D7 Auto Service Center Web-App

**Test Plan**

**Revision History**

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**Reference Document**

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# INTRODUCTION

## Purpose

Plan for testing: Set the foundations for testing. Define the basics of the project (scope, dates, and goals) and set up a good testing environment. This includes deciding how to start and end tests, making accurate test cases, laying out jobs, making schedules, and making the data plans.

Execution Strategy: Plan for how the tests will be done. Describe how problems are found, written down, and reported, as well as the steps to fix them. This shows how important it is to handle problems well.

Strategy for Testing: Sets up the basics for testing. We'll outline the most important parts of the project (scope, dates, and goals) and set up a solid testing environment. This means making rules for how tests should start and end, making precise test cases, outlining jobs, making schedules, and putting data strategies into place.

Test Management: Set up the process of testing. Define the team's roles and how they will communicate, escalate, and deal with risks. With this structure, testing is kept organized and flexible.

By including the Test Strategy, the Execution Strategy, and the Test Management, our plan makes sure that we test [Module/System Name] in [Project Name] well. We want to make sure the project is good and reliable while also meeting the project's larger goals.

## Project Overview

The goal of the "D7 Auto Service Center Web-App" project is to create a management tool for the auto repair business D7 Auto Service Center, which specializes in vehicle maintenance and repair. The project was initiated to assist D7 with their challenges in keeping up with how they could convince the customers to use their services. The project's goal is to enhance their existing advertising methods by adding an online presence platform. The Elite Four group of BSIT-MI students from Asia Pacific College made this project for their PBL (Project Based Learning) course.

## Audience

The Project team members are appointed with tasks to perform based on their roles and responsibilities which are shown in this documentation, The project team is also tasked with providing unbiased input and recommendations which can help improve the quality of the system.

1. **Project Manager** – in charge of planning and going over the project schedule, as well as the project documentation and testing tasks. They keep track of how well tests are doing based on jobs that have been given to them, approve documents, and are responsible for the project's results.
2. **Business Analyst** – in charge of gathering and refining requirements, assisting in planning, and designing testing activities, and acting as the communication bridge between stakeholders and the testing team. They also maintain documentation against business requirements, manage defects and modifications.
3. **Testing Team –** responsible for executing tests and assessing the software or system to identify issues and ensure its quality and functionality.
4. **Technical Team** - make environment and test plan and deliverables align with the design, provides the testing environment, and adheres to the established procedures for problem modification.

The stakeholders may have representatives to take part in testing, including User Acceptance Testing (UAT), to confirm that the system meets business requirements and also offer clarifications to the testing team if necessary and assess the test results.

# TEST STRATEGY

## Test Objectives

The test will execute and verify the test scripts, identify, fix, and retest all high and medium severity defects per the entrance criteria, prioritize lower severity defects for future fixing via CR.

The final product of the test is twofold:

**A production-ready website:**

* All functionalities and features of the website operate as intended.
* High and medium severity defects have been addressed and resolved.
* The performance and security aspects of the website meet the specified criteria.
* User interface elements are consistent, responsive, and visually appealing.
* Website content is accurate, up-to-date, and properly displayed.

**A set of stable test scripts:**

* Test scripts cover all major functionalities and use cases of the website.
* Test scripts are well-structured, modular, and maintainable.
* Test scripts provide clear and concise test steps, expected results, and validation criteria.
* Test scripts are designed to accommodate future changes and updates to the website.
* Test data used in the scripts is representative of real-world scenarios.
* Test scripts are documented so that they can be easily understood and executed.

## Test Assumptions

**Key Assumptions**

1. All the necessary documentation will be provided to help the testing team be familiarized with the system.
2. The testing team will be provided with appropriate testing software and tools.
3. The development team will allot time for regular meetings with the testing team.
4. The system is ready for testing.

**General**

1. Delays might occur during testing.
2. The testing team is considering doing performance testing.
3. All the defects would come along with a snapshot JPEG format.
4. The Test Team assumes all necessary inputs required during Test design and execution will be supported by the Development team.
5. Test case design activities will be performed by the test team.
6. The same will be informed to test team prior to start of Defect fix cycles.
7. The project manager will review and sign-off all Test cases prepared by the Test Team prior to the start of Test execution.
8. Any defect fixes planned will be shared with the Test Team prior to applying the fixes on the Test environment.
9. The Project Manager will review and sign off all test deliverables.
10. The project will provide test planning, test design and test execution support.
11. The test team will manage the testing effort with close coordination with the dev team.
12. Project team has the knowledge and experience necessary, or has received adequate training in the system, the project, and the testing processes.
13. The testing environment might experience some downtime during the test due to outages or defective fixes.

## Test Principles

* Testing will be conducted following all procedures.
* Testing will focus on assuring quality and that the system follows the business objectives.
* Testing processes will be established for the team to conduct it properly.
* Testing will undergo repeatable and measurable activities.
* Testing will be conducted in different phases following a specific objective.
* Testing will be used to find inconsistencies with the system to help resolve and assure quality.

## Data Approach

The primary objective of the data approach within the test plan is to ensure the correct and secure operation of the web application while managing data associated with auto service center operations. Pre-loaded data will be available for functional testing, and this approach entails gaining a comprehensive understanding of the data encompassed by the web application, including customer information, reservation details, vehicle records, and user interactions. Furthermore, it involves the identification of key data entities, their associated attributes, and their relationships within the application's data structure.

## Scope and Levels of Testing

### Exploratory

**PURPOSE:** The purpose of this test is to identify and eliminate critical defects within specific modules before progressing to subsequent levels of testing.

**SCOPE:** The scope of exploratory testing includes the examination of the following modules:

* + First level navigation
  + Dealer module
  + Admin module

**LEVEL OF TESTING:** This testing falls under the category of Functional Testing.

**TESTERS:** The testing team will be responsible for conducting exploratory testing.

**METHOD:** Exploratory testing will be carried out within the application without relying on predefined test scripts or formal documentation. Testers will interact with the application, perform various actions, and explore functionalities to uncover potential defects.

**TIMING:** Exploratory testing will be conducted at the beginning of each testing cycle to ensure that critical defects are addressed before proceeding to subsequent levels of testing.

### Functional Test

**PURPOSE:** Functional Testing will be performed to check and verify the different features of the D7 Auto Service Center Web-App. This testing will be conducted by providing inputs to the system and validating the output from the systems.

**SCOPE:** The scope of the functional testing for D7 Auto Service Center Web-App are based on the functional requirements outlined in the project documentation and different features of the system, including but not limited to:

1. Registration
2. Login
3. Reservation System
4. Support Tab
5. Chat System
6. System Administration

The scope also includes browser and device compatibility testing to ensure optimal user experience.

**TESTERS:** Testing Team.

**METHOD:** The test will be performed according to the functional requirements outlined in the project documentation for D7 Auto Service Center Web-App.

TIMING: After exploratory test is completed.

**TEST ACCEPTANCE CRITERIA:**

1. All the features and functionalities that were outlined in the system documentation, including the product backlog and use case have been successfully implemented according to the given requirements.
2. Development is done including the unit testing that have been done and passed.
3. Test strategy and planning must be accepted and signed by the necessary personnel.
4. There are no significant problems or flaws present in the application prior to its release.
5. The hosting of the system has been hosted without significant issues or disruptions.

**TEST DELIVERABLES:**

List of test deliverables under the Functional Testing, including but not limited to:

1. Test Plan
2. Test Case
3. Test Data
4. Test Environment
5. Test Execution Logs (daily/weekly status report)
6. Defect Reports
7. Test Summary Report
8. Test Closure report

**MILESTONE LIST**

Following are the milestone lists in functional testing, including but not limited to:

1. Completion of Test Planning
2. Setting up testing tools and testing environments
3. Executing the functional testing
4. Creation of User Acceptance Testing (UAT).
5. Test Completion
6. Test Review and Approval
7. Test Closure

### User Acceptance Test (UAT)

**The User Acceptance Test (UAT)** is a crucial step that checks to see if the system matches business theory. It gives the end users their last chance to look over the system carefully before it goes live, making sure it meets their practical needs well.

**Testers**: End users, including people from the L1, L2, and L3 user groups, do the UAT.

**Method:** The UAT is a joint process that considers the unique knowledge of business users about their specific needs and how the system meets them. The test team makes UAT test cases based on what End Users (Levels 1, 2, and 3) and Business Analysts tell them. This method allows for thorough validation that sometimes goes beyond scripted situations to meet the needs of different businesses.

**Timing**: The User Acceptance Test is done after the Exploratory and Functional Testing phases have been finished successfully. Its completion is a key step, because the product cannot go to final release until it passes UAT.

**During the User Acceptance Testing phase**: we want to make sure that the system not only meets functional requirements but is also in line with complex business logic. This will allow end users to use the system with trust and efficiency.

**TEST DELIVERABLES:**

List of test deliverables under the Functional Testing, including but not limited to:

|  |  |  |  |
| --- | --- | --- | --- |
| S.No. | Deliverable Name | Author | Reviewer |
| 1. | UAT Test Cases | Test Team | Business Analyst’s Sign off |
| 2 | UAT Test Plan | Test Team | Business Analyst’s Sign off |
| 3 | Test Data | Test Team | Business Analyst’s Sign off |
| 4 | Test Environment | Test Team | Test Lead |
| 5 | Test Logs and Reports | Test Team | Business Analyst’s Sign off |
| 6 | Defect Reports | Test Team | Business Analyst’s Sign off |
| 7 | UAT Test Summary Report | Test Team | Business Analyst’s Sign off |

## Test Effort Estimate

|  |  |
| --- | --- |
| ACTIVITY | HOURS |
| Requirement Analysis | 24 Hours |
| Test Planning | 48 Hours |
| Test Case Development | 96 Hours |
| Test Environment Setup | 48 Hours |
| Test Execution | 48 Hours |
| Test Cycle Closure | 36 Hours |

# TEST AREAS AND SPECIFICATIONS

## Features to be Tested (Use Cases)

|  |  |  |
| --- | --- | --- |
| Use Case Number | Use Case Name | Test Type |
| UC01 |  |  |
| UC02 |  |  |
| UC03 |  |  |
| UC04 |  |  |
| UC05 |  |  |
| UC06 |  |  |
| UC07 |  |  |
| UC08 |  |  |
| UC09 |  |  |
| UC10 |  |  |
| UC11 |  |  |
| UC12 |  |  |
| UC13 |  |  |
| UC14 |  |  |
| UC15 |  |  |
| UC16 |  |  |
| UC17 |  |  |
| UC18 |  |  |
| UC19 |  |  |
| UC20 |  |  |
| UC21 |  |  |
| UC22 |  |  |
| UC23 |  |  |
| UC24 |  |  |
| UC25 |  |  |
| UC26 |  |  |
| UC27 |  |  |
| UC28 | Admin Delete Reviews | Functional, GUI |
| UC29 | Admin Access Rendered Services | Functional, GUI |
| UC30 |  |  |
| UC31 |  |  |
| UC32 |  |  |
| UC33 | Admin Access Customer Account Statistics | Functional, GUI |
| UC34 | Admin Access Website Visit Statistics | Functional, GUI |

# EXECUTION STRATEGY

## Entry and Exit Criteria

The following entry criteria are the desirable conditions to be able the testing team to start the testing activities according to the phases:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Phase: | Entry Criteria: | Test Team: | Technical team: | Notes: | Date: |
| **Requirement Analysis** | Documentation Requirements of the system encompassing both functional and non-functional requirements. |  |  |  |  |
| Documentation for Design and Analysis |  |  |  |  |
| User stories and acceptance criteria document |  |  |  |  |
| **Test Planning and Control** | Requirement Analysis |  |  |  |  |
| Document assessing the feasibility of test automation |  |  |  |  |
| Requirements traceability matrix (RTM) |  |  |  |  |
| **Test Case Development** | Requirements document |  |  |  |  |
| RTM |  |  |  |  |
| Test Plan |  |  |  |  |
| Analysis Report for automation |  |  |  |  |
| **Test Environment Setup** | Plan for environment setup plan |  |  |  |  |
| Source Codes and system design documentation |  |  |  |  |
| **Test Execution** | Test data |  |  |  |  |
| Working testing Environment |  |  |  |  |
| Requirements Traceability Matrix (RTM), test plan, and test scripts are ready and accessible. |  |  |  |  |
| **Test Closure** | Results of testing |  |  |  |  |
| Completed Testing |  |  |  |  |
| Logs for defects |  |  |  |  |

The following exit criteria are the desirable conditions that need to be met in order to proceed with the implementations of the system:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Phase: | Exit Criteria: | Test Team: | Technical team: | Notes: | Date: |
| **Requirement Analysis** | Signed Requirements Traceability Matrix (RTM) |  |  |  |  |
| **Test Planning and Control** | Approved test plan strategy |  |  |  |  |
| **Test Case Development** | Test cases and automation scripts have been thoroughly reviewed and approved. |  |  |  |  |
| Test data has also undergone review and approval. |  |  |  |  |
| **Test Environment Setup** | Completed Test Data that has already setup |  |  |  |  |
| Testing environment established in accordance with the specified criteria. |  |  |  |  |
| **Test Execution** | All the planned tests have been executed according to the requirements. |  |  |  |  |
| Defects logged |  |  |  |  |
| **Test Closure** | Test closure report signed off by clients. |  |  |  |  |

***Note: mark the necessary criteria if met accordingly.***

Entry and exit criteria are flexible standards which if they aren't met, the testing team evaluates the risks, suggests solutions, and informs the project manager and the development team’s representative for a final decision on whether to proceed or not.

## Test Cycles

* Functional testing will be conducted in two separate cycles, with all scripts being executed in each cycle.
* The primary aim of the initial cycle is to uncover any obstructive or critical defects, as well as addressing most high-priority defects. It's anticipated that certain temporary solutions may be employed to ensure coverage of all scripts.
* The subsequent cycle's goal is to pinpoint any remaining high and medium defects, eliminate the temporary solutions implemented in the first cycle, rectify any script deficiencies, and gather performance metrics.
* A single cycle will be used for User Acceptance Testing (UAT).

## Validation and Defect Management

During our tests, we want to make sure everything works as it should. Our test plans will be followed by the testers. But sometimes they find things that we did not expect. Business Analysts help with the second round of testing because they know a lot about how things should work. If we find something new, we will make a note of it and change our plans.

We will use a tool called TESTLINK to keep track of these problems. Our Technical Team will check it every day and might ask the person in charge of bugs for more information. They will also try to fix the issues.

Everyone does the following:

* **Testing Team:** They identify problems, make sure they are linked to the right test, and check to see if they have been fixed.
* **Development Lead:** They decide how important the problems are, talk to the Technical Team about how to fix them, and make sure testing goes well.
* **Technical Team:** They look at TESTLINK every day, seek more information if they need it, fix the problems, and let the Defect Manager know when they are done.

By doing these things, we make sure that any problems we find are fixed the right way. This ensures that the method works well for everyone.

Below is the category that will be used to classify the defects that will be found during testing:

|  |  |
| --- | --- |
| Severity | Impact |
| 1 (Critical) | * This bug may cause the system to crash, may lead to data loss or even corrupt existing files. * This bug may render the system unusable which may damage the system. * Requires immediate attention and action. |
| 2 (High) | * This bug may have an impact on the overall performance of the system. * This may cause the system to have a downgrade in its quality or usability. * Requires immediate attention. |
| 3 (Medium) | * This bug has a moderate impact on the functionality of the system. * This bug may cause minor inconveniences to the user or may affect non-core functionalities. * Does not require immediate attention. |
| 4 (Low) | * There is an insufficient or unclear error message, which has minimum impact on system functionality. * Minor to no impact on user experience. |

## Test Metrics

Test metrics to measure the progress and level of success of the test will be developed and shared with the project manager for approval.  The below are some of the metrics

|  |  |  |
| --- | --- | --- |
| Report | Description | Frequency |
| Test preparation & Execution Status | To show how much we’re finished, what’s still in progress, what passed, and what failed | We’ll update this either daily or weekly (optional) |
| Daily execution  status | To track defects that are still open, those that are closed, and any other statuses. | This will be updated daily |
| Project Weekly Status report | We’ll provide project-related updates if the project team requests them. | This will be done weekly if needed, using a template provided by the project team |

## Defect tracking & Reporting

Following flowchart depicts Defect Tracking Process:

A diagram of a process flow

Description automatically generated

# TEST MANAGEMENT PROCESS

## Test Management Tool

**Project-Centric Folders in TestLink:**

* To enhance project oversight and organization, TestLink will implement a dedicated folder structure tailored to the DFRT project.
* This structure will ensure efficient monitoring and tracking of project status.

**Resource Access Permissions:**

* All members of the Testing team will receive permissions within TestLink, allowing them to both view and modify content.
* These permissions empower team members to actively contribute by creating and refining test cases directly within TestLink.

**Test Case Development Phase:**

* Test case creation will occur within TestLink during the Test Design phase.
* Any updates or changes to test cases will be immediately reflected within the TestLink system, ensuring that test case documentation is always up to date.

**Involvement of Testers:**

* Testers will have direct access to their designated test cases through TestLink.
* They can efficiently update the status of individual test steps directly within the TestLink interface, streamlining the testing process and enhancing collaboration.

**Defect Tracking:**

* Any identified defects will be comprehensively documented within TestLink.
* This will establish a clear link between defects and the relevant test cases and test steps, ensuring effective defect tracking and resolution.

**Defect Validation Phase:**

* During the Defect fix validation phase, previously identified defects will be returned to testers for confirmation.
* To guarantee that defects are correctly validated and closed, testers will analyze and approve defect resolutions, updating the defect status directly within TestLink.

**Comprehensive Reporting:**

* TestLink offers robust reporting capabilities, enabling the generation of various reports to gain insights into test execution progress.
* For example, Status reports can provide information on executed test cases, Pass/Fail outcomes, open defect counts, and defect distribution by severity, ensuring that stakeholders have access to comprehensive project status information.

## Test Design Process

* The tester will understand each requirement and prepare corresponding test case to ensure all requirements are covered.
* Each Test case will be mapped to Use cases to Requirements as part of Traceability matrix.
* Each of the Test cases will undergo review by the BUSINESS ANALYST and the review defects are captured and shared to the Test team. The testers will rework on the review defects and finally obtain approval and sign-off.
* During the preparation phase, tester will use the prototype, use case and functional specification to write step by step test cases.
* Testers will maintain a clarification Tracker sheet and same will be shared periodically with the Requirements team and accordingly the test case will be updated. The clarifications may sometimes lead to Change Requests or not in scope or detailing implicit requirements.
* Sign-off for the test cases would be communicates through mail by Business Analyst’s.
* Any subsequent changes to the test case if any will be directly updated in TESTLINK.

## Test Execution Process

* After all test cases are approved and the testing environment is prepared, testers will initiate exploratory testing of the application to ensure its stability.
* Each tester will access their assigned test cases directly through TESTLINK.
* Testers must have access to the testing environment and TESTLINK to report defects and update test statuses. If challenges arise, they will be escalated to the Test Lead initially, and if unresolved, to the Project Manager.
* Significant issues uncovered during the exploratory phase will be communicated to the development team for prompt resolution.
* Testers will systematically follow test steps and update the status (Pass or Fail) within TESTLINK.
* Every tester will create a chart illustrating the progress of daily test execution.
* In the event of problems, testers will document defects in TESTLINK, providing explanations and, if applicable, visual evidence.
* Stakeholders will receive daily updates on test execution progress and the status of identified defects.
* The testing team will actively participate in defect triage meetings to ensure accurate categorization of test cases as Pass or Fail.
* If approved by the Test Lead, noteworthy issues not covered by test steps but still relevant will be documented in TESTLINK and linked to the corresponding test case or step.
* This iterative process will persist, aiming to achieve comprehensive testing coverage and accurate Pass/Fail outcomes.
* As per Process, final sign-off or project completion process will be followed.

## Test Risks and Mitigation Factors

|  |  |  |  |
| --- | --- | --- | --- |
| Risk | Prob. | Impact | Mitigation Plan |
| **Security Risks** -  Data breaches can compromise the security of the web application. | High | High | Conduct regular security audits, code reviews, and stay up to date with security best practices. |
| **Performance Risks** –  Poor application performance can result in slow load times, leading to poor user experience. | Medium | High | Employ performance testing throughout development, optimize code and database queries, and consider scalability from the beginning. |
| **Data Loss Risks** –  Data loss can occur due to technical failures or human errors. | Medium | High | Implement regular data backups and recovery procedures, employ version control for code, and restrict access to sensitive data. |
| **Resource Constraints** –  Insufficient resources, including time, budget, or skilled personnel, can lead to project delays. | Medium | Medium | Develop a realistic project plan with clear timelines and resource requirements, allocate resources effectively, and have contingency plans in place for unforeseen challenges. |
| **Communication Risks** –  Poor communication within the development team or with stakeholders can lead to misunderstandings and project mismanagement. | Low | Medium | Establish effective communication channels, hold regular meetings, document decisions and action items, and ensure all stakeholders are kept informed of project progress. |
| **Project Scope** –  The project scope may expand beyond the initial requirements, leading to delays and increased costs. | Medium | Medium | Clearly define project scope, document requirements, and use project management tools to track progress. |

## Role Expectations

The following list defines in general terms the expectations related to the roles directly involved in the management, planning or execution of the test for the project.

|  |  |  |  |
| --- | --- | --- | --- |
| SN0. | Roles | Name | Contact Info |
|  | Project Manager | Wilkins V. Caducio | [wvcaducio@student.apc.edu.ph](mailto:wvcaducio@student.apc.edu.ph) |
|  | Test Lead | Mikedale B. Dellera | [mbdellera@student.apc.edu.ph](mailto:mbdellera@student.apc.edu.ph) |
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### Project Management

Project Manager: checks and gives approval for the Test Plan, Test Strategy, and Test Estimates after looking at them.

### Test Planning (Test Lead)

* Thoroughly review and make sure to understand its objectives, scope, and strategies before executing the test plan.
* Define the tasks and responsibilities clearly to the testing team members and assign them based on their expertise and skills.
* Conduct a peer review of test cases and scripts to identify and rectify any errors.
* Execute the test cases and scripts according to the test plan.
* Regularly update and maintain test status reports to track progress and communicate it to stakeholders.
* Maintain open communication with stakeholders, development teams, and other relevant parties.
* Properly document all testing cases, test scripts and test reports for future reference.

### Test Team

The Test Team is responsible for evaluating the software to identify defects/ bugs. They will also verify if the software meets the requirements and ensure that it is fully functional. Below is the expected role of the test team:

* Review and understand project requirements thoroughly to create a test plan that covers all aspects of the software.
* Execute test cases, document test results, and report defects following the established test plan.
* Create test cases, test scripts, and test data that cover different scenarios and use cases.
* Log and track defects, communicate issues to the development team, and verify fixes.
* Maintain detailed documentation of test cases, test results, and any issues discovered.
* Develop a comprehensive test strategy and test plan that outlines the scope, objectives, resources, schedule, and deliverables.

### Test Lead

* Acknowledge the completion of a section within a cycle.
* Give the OK to start the next level of testing.
* Facilitate defective communications between testing team and technical / development team.

### Development Team

The Development Team is the representative of the D7 Auto Service Center Web-App who are working with the testing team. Their main responsibility is to facilitate communication and teamwork between the development and testing teams. The following are the functions of the representative of the development team:

* Evaluate testing deliverables created by the testing team and provide insights in a timely manner.
* Aid supports the project's development and testing processes.
* Help in validating the results of some testing if required by the testing team.
* Clarify any uncertainties or inquiries that the testing team may have with regard to the software's requirements or design. This makes sure the testing team understands what exactly must be validated.
* Provide test data and scenarios.
* Assist in setting up some testing environment that the testing team will be utilized.
* When the testing team determines defects (bugs) during testing, the representative of the development team can help the testing team understand the source of the issues and work with developers to prioritize and resolve them.

# TEST ENVIRONMENT

The team will be utilizing two standard testing environments which will be used to conduct a variety of testing activities that will evaluate the functionality of the web application. The activities that will be conducted will revolve around testing the system's functionality in terms of the following:

1. **Localhost** - which is intended for the development team's use wherein the testing team will do the necessary testing for the updated functionalities depending on the updated requirements. In using localhost as the testing environment, the testing team will need the updated source code from the development team and then, it will be run on the localhost environment of the testing team specifically the XAMPP or another similar platform. The setup enables the testing team to assess and validate the functionality of the web application in a controlled and safe environment prior to broader testing and deployment.
2. **SocitCloud**, - The socitcload is the temporary hosted environment of the development team which intended to test the web application in the state of hosting the actual deployed system.

The team will also employ Selenium-IDE to execute the program within the browser based on recorded scripts of actions and associated data. By using this integrated development environment (IDE), the testing team will assess whether the following development team requirements are met with the intended level of quality.

# APPROVALS

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