed based on past experience, historical data or knowledge of the project.

###### **2. Unknown risk:**

These are risks that appear during the testing phase of the project, not previously anticipated (e.g. unexpected software behavior, testing delayed due to unexpected bugs).

###### **3. Unknown risk:**

unforeseen risks that can seriously affect the project (e.g. system outage for more than a day, natural disaster).

Documenting the identified risks in a spreadsheet or risk register is an essential component of risk management in software development.

### 3.1.2.2 Risk Strategy & Assessment

The Risk Matrix is a tool that helps project managers understand the likelihood of a risk occurring and how it will affect the project. By assigning risk a value on a scale, project managers can prioritize which risks need the most attention. It is a means of ensuring that risks are systematically and effectively identified and managed.

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Severe
Almost Certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	Extreme	Extreme
Possible	Medium	Medium	High	High	Extreme
Unlikely	Low	Medium	Medium	High	High
Rare	Low	Low	Medium	High	High

### 3.1.2.3 Risk Mitigation

Once the risks have been identified and assessed, the next step is to develop an intervention strategy to manage them. Response strategies may involve eliminating a risk or reducing its impact to an acceptable level. This is known as risk reduction, which is an important part of risk management in software development.

### 3.1.2.4 Risk Monitoring and Control

Risk monitoring and control involves regularly examining residual risks and identifying new risks that may arise during project implementation. To monitor and control risks, the team can use methods such as reassessing risks, performing audits, analyzing trends, or updating project status during meetings.

## 3.1.3 Eight characteristics of Software Product Quality

**<The learner needs to follow ISO standards (ISO/IEC 25010:2011) to create test cases>**

The used car sales portal is to be developed into a product which satisfies the ISO/IEC 25010:2011 software product quality. Therefore, the website should be tested for suitability for functionality, efficiency, compatibility, usability, reliability, security, maintainability, and portability.

**Eight characteristics of Software product quality**

Functional Suitability	Performance Efficiency	Compatibility	Usability	Reliability	Security	Maintainability	Portability
Functional Completeness Correctness Appropriateness	Time Behaviour Resource Utilisation Capacity	Co-existence Interoperability	Appropriateness Learnability User Error Protection User Interface Aesthetics Accessibility	Maturity Availability Fault Tolerance Recoverability	Confidentiality Integrity Accountability Authenticity Non-repudiation	Modularity Reusability Analyzability Modifiability Testability	Adaptability Installability Replaceability

Define each feature:

1. Functional suitability – How the software meets the specified functional requirements and user goals.
2. Performance - performance relative to the amount of resources used under defined conditions.
3. Compatibility - the extent to which the software can be used with different hardware, software, or other systems.
4. User-friendly - Is the software easy to learn, use and understand.
5. Reliability - the extent to which the software can perform its required functions under specified conditions for a specified period of time.
6. Security - the degree to which the software protects information and data from unauthorized access and other security risks.
7. Maintainability - the extent to which software can be modified and maintained as well as the effort required to do so.
8. Portability - the extent to which software can be moved from one environment to another.

### 3.2 Types of Risk

Type of risk	Risk identification	Risk description	Impact
Functional	Login risk	User is not able to login	If the user is unable to log in into the website, then the users will not be able to use all the features provided in the website.

	<i>Searching risk</i>	<i>User is not able to search a car</i>	<i>User can't easily find a specific car in the portal in other words the user needs to find a car manually</i>
	<i>Posting a car risk</i>	<i>User is not able to post his car</i>	<i>User is not able to post a car to sale his car in the portal</i>
	<i>Viewing car detail risk</i>	<i>User is not able to view selected car details</i>	<i>User is not able to bid, book, and see the details for a particular car</i>
	<i>Data is not saved, deleted, or updated in the database</i>	<i>No rows affected during the operation</i>	<i>Some features or even the entire application will not work properly</i>
<i>Non-Functional Risk</i>	<i>Performance</i>	<i>Home page is not loading in expected time</i>	<i>The user will lose interest and lose patience to wait and finally the user chooses another website which meets the user needs</i>
	<i>Compatibility</i>	<i>Home page has different look and feel into different browsers</i>	<i>User will lose interest due to the difference of user interface</i>
	<i>Maintainability</i>	<i>Used car portal cannot be modified or make changes</i>	<i>User will judge the portal as not up to date</i>
	<i>Usability</i>	<i>The portal is not easy to navigate and does</i>	<i>users may find it difficult to learn and use the</i>

		<i>not have clear label or instructions to use</i>	<i>software, leading to frustration and potential abandonment of the product.</i>
<i>Technical Risk</i>	<i>Security</i>	<i>The user is not authenticated correctly after logging in</i>	<i>User will not be able to log in to the portal and reach the home page</i>
		<i>Navigation is not properly authorized based on the user's login role assigned</i>	<i>The user will have unauthorized access to sensitive information or functionality</i>
		<i>SQL injection</i>	<i>it can lead to data breaches, loss of sensitive information, and compromise of system integrity</i>
	<i>Portability</i>	<i>Used car sale portal look and feel is different in phone/mobile devices</i>	<i>User who are familiar with using specific device will lose interest in using the website.</i>

**Reference Link:**

<https://www.slideshare.net/HcmcStc/hcmc-stc-jan-2015-riskbased-software-testing-approaches>

<https://www.youtube.com/watch?v=-OGne8uhJgQ>

<https://www.softwaretestinghelp.com/risk-management-during-test-planning-risk-based-testing/>

<https://www testers.blog/risk-based-testing-effective-way-to-manage-testing/>

<https://www.guru99.com/risk-based-testing.html https://www.softwaretestingclass.com/what-is-risk-based-testing-in-software-testing/>

## 7. Task 4

### Task Statement

Create the following items under “Test Planning” in Project Report

1. Establish the test phases of security testing with its prioritization
2. Develop the detailed test plan with test cases based on quantitative risk analysis
3. Create a test risk matrix with the evaluation of the impact

### Solution

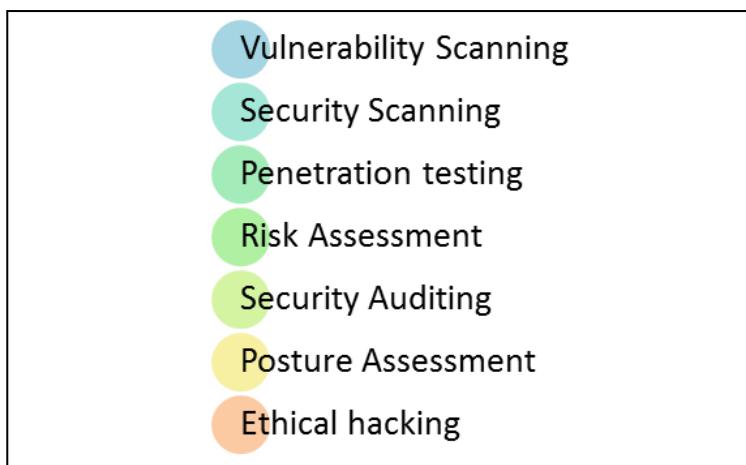
#### **4.1 Establish the test phases of security testing with its prioritization.**

##### **(a) RBT Test Strategy in car portal project**

###### **1. What is security testing ?**

Security testing is a type of software testing that focuses on identifying vulnerabilities and weaknesses in an application or system's security measures. The goal of security testing is to ensure that the system or application is safe from potential threats such as hacking, unauthorized access, data breaches, and other cyberattacks.

###### **2. Types of Security Testing**



- Vulnerability scanning : identify known vulnerabilities in the system or network.
- Security scanning : This can be done either manually or using automated tools to identify weaknesses in the system and network, with the aim of reducing the risk.
- Penetration testing : An external attack simulation is carried out to identify potential vulnerabilities in the system or network.
- Risk assessment : This involves analyzing security risks and classifying them as low, medium, or high, and identifying measures to reduce them.
- Security auditing : This involves inspecting the code line by line to identify security flaws.
- Posture assessment : Ethical hackers are employed to identify security flaws in the system.
- Ethical hacking : This involves combining security scanning, ethical hacking, and risk assessment to determine the overall security posture of an organization.

##### **(b) Among test strategies, how to carry security testing.**

ABC Cars . project safety inspection process

Risk assessment is a process of identifying, assessing and analyzing potential risks that may affect an organization's operations, assets or objectives. The purpose of a risk assessment is to identify potential threats and vulnerabilities that may impact the organization and determine the likelihood and impact of those risks. This process includes several steps:

### 1. Risk identification:

This involves identifying potential risks to the organization, such as cyber attacks, natural disasters, or other security incidents.

### 2. Risk analysis:

This step involves assessing the likelihood and impact of each identified risk. Likelihood is determined by looking at the likelihood of a risk occurring, while impact is determined by looking at the potential consequences of the risk.

### 3. Risk reduction:

This step involves developing strategies to manage and mitigate the identified risks.

### (c) Test phases in security testing

Security testing is an important part of every phase of the software development life cycle (SDLC) to ensure the security of the final product.

#### 1. Request stage:

perform a security scan to check for any potential abuses that could pose a security risk.

#### 2. Design:

Identify potential security issues and plan how to address them.

3. Coding and unit testing:

should be performed by testers who are familiar with the internal code structure of the site.

#### 4. Integration testing:

test the functionality of the website without regard to the design of the internal system.

#### 5. System check:

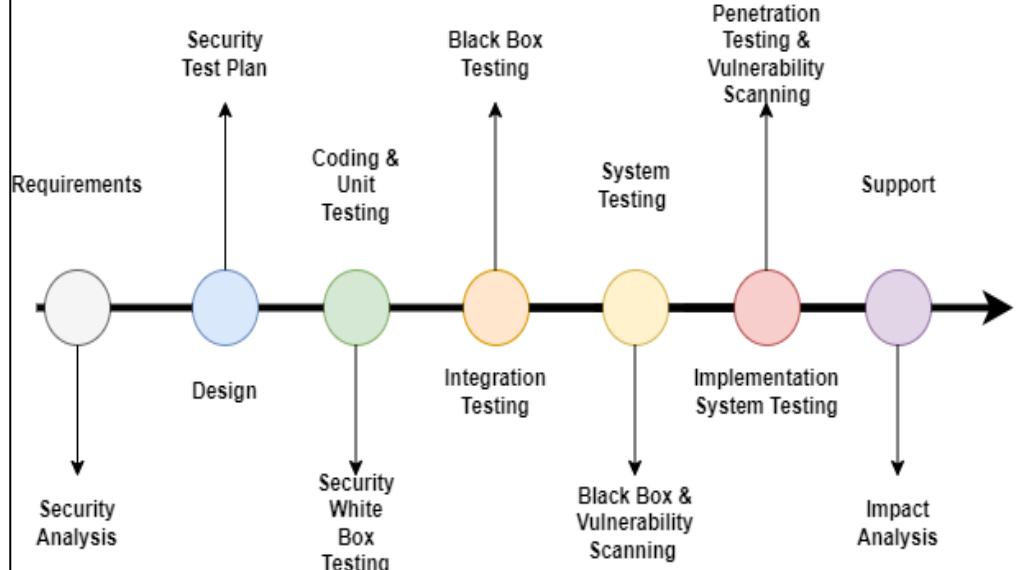
Vulnerability testing and scanning should be performed to identify any potential vulnerabilities throughout the site.

#### 6. Implementation:

Penetration testing should be performed to simulate an attack from malicious hackers, as well as scan for vulnerabilities.

#### 7. Support:

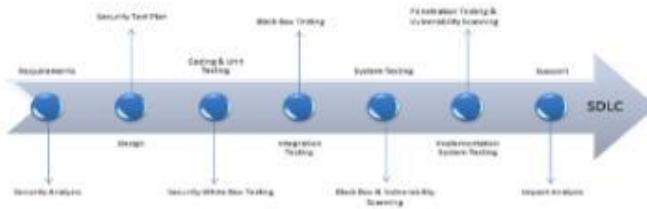
Patches and software updates should be made to address vulnerabilities identified during testing.



## How to do Security Testing

It is always agreed, that cost will be more if we postpone security testing after software implementation phase or after deployment. So, it is necessary to involve security testing in the SDLC life cycle in the earlier phases.

Let's look into the corresponding Security processes to be adopted for every phase in SDLC.



SDLC Phases	Security Processes
Requirements	Security analysis for requirements and check abuse/misuse cases
Design	Security risks analysis for designing, Development of <a href="#">Test Plan</a> including security tests
Coding and Unit Testing	Static and Dynamic Testing and Security <a href="#">White Box Testing</a>
Integration Testing	<a href="#">Black Box Testing</a>
System Testing	Black Box Testing and Vulnerability scanning
Implementation	<a href="#">Penetration Testing</a> , Vulnerability Scanning

## 4.2 Develop The Detailed test plan with test cases based on quantitative risk

### 4.2.1 The testing plan for the used car portal includes the following testing

1. Functional Testing - UAT test cases - 5 atleast
2. Compatibility - Cross-browser testing / responsiveness
3. Performance Efficiency - Load Testing/ Stress testing
4. Usability testing - Prototyping
5. Security - Security testing (IU 5) / Spring Security (Priority Testing)
  - a) SQL injection
  - b) Logging
  - c) Authentication and Authorization
6. Portability - Multi platforms (different platforms, different devices)
7. Reliability – same with usability testing
8. Maintainability – Using Spring (Dependency Injection), Junit Testing

### 4.2.2 Test Plan Table

The test plan includes the following:

- 1) Test Scenario
- 2) Test Cases (Under one scenario, there may be more than one test cases)
- 3) Test Objectives
- 4) Expected Outcome
- 5) Risk
- 6) Techniques (Types of testing)

Risk Id	Test Scenario ID	Test Scenario	Test Objective	Test Priority	Risk	Technique	Expected Results
1	UA001	Ensure user can register in the portal	To allow user to register with their credentials (name, username, email, password) successfully	High	User is not able to register with their credentials	UAT Testing	After registering user will see the success message and their credentials saved in the database
2	UA002	Ensure user can login in the portal	To allow user to log in with registered credentials	High	User is not able to log in with registered credentials	UAT Testing	After login, user will reach to the home page
3	UA003	Ensure user can post a car in the portal	To allow user to post a car in the portal	High	User is not able to post a car in the portal	UAT Testing	Users can post their car in the portal
4	UA004	Ensure user can search and view car detail	To allow user to search a particular car in the portal	High	User is not able to find the expected car	UAT Testing	After giving the keyword user will see matched search result
5	UA005	Ensure user can update his profile	To allow user to update their profile	High	Users is not able to update their profile	UAT Testing	Users can see updated details in their profile
6	TS001	Validating registration functionality	To check registered data stored successfully	High	User is not able to register in the portal	Unit Testing	After checking, junit should return a passing result as user data can be save
7	TS002	Validating login functionality	To check credentials are existing in the system	High	User is not able to log in to the portal	Unit Testing	After checking, junit should return a passing result as user data exist/present in the system
8	TS003	Ensure car can be added/saved	To test posting a car	High	User not able to post a car	Unit Testing	After checking, junit should return a passing result as car data can be saved
9	TS004	Checking search functionality	To test searching functionality	High	User not able to find a car	Unit Testing	After checking, junit should return a passing result as any car can be search with matching requirements
10	TS005	Ensure the functionality of bidding price for a selected car	To test adding a bid worked properly	High	User not able to bid for a car	Unit Testing	After checking, junit should return a passing result as Project Report NICF Capstone Project using Java Page   28 bidding data can be save
11	PM001	Testing the performance of	To utilize the page's loading speed of the	Extreme	User will lose interest and does not want	Performance Testing	After testing, The loading time speed should be above 80

		registration page	registration page using Chrome DevTools		to use the application		- 90% or less than 1s.
12	CB001	Ensure register page maintain a consistent look and feel in different browser (Chrome, Edge, Firefox)	To check a consistent look and feel of the register page across different browser	High	User may feel irritated with the different look and feel in the register page and lose credibility on the portal	Compatibility Testing	After testing, register page maintain a consistent look and feel across different browser
13	CB002	Ensure login page maintain a consistent look and feel in different browser (Chrome, Edge, Firefox)	To see a consistent look and feel of the login page across different browser	High	User may feel confused with the different look and feel in the login page and lose credibility on the portal	Compatibility Testing	After testing, Register page should have consistent look and feel across different browser
14	CB003	Ensure home page maintain a consistent look and feel in different browser (Chrome, Edge, Firefox)	To see a consistent look and feel of the home page across different browser	High	User may feel confused with the different look and feel in the home page and lose credibility on the portal	Compatibility Testing	After testing, home page should have consistent look and feel across different browser
15	CB004	Ensure car detail page maintain a consistent look and feel in different browser (Chrome, Edge, Firefox)	To see a consistent look and feel of the car detail page across different browser	High	User may feel confused with the different look and feel in the car detail page and lose credibility on the porta	Compatibility Testing	After testing, car detail page should have consistent look and feel across different browser
16	CB005	Ensure profile page maintain a consistent look and feel in different browser (Chrome, Edge, Firefox)	To see a consistent look and feel of the profile page across different browser	High	User may feel confused with the different look and feel in the profile page and lose credibility on the porta	Compatibility Testing	After testing, profile page should have consistent look and feel across different browser
17	PB001	Ensure register page maintain a consistent look and feel in different devices	To ensure all feature in the register page is visible to the user in different devices	High	User may lose interest and chose a different option as the website are not able to adapt to their	Portability Testing	After testing, all register page is visible to the user in different devices (laptop, iPad and phones)

		(laptop, iPad, phone)			device of choice		
18	UB001	Test whether the register page is userfriendly in design	To ensure all navigation in header and footer works properly and the content is visible	High	User will be unable to fully utilize the function in the register page	Usability Testing	User will be able to use all navigation links in the register page properly and understand the flow of features available
19	UB002	Test whether the login page is userfriendly in design	To ensure all navigation in header and footer works properly and the content is visible	High	User will be unable to fully utilize the function in the login page	Usability Testing	User will be able to use all navigation links in the login page properly and understand the flow of features available
20	UB003	Test whether the home page is userfriendly in design	To ensure all navigation in header and footer works properly and the content is visible	High	User will be unable to fully utilize the function in the home page	Usability Testing	User will be able to use all navigation links in the home page properly and understand the flow of features available
21	UB004	Test whether the car detail page is userfriendly in design	To ensure all navigation in header and footer works properly and the content is visible	High	User will be unable to fully utilize the function in the car detail page	Usability Testing	User will be able to use all navigation links in the car detail page properly and understand the flow of features available
22	UB005	Test whether the profile page is userfriendly in design	To ensure all navigation in header and footer works properly and the content is visible	High	User will be unable to fully utilize the function in the profile page	Usability Testing	User will be able to use all navigation links in the profile page properly and understand the flow of features available
23	SE001	Ensure user is authenticated correctly after logging in	To ensure Spring Security login feature is authenticated correctly	High	User will not be able to log in to the portal and reach the home page	Security testing	User will be able to reach respective home page based on role assigned
24	SE002	Ensure after logging in, user home page navigation is authorized correctly based on role assigned	To ensure Spring security authorization is working correctly on the navigation bar	Extreme	User with role assigned could not fully utilize feature based on assigned role and expose all user's data to unauthorized access compromising user confidentiality	Security testing	User with user role can post car and buy car while user with administrator role can manage user and car data
25	SE003	Checking for SQL injection	To ensure search input data is not vulnerable to an SQL injection	Extreme	User with ill intent will be able to access database data and retrieve	Security testing	No return is given as a result from the injected SQL Query

					sensitive information		
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### 4.3 Create a test risk matrix with the evaluation of the impact

4.3.1 How Risk Evaluation is conducted.

#### Quantitative Risk Analysis

1. Identify risk related to ABC used car portal
2. Calculate the risk by multiplying the likelihood by the consequences

$$Risk = Likelihood \times Consequence$$

$$Risk = 2 \times 4 = 8$$

3. The result of the risk value (8), based on the Risk Matrix diagram below will be in the scale of High.

4.3.2 Develop a test Risk Matrix for a given specification.

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Severe
Almost Certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	Extreme	Extreme
Possible	Medium	Medium	High	High	Extreme
Unlikely	Low	Medium	Medium	High	High
Rare	Low	Low	Medium	High	High

#### Test Risk Matriks

Risk ID	Risk	Likelihood	Impact	Type of Testing	Risk Rating	Risk Level
		(1-5)	(1 - 5)			
1	User is not be able register in the system	3	4	UAT Testing	12	High
2	User will not be able to reach the portal home page to post or view cars	3	4	UAT Testing	12	High
3	User will not be able to sell their car	3	4	UAT Testing	12	High
4	User will not be able to find the car expected	3	3	UAT Testing	9	High
5	User will not be able to complete their profile information	3	3	UAT Testing	9	High
6	User will not be able to login to the portal	3	4	Unit Testing	12	High
7	User will not be able to register in the portal	3	4	Unit Testing	12	High
8	User will not be able to post a car in the portal	3	4	Unit Testing	12	High

9	User will not be able to search for any car	3	3	Unit Testing	9	High
10	User will not be able to bid for any car	3	4	Unit Testing	12	High
11	User will lose interest and will not register to login and access the home page to buy or sell car	4	4	Performance Testing	16	Extreme
12	User may feel irritated with the different look and feel in the register page and lose credibility on the portal	3	3	Compatibility Testing	9	High
13	User may feel irritated with the different look and feel in the login page and lose credibility on the portal	3	3	Compatibility Testing	9	High
14	User may feel irritated with the different look and feel in the home page and lose credibility on the portal	3	3	Compatibility Testing	9	High
15	User may feel irritated with the different look and feel in the car detail page and lose credibility on the portal	3	3	Compatibility Testing	9	High
16	User may feel irritated with the different look and feel in the profile page and lose credibility on the portal	3	2	Compatibility Testing	6	High
17	User may lose interest and chose a different option as the website are not able to adapt to their device of choice	3	4	Portability Testing	12	High
18	User will be unable to fully utilize the function in the register page	3	4	Usability Testing	12	High
19	User will be unable to fully utilize the function in the login page	3	4	Usability Testing	12	High
20	User will be unable to fully utilize the function in the home page	3	4	Usability Testing	12	High
21	User will be unable to fully utilize the function in the car detail page	3	4	Usability Testing	12	High
22	User will be unable to fully utilize the function in the profile page	3	3	Usability Testing	9	High
23	User will not be able to log in to the portal and reach the home page	3	4	Security Testing	12	High
24	User with role assigned could not fully utilize feature based on assigned role and expose all user's data to unauthorized access compromising user confidentiality	3	5	Security Testing	15	Extreme
25	User with ill intent will be able to access database data and retrieve sensitive information	3	5	Security Testing	15	Extreme

## 8. Task 5

### Task Statement

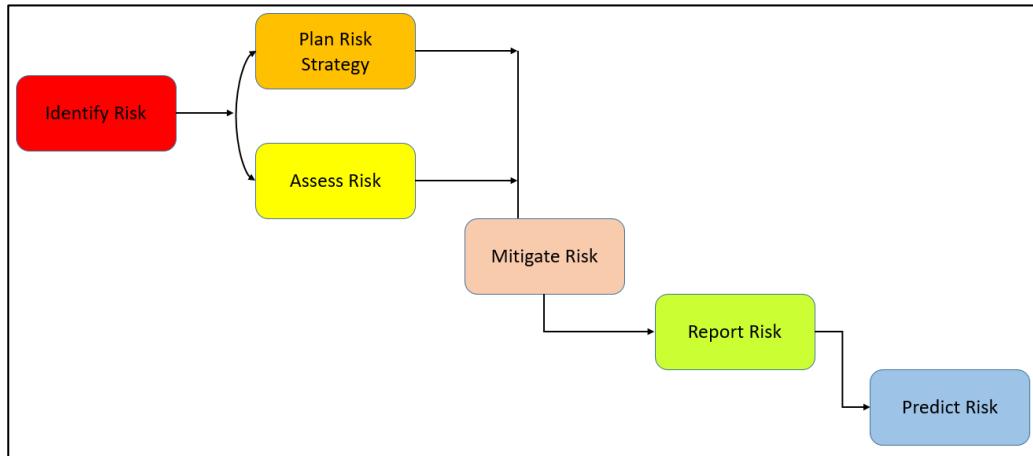
Create the following items under "Testing Strategy" in Project Report

1. Design suitable RBT cycle content and priorities further test cycles
2. Communicate the details of the strategy and test planning to the key stakeholders with proper justifications

### Solution

#### 1. Design suitable RBT cycle content and priorities further test cycles.

- Based on your car sale portal project, design and explain a suitable risk base **test cycle**.
- 



##### Identify risk

- Ensure that the requirements for developing the ABC Car portal have been thoroughly assessed based on the customer specification.
- requesting input from every team member during a brainstorming session on potential risks to the used vehicle sales portal
- Plan risk strategy and assess risk
- Creating a Risk Register or putting all identified risks there so they can be classified according to how important they are to the portal
- Create a thorough risk assessment plan for the used car gateway by filtering the risks that have been discovered and taking into account their likelihood and potential effects.
- Prioritize which risks should be tested in the test plan by calculating the risk level using the risk matrix.
- Create test cases and run them in accordance with the importance of the risk item.
- Mitigate risk
- Making contact with each stakeholder, scheduling meetings to discuss potential fixes for the problem/risk, and obtaining updates on risks that have already been managed for the portal

- Establish a central system where all risk information is stored and can be consulted for future risk management.
  - Report risk
- Report the results or record of the risk-based testing for the used car portal to the development team so that the problem can be resolved for the failed test cases.
- Predict risk
- Predict future risk outcomes based on risk assessments, and develop a backup plan to deal with any unforeseen situations.

**2. Communicate the details of the strategy and test planning to the key stakeholders with proper justifications**

- a. Justify the selection of test methods based on quantified risk to a project.

- 

Type of Testing	Main Purpose
Functional Testing	This testing focuses on validating functions mentioned in project requirement specification for user and admin correspondingly, such as login, register, view car's details, post new car with details, bidding car's price.
Security Testing	The testing identifies weaknesses, risks, and threats to the used vehicle portal against hostile intrusions that could result in the loss of data, money, or the reputation of the portal. Possible attacks include SQL injection, in which a hacker inserts a harmful SQL query into a field, like the search bar, to retrieve and edit information in the portal database. The confidentiality of user data will be jeopardized, and the portal will become exposed, exposing the design of the database. In order to properly authenticate or validate the user during the login stage and authorize which links a user can access based on their role, Spring Security is essential.
Performance Testing	In order to ensure a better user experience, this testing focuses on analyzing the speed and responsiveness of the portal web pages, such as the signup page.
Compatibility Testing	This testing, also known as cross-browser testing, makes sure that the portal can provide an excellent user experience in any browser of choice and can spot any compatibility issues with Chrome, Edge, or Firefox.
Portability Testing	In order to assure the lifespan of the portal and its capacity to adapt to ongoing change, this testing will examine how well the portal can be used on various commercially available devices, such as phones, tablets, or laptops.requires ongoing upgrades in order to reduce costs.
Usability Testing	The purpose of this testing is to see how simple it is for users to navigate the used vehicle portal and assess how easily users

	can utilize the features to accomplish tasks like listing a car or searching for a car.
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- b. Communicate the details of your strategy and test planning to the key stakeholders with proper justifications
- What is stakeholder?

Stakeholders are individuals, groups, or organizations that have an impact on a software project. They may also be actively involved in the project or have interests that could make or break the project's success. You are always responsible. Project Lifetime and Multiple Levels of Responsibility

- Why is it important to communicate risks to key stakeholders?
  - Promote accountability

It can be difficult to define project roles and responsibilities before threats are identified. 29% of companies cite accountability as the top barrier to project completion, highlighting the need for improved accountability and risk management processes.

- State realistic expectations

Project stakeholders give money, time, and support for a variety of reasons, so it's important to return the favor by speaking openly and honestly about the project timeline.

- unite the team

In today's world, teams working on projects are often distributed in multiple locations, even around the world. If something goes wrong, how can a project manager properly communicate risk to a large team?

- How do you communicate risks to stakeholders? - JOIN YOUR TEAM

Communication with stakeholders is often the project manager's responsibility, but it should not be the sole means of communication. All members of the project team should participate in risk management. Especially if members have knowledge of specific risk areas or are responsible for specific project components.

- Consider stakeholder locations

Effective communication can be difficult when key stakeholders are scattered and far from you and your project. Ideally, a project team her members should be selected who are close to the stakeholders, be it region, country, time zone, etc., so that they can respond quickly to questions and issues.

- use technology

You and your team members can use risk analysis technology to provide stakeholders with access to quantitative risk analysis. If risk assessments are purely hypothetical or involve an erroneous assessment of resources, finances, or time, stakeholder expectations can be misguided into inappropriate demands. This can lead to dissatisfaction with the way projects are handled, which can jeopardize support.

- Use reports and alerts

Search for common issues, report potential issues using interactive links, and submit for review by reporting regularly on your project. You can then set alerts to potential threats, react retroactively, and notify key parties or stakeholders who need information.

## Task 6

Create the following items under “**Testing Results**” in Project Report

1. Execute the risk-based test plan and log the test results
2. Modify the risk-based test procedure with the reasons

### 1. Functional Testing:-

- i. UAT Testing- 5 scenarios:- 10
  - i. Registration - TS001- TC001, TC002
  - ii. Login –TS002
  - iii. Search Car
  - iv. View car
  - v. Post car

Requirements	Test Scenario ID	Test Scenario	Number of Test Cases
Functional Testing	UA001 – UAT Testing	Ensure user can register in the portal	2
	UA002 – UAT Testing	Ensure user can login in the portal	2
	UA003 – UAT Testing	Ensure user can post a car in the portal	2
	UA004 – UAT Testing	Ensure user can search a car	2
	UA005 – UAT Testing	Ensure user can update profile	2

Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
UA001	UATC001	Check all the mandatory fields are entered	ABC Cars Portal website has completed and uploaded on server	After registering, user will see a successful registration message and a login link.	Result is come out as expected	Pass
Test data and steps	Name=user4 Username = user4 Email= <a href="mailto:user4@user.com">user4@user.com</a> Password= user4  1. Enter URL localhost:8080 2. Click “Register” on website navigation bar 3. Enter all the fields. 4. Click Register.					

## Evidence

The screenshot shows the 'REGISTER' form on the ABC Cars Pte Ltd website. The form fields are filled with the following values:

- Name: user4
- Username: user4
- Email: user4@user.com
- Password: \*\*\*\*

Each field has a green checkmark indicating it is valid. Below the form is a 'Register' button.

At the bottom of the page, there is a footer with social media links and copyright information: © 2022 Copyright: ABCar.com

The screenshot shows the 'REGISTER' form on the ABC Cars Pte Ltd website. The form fields are filled with the following values:

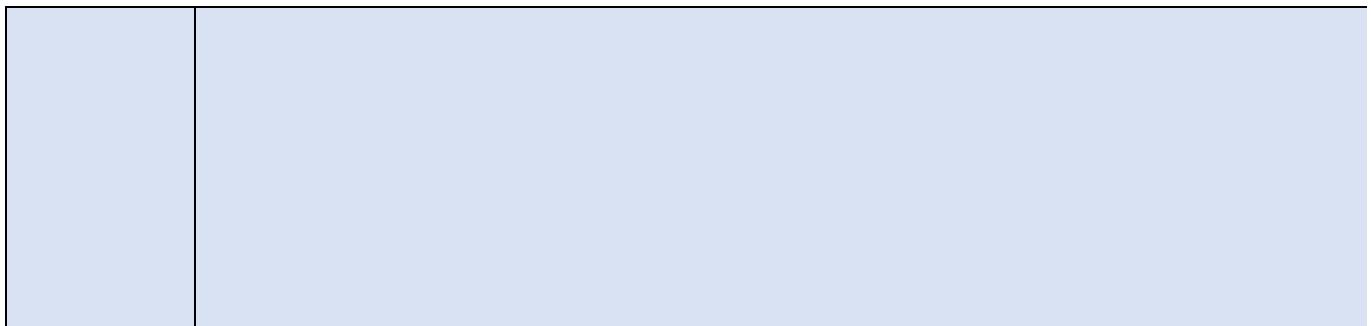
- Name: user4
- Username: user4
- Email: user4@user.com
- Password: \*\*\*\*

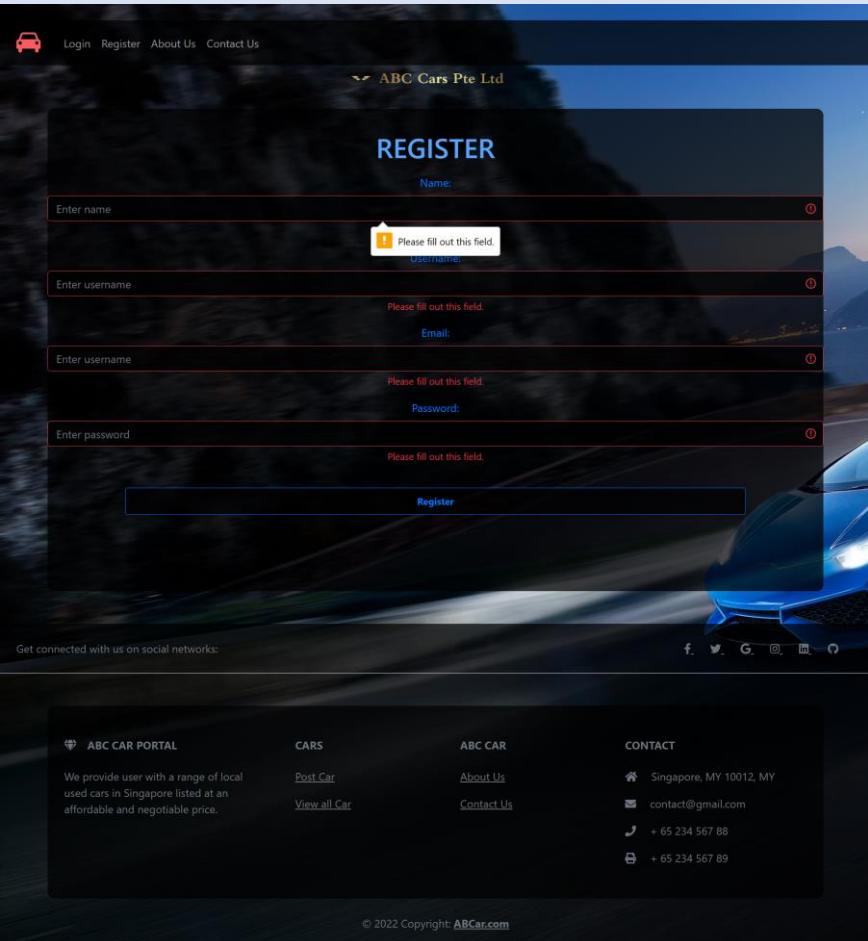
Each field has a green checkmark indicating it is valid. Above the form, a green success message reads: Registration Successfull Click here to [Sign In](#).

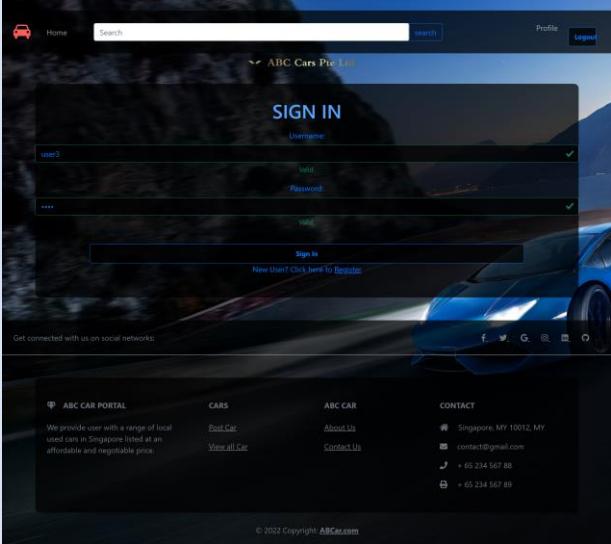
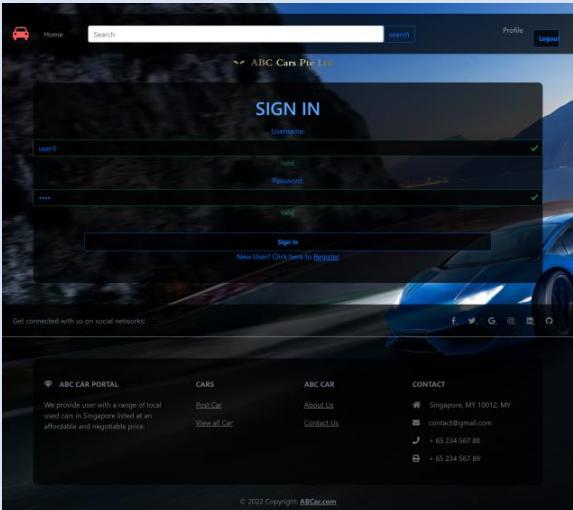
Below the form is a footer with social media links and copyright information: © 2022 Copyright: ABCar.com

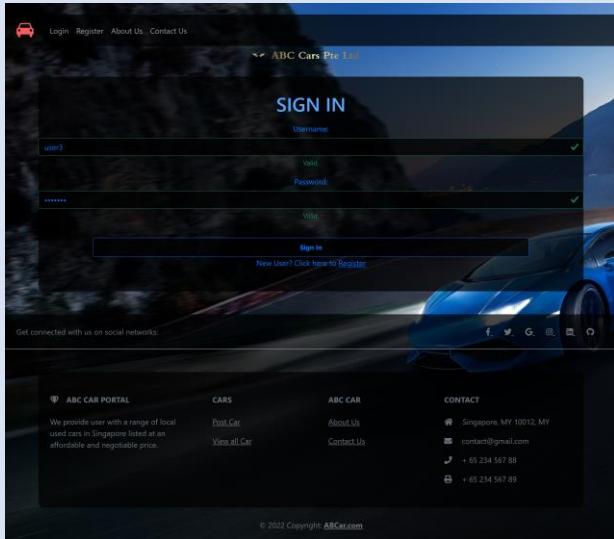
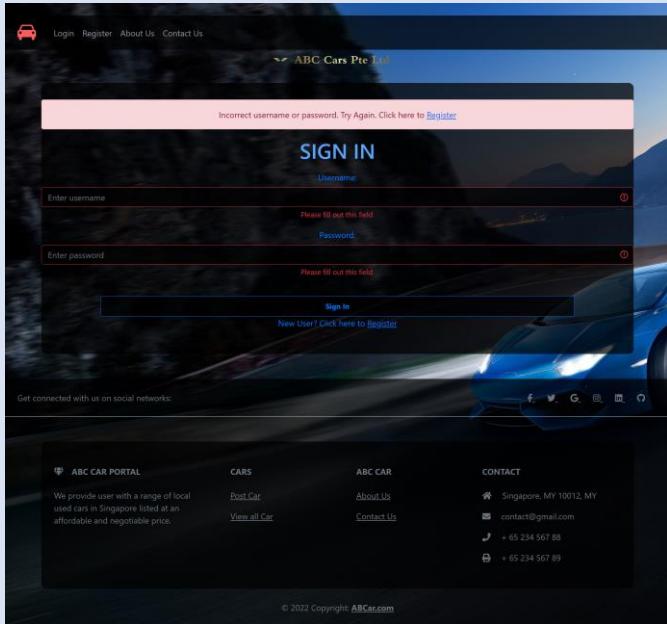
Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content: |

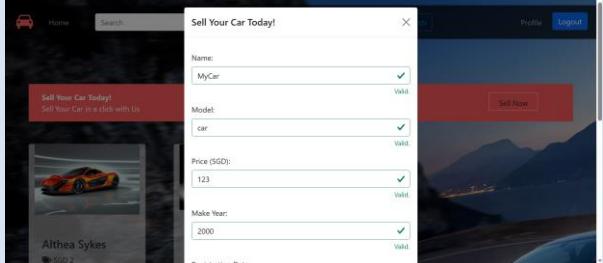
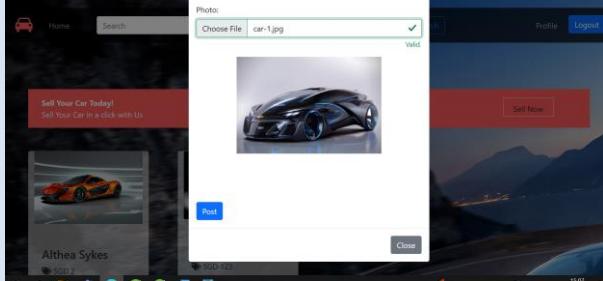
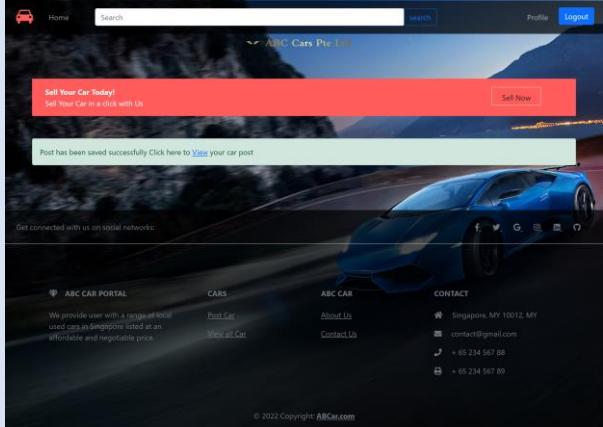
	<b>id</b>	<b>address</b>	<b>email</b>	<b>mobile</b>	<b>name</b>	<b>password</b>	<b>user_name</b>
▶	1	NULL	user@user	NULL	user	\$2a\$10\$pNRHOB9HGDVBU30U0Cqt1eOo/u3KH...	user
2	NULL	NULL	user4@user.com	NULL	user4	\$2a\$10\$akZwpybSfu1FRgf87ZgYgO0jh9BoRl7q...	user4
*	NULL	NULL	NULL	NULL	NULL	NULL	NULL



Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
UA001	UATC002	Check registration not blank validation working correctly	ABC Cars Portal website has completed and uploaded on server	After submitting the register data, user will see the browser default validation message 'Please fill out this field'	Result is come out as expected	Pass
<b>Test data</b>	Name= Username = Email= Password=					
<b>Evidence</b>	 <p>The screenshot shows the 'REGISTER' form on the ABC Cars Pte Ltd website. The form has four input fields: 'Enter name', 'Enter username', 'Email:', and 'Password:'. Each field has a red border and a validation error message: 'Please fill out this field.' A yellow info icon is next to each message. Below the form is a 'Register' button.</p>					

Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
UA002	UATC001	Check all the mandatory fields are entered	ABC Cars Portal website has completed and uploaded on server	After login, user will reach to the home page	Result is come out as expected	Pass
<b>Test data and steps</b>	<p>Username = user3            Password= user            1. Enter URL            localhost:8080            3. Enter all the fields.            4. Click Log In.</p>					
<b>Evidence</b>	 					

<b>Test Scenario ID</b>	<b>Test Case ID</b>	<b>Test Case</b>	<b>Pre-condition</b>	<b>Expected Result</b>	<b>Actual Result</b>	<b>Pass/Fail</b>
UA002	UATC002	Check registration not blank validation working correctly	ABC Cars Portal website has completed and uploaded on server	After submitting the register data, user will see the browser default validation message 'Please fill out this field'	Result is come out as expected	Pass
<b>Test data And steps</b>	<p>Username = user3          Password= asdddddd          1. Enter URL localhost:8080          3. Enter all the fields.          4. Click Log In.</p>					
<b>Evidence</b>	 					

Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
UA003	UATC001	Check if user can successfully post a car in the portal	ABC Cars Portal website has completed and uploaded on server	After posting a car, user will see a success message and view car detail link.	Result is come out as expected	Pass
<b>Test data</b>	<p>name = MyCar</p> <p>model= car</p> <p>Price = 123</p> <p>Make Year =2000</p> <p>Registration Date = 01-Nov-2000</p> <p>1. Enter URL localhost:8080 2.Sign In into the portal</p>					
<b>Evidence</b>	  					

The screenshot shows a car listing page for a futuristic-looking car named 'MyCar'. The car is shown in a dark, low-light environment, possibly a tunnel or at night. The listing details include:

- Condition:** Used Car
- Model:** MyCar
- Current Price:** SGD 123
- Current Bid:** SGD 0
- Manufacture Year:** 2000
- Registration Date:** 01-Nov-2000

Below the listing are buttons for "Book for Test Drive" and "Bid". At the bottom of the main content area, there's a section titled "Get connected with us on social networks" with icons for Facebook, Twitter, Google+, and LinkedIn.

At the very bottom of the page, there's a footer with links to "ABC CAR PORTAL", "CARS", "ABC CAR", and "CONTACT". The contact information includes an address in Singapore, an email (contact@gmail.com), and two phone numbers (+65 234 567 88 and +65 234 567 89). The footer also notes "© 2022 Copyright AllCars.com".

Below the main content area, there's a data grid table with the following data:

	id	make	model	name	photo_image_path	photos	post_date	price	registration	sell_status	seller_id
▶	1	1988	Mollitia fugit sit	Althea Sykes	/images/car-photo/1/car-2.jpg	car-2.jpg	Serini 08 Mei 2023	2	29-May-1971	HULL	1
▶	2	1997	car	MyCar	/images/car-photo/2/car-3.jpg	car-3.jpg	Serini 08 Mei 2023	123	01-Nov-1997	HULL	3
▶	3	2000	car	MyCar	/images/car-photo/3/car-1.jpg	car-1.jpg	Serini 08 Mei 2023	123	01-Nov-2000	HULL	3
*	HULL	HULL	HULL	HULL	HULL	HULL	HULL	HULL	HULL	HULL	HULL

Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
UA003	UATC002	Check post car form not blank validation working correctly	ABC Cars Portal website has complete d and uploaded on server	After submitting the post data, user will see the browser default validation message 'Please fill out this field'	Result is come out as expected	Pass
<b>Test data And Steps</b>	<p>Name=</p> <p>Username =</p> <p>Email=</p> <p>Password=</p> <p>1.Enter URL localhost:8080</p> <p>2.Sign In into the portal</p> <p>3.Click 'Sell Now' to post a new car in the home page</p> <p>4. Click Post without entering any information.</p>					

<b>Evidence</b>	
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<b>Test Scenario ID</b>	<b>Test Case ID</b>	<b>Test Case</b>	<b>Pre-condition</b>	<b>Expected Result</b>	<b>Actual Result</b>	<b>Pass/Fail</b>
UA004	UATC001	Check if user can search a car successfully	ABC Cars Portal website has completed and uploaded on server	After searching, user will see a search result of list of cars matching with the user search input	Result is come out as expected	Pass
<b>Test data And steps</b>	<p>Search input = Car</p> <ol style="list-style-type: none"> <li>1. Enter URL localhost:8080</li> <li>2. Sign In into the portal</li> <li>3. Navigate to home page search bar</li> <li>3. Enter search input</li> <li>4. Click Search.</li> </ol>					

## Evidence

ABC Cars Pte Ltd

**REGISTER**

Name:

Please fill out this field.

Username:

Please fill out this field.

Email:

Please fill out this field.

Password:

Please fill out this field.

**Register**

Get connected with us on social networks: [f](#) [t](#) [g](#) [o](#)

**ABC CAR PORTAL**

We provide user with a range of local used cars in Singapore listed at an affordable and negotiable price.

**CARS**

[Post Car](#) [View all Car](#)

**ABC CAR**

[About Us](#) [Contact Us](#)

**CONTACT**

Singapore, MY 10012, MY  
contact@gmail.com  
+65 234 567 88  
+65 234 567 89

© 2022 Copyright: ABCar.com

ABC Cars Pte Ltd

**REGISTER**

Name:

Please fill out this field.

Username:

Please fill out this field.

Email:

Please fill out this field.

Password:

Please fill out this field.

**Register**

Get connected with us on social networks: [f](#) [t](#) [g](#) [o](#)

**ABC CAR PORTAL**

We provide user with a range of local used cars in Singapore listed at an affordable and negotiable price.

**CARS**

[Post Car](#) [View all Car](#)

**ABC CAR**

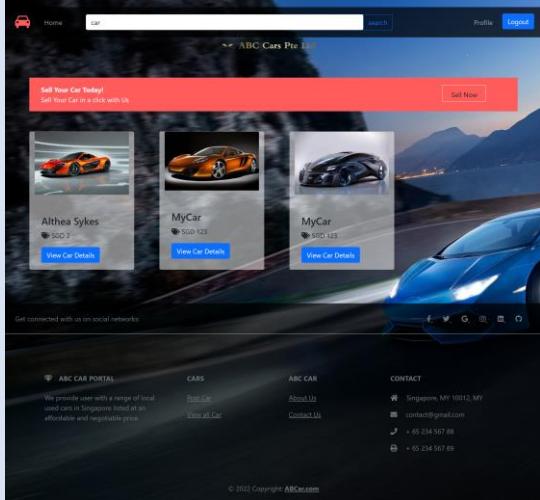
[About Us](#) [Contact Us](#)

**CONTACT**

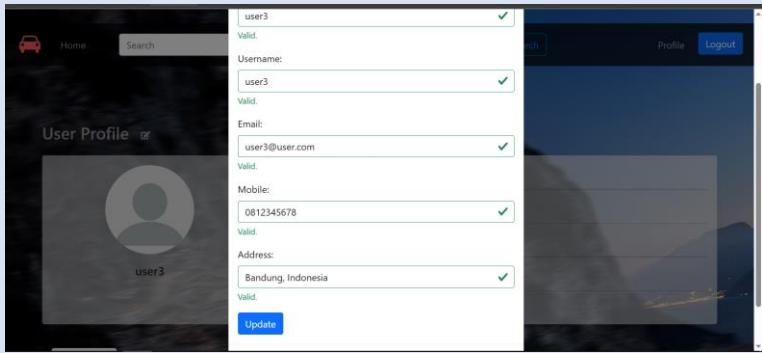
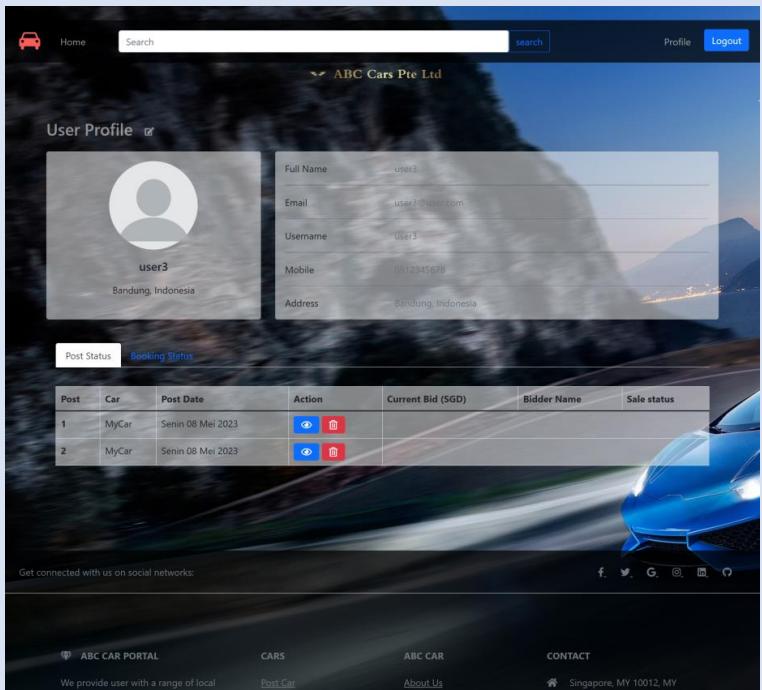
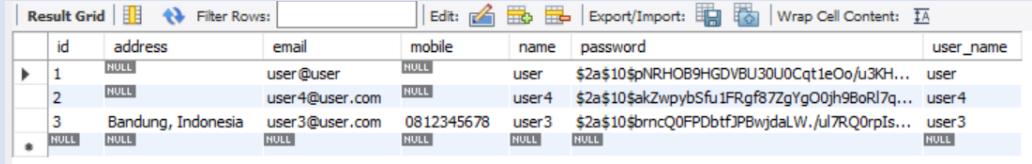
Singapore, MY 10012, MY  
contact@gmail.com  
+65 234 567 88  
+65 234 567 89

© 2022 Copyright: ABCar.com

Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
UA004	UATC002	Ensure user can view detail of search car	ABC Cars Portal website has completed and	User can view detail of search car selected	Not as expected,	fail

			uploaded on server			
<b>Test data And steps</b>	1. Enter URL localhost:8080 2. Sign In into the portal 3. Navigate to home page search bar 4. Enter search input 4. Click Search. 5. Click 'View CarDetails' on selected search car result					
<b>Evidence</b>	 <p><b>Whitelabel Error Page</b></p> <p>This application has no explicit mapping for /error, so you are seeing this as a fallback.</p> <p>Mon May 08 15:22:52 WIB 2023    There was an unexpected error (type=Bad Request, status=400).</p>					

Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
UA005	UATC001	Check if user can update profile successfully	ABC Cars Portal website has completed and uploaded on server	After updating, user input data mobile and address will appear on their profile page	Result is come out as expected	pass
<b>Test data</b>	Mobile = 0812345678 Address = Bandung, Indonesia 1. Enter URL localhost:8080 2. Sign In into the portal 3. Navigate to home page navigation bar and click Profile 3. Click on the pencil icon					

	<p>next to user image</p> <p>4. Enter all field</p> <p>5.Click 'Update'</p>
<b>Evidence</b>	  

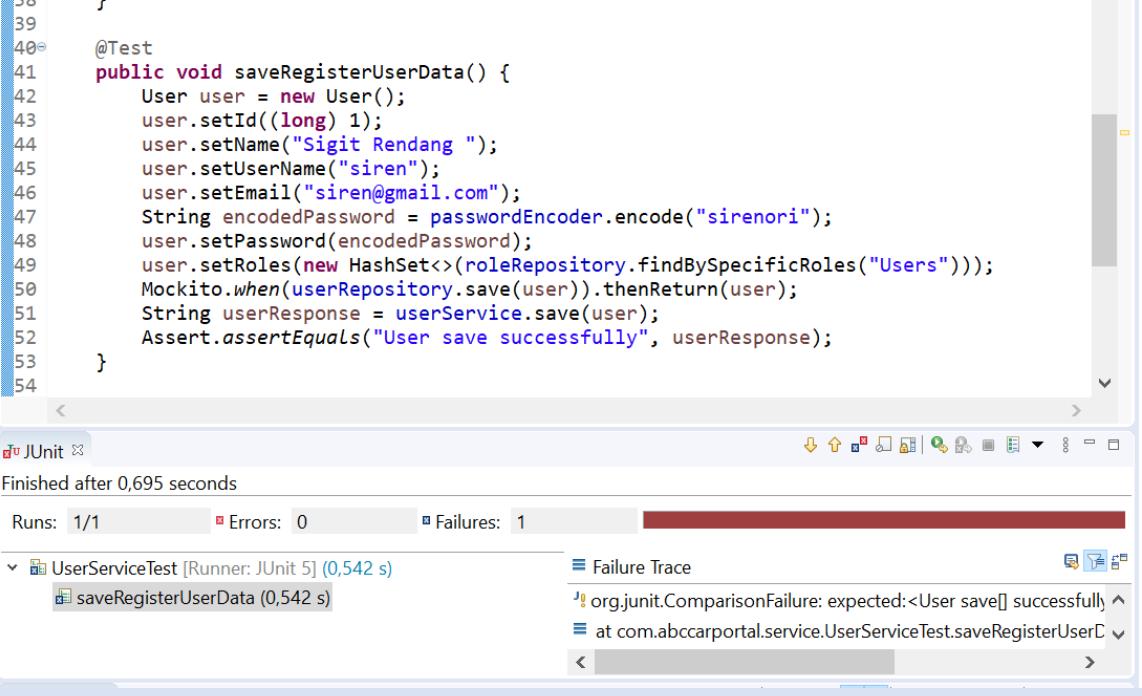
Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
UA005	TC002	Check update profile form not blank validation working correctly	ABC Cars Portal website has completed and	After submitting the update profile data, user will see the browser default validation message 'Please fill out this field'	Result is come out as expected	Pass

			uploaded on server			
<b>Test Step &amp; Test data</b>	<p>Mobile = Address =</p> <ol style="list-style-type: none"> <li>1. Enter URL localhost:8080</li> <li>2. Sign In into the portal</li> <li>3. Navigate to home page navigation bar and click Profile</li> <li>3. Click on the pencil icon next to user image</li> <li>5. Click 'Update' without entering mobile and address fields</li> </ol>					
<b>Evidence</b>						

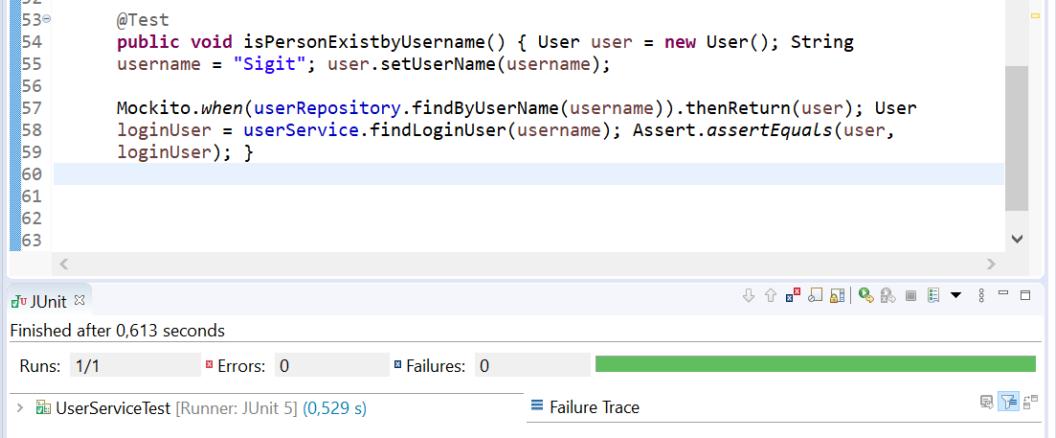
## ii Unit Testing- :

- i. Registration - TS001- TC001
- ii. Login – TS002
- iii. Search Car
- iv. View car
- v. Post car

Requirements	Test Scenario ID	Test Scenario	Number of Test Cases
Functional Testing	TS001 – Unit Testing	Validating registration functionality	1
	TS002 – Unit Testing	Validating Login functionality	1
	TS003 – Unit Testing	Check if car data can be added/save	1
	TS004 – Unit Testing	Check if car can be search	1
	TS005 – Unit Testing	Check if bidding price can be saved	1

Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
TS001	TC001	Check if registered data can be saved	ABC Cars Portal website has completed and uploaded on server	After checking, junit should return a passing result as user data can be save	Not as expected	fail
<b>Test Step &amp; Test data</b>	Name= Sigit Rendang Username = Siren Email= <a href="mailto:Siren@gmail.com">Siren@gmail.com</a> Password= sirenori 1. Run Test script shown in screenshot below					
<b>Evidence</b>	 <pre> 39 40 @Test 41 public void saveRegisterUserData() { 42     User user = new User(); 43     user.setId((long) 1); 44     user.setName("Sigit Rendang "); 45     user.setUserName("siren"); 46     user.setEmail("siren@gmail.com"); 47     String encodedPassword = passwordEncoder.encode("sirenori"); 48     user.setPassword(encodedPassword); 49     user.setRoles(new HashSet&lt;&gt;(roleRepository.findBySpecificRoles("Users"))); 50     Mockito.when(userRepository.save(user)).thenReturn(user); 51     String userResponse = userService.save(user); 52     Assert.assertEquals("User save successfully", userResponse); 53 } 54       </pre> <p>JUnit</p> <p>Finished after 0,695 seconds</p> <p>Runs: 1/1 Errors: 0 Failures: 1</p> <p>UserServiceTest [Runner: JUnit 5] (0,542 s)</p> <p>saveRegisterUserData (0,542 s)</p> <p>Failure Trace</p> <p>org.junit.ComparisonFailure: expected:&lt;User save[] successfully&gt; actual:&lt;User save[] successfully&gt;</p> <p>at com.abccarportal.service.UserServiceTest.saveRegisterUserC</p>					

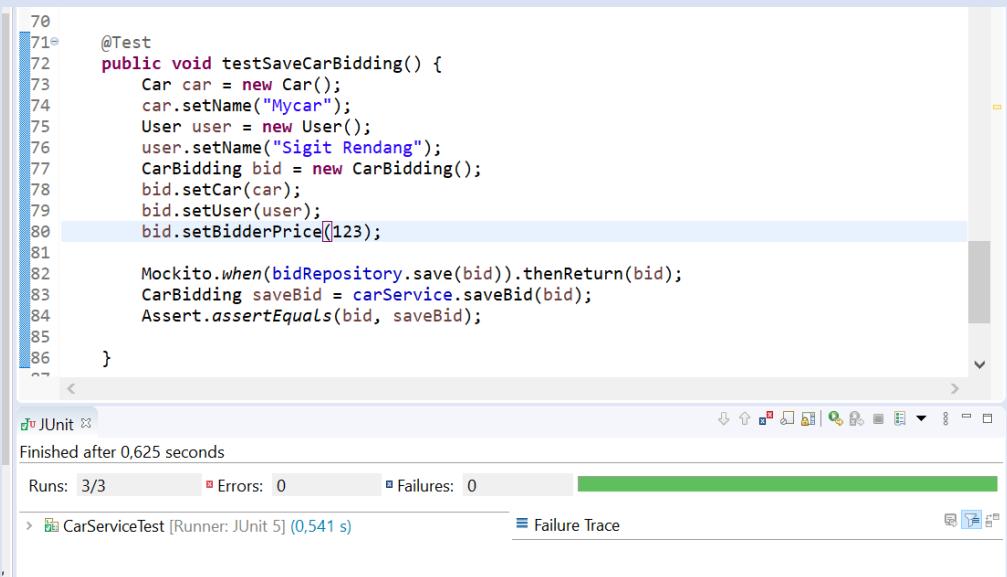
Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
TS002	TC001	Check if user credential is existing in the system	ABC Cars Portal website has completed and uploaded on server	After checking, junit should return a passing result as user data exist/present in the system	As expected,	pass

<b>Test Step &amp; Test data</b>	<p>Name= Sigit Rendang          Username = siren          Email= siren <a href="mailto:@gmail.com">@gmail.com</a>          Password= siren          1. Run Test script shown in screenshot below</p>
<b>Evidence</b>	 <pre> 53     @Test 54     public void isPersonExistByUsername() { User user = new User(); String 55     username = "Sigit"; user.setUserName(username); 56 57     Mockito.when(userRepository.findByUserName(username)).thenReturn(user); User 58     loginUser = userService.findLoginUser(username); Assert.assertEquals(user, 59     loginUser); } 60 61 62 63 </pre> <p>JUnit</p> <p>Finished after 0,613 seconds</p> <p>Runs: 1/1 Errors: 0 Failures: 0</p> <p>UserServiceTest [Runner: JUnit 5] (0,529 s) Failure Trace</p>

Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
TS003	TC001	Validate if car information can be added successfully	ABC Cars Portal website has completed and uploaded on server	After checking, junit should return a passing result as car data can be saved	As expected,	pass
<b>Test Step &amp; Test data</b>	<p>name = Mycar          model= car          Price = 123          Make Year = 2000          Registration Date = 10-Jan-2000</p>					

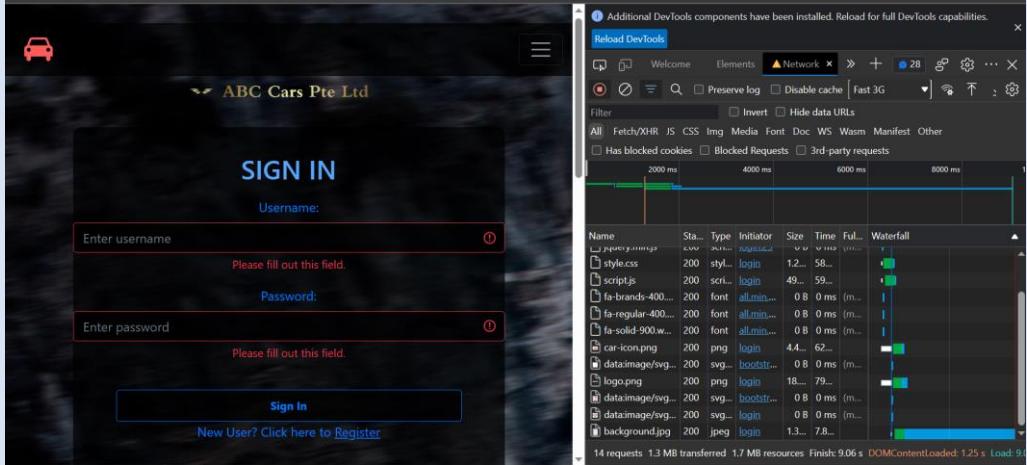
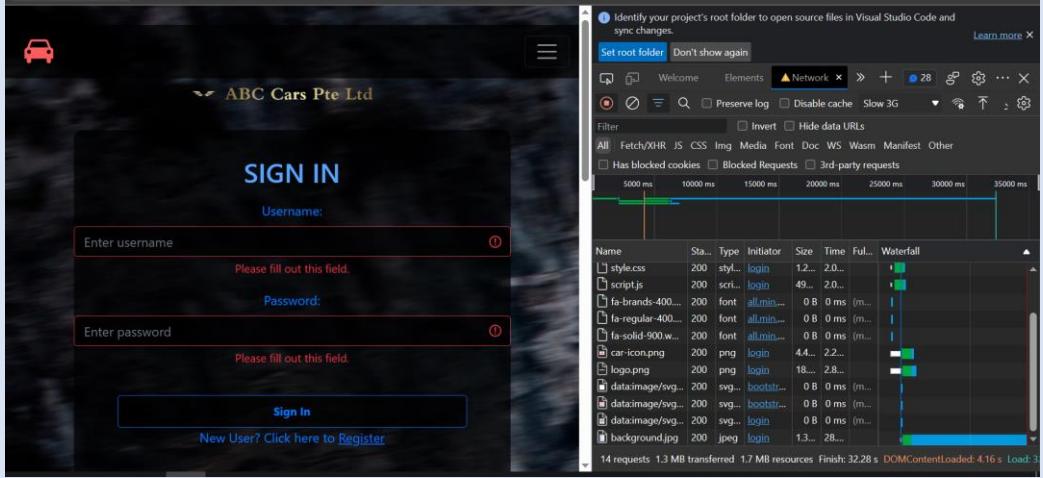
	1. Run Test script shown in screenshot below
<b>Evidence</b>	<pre> 40 41@Test 42public void testSaveCar() { 43    Car car = new Car(); 44    car.setId((Long) 1); 45    car.setName("Mycar"); 46    car.setModel("can"); 47    car.setPrice("123"); 48    car.setMake("2000"); 49    car.setRegistration("10-Jan-2021"); 50    Mockito.when(carRepository.save(car)).thenReturn(car); 51    Car savedCar = carService.save(car); 52    Assert.assertEquals(car, savedCar); </pre> <p>JUnit</p> <p>Finished after 0,63 seconds</p> <p>Runs: 3/3 Errors: 0 Failures: 0</p> <p>CarServiceTest [Runner: JUnit 5] (0,545 s) Failure Trace</p>

Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
TS004	TC001	To test searching for a car	ABC Cars Portal website has completed and uploaded on server	After checking, junit should return a passing result as any car can be search with matching requirements	As expected,	pass
<b>Test Step &amp; Test data</b>	Search input = car 1. Run Test script shown in screenshot below					
<b>Evidence</b>	<pre> 55 56@Test 57public void testSearchCar() { 58    Car car = new Car(); 59    String searchInput = "car"; 60    car.setModel(searchInput); 61 62    List&lt;Car&gt; searchCar = new ArrayList&lt;Car&gt;(); 63    searchCar.add(car); 64 65    Mockito.when(carRepository.search(searchInput)).thenReturn(searchCar); 66    List&lt;Car&gt; search = carService.search(searchInput); 67    Assert.assertEquals(searchCar, search); 68 </pre> <p>JUnit</p> <p>Finished after 0,612 seconds</p> <p>Runs: 3/3 Errors: 0 Failures: 0</p> <p>CarServiceTest [Runner: JUnit 5] (0,527 s) Failure Trace</p>					

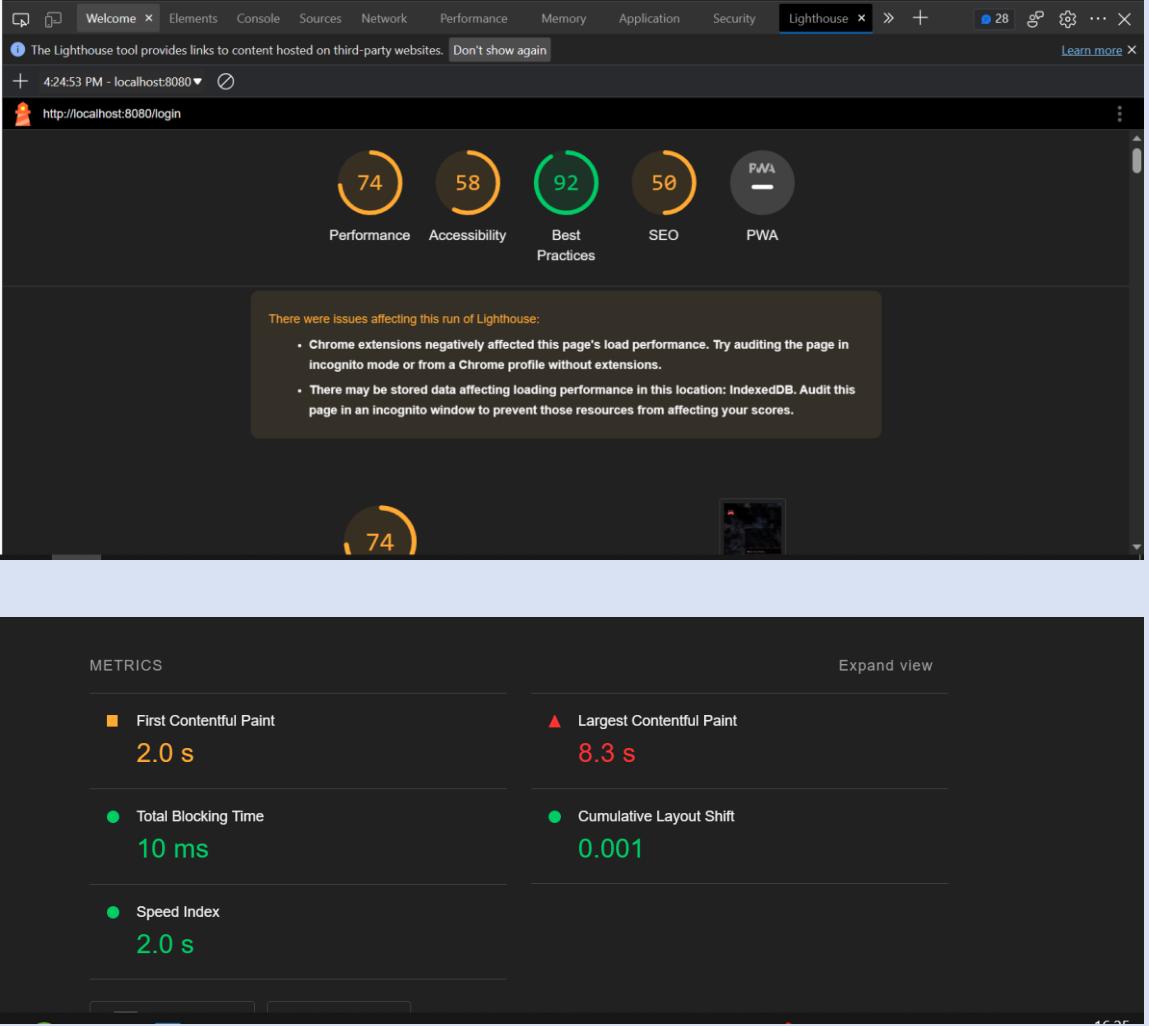
Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
TS005	TC001	To test saving bidding information	ABC Cars Portal website has completed and uploaded on server	After checking, junit should return a passing result bidding information is saved	As expected,	pass
Test Step & Test data	Bidding price = 123 Car Name = "Mycar" User name = "Sigit Rendang" 1. Run Test script shown in screenshot below					
Evidence	 <pre> 70 71  @Test 72  public void testSaveCarBidding() { 73      Car car = new Car(); 74      car.setName("Mycar"); 75      User user = new User(); 76      user.setName("Sigit Rendang"); 77      CarBidding bid = new CarBidding(); 78      bid.setCar(car); 79      bid.setUser(user); 80      bid.setBidderPrice(123);  81      Mockito.when(bidRepository.save(bid)).thenReturn(bid); 82      CarBidding saveBid = carService.saveBid(bid); 83      Assert.assertEquals(bid, saveBid); 84 85  }     </pre> <p>JUnit Finished after 0.625 seconds Runs: 3/3 Errors: 0 Failures: 0 CarServiceTest [Runner: JUnit 5] (0,541 s) Failure Trace</p>					

### III. Performance testing - Load Testing/ Stress testing

Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
PM001	PMC001	To test the loading time speed of the registration page using Chrome DevTools	ABC Cars Portal website has completed and uploaded on server	After testing, The loading time is expected to be less than 1s.	Result is come out as expected	Pass
Test Step & Test data	1. Enter URL localhost:8080 2. Use Chrome DevTools by right click and choose inspect 3. Click Network, choose No					

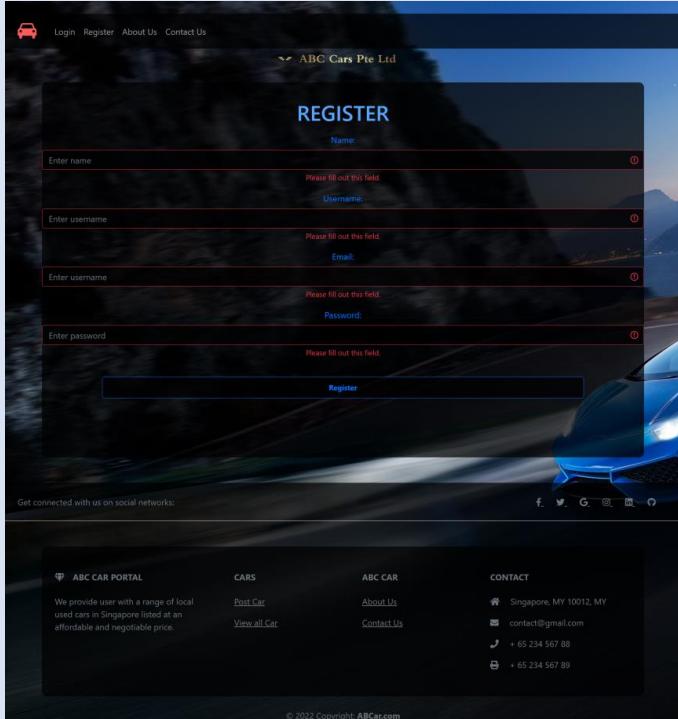
	throttling, Fast 3G, Slow 3G 4. Click “Register” on website navigation bar
<b>Evidence</b>	 

Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
PM001	PMC002	To test the loading time speed of the registration page using Chrome DevTools	ABC Cars Portal website has completed and uploaded on server	A performance report is generated with performance expected to be above 80 – 90%	Result is come out as expected	Pass

<b>Test Step &amp; Test data</b>	Mobile = Address =												
<b>Evidence</b>	 <p>The screenshot shows the Lighthouse tool running on a local host login page. The main summary section displays scores for Performance (74), Accessibility (58), Best Practices (92), SEO (50), and PWA (0). A message box indicates issues: "There were Issues affecting this run of Lighthouse:" with points about extensions and IndexedDB.</p> <p><b>METRICS</b></p> <table border="1"> <thead> <tr> <th></th> <th></th> <th>Expand view</th> </tr> </thead> <tbody> <tr> <td>■ First Contentful Paint</td> <td>2.0 s</td> <td>▲ Largest Contentful Paint</td> </tr> <tr> <td>● Total Blocking Time</td> <td>10 ms</td> <td>● Cumulative Layout Shift</td> </tr> <tr> <td>● Speed Index</td> <td>2.0 s</td> <td>0.001</td> </tr> </tbody> </table>			Expand view	■ First Contentful Paint	2.0 s	▲ Largest Contentful Paint	● Total Blocking Time	10 ms	● Cumulative Layout Shift	● Speed Index	2.0 s	0.001
		Expand view											
■ First Contentful Paint	2.0 s	▲ Largest Contentful Paint											
● Total Blocking Time	10 ms	● Cumulative Layout Shift											
● Speed Index	2.0 s	0.001											

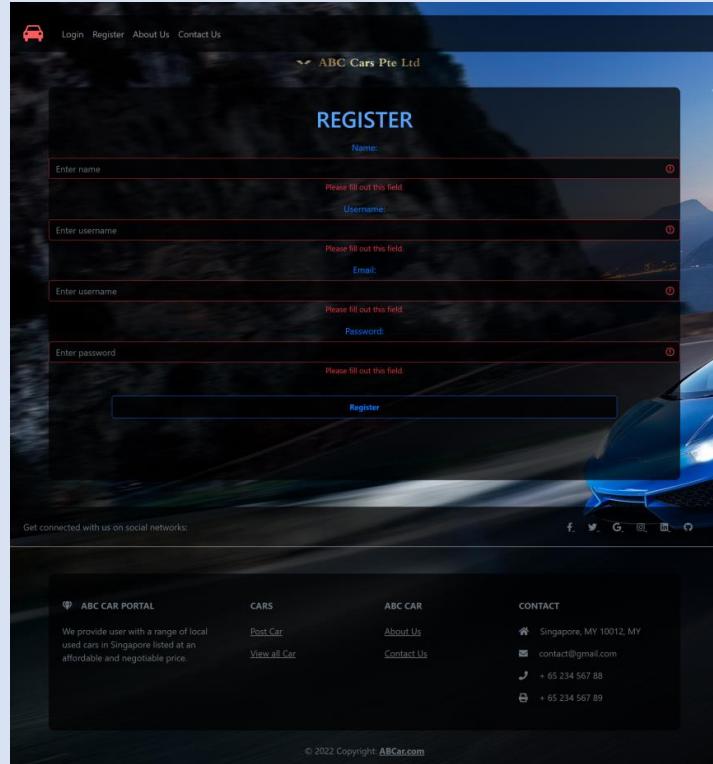
#### IV. Compatibility testing –cross browser testing-

Requirements	Test Scenario ID	Test Scenario	Number of Test Cases
Non-Functional Testing	CB001 – Cross Browser Testing	Ensure register page maintain a consistent look and feel in different browser (Chrome, Edge, Firefox)	3
	CB002 – Cross Browser Testing	Ensure login page maintain a consistent look and feel in different browser (Chrome, Edge, Firefox)	3
	CB003 – Cross Browser Testing	Ensure home page maintain a consistent look and feel in different browser (Chrome, Edge, Firefox)	3
	CB004 – Cross Browser Testing	Ensure car detail page maintain a consistent look and feel in different browser (Chrome, Edge, Firefox)	3
	CB005 – Cross Browser Testing	Ensure profile page maintain a consistent look and feel in different browser (Chrome, Edge, Firefox)	3

<b>Test Scenario ID</b>	<b>Test Case ID</b>	<b>Test case</b>	<b>Pre-condition</b>	<b>Expected Result</b>	<b>Actual Result</b>	<b>Pass/Fail</b>
CB001	CBCC001	Check a consistent look and feel of the register page in Google Chrome	ABC Cars Portal website has completed and uploaded on server	After testing, Register page maintain a consistent look and feel in Google Chrome	Result is come out as expected	Pass
<b>Test Step &amp; Test data</b>						
<b>Evidence</b>						

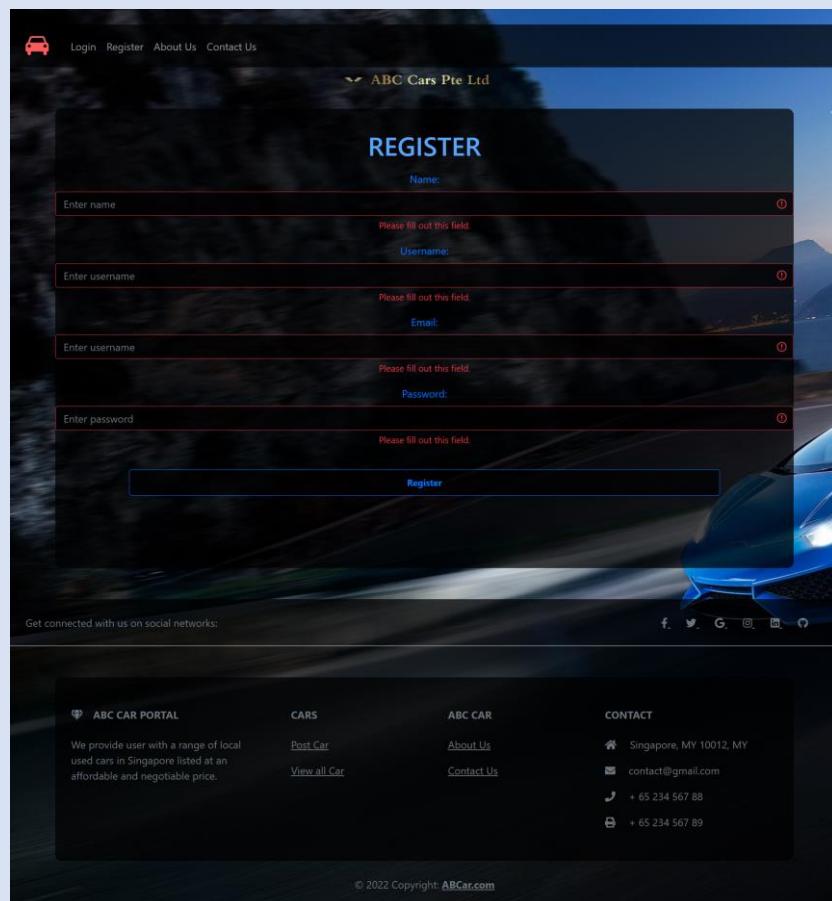
<b>Test Scenario ID</b>	<b>Test Case ID</b>	<b>Test case</b>	<b>Pre-condition</b>	<b>Expected Result</b>	<b>Actual Result</b>	<b>Pass/Fail</b>
CB001	CBCC002	Check a consistent look and feel of the register page in firefox	ABC Cars Portal website has completed and uploaded on server	After testing, Register page maintain a consistent look and feel in firefox	Result is come out as expected	Pass
<b>Test Step &amp; Test data</b>						

## Evidence



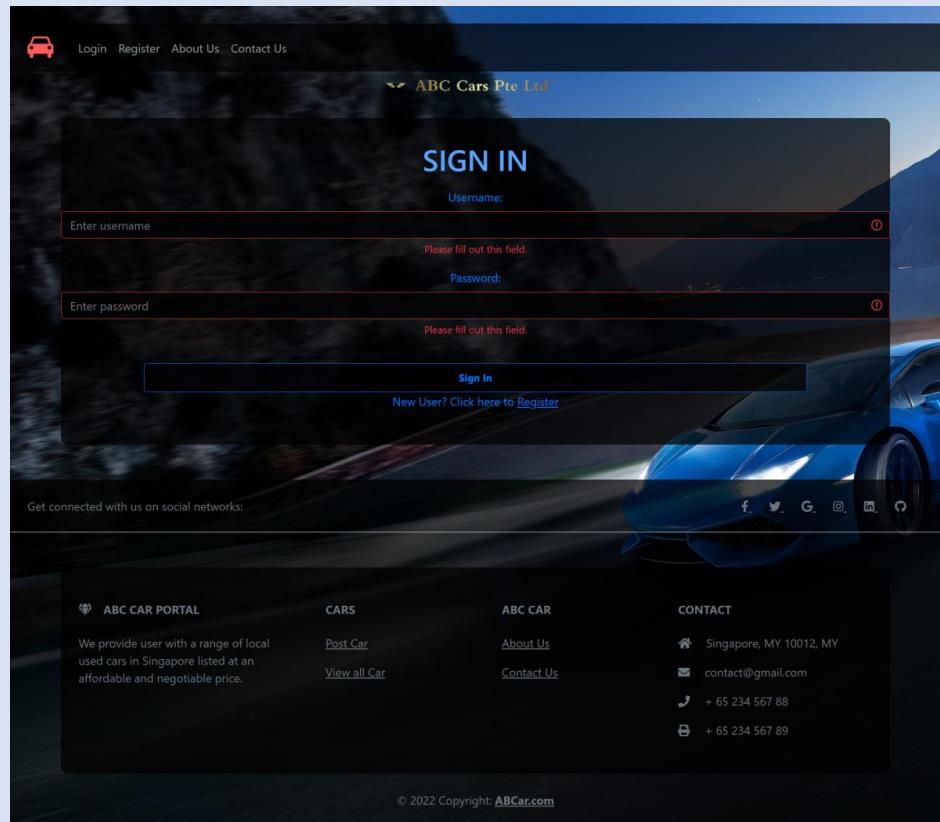
Test Scenario ID	Test Case ID	Test case	Pre-condition	Expected Result	Actual Result	Pass/Fail
CB001	CBCC003	Check a consistent look and feel of the register page in Microsoft edge	ABC Cars Portal website has completed and uploaded on server	After testing, Register page maintain a consistent look and feel in microsoft edge	Result is come out as expected	Pass
<b>Test Step &amp; Test data</b>						

## Evidence



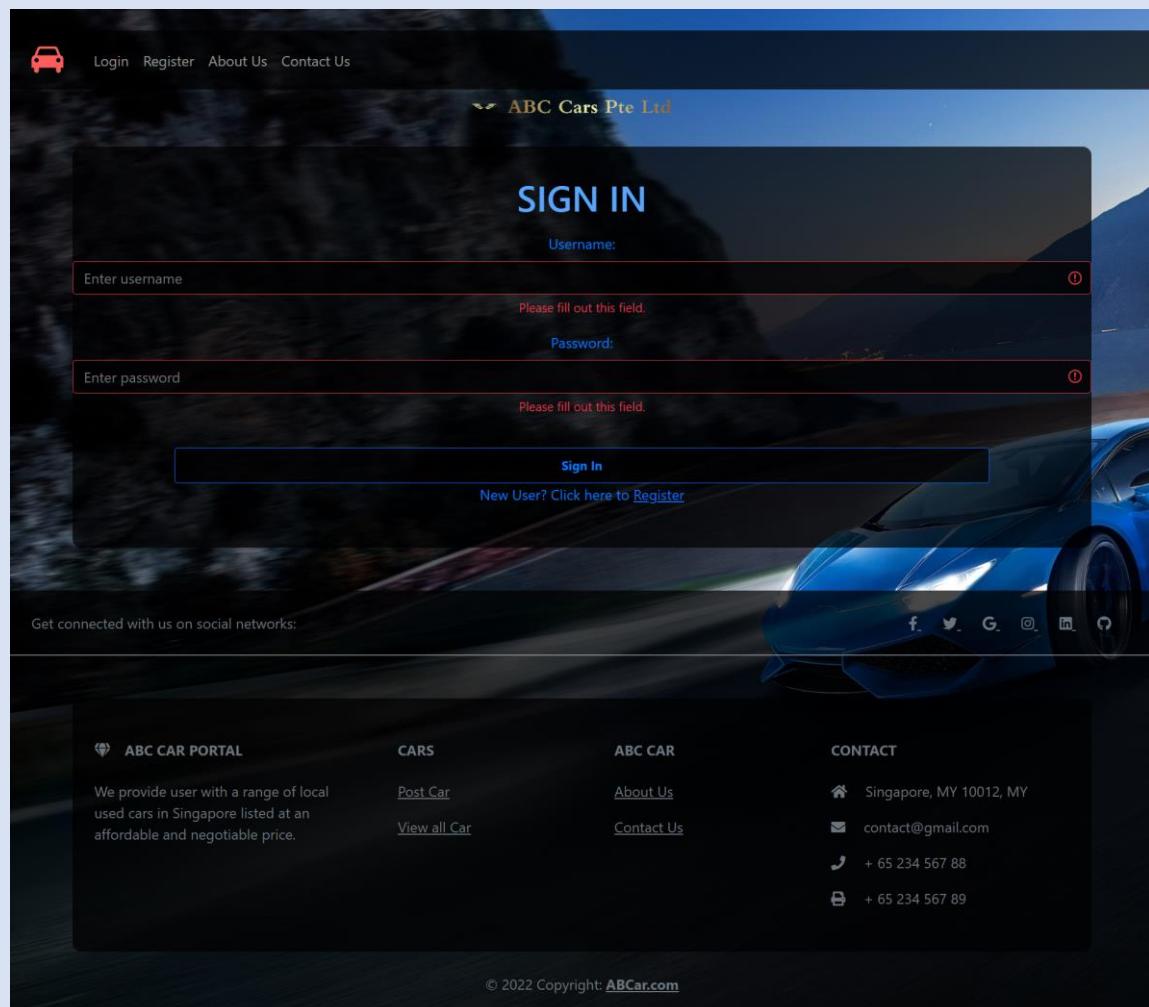
Test Scenario ID	Test Case ID	Test case	Pre-condition	Expected Result	Actual Result	Pass/Fail
CB002	CBCC001	Check a consistent look and feel of the login page in Google Chrome	ABC Cars Portal website has completed and uploaded on server	After testing, Register page maintain a consistent look and feel in google chrome	Result is come out as expected	Pass
<b>Test Step &amp; Test data</b>						

## Evidence



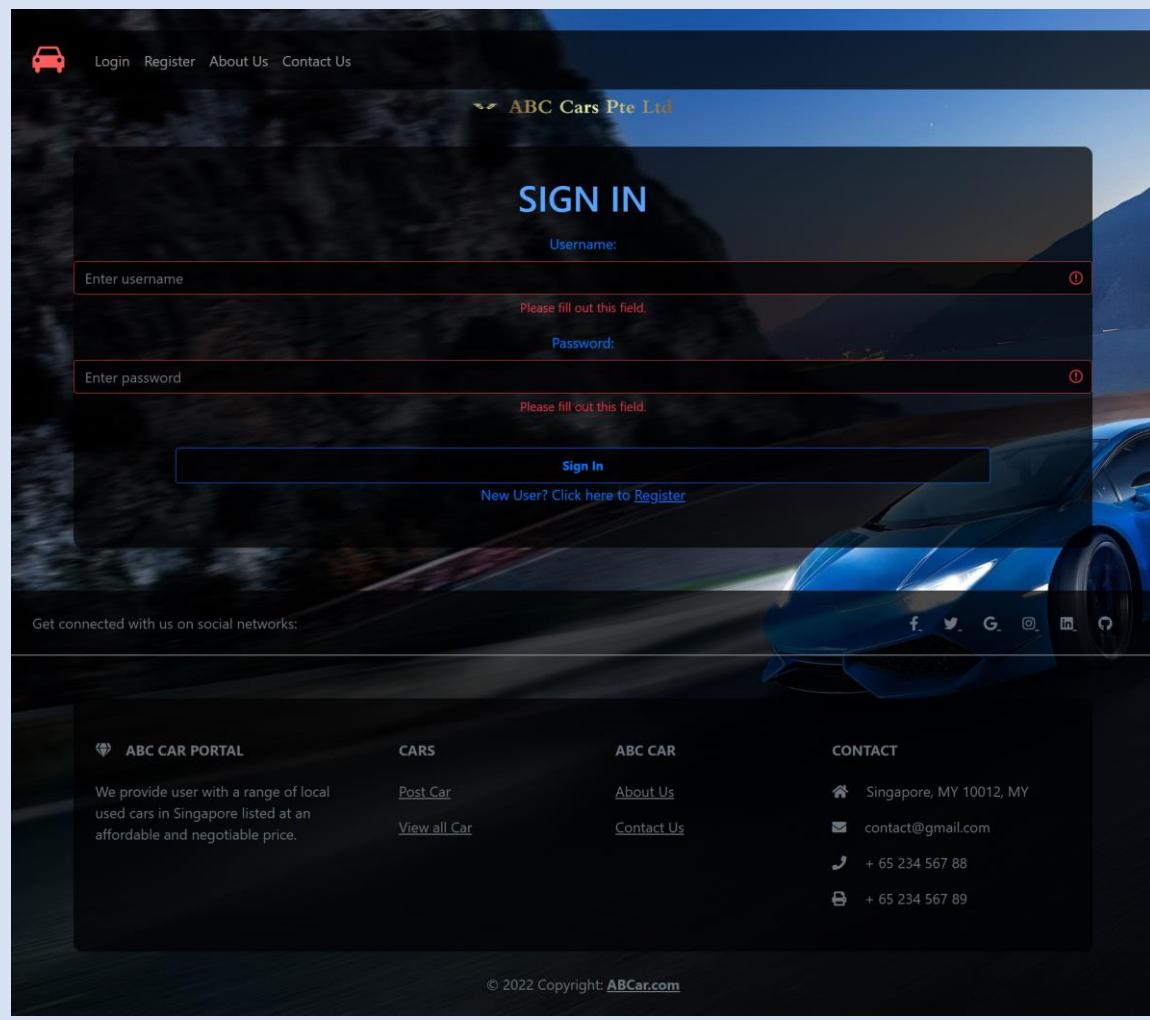
Test Scenario ID	Test Case ID	Test case	Pre-condition	Expected Result	Actual Result	Pass/Fail
CB002	CBCC002	Check a consistent look and feel of the login page in firefox	ABC Cars Portal website has completed and uploaded on server	After testing, Register page maintain a consistent look and feel in firefox	Result is come out as expected	Pass
<b>Test Step &amp; Test data</b>						

## Evidence



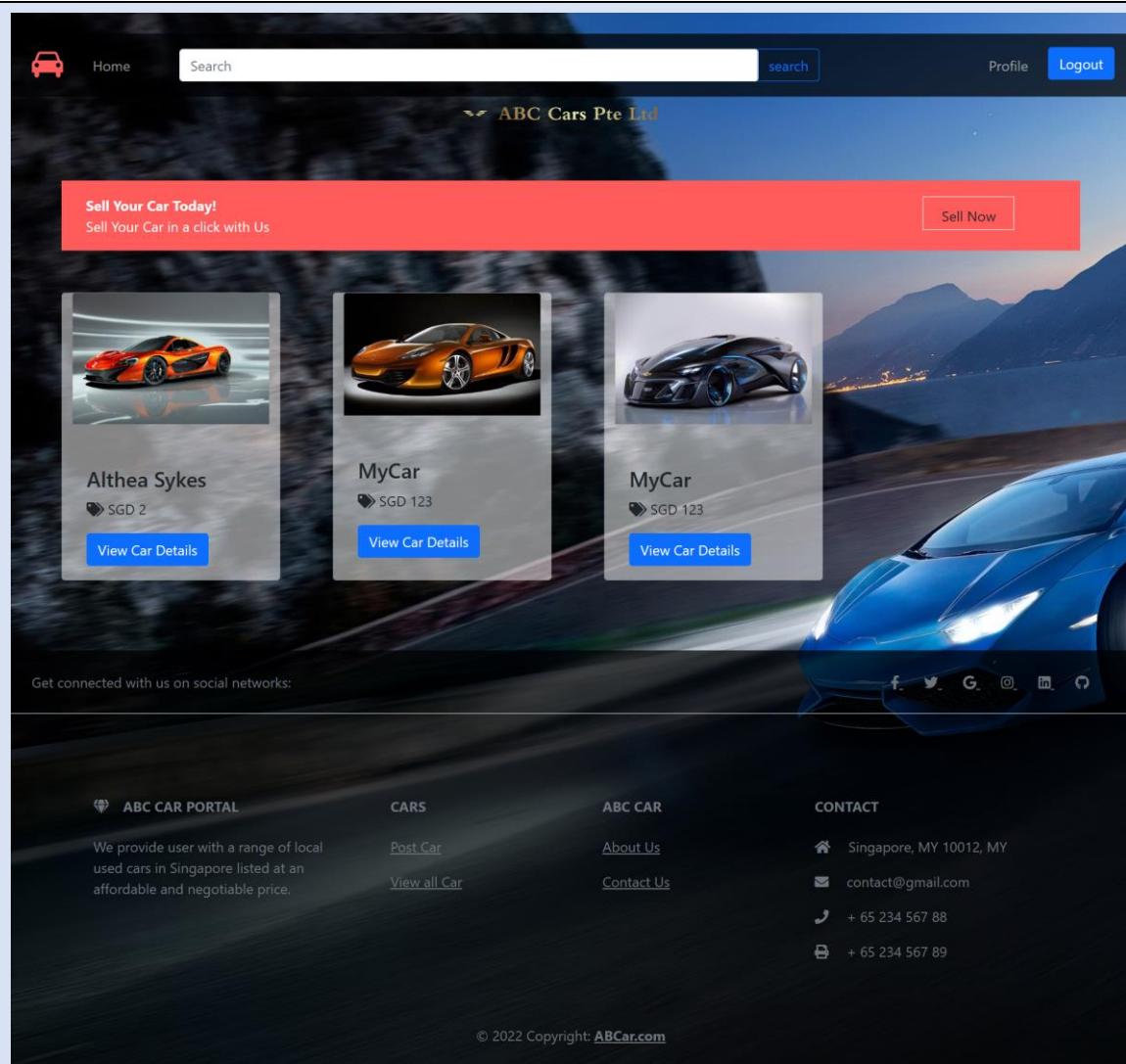
Test Scenario ID	Test Case ID	Test case	Pre-condition	Expected Result	Actual Result	Pass/Fail
CB002	CBCC003	Check a consistent look and feel of the login page in Microsoft edge	ABC Cars Portal website has completed and uploaded on server	After testing, Register page maintain a consistent look and feel in microsoft edge	Result is come out as expected	Pass
Test Step & Test data						

## Evidence



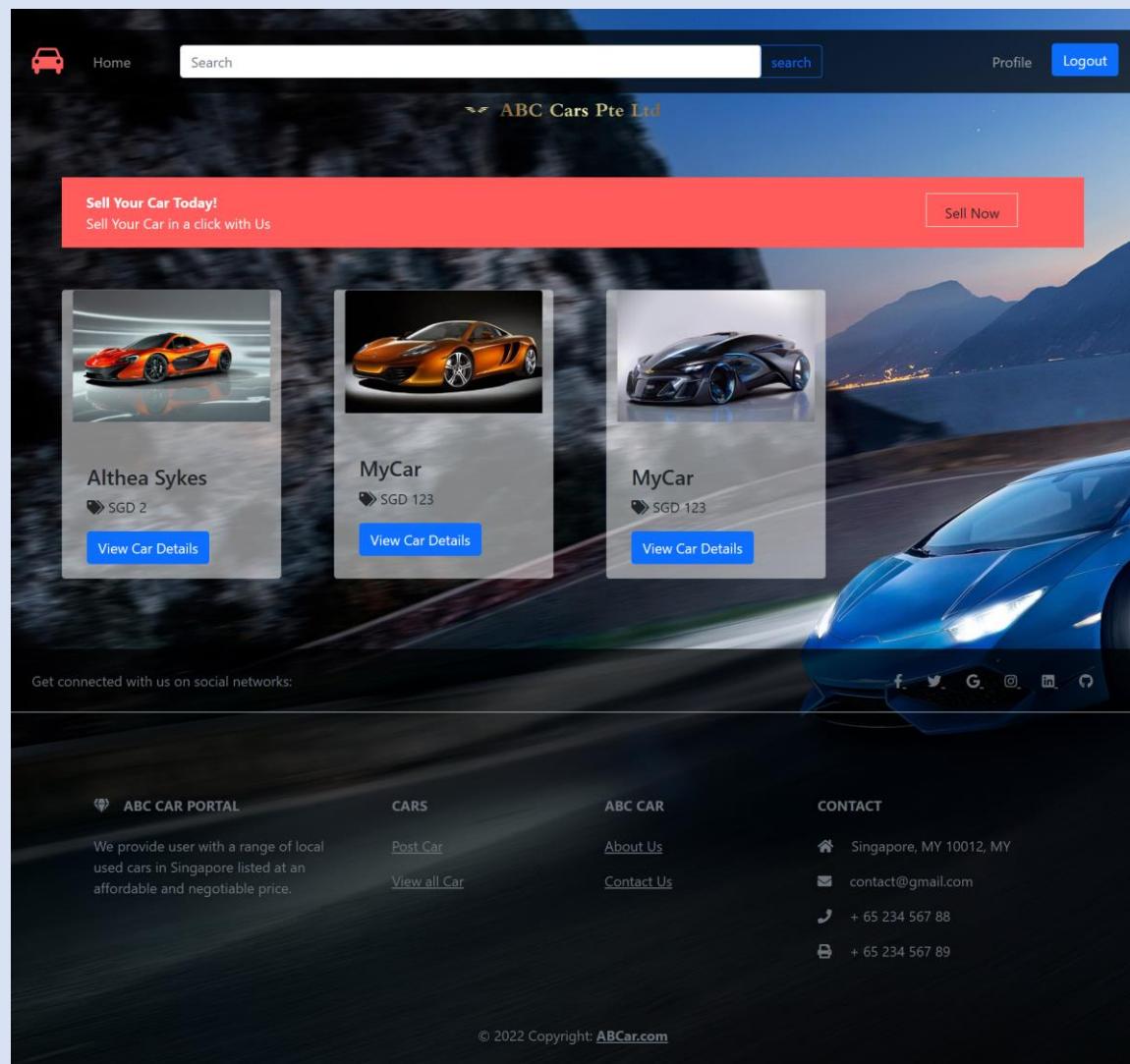
Test Scenario ID	Test Case ID	Test case	Pre-condition	Expected Result	Actual Result	Pass/Fail
CB003	CBCC001	Check a consistent look and feel of the home page in Google Chrome	ABC Cars Portal website has completed and uploaded on server	After testing, Register page maintain a consistent look and feel in google chrome	Result is come out as expected	Pass
<b>Test Step &amp; Test data</b>						

## Evidence



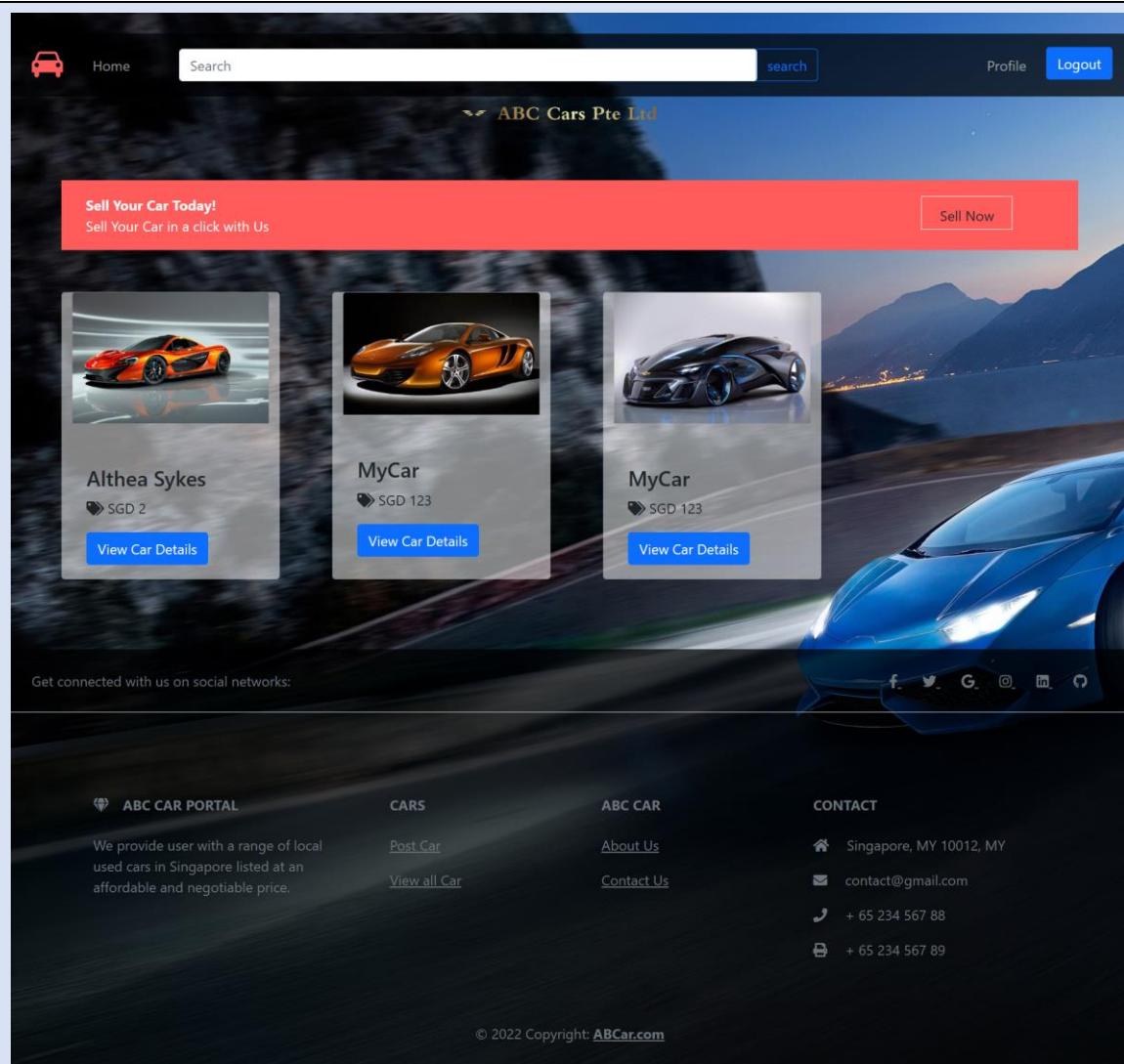
Test Scenario ID	Test Case ID	Test case	Pre-condition	Expected Result	Actual Result	Pass/Fail
CB003	CBCC002	Check a consistent look and feel of the home page in firefox	ABC Cars Portal website has completed and uploaded on server	After testing, Register page maintain a consistent look and feel in firefox	Result is come out as expected	Pass
Test Step & Test data						

## Evidence



Test Scenario ID	Test Case ID	Test case	Pre-condition	Expected Result	Actual Result	Pass/Fail
CB003	CBCC003	Check a consistent look and feel of the home page in Microsoft edge	ABC Cars Portal website has completed and uploaded on server	After testing, Register page maintain a consistent look and feel in microsoft edge	Result is come out as expected	Pass
<b>Test Step &amp; Test data</b>						

## Evidence

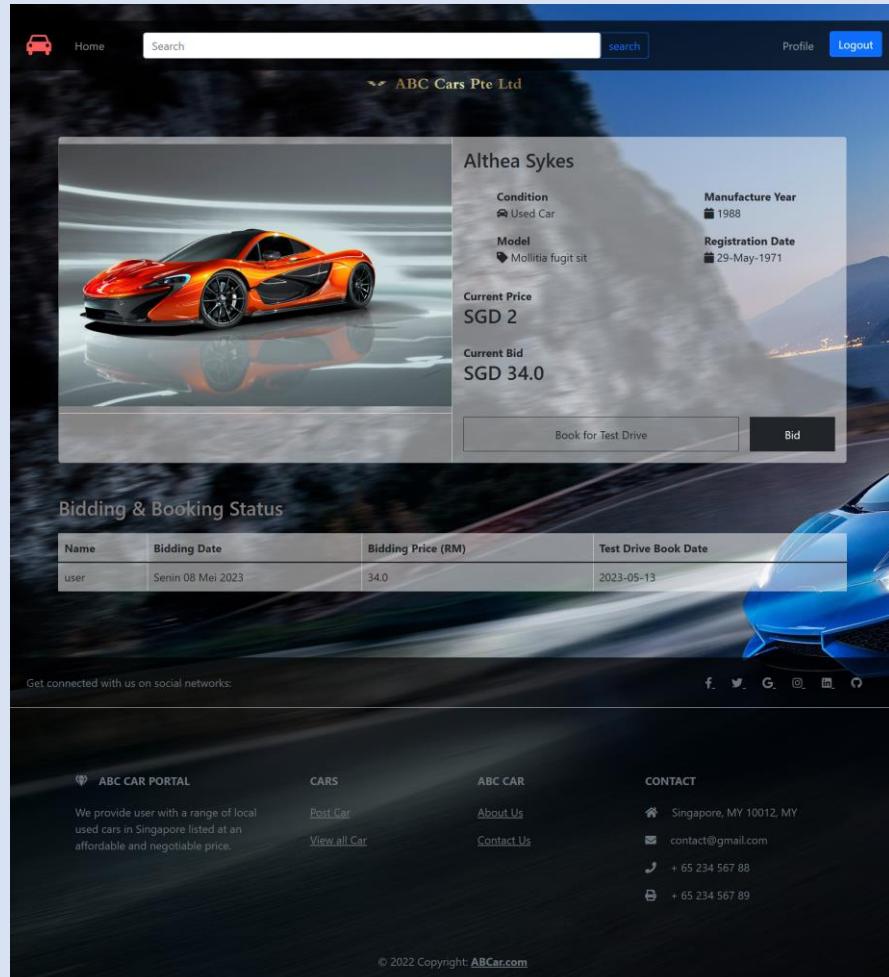


Test Scenario ID	Test Case ID	Test case	Pre-condition	Expected Result	Actual Result	Pass/Fail
CB004	CBCC001	Check a consistent look and feel of the car detail page in Google Chrome	ABC Cars Portal website has completed and uploaded on server	After testing, Register page maintain a consistent look and feel in google chrome	Result is come out as expected	Pass
<b>Test Step &amp; Test data</b>						

<b>Evidence</b>	
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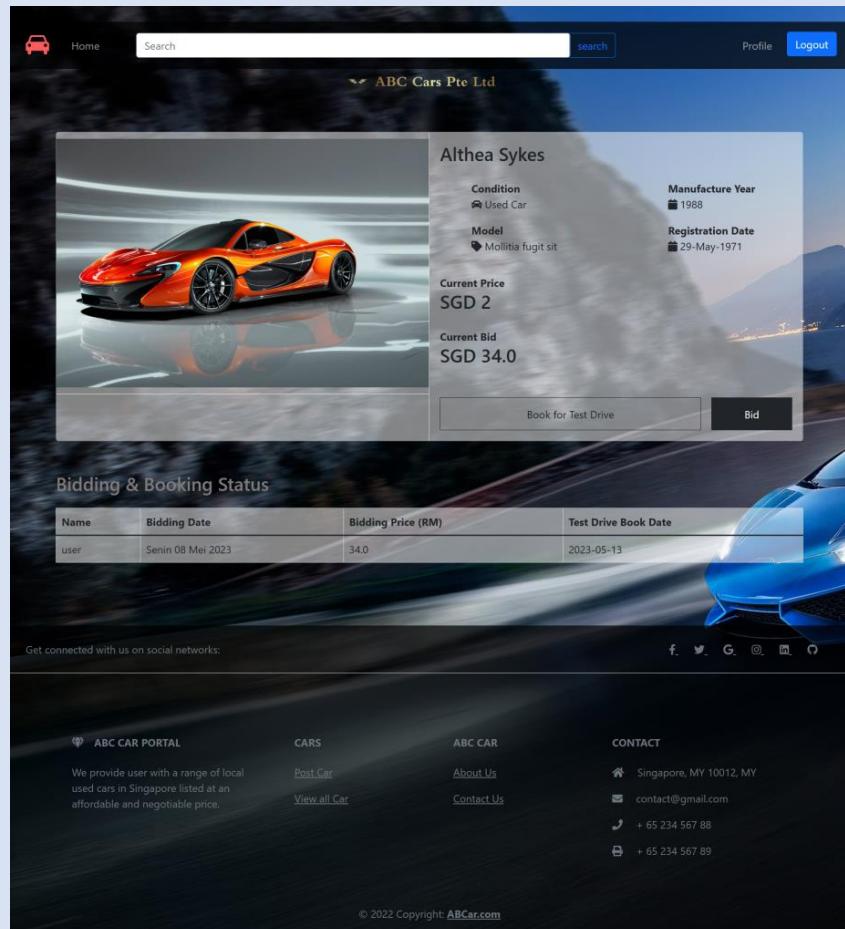
<b>Test Scenario ID</b>	<b>Test Case ID</b>	<b>Test case</b>	<b>Pre-condition</b>	<b>Expected Result</b>	<b>Actual Result</b>	<b>Pass/Fail</b>
CB004	CBCC002	Check a consistent look and feel of the car detail page in firefox	ABC Cars Portal website has completed and uploaded on server	After testing, Register page maintain a consistent look and feel in firefox	Result is come out as expected	Pass
<b>Test Step &amp; Test data</b>						

## Evidence



Test Scenario ID	Test Case ID	Test case	Pre-condition	Expected Result	Actual Result	Pass/Fail
CB004	CBCC003	Check a consistent look and feel of the profile page in Microsoft edge	ABC Cars Portal website has completed and uploaded on server	After testing, Register page maintain a consistent look and feel in microsoft edge	Result is come out as expected	Pass
<b>Test Step &amp; Test data</b>						

## Evidence



Test Scenario ID	Test Case ID	Test case	Pre-condition	Expected Result	Actual Result	Pass/Fail
TS005	CBCC001	Check a consistent look and feel of the profile page in Google Chrome	ABC Cars Portal website has completed and uploaded on server	After testing, Profile page maintain a consistent look and feel in Google Chrome	Result is come out as expected	Pass
<b>Test Step &amp; Test data</b>						

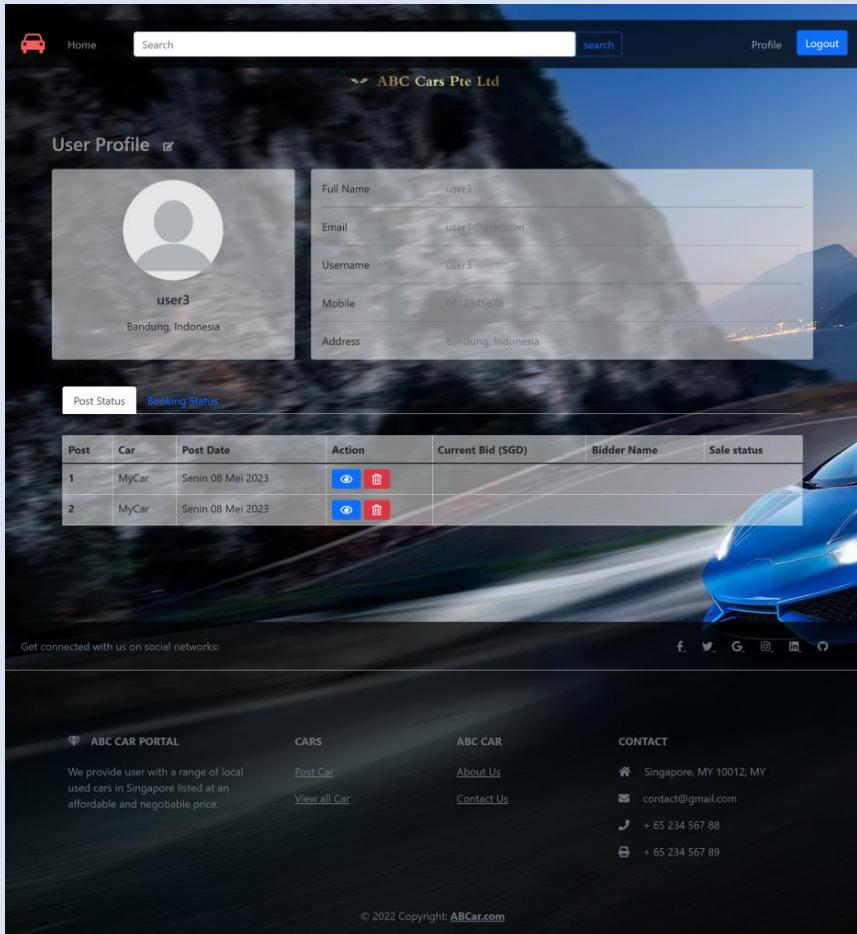
## Evidence

The screenshot shows a user profile page for 'user3' on the ABC Cars Pte Ltd website. The profile includes a placeholder image, the name 'user3', and the location 'Bandung, Indonesia'. Below the profile, there is a table listing two posts made by the user:

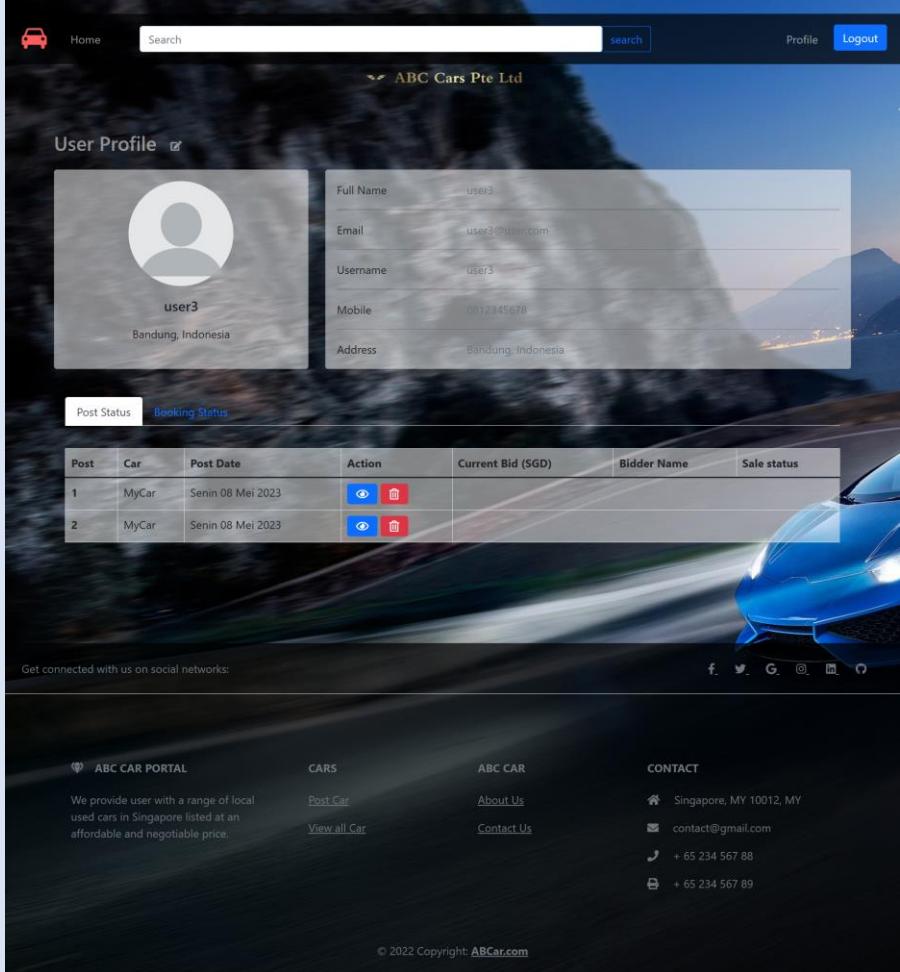
Post	Car	Post Date	Action	Current Bid (SGD)	Bidder Name	Sale status
1	MyCar	Senin 08 Mei 2023				
2	MyCar	Senin 08 Mei 2023				

At the bottom of the page, there is a footer section with social media links and contact information.

Test Scenario ID	Test Case ID	Test case	Pre-condition	Expected Result	Actual Result	Pass/Fail
TS005	CBCC002	Check a consistent look and feel of the profile page in firefox	ABC Cars Portal website has completed and uploaded on server	After testing, Profile page maintain a consistent look and feel in firefox	Result is come out as expected	Pass
<b>Test Step &amp; Test data</b>						

Evidence	
	

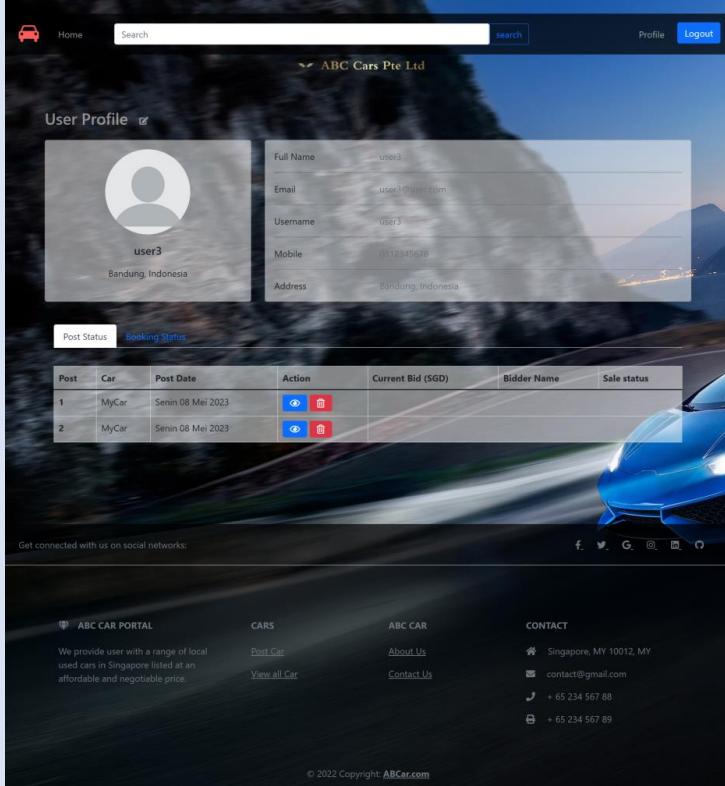
Test Scenario ID	Test Case ID	Test case	Pre-condition	Expected Result	Actual Result	Pass/Fail
TS005	CBCC003	Check a consistent look and feel of the profile page in Microsoft edge	ABC Cars Portal website has complete d and uploaded on server	After testing, Profile page maintain a consistent look and feel in Microsoft edge	Result is come out as expected	Pass
Test Step & Test data						

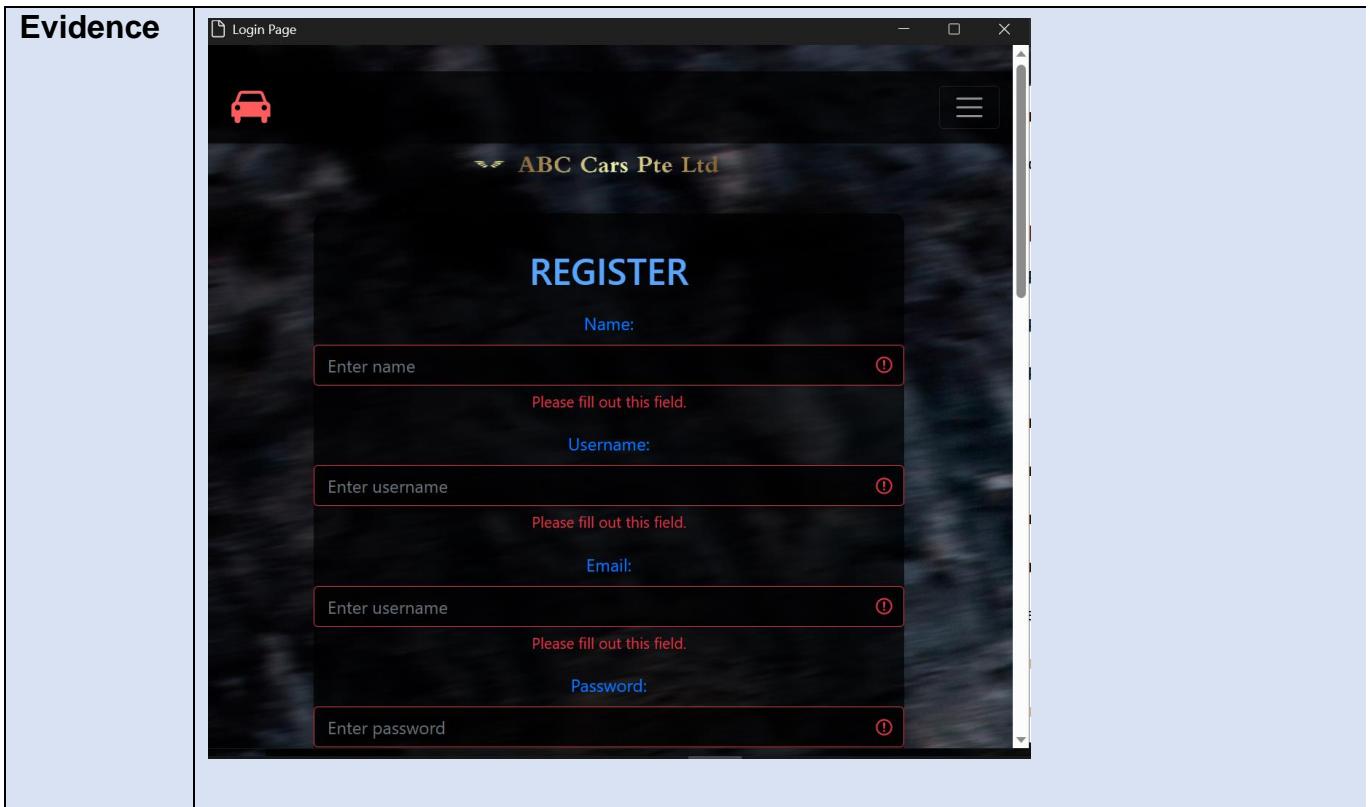
<b>Evidence</b>	 <p>The screenshot shows the ABC Cars Pte Ltd website. At the top, there's a navigation bar with 'Home', 'Search' (with a search icon), 'Profile', and 'Logout'. Below the navigation is the 'ABC Cars Pte Ltd' logo. The main content area is titled 'User Profile' and displays a placeholder user icon with the name 'user3' and location 'Bandung, Indonesia'. To the right of the profile is a table with user information: Full Name (user3), Email (user3@user.com), Username (user3), Mobile (0812345678), and Address (Bandung, Indonesia). Below this is a table titled 'Post Status' showing two entries, both labeled 'MyCar' and dated 'Senin 08 Mei 2023'. The table includes columns for Post, Car, Post Date, Action, Current Bid (SGD), Bidder Name, and Sale status. The 'Action' column contains edit and delete icons. At the bottom of the page, there's a social media link section with icons for Facebook, Twitter, Google+, LinkedIn, and YouTube. The footer contains sections for 'ABC CAR PORTAL' (describing used cars in Singapore), 'CARS' (links to Post Car and View all Car), 'ABC CAR' (links to About Us and Contact Us), and 'CONTACT' (information about Singapore, MY 10012, contact@gmail.com, +65 234 567 88, and +65 234 567 89). The copyright notice '© 2022 Copyright: ABCar.com' is at the very bottom.</p>
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## VI. Portability Testing (Multiplatform)

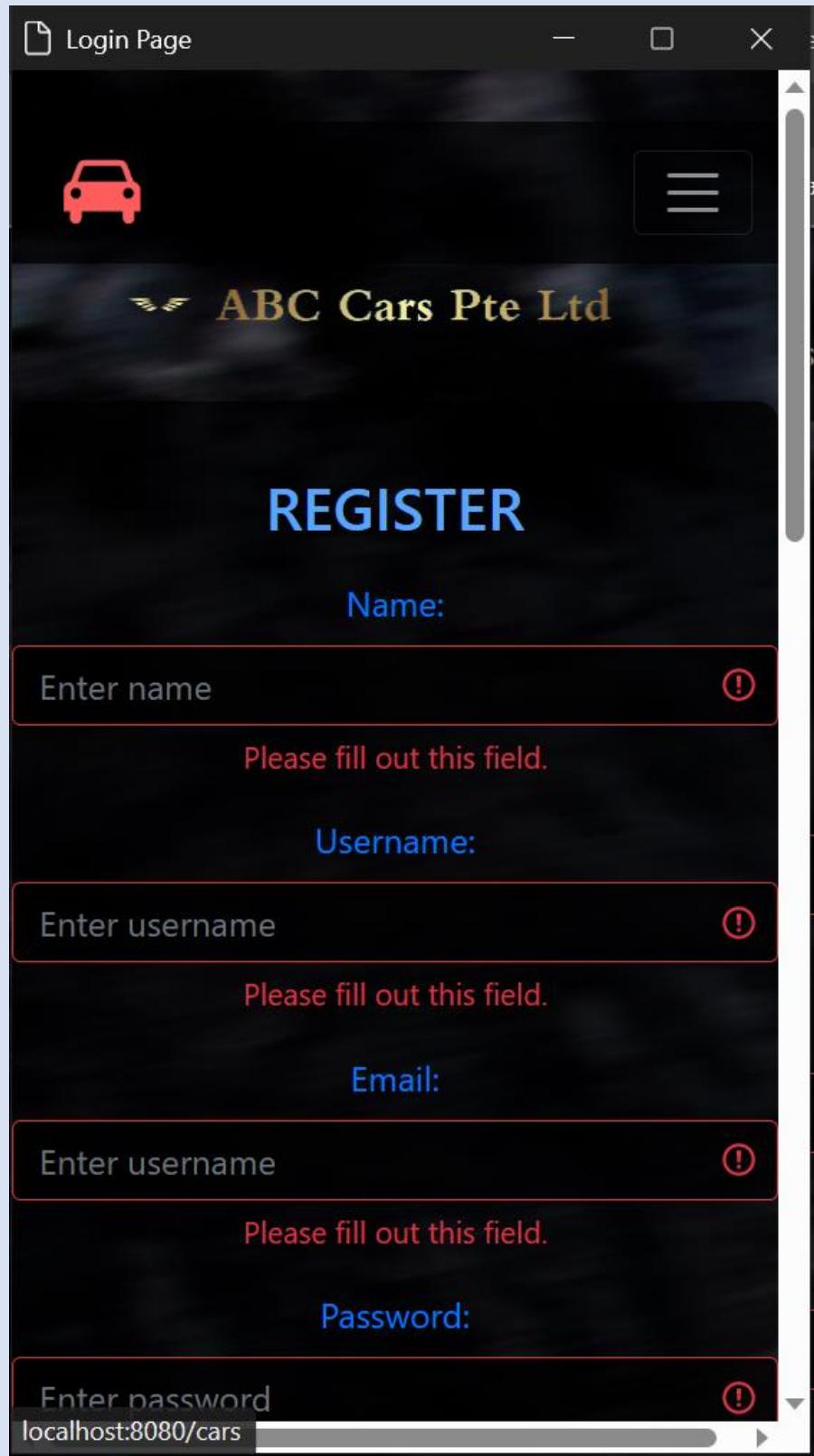
Requirements	Test Scenario ID	Test Scenario	Number of Test Cases
Non-Functional Testing	PB001 – Portability Testing	Ensure register page maintain a consistent look and feel in different devices (laptop, iPad, phone)	3

Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
PB001	PBCC001	To ensure all feature in the register page is visible to	ABC Cars Portal website has completed	After testing, all register page feature is visible to the user in laptop devices	Result is come out as expected	Pass

		the user in laptop	uploaded on server			
<b>Test Step &amp; Test data</b>						
<b>Evidence</b>						
Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
PB001	PBCC002	To ensure all feature in the register page is visible to the user in ipad	ABC Cars Portal website has complete d and uploaded on server	After testing, all register page feature is visible to the user in ipad devices	Result is come out as expected	Pass
<b>Test Step &amp; Test data</b>						



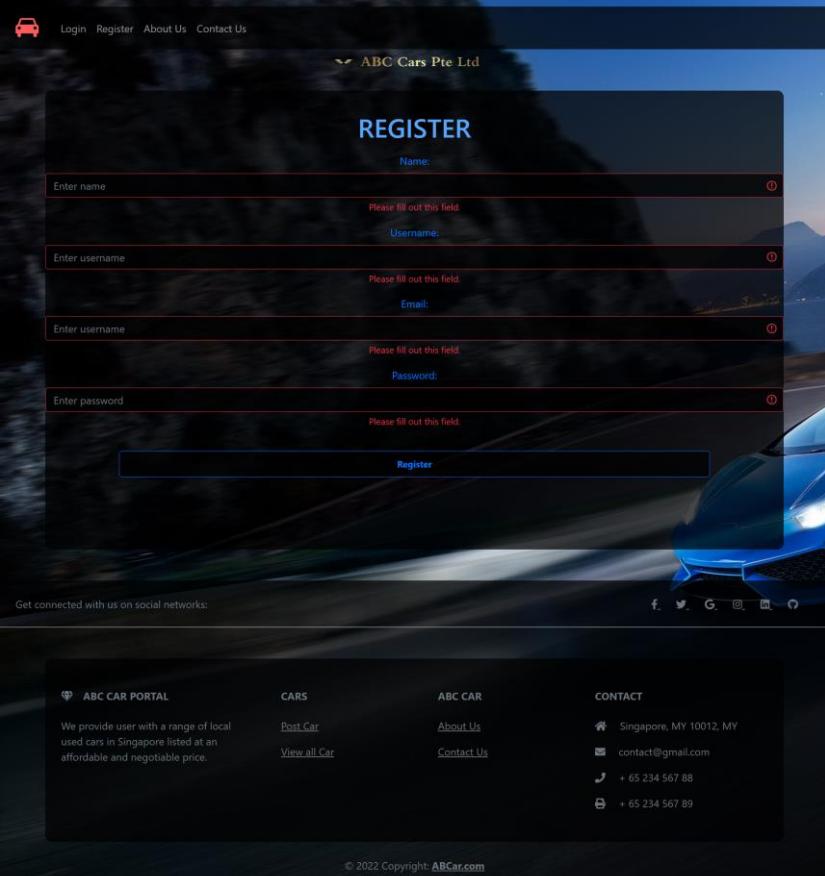
Test Scenario ID	Test Case ID	Test case	Pre-condition	Expected Result	Actual Result	Pass/Fail
PB001	PBCC002	To ensure all feature in the register page is visible to the user in phone	ABC Cars Portal website has completed and uploaded on server	After testing, all register page feature is visible to the user in phone devices	Result is come out as expected	Pass
<b>Test Step &amp; Test data</b>						

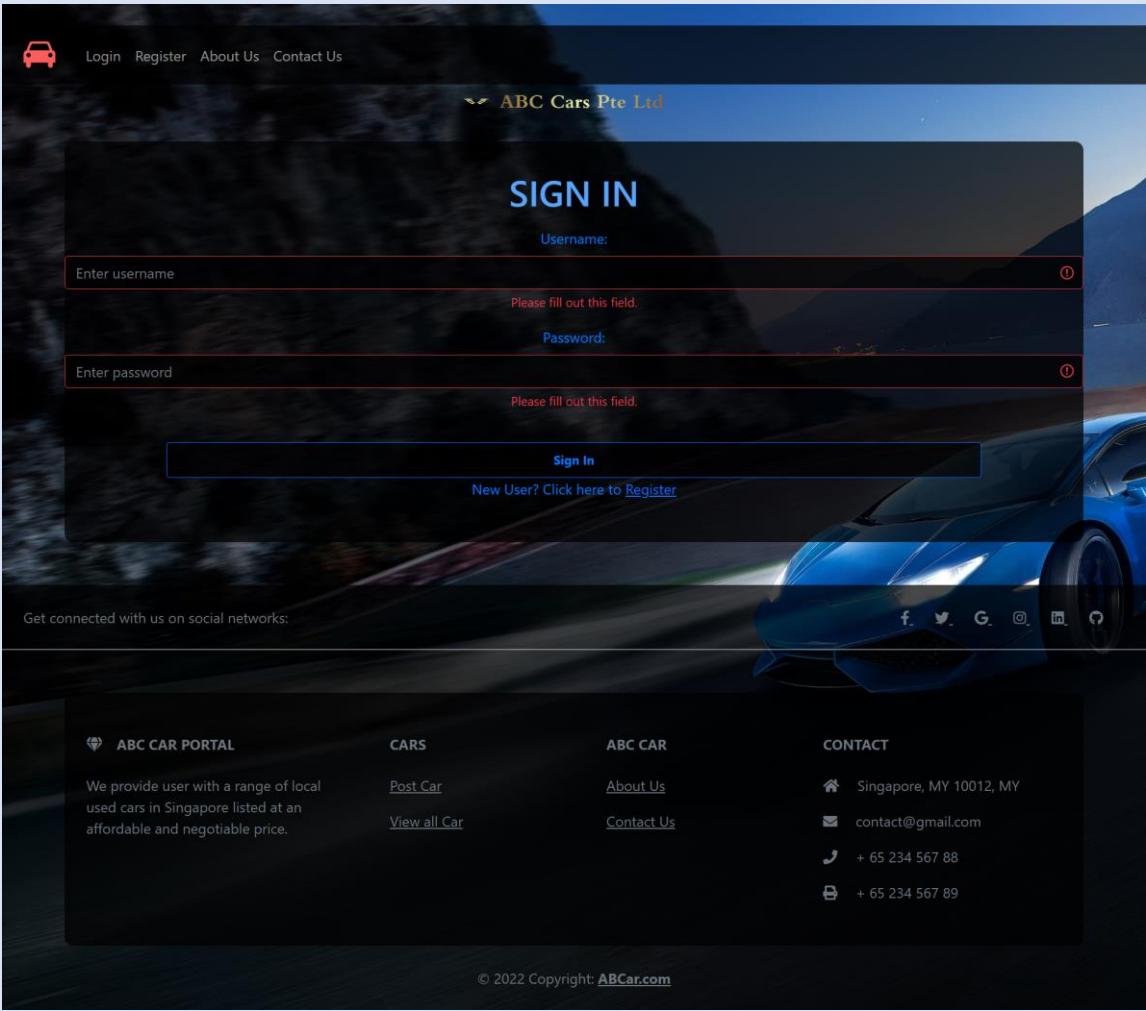
**Evidence**

VII. Usability testing:- (5 scenarios)- 1 test case (check-navigation, content, header and footer) 5

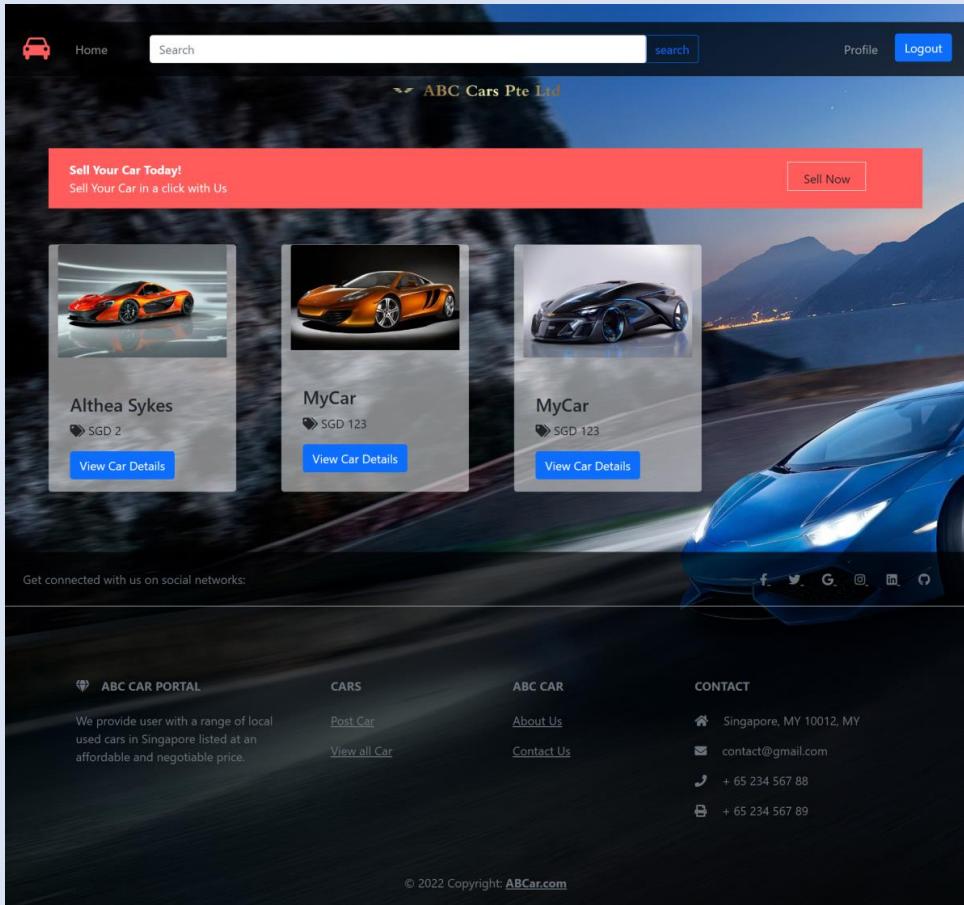
Requirements	Test Scenario ID	Test Scenario	Number of Test Cases
Functional Testing	UB001 – Usability Testing	Test whether the register page is user-friendly in design	1

UB002 – Usability Testing	Test whether the login page is user-friendly in design	1
UB003 – Usability Testing	Test whether the home page is user-friendly in design	1
UB004 – Usability Testing	Test whether the car detail page is user-friendly in design	1
UB005 – Usability Testing	Test whether the profile page is user-friendly in design	1

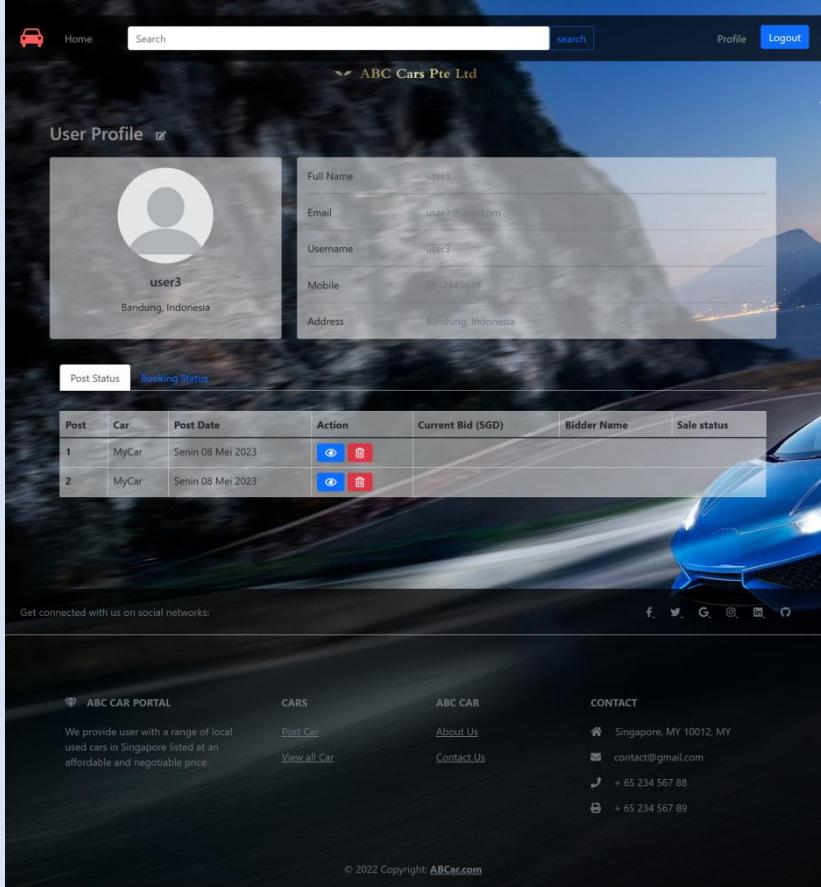
Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
UB001	UBC001	Check all navigation in header and footer works properly and the content is visible in register page and user friendliness	ABC Cars Portal website has completed and uploaded on server	All navigations links is working correctly in the register page and loading the right web pages and having a clear flow easily understood by user	Result is come out as expected	Pass
<b>Test Step &amp; Test data</b>	1. Enter URL localhost:8080 2. Click “Register” on website navigation bar					
<b>Evidence</b>						

Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
UB002	TC001	Check all navigation in header and footer works properly and the content is visible in login page and user friendliness	ABC Cars Portal website has complete d and uploaded on server	All navigations links is working correctly in the login page andloading the right web pages and having a clear flow easily understood by user.	As expected,	Pass
<b>Test Step &amp; Test data</b>	1. Enter URL localhost:8080 2.Sign in to the portal 3. Navigate to home page navigation bar 4.Click Profile					
<b>Evidence</b>						

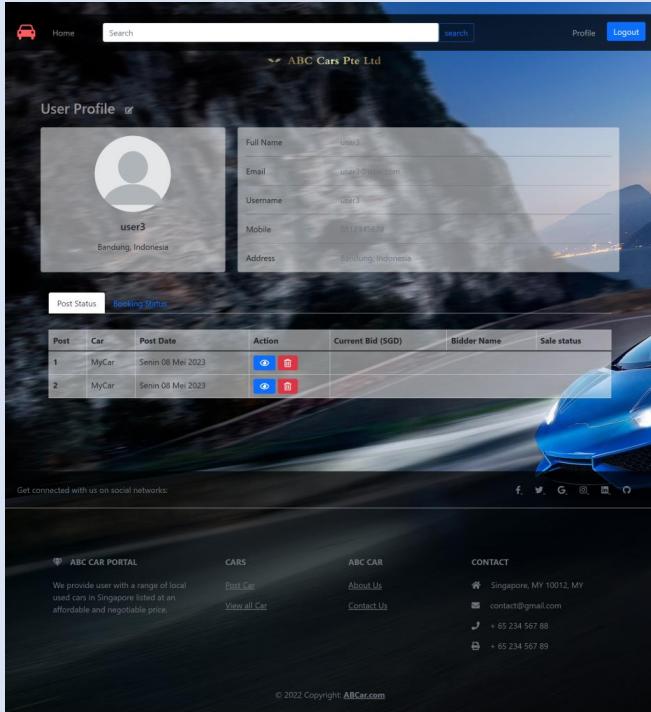
Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
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UB003	TC001	Check all navigation in header and footer works properly and the content is visible in the home page and user friendliness	ABC Cars Portal website has complete d and uploaded on server	All navigations links is working correctly in the home page and loading the right web pages and having a clear flow easily understood by user	As expected,	Pass
<b>Test Step &amp; Test data</b>	1. Enter URL localhost:8080 2.Sign in to the portal					
<b>Evidence</b>						

Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
UB004	TC001	Check all navigation in header and footer works properly and the	ABC Cars Portal website has complete d and	All navigations links is working correctly in the car detail page and loading the right web pages and having a clear flow easily understood by user	As expected,	Pass

		content is visible in the car detail page and user friendliness	uploaded on server			
<b>Test Step &amp; Test data</b>	1. Enter URL localhost:8080 2.Sign in to the portal					
<b>Evidence</b>						

Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
UB005	TC001	Check all navigation in header and footer works properly and the content is visible in the profile page and user friendliness	ABC Cars Portal website has completed and uploaded on server	All navigations links is working correctly in the profile page and loading the right web pages and having a clear flow easily understood by user	As expected,	Pass

<b>Test Step &amp; Test data</b>	1. Enter URL localhost:8080 2. Sign in to the portal 3. Navigate to home page navigation bar 4. Click Profile
<b>Evidence</b>	

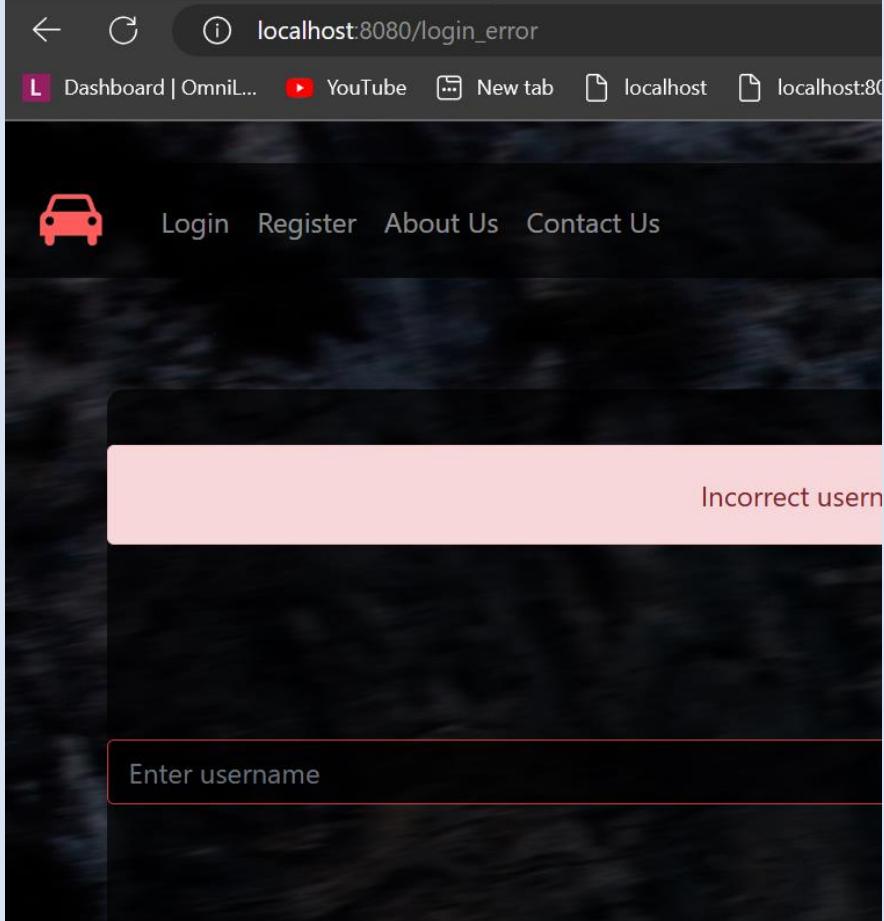
## V. Security Testing

Requirements	Test Scenario ID	Test Scenario	Number of Test Cases
Functional Testing	SE001 – Security Testing	Ensure user is authenticated correctly after logging in	2
	SE002 – Security Testing	Ensure after logging in, user home page navigation is authorized correctly based on role assigned	2
	SE003 – Security Testing	Checking for SQL injection	1

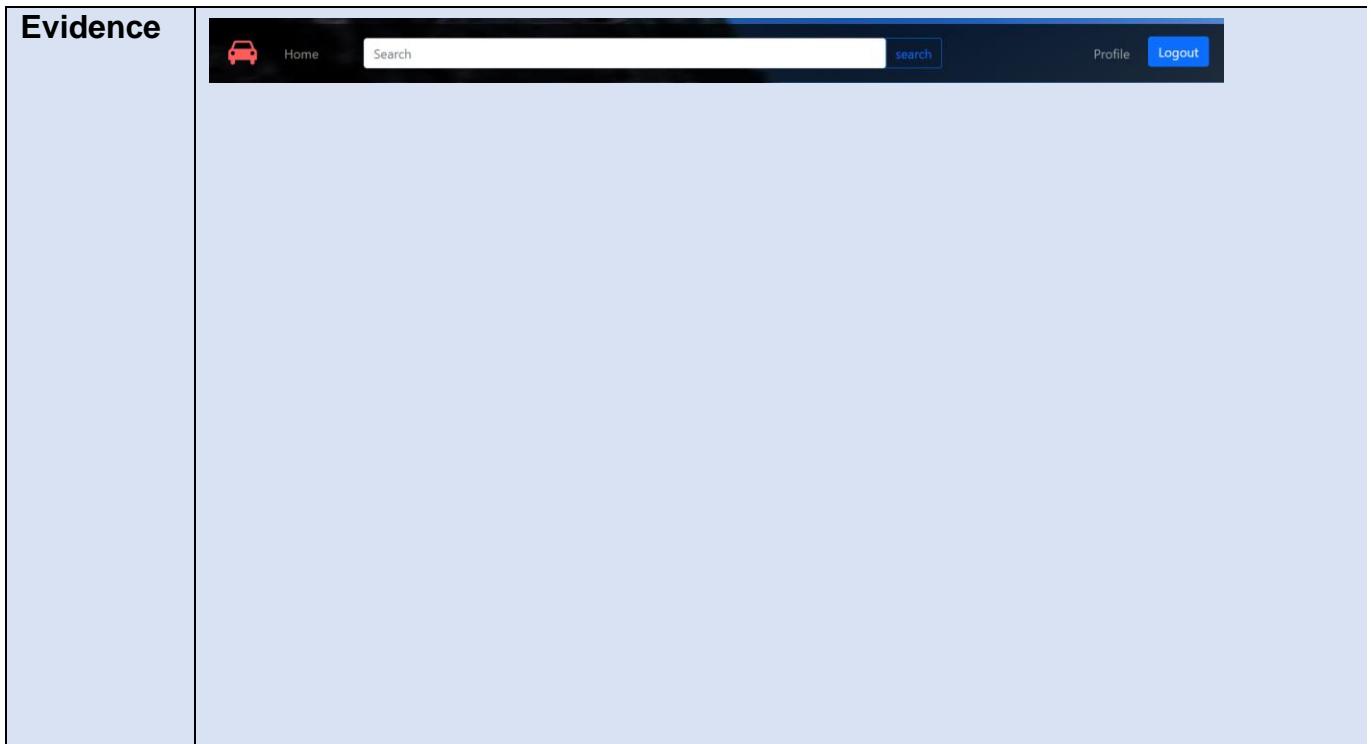
Test Scenario ID	Test Case ID	Test Case	Pre-condition	Expected Result	Actual Result	Pass/Fail
SE001	SEC001	To ensure Spring Security login feature is authenticated correctly for User after login with valid credentials	ABC Cars Portal website has completed and uploaded on server	User will reach to home page and see option to sell car	As expected,	Pass

<b>Test Step &amp; Test data</b>	1. Enter URL localhost:8080 2.Sign in to the portal
<b>Evidence</b>	

<b>Test Scenario ID</b>	<b>Test Case ID</b>	<b>Test Case</b>	<b>Pre-condition</b>	<b>Expected Result</b>	<b>Actual Result</b>	<b>Pass/Fail</b>
SE001	SEC002	To ensure Spring Security login feature is authenticated correctly for User after login with invalid credentials	ABC Cars Portal website has completed and uploaded on server	User should see an error message asking user to try again or register	Not as expected,	fail
<b>Test Step &amp; Test data</b>						

<b>Evidence</b>	
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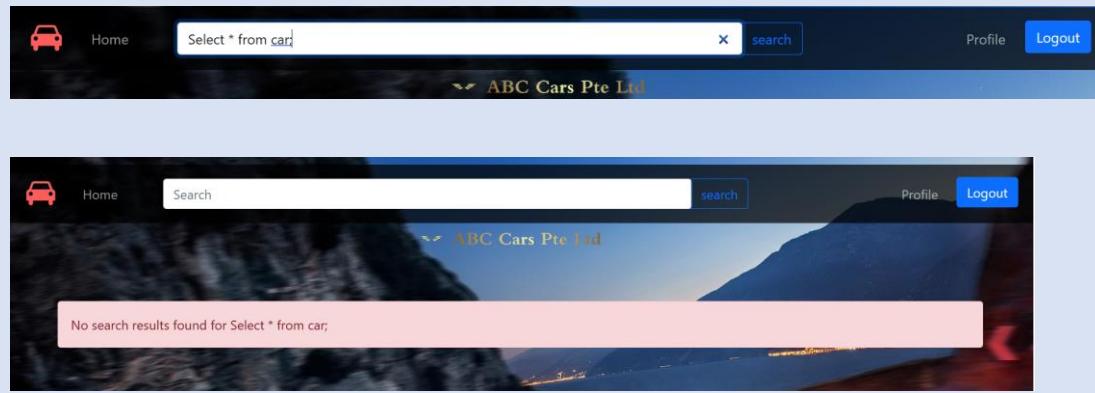
<b>Test Scenario ID</b>	<b>Test Case ID</b>	<b>Test Case</b>	<b>Pre-condition</b>	<b>Expected Result</b>	<b>Actual Result</b>	<b>Pass/Fail</b>
<b>SE002</b>	SEC001	To ensure Spring security authorization is working correctly on the navigation bar for user	ABC Cars Portal website has completed and uploaded on server	User navigation bar does not show user and car management	As expected	Pass
<b>Test Step &amp; Test data</b>	1. Enter URL localhost:8080 2.Sign in to the portal					



<b>Test Scenario ID</b>	<b>Test Case ID</b>	<b>Test Case</b>	<b>Pre-condition</b>	<b>Expected Result</b>	<b>Actual Result</b>	<b>Pass/Fail</b>
SE002	SEC002	To ensure Spring security authorization is working correctly on the navigation bar for Administrator	ABC Cars Portal website has completed and uploaded on server	User navigation bar show user and car management	As expected	Pass
<b>Test Step &amp; Test data</b>	1. Enter URL localhost:8080 2.Sign in to the portal					

<b>Evidence</b>	
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<b>Test Scenario ID</b>	<b>Test Case ID</b>	<b>Test Case</b>	<b>Pre-condition</b>	<b>Expected Result</b>	<b>Actual Result</b>	<b>Pass/Fail</b>
SE003	SEC001	To ensure search input data is not vulnerable to an SQL injection	ABC Cars Portal website has completed and uploaded on server	No return is given as a result from the injected SQL Query	As expected	Pass
<b>Test Step &amp; Test data</b>						

**Evidence**

Select \* from car;

## Provide a detailed log of test results

<b>Used Car Sale Portal Project</b>	
<b>Reported By:</b>	Syukur Sidiq Nur Alam
<b>Report Date:</b>	3/5/2023
<b>Tested By:</b>	Syukur Sidiq Nur Alam
<b>Tested Date:</b>	3/5/2023
<b>Testing Name/ Test Scenario ID</b>	Functional testing:-UAT Testing/ TS001 / TS002 / TS003 / TS004 /TS005
<b>Total Number of Test Cases</b>	5
<b>No. of Pass:</b>	4
<b>No. of Failures:</b>	1
<b>Elapsed Time:</b>	00:30:00
<b>Tested By:</b>	Syukur Sidiq Nur Alam
<b>Tested Date:</b>	04-05-2023
<b>Testing Name/ Test Scenario ID</b>	Functional testing:-Unit Testing/ TS006 / TS007
<b>Total Number of Test Cases</b>	10
<b>No. of Pass:</b>	9
<b>No. of Failures:</b>	1
<b>Elapsed Time:</b>	00:30:00
<b>Tested By:</b>	Syukur Sidiq Nur Alam
<b>Tested Date:</b>	04-05-2023
<b>Testing Name/ Test Scenario ID</b>	Performance Testing/ TS006
<b>Total Number of Test Cases</b>	2
<b>No. of Pass:</b>	2
<b>No. of Failures:</b>	0
<b>Elapsed Time:</b>	00:10:00

Tested By:	Syukur Sidiq Nur Alam
Tested Date:	04-05-2023
Testing Name/ Test Scenario ID	Compatibility Testing/ TS007 / TS008 / TS009 / TS010
Total Number of Test Cases	15
No. of Pass:	15
No. of Failures:	0
Elapsed Time:	00:40:00
Tested By:	Syukur Sidiq Nur Alam
Tested Date:	04-05-2023
Testing Name/ Test Scenario ID	Usability Testing/ TS011
Total Number of Test Cases	5
No. of Pass:	4
No. of Failures:	1
Elapsed Time:	00:20:00
Tested By:	Syukur Sidiq Nur Alam
Tested Date:	04-05-2023
Testing Name/ Test Scenario ID	Security Testing/ TS012
Total Number of Test Cases	5
No. of Pass:	4
No. of Failures:	1
Elapsed Time:	00:20:00
Tested By:	Syukur Sidiq Nur Alam
Tested Date:	04-05-2023
Testing Name/ Test Scenario ID	Portability Testing/ TS013
Total Number of Test Cases	3
No. of Pass:	3
No. of Failures:	0
Elapsed Time:	
<b>SUMMARY LOG STATUS</b>	
Total Number of Test Cases	45
Total Number of Pass	41
Total Number of Failures	4
Pass %	91%
Total Elapsed Time	06:00:00

## 2. Modify the risk-based test procedure with the reasons

According to Log Result, you need to modify RBT strategy on car portal project.

Risk ID	Test Scenario ID	Test Scenario	Test Objective	Test Priority	Risk	Technique	Expected Results
1.	TS001	Validating registration functionality	To check registered data can be save	High	User will not be able to register to the portal	Unit Testing	After checking, junit should return a passing result as user data can be save

2	UA004	Ensure user can search and view cardetail	To allow user to search a car successfully	High	User will not be able to find the car expected	UAT Testing	After searching, user will see a search result of list of cars matching with the user search input
3	UB003	Test whether the home page is user-friendly in design	To ensure all navigation in header and footer works properly and the	Moderate	User will be unable to fully utilize the function in the home page	Usability Testing	User will be able to use all navigation links in the home page properly and understand the flow of

Modification to source code required for each failed test cases:

Scenario ID	Test Case ID	Test Case
SE001	SEC002	To ensure Spring Security login feature is authenticated correctly for User after login with invalid credentials
Modification		<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="margin: 0;">Before Modification</p> <pre style="font-family: monospace; margin: 0;">@SecurityConfig.java ::</pre> <pre style="font-family: monospace; margin: 0;">30  protected void configure(AuthenticationManagerBuilder auth) {n 31      System.out.println("At Authen configure");n 32      auth.userDetailsService(userDetailsService()).passwordEncoder();n 33  }n 34n 35  @Override 36  protected void configure(HttpSecurity http) throws Exception {n 37      System.out.println("At Security configure");n 38      http 39          .formLogin() 40              .loginPage("/login") 41              .loginProcessingUrl("/login") 42              .permitAll() 43              .defaultSuccessUrl("/cars", true) 44          .and() 45          .csrf() 46          .and()</pre> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="margin: 0;">After modification</p> </div>

		<pre> 35④    @Override 36    protected void configure(HttpSecurity http) throws Exception { 37 38        System.out.println("At Security configure"); 39        http 40            .formLogin() 41                .loginPage("/login") 42                .loginProcessingUrl("/login") 43                .failureUrl("/login_error") 44                .permitAll() 45                .defaultSuccessUrl("/cars", true) 46 47 48    } 49 50    @GetMapping("login_error") 51    public String onLoginError(Model model) { 52        String error_msg = "Incorrect username or password. Try Again."; 53        model.addAttribute("error_string", error_msg); 54        return "login"; 55    } 56} 57 </pre>
<b>TS001</b>	TC001	Check if registered data can be saved
Modification		<p><b>Before modification</b></p> <pre> @Test public void saveRegisterUserData() { User user = new User(); user.setId((long) 1); user.setName("john smith"); user.setUserName("john"); user.setEmail("john@gmail.com"); String encodedPassword = passwordEncoder.encode("john"); user.setPassword(encodedPassword); user.setRoles(new HashSet&lt;&gt;(roleRepository.findBySpecificRoles("Users"))); Mockito.when(userRepository.save(user)).thenReturn(user); String userResponse = userService.save(user); Assert.assertEquals("User save successfully",userResponse); } </pre> <p><b>After modification</b></p> <pre> 41④    @Test public void saveRegisterUserData() { User user = new User(); 42        user.setId((long) 1); user.setName("john smith"); user.setUserName("john"); 43        user.setEmail("john@gmail.com"); String encodedPassword = 44        passwordEncoder.encode("john"); user.setPassword(encodedPassword); 45        user.setRoles(new HashSet&lt;&gt;(roleRepository.findBySpecificRoles("Users"))); 46        Mockito.when(userRepository.save(user)).thenReturn(user); String userResponse 47        = userService.save(user); Assert.assertEquals("User saved  successfully",userResponse); } 48 49 50 51 52    public String save(User user) { 53        String encodedPassword = passwordEncoder.encode(user.getPassword()); 54        user.setPassword(encodedPassword); 55 56        user.setRoles(new HashSet&lt;&gt;(roleRepository.findBySpecificRoles("Users"))); 57 58        userRepository.save(user); 59 60        return "User saved successfully"; 61    } 62 </pre>

Scenario ID	Test Case ID	Test Case
<b>UA004</b>	UATC002	Ensure user can view detail of search car
Modification		<p><b>Before modification</b></p>

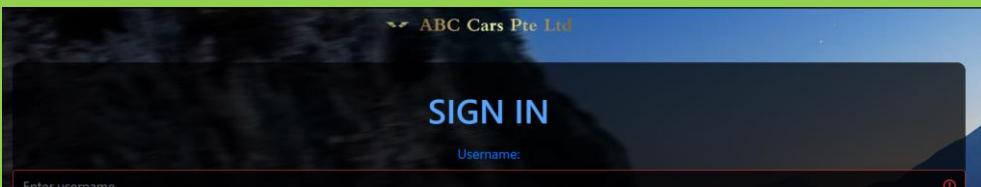
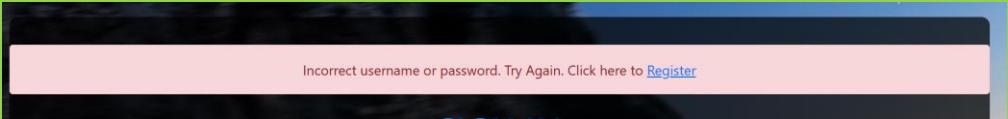
	<pre> &lt;/c:if&gt; &lt;!-- list of all cars posted --&gt; &lt;div class="row" style="gap: 60px;"&gt;      &lt;c:forEach items="\${searchCar}" var="c"&gt;          &lt;div class="card" style="width: 400px"&gt;             &lt;img class="card-img-top" src="\${c.photoImagePath}"                 alt="\${c.photos}" style="width: 100%"&gt;             &lt;div class="card-body"&gt;                 &lt;h4 class="card-title"&gt;\${c.name}&lt;/h4&gt;                 &lt;p class="card-text"&gt;                     &lt;i class="fas fa-tags"&gt;&lt;/i&gt;&amp;ampnbspUSD \${c.price}                 &lt;/p&gt;                  &lt;!--&lt;a href="#" class="btn"                     style="background-color: red; margin-right: 40px;"&gt;Book a                     Test Drive&lt;/a&gt;--&gt;                 &lt;a href="/car_detail?cid=\${c.id}" class="btn btn-primary"&gt;View                     Car Details&lt;/a&gt;             &lt;/div&gt;         &lt;/div&gt;     &lt;/c:forEach&gt; </pre>	
	<h3>After modification</h3> <pre> &lt;/c:if&gt; &lt;!-- list of all cars posted --&gt; &lt;div class="row" style="gap: 60px;"&gt;      &lt;c:forEach items="\${searchCar}" var="c"&gt;          &lt;div class="card" style="width: 400px"&gt;             &lt;img class="card-img-top" src="\${c.photoImagePath}"                 alt="\${c.photos}" style="width: 100%"&gt;             &lt;div class="card-body"&gt;                 &lt;h4 class="card-title"&gt;\${c.name}&lt;/h4&gt;                 &lt;p class="card-text"&gt;                     &lt;i class="fas fa-tags"&gt;&lt;/i&gt;&amp;ampnbspUSD \${c.price}                 &lt;/p&gt;                  &lt;!--&lt;a href="#" class="btn"                     style="background-color: red; margin-right: 40px;"&gt;Book a                     Test Drive&lt;/a&gt;--&gt;                 &lt;a href="/car_detail?cid=\${c.id}" class="btn btn-primary"&gt;View                     Car Details&lt;/a&gt;             &lt;/div&gt;         &lt;/div&gt;     &lt;/c:forEach&gt; </pre>	
UB003	UBC001	Check all navigation in header and footer works properly and the content is visible big images
Modification	<h3>Before modification</h3> <pre> &lt;/nav&gt;&lt;br&gt; &lt;sec:authorize access="hasAnyRole('Administrator', 'Users')"&gt; &lt;div class="container-fluid text-center"&gt;     &lt;a href="cars" class="navbar-brand " data-toggle="tooltip"         data-placement="top" title="Home"&gt; &lt;img src="/images/logos"         height="250px"&gt;     &lt;/a&gt; &lt;/div&gt;&lt;br&gt;  &lt;/sec:authorize&gt; </pre> <h3>After modification</h3>	

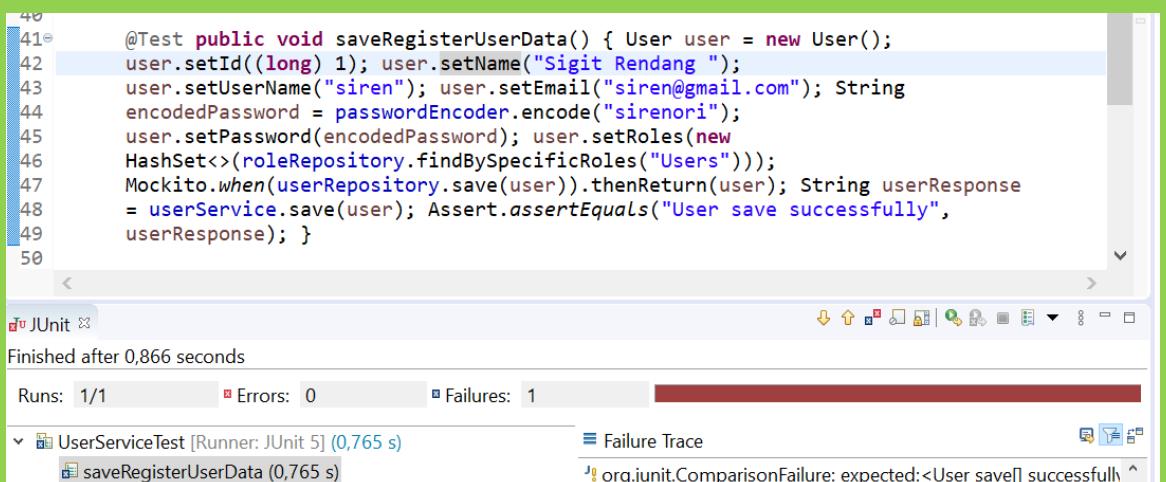
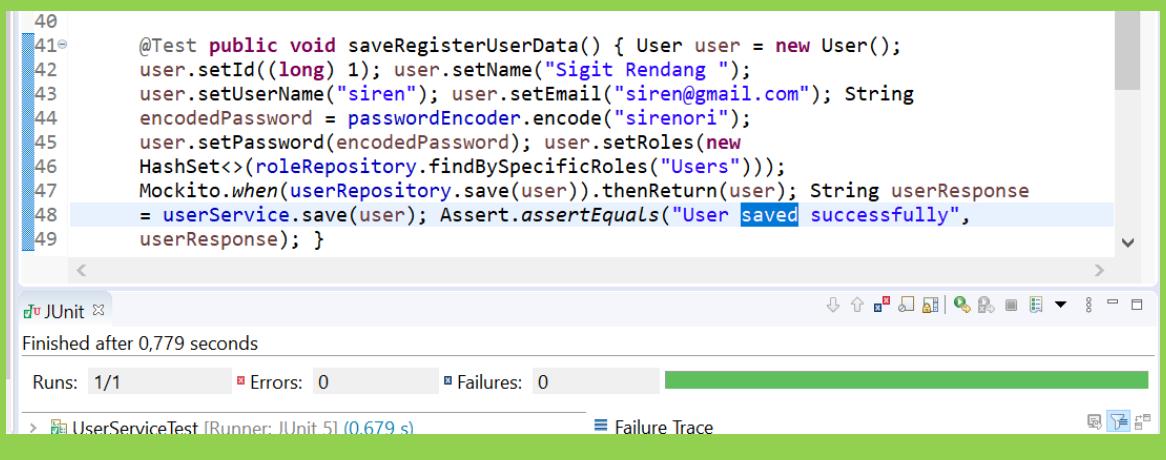
```

82         </div>
83     </nav><br>
84     <sec:authorize access="hasAnyRole('Administrator', 'Users')">
85         <div class="container-fluid text-center">
86             <a href="cars" class="navbar-brand " data-toggle="tooltip"
87                 data-placement="top" title="Home"> 
89             </a>
90         </div><br>
91
92
93     </sec:authorize>

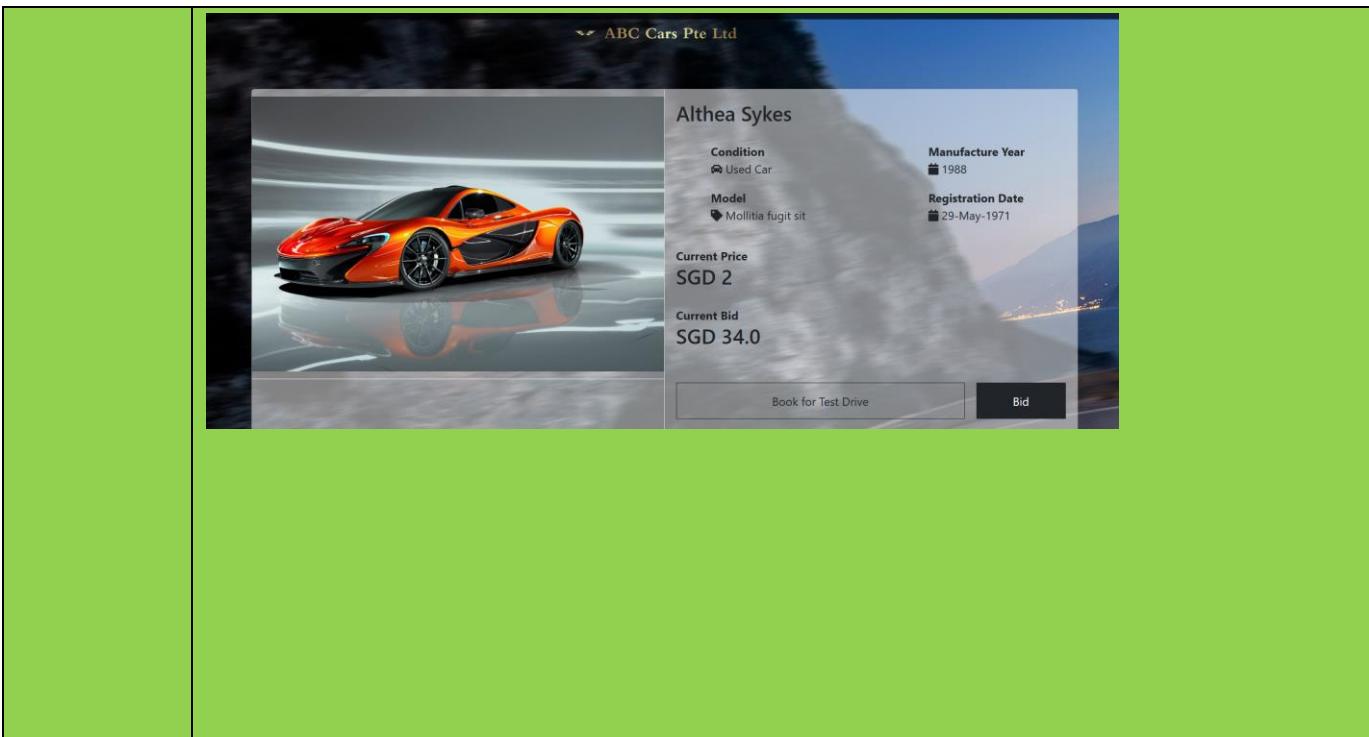
```

Below shows the record of executed prioritized test cases after modification has been made:

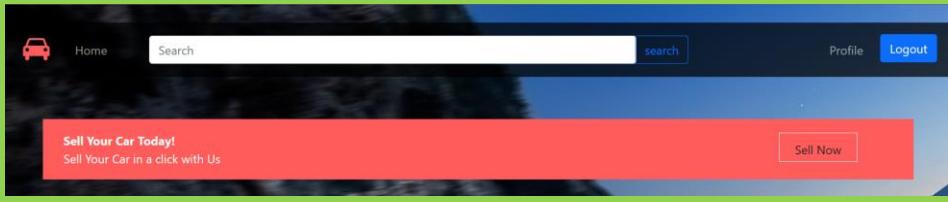
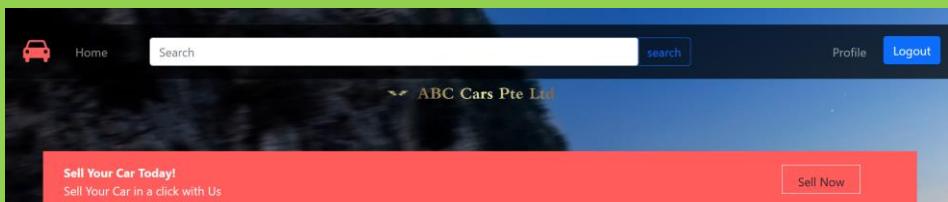
Test Scenario ID	Test Case ID	Test Priority	Pre-condition	Expected Result	Actual Result	Pass/Fail
SE001	SEC002	To ensure Spring Security login feature is authenticated correctly for User after login with invalid credentials	Implementation of ABC Car Portal is complete with all webpages and navigation links and uploaded on localhost server	User should see an error message asking user to try again or register	Result is come out as expected	Pass
<b>Test Step</b>	1. Enter URL localhost:9090 Sign in to the portal					
<b>Evidence</b>	<p><b>Before</b></p>  <p><b>After</b></p> 					

Test Scenario ID	Test Case ID	Test Priority	Pre-condition	Expected Result	Actual Result	Pass/Fail
TS001	TC001	Check if registered data can be saved	Implementation of ABC Car Portal is complete with all webpages and navigation links and uploaded on localhost server	After checking, junit should return a passing result as user data can be save	Result is come out as expected	Pass
<b>Test Step</b>	. Run Test script shown in screenshot below					
<b>Evidence</b>	<p><b>Before</b></p>  <pre> 40 41@Test public void saveRegisterUserData() { User user = new User(); 42 user.setId((long) 1); user.setName("Sigit Rendang "); 43 user.setUserName("siren"); user.setEmail("siren@gmail.com"); String 44 encodedPassword = passwordEncoder.encode("sirenori"); 45 user.setPassword(encodedPassword); user.setRoles(new 46 HashSet&lt;&gt;(roleRepository.findBySpecificRoles("Users"))); 47 Mockito.when(userRepository.save(user)).thenReturn(user); String userResponse 48 = userService.save(user); Assert.assertEquals("User save successfully", 49 userResponse); } 50 </pre> <p>JUnit</p> <p>Finished after 0,866 seconds</p> <p>Runs: 1/1 Errors: 0 Failures: 1</p> <p>UserServiceTest [Runner: JUnit 5] (0,765 s)</p> <p>saveRegisterUserData (0,765 s)</p> <p>Failure Trace</p> <p>org.junit.ComparisonFailure: expected:&lt;User save[] successfully&gt; but was:&lt;User save successfully&gt;</p> <p><b>After</b></p>  <pre> 40 41@Test public void saveRegisterUserData() { User user = new User(); 42 user.setId((long) 1); user.setName("Sigit Rendang "); 43 user.setUserName("siren"); user.setEmail("siren@gmail.com"); String 44 encodedPassword = passwordEncoder.encode("sirenori"); 45 user.setPassword(encodedPassword); user.setRoles(new 46 HashSet&lt;&gt;(roleRepository.findBySpecificRoles("Users"))); 47 Mockito.when(userRepository.save(user)).thenReturn(user); String userResponse 48 = userService.save(user); Assert.assertEquals("User saved successfully", 49 userResponse); } 50 </pre> <p>JUnit</p> <p>Finished after 0,779 seconds</p> <p>Runs: 1/1 Errors: 0 Failures: 0</p> <p>UserServiceTest [Runner: JUnit 5] (0,679 s)</p> <p>Failure Trace</p>					

Test Scenario ID	Test Case ID	Test Priority	Pre-condition	Expected Result	Actual Result	Pass/Fail
UA004	UATC002	Ensure user can view detail of search car	Implementation of ABC CarPortal is complete with all webpages and navigation links and uploaded on localhost server	User can view detail of search car selected	Result is come out as expected	Pass
<b>Test Step</b>	1 Enter URL localhost:80802.Sign In into the portal 2 Navigate to home page search bar 3. Enter search input 4. Click Search. 5. Click 'View Car Details' on selected search car result					
<b>Evidence</b>	<p><b>Before</b></p>  <p><b>Whitelabel Error Page</b></p> <p>This application has no explicit mapping for /error, so you are seeing this as a fallback.</p> <pre>Sat May 06 23:03:56 WIB 2023 There was an unexpected error (type=Bad Request, status=400). Failed to convert value of type 'java.lang.String' to required type 'long'; nested exception is java.lang.NumberFormatException: For input string: "" org.springframework.web.method.annotation.MethodArgumentTypeMismatchException: Failed to convert value of type 'java.lang.String' to required type 'long'; nested exception is java.lang.NumberFormatException: For input string: "" at org.springframework.web.method.annotation.AbstractNamedValueMethodArgumentResolver.resolveArgument(AbstractNamedValueMethodArgumentResolver.java:133) at org.springframework.web.method.support.HandlerMethodArgumentResolverComposite.resolveArgument(HandlerMethodArgumentResolverComposite.java:122) at org.springframework.web.method.support.InvocableHandlerMethod.getMethodArgumentValues(InvocableHandlerMethod.java:179) at org.springframework.web.method.support.InvocableHandlerMethod.invokeForRequest(InvocableHandlerMethod.java:146) at org.springframework.web.servlet.mvc.method.annotation.ServletInvocableHandlerMethod.invokeAndHandle(ServletInvocableHandlerMethod.java:117) at org.springframework.web.servlet.mvc.method.annotation.RequestMappingHandlerAdapter.invokeHandlerMethod(RequestMappingHandlerAdapter.java:895) at org.springframework.web.servlet.mvc.method.annotation.RequestMappingHandlerAdapter.handleInternal(RequestMappingHandlerAdapter.java:808) at org.springframework.web.servlet.mvc.method.AbstractHandlerMethodAdapter.handle(AbstractHandlerMethodAdapter.java:87)</pre> <p><b>After</b></p> 					



Test Scenario ID	Test Case ID	Test Priority	Pre-condition	Expected Result	Actual Result	Pass/Fail
UB003	UBC001	Check all navigation in header and footer works properly and the content is visible in the home page and user friendliness	Implementation of ABC CarPortal is complete with all webpages and navigation links and uploaded on localhost server	All navigations links is working correctly in the home page and loading the right web pages and having a clear flow easily understood by user	Result is come out as expected	Pass
<b>Test Step</b>	1. Enter URL localhost:8080 Sign in to the portal					

<b>Evidence</b>	<p><b>Before</b></p>  <p><b>After</b></p> 
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### Log result after modification:

<b>Used Car Sale Portal Project</b>	
<b>Reported By:</b>	Syukur Sidiq Nur Alam
<b>Report Date:</b>	05/5/2023
<b>Tested By:</b>	Syukur Sidiq Nur Alam
<b>Tested Date:</b>	05/5/2023
<b>Testing Name/ Test Scenario ID</b>	Functional testing: -Unit Testing/ TS001
<b>Total Number of Test Cases</b>	1
<b>No. of Pass:</b>	1
<b>No. of Failures:</b>	0
<b>Elapsed Time:</b>	00:10:00
<b>Tested By:</b>	Syukur Sidiq Nur Alam
<b>Tested Date:</b>	05/5/2023
<b>Testing Name/ Test Scenario ID</b>	Functional testing: -UAT Testing/ UA004
<b>Total Number of Test Cases</b>	1
<b>No. of Pass:</b>	1
<b>No. of Failures:</b>	0
<b>Elapsed Time:</b>	05/5/2023
<b>Tested By:</b>	Syukur Sidiq Nur Alam
<b>Tested Date:</b>	05/5/2023
<b>Testing Name/ Test Scenario ID</b>	Usability Testing/ UB003
<b>Total Number of Test Cases</b>	1
<b>No. of Pass:</b>	1
<b>No. of Failures:</b>	0
<b>Elapsed Time:</b>	04/5/2023
<b>Tested By:</b>	Syukur Sidiq Nur Alam

<b>Tested Date:</b>	05/5/2023
<b>Testing Name/ Test Scenario ID</b>	Security Testing/ SE001
<b>Total Number of Test Cases</b>	1
<b>No. of Pass:</b>	1
<b>No. of Failures:</b>	0
<b>Elapsed Time:</b>	00:10:00
<b>SUMMARY LOG STATUS</b>	
<b>Total Number of Test Cases</b>	4
<b>Total Number of Pass</b>	4
<b>Total Number of Failures</b>	0
<b>Pass %</b>	100%
<b>Total Elapsed Time</b>	00:40:00

## Task 7

Create the following items under “Evaluation of Testing strategy” in Project Presentation

1. Evaluate the effectiveness of the RBT strategy and assess the security testing cycles
2. Evaluate the testing strategies and compare it's pro and cons
3. Assess the importance and environment suitability and examine the test heuristics are identified with proper justification

### 1. Evaluate the effectiveness of the RBT strategy and assess the security testing cycles.

- Evaluate and discuss the effectiveness of the RBT strategy after you applied it on the Car Portal. (discuss the benefits and summarize how you have implemented this strategy)

The introduction of risk-based testing (RBT) has proven invaluable during the spiral life of the SDLC model to find application flaws that can cause major problems after deployment. Knowing your website's shortcomings after launch is expensive, so it's better to identify potential risks early and mitigate the negative impact on your customers and the company as a whole.

You can use the Risk Matrix to rank the discovered risks and determine if potential issues should be flagged as low, medium, high, or extreme risk. The resulting risk assessment clearly indicates which tests should be classified as particularly dangerous. The biggest risk is therefore the problem of planning the test cases recorded in the test protocol. If there are failed test cases, mitigation plans are used based on test log data. Once the issue is fully resolved, the test case should be re-run.

Retesting confirms that the issue has been resolved, and the cycle repeats until all major risk factors are fully resolved or risk is maintained at the lowest acceptable level for the project. If the customer is satisfied, as indicated by the feedback, then the end goal has been achieved. Each level of the SDLC model now includes security testing, and security is treated as a non-functional requirement throughout the requirements phase. Because security is part of the quality of any software product and you need to set up a secure automotive gateway. In terms of confidentiality and integrity to protect against harmful cyber-attacks that may lead to data misuse. That's why the automotive site uses Spring Security, which provides authentication. Privileges and defenses against common attacks such as SQL

injection. A user's identity can be verified by authentication only if the user is registered and their credentials are in the database. This typically uses a username and password. A user can successfully log in only if the user's credentials match the credentials in his store of data. Otherwise, it will send you back to the login page.

Authorizations are used to segregate tasks that are permitted based on designated roles. User His role can only list her one car for sale, and Admin is the only person with access to all user and published vehicle data. Last but not least, SQL queries have been added to the search input field to test common attacks such as SQL injection. A successful attempt could use sensitive data in the database and gain administrative privileges to modify the data. The check was successful as there were no signs of reappearance on the used car portal. Input validation, which can remove malicious code components such as single quotes from input data, is a way to prevent SQL injection.

- Assess the security testing cycles. (how did u implemented security testing – spring security)

## 2. Evaluate the testing strategies and compare it's pro and cons

- The leaner needs to evaluate testing strategies that used in car portal and compare their pro and cons.  
<You may compare before using RBT and after using RBT pros and cons>

Before Using RBT	
Pro	Cons
➤ Find problem areas early and make changes faster	➤ underestimation of risks assessed as Low risk that can cause problems. when there is only one reality
➤ Ability to prioritize critical, high-risk issues and change the overall testing strategy based on problem areas.	➤ More paperwork will be required depending on how often the problem area is retested and customer satisfaction
➤ Reduce costs because all critical and dangerous issues are resolved before product release.	➤ Manual risk management can be difficult when it is repetitive or when records are lost without backup data. As a result, vehicle gateways must use software to automate the risk management process.

## 3. Assess the importance and environment suitability and examine the test heuristics are identified with proper justification

- Discuss & assess the importance of suitable test environments that need to design and build.
- Show how it supports the risk-based test strategy.
- The learner needs to write from their perspective.

Environment	The Importance of Environment Suitability and How It Supports RBT Test Strategy
-------------	---

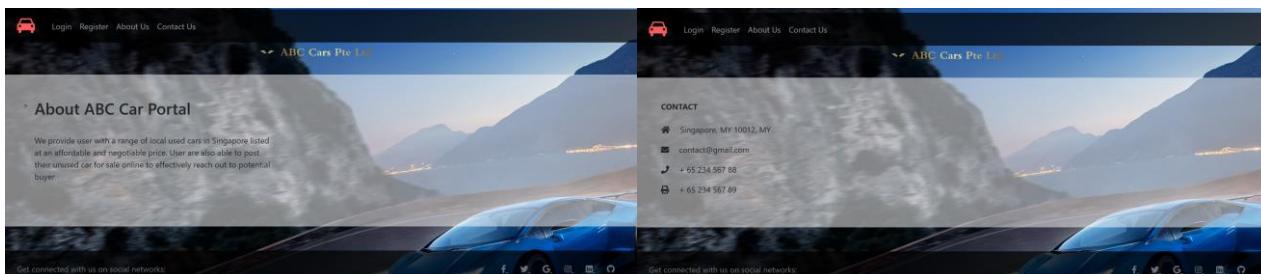
STS IDE	Create Spring Boot apps like ABC Car Portal using an integrated development environment (IDE) called Spring Tool Suite. When building an automotive portal with Spring Boot, you can take advantage of features such as dependency injection and robust database transaction management. You can also run unit tests in this IDE using JUnit, which you can add to your Autoportal project's build root. Additionally, Spring Boot Test (a Maven dependency injection tool for unit testing) supports mocking, so only the code itself is tested, not external dependencies or behavior.
MySQL Database	User, car, autobid, and user role information are all stored in separate tables using a MySQL database. It's also one of the most secure databases with features like user authentication, encryption, and firewalls.
Window 10 OS	To create a secure ABC car portal, the current computer system used to install all the software required to create a car portal such as Spring Tool Suite, MySQL Workbench 8.0 is Windows 11 .
Java Version 8	Java was chosen as the programming language for creating the vehicle pages. Access modifiers such as private can be used to restrict access to Java security features fields, methods, and classes. The automotive gateway POJO class fields are private and can only be accessed via getter and setter methods.
ABC Cars Pte Ltd (Used Car Sales Portal Application)	ABC Car Portal should be developed on time and according to customer wishes. A full implementation of a portal requires numerous tests of functional and non-functional requirements.
Test Plan	Based on the risk level determined using the Risk Matrix, the test plan is ranked in order of importance. Extreme, high-risk tests will be run first, then they will be recorded in a test log. After the problem has been fixed, the related failed test cases will be retested. Ongoing risk monitoring and application quality assurance are made possible in this way.
Documentation	The test results of unit, user acceptance, performance, compatibility, portability, usability and security tests of automated portal applications are recorded in test logs. You can document failed test cases and assess risk levels to determine key risks for further testing.
Devices	Three devices were used: a laptop, an iPad or tablet, and a mobile phone to evaluate the adaptability of the automotive website to different hardware elements.
Browsers	Three different browsers were used for cross-browser testing on the Lambdatest website: Chrome, Edge, and Firefox. The goal was to provide a consistent visual and haptic experience for the automotive portal across browsers.

## Task 8

1. Provide screen capture of developed pages and hosted application in Project Presentation

**SIGN IN**

**REGISTER**



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+65 234 567 89

**Car Management**

No.	Name	Model	Price (\$GD)	Seller	Action	Sell Car?	Current Bid (\$GD)	Booking Date	Approve?	Bidder Name	
1	Tanya Bender	Ullam facere velit in	441					07/08/2018	07/08/2018		user
2	Rebecca Lawson	Error ex eius id tempor	414					07/08/2018	07/08/2018		
3	Margaret Espinosa	Sit ad tempor ut labore	572					07/08/2018	07/08/2018		

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**User Management**

No.	Name	Username	Email	Role	Action	
1	user	user	user@gmail.com	Administrator		

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