**LMS TEST PLAN**

**PROJECT NAME:** Test Plan for HCL LMS (Learning Management System)

**TEST ENGINEER:** Partha Pratim Nath

**DATE: 6/9/2023**

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1. **AIM/OBJECTIVE:**  To provide a platform for scholars to see their progress and course overview and check/do their daily tasks.

It’s helping scholars improves their overall performance by looking to the dashboard.

In addition, scholars can give feedbacks to their trainers, which develop a healthy relationship as well as a better studying environment.

1. **SCOPE OF TESTING:**

**a) *Within The Scope*:**  
Scholar login and authentication  
Navigation through topics performance, participation, labs sections, assessments.  
Progress tracking and percentage completion of overall content.  
Displaying of scores of different assessments.  
Daily and Weekly Quizzes.

Check attendance percentage.

**b) *Out of the Scope*:**

Non-functional testing like stress and performance testing.

End-to-end system testing outside the coding scope.

Hardware testing or infrastructure –related testing.

Compatibility testing

Backend server and database testing

Security penetration testing

1. **TEST STRATEGY:**

**A)Levels of Testing:  
i)*Unit Testing***: Individual components such as login, navigation buttons, progress tracking, and displaying of scores of different assessments will undergo unit testing to ensure their correctness and functionality.  
  
**ii)*Integration Testing***: The interaction between components, such as the connection between two interfaces, will be tested to ensure smooth data flow and interaction.  
  
**iii)*System Testing***: End-to-end testing will be performed to validate the complete user journey, from login to help & support, while considering various scenarios.

**B)Types of Testing**:   
**i)*Functional Testing***: Each feature, such as user login, navigation through different interfaces, attempting daily/weekly quiz, and score and attendance display, will be thoroughly tested to ensure they work as intended.  
  
**ii)*Usability Testing***: The user interface will be assessed for its user-friendliness and ease of navigation.  
  
**iii)*Performance Testing***: The responsiveness of the application, especially during peak loads, will be tested to ensure smooth user experience.  
  
**iv)*Regression Testing***: After any changes or updates, previously working functionalities will be retested to ensure new changes do not introduce regressions.  
  
**C)Test Design Techniques**:  
**i)*Equivalence Partitioning***: Input fields such as login credentials will be validate with valid and invalid inputs.  
  
**ii)*Boundary Value Analysis***: Numeric inputs like percentage completion and attendance percentage will be tested with boundary values to ensure accuracy.  
  
**iii)*Decision Table Testing***: Different scenarios, such as different quizzes and assignments, will be documented and tested to validate various combinations of inputs and outputs.

**D)Terminology Used**:  
**i)*Topics***: Distinct areas of content available for study and practice.  
My Job Learning (Technical skills, Interpersonal/Social skills, My performance Check): Segments within topics offering various types of content.  
  
Quiz ( Daily Quizzes/Weekly Quizzes, Assignments): Different types of exercises available for practice.  
  
**ii)*Percentage Completion***: Progress tracking for each content.  
  
**iii)*Score***: Scholar's scores for different quizzes and assessment.

**E)Configuration Management Tool**: example GIT (Global Information Tracker)  
  
**F)Area Planned for Automation**:  
**i)*Regression Testing***: Automate test cases to ensure quick validation of previously tested functionalities.  
  
**ii)*Performance Testing***: Automate load testing to simulate multiple users and assess application responsiveness.

**4) ENTRY AND EXIT CRITERIA**:  
  
**Entry Criteria**:  
**1. *Functional Requirements***: All functional requirements for the "HCL LMS" web application should be documented and approved by the stakeholders.  
  
**2. *Design and UI***: The user interface design and layout should be finalized and approved.  
  
**3. *Test Environment***: The testing environment should be set up and configured with the necessary browsers and devices.  
  
**4. *Test Data***: Mock data for different quizzes and login credentials should be available for testing purposes.  
  
**5. *Test Plan***: The comprehensive test plan for the application should be reviewed and approved by the QA Lead.  
  
**Exit Criteria**:  
**1. *Test Case Execution***: All identified test cases must be executed.  
  
**2. *Defect Resolution***: Any critical defects identified during testing must be resolved and retested.  
  
**3. *Functionality***: All features, interfaces, quizzes

and tracking mechanisms should function as intended.  
  
**4. *Usability***: The user interface should be intuitive and user-friendly.  
  
**5. *Performance***: The application should respond quickly and efficiently during various user interactions.  
  
**6. *Regression Testing***: After defect resolution, regression testing should be conducted to ensure new changes do not cause any regressions.  
  
**7. *Documentation***: Test cases, test execution reports, and defect reports should be updated and finalized.  
  
**8. *Approval***: The QA Lead should review the test execution reports and approve the readiness for deployment.  
  
 **Suspension and Resumption Criteria**:  
***a. Suspension***: Testing may be suspended if critical defects affect the core functionalities, preventing further testing until the issues are resolved.  
  
***b. Resumption***: Testing can be resumed once the critical defects are resolved, and the application is stable for testing again.

**Pass/Fail Criteria:**   
***a. Pass Criteria***: The application must pass all functional, usability, and performance tests without any critical defects.  
***b. Fail Criteria***: The application will be considered a fail if critical defects prevent core functionalities from working as intended.

**5)TEST DELIVERABLES**:   
  
***Test Case and Test Script Documents*:**   
***- Purpose***: Provide a detailed outline of the test scenarios, steps, and expected results for each feature and functionality of the "HCL LMS" web application.  
***- Content***: Clearly defined test cases and scripts for user login, navigation, progress tracking, quizzes, and other features.  
  
***Test Execution Reports*:**   
***- Purpose***: Document the results of the test cases executed during various testing phases.  
***- Content***: A comprehensive report showcasing the test case ID, description, status (pass/fail), any defects found, and remarks.  
  
***Defect Reports***:   
***- Purpose***: Document and track defects found during testing, aiding developers in addressing and resolving issues.  
***- Content***: Detailed description of each defect, including steps to reproduce, severity, priority, and screenshots.   
  
***Traceability Matrix*:**   
***- Purpose***: Establish a clear link between requirements and the corresponding test cases, ensuring comprehensive coverage.  
***- Content***: A matrix that maps each requirement to its associated test case(s).  
  
***Regression Test Suite*:**   
***- Purpose***: Compile a set of test cases to be executed during regression testing to ensure new changes do not cause regressions.  
***- Content*:** List of test cases specifically focused on retesting modified or impacted functionalities.  
  
***Performance Test Reports*:**   
***- Purpose*:** Document the results of performance testing, including response times, resource utilization, and scalability analysis.  
***- Content*:** Performance metrics, graphs, and analysis showcasing application responsiveness and stability under various loads.  
  
***Usability Test Reports*:**   
***- Purpose*:** Evaluate user-friendliness and user satisfaction with the application's interface.  
***- Content***: User feedback, observations, and recommendations to enhance the user experience.  
  
***Test Summary Report*:**  
***- Purpose*:** Provide an overall summary of the testing efforts, outcomes, and key findings.  
***- Content*:** Overview of testing phases, pass/fail status, defect trends, and any outstanding issues.  
  
***Exit Criteria Checklist*:**  
***- Purpose*:** Verify that all exit criteria have been met before the application is considered ready for deployment.  
***- Content***: A checklist indicating whether each exit criterion has been fulfilled.  
  
***Documentation Updates*:**  
**- *Purpose***: Ensure that all test-related documentation is updated with the latest information and results.  
**- *Content***: Revised test cases, scripts, and documents to reflect any changes during the testing process.

6**. ROLES AND RESPONSIBILITIES**:

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| **ROLES** | **RESPONSIBILITIES** |
| Test Manager | * Develop the overall test strategy, including test levels, types, and techniques. * Coordinate with stakeholders to understand project goals and priorities. * Allocate resources, assign tasks, and monitor progress throughout testing phases. * Review and approve the test plan and test deliverables. * Oversee risk assessment and mitigation strategies. * Ensure testing aligns with project schedules and goals. |
| Domain Expert | * Provide insights into the educational context and coding concepts for effective test design. * Collaborate with the QA team to ensure assessments align with real-world student needs. * Verify the accuracy of assessment content in line with coding curriculum. |
| Test Lead | * Develop detailed test plans, specifying testing scope, objectives, and methodologies. * Coordinate with the Test Manager to align testing efforts with project goals. * Assign test cases to team members and oversee test execution. * Monitor progress and ensure testing milestones are met. * Review and approve test case documentation and test scripts. * Report testing progress, defects, and issues to stakeholders. |
| Senior QA Tester | * Design and document detailed test cases based on requirements and specifications. * Execute test cases, record results, and report defects. * Mentor junior testers, guiding them in test case design and execution. * Participate in defect triage meetings and contribute to defect resolution. * Conduct regression testing and verify defect fixes. |
| Test Engineer | * Execute test cases as per the test plan and report defects with accurate details. * Collaborate with Senior Test Engineer to enhance testing skills. * Participate in test case reviews and provide feedback for improvement. * Contribute to test documentation, including test execution reports. |
| Automation Tester | * Design, develop, and maintain automated test scripts using selected tools. * Execute automated test scripts and analyze results. * Identify areas suitable for automation and implement automation frameworks. * Perform regular regression testing using automated scripts. * Collaborate with the QA team to integrate automation into the testing process. |
| Performance Tester | * Develop performance test plans, scenarios, and scripts. * Execute load, stress, and performance tests to identify bottlenecks and issues. * Analyze performance test results and recommend improvements. * Collaborate with development and infrastructure teams to optimize application performance. * Ensure the application's responsiveness under varying loads. |

**7) RISK AND MITIGATION**:   
  
**a) Risks and Contingency**:   
**1. *Performance Issues with Multiple Users*:**   
**- Risk:** Application might slow down or crash during peak usage times.  
**- Contingency:** Conduct thorough load testing to identify performance bottlenecks and optimize server resources accordingly.  
  
**2. *Data Privacy Concerns*:**  
**- Risk:** User data and quizzes scores might be vulnerable to breaches.  
**- Contingency:** Implement robust encryption methods, regular security audits, and comply with data protection regulations.  
  
**b) Risks and Mitigation:**   
**1. *Data Privacy Concerns***:   
**- Risk**: User data, especially quizzes scores, may be accessed by unauthorized parties.  
**- Mitigation**: Implement strict role-based access controls and encryption to ensure data confidentiality. Regularly audit access logs for anomalies.  
  
**2. *Platform Compatibility Issues***:   
**- Risk**: The application might not function as expected on various browsers and devices.  
**- Mitigation**: Conduct extensive cross-browser and cross-device testing to identify and fix compatibility issues.  
  
**3. *User Experience Hurdles*:**   
**- Risk:** Users might find the interface confusing or cumbersome, affecting their engagement.  
**- Mitigation**: Perform usability testing to gather user feedback and make necessary interface adjustments for a smoother experience.  
  
**4. *Inaccurate Quiz Scores***:   
**- Risk**: Technical glitches might lead to incorrect quiz score.  
**- Mitigation**: Implement a comprehensive validation process to ensure accurate quiz/assignment results. Conduct thorough testing of quiz/assignment grading algorithms.  
  
**5. *Incomplete Progress Tracking*:**   
**- Risk**: Users might not receive accurate percentage completion due to glitches.  
**- Mitigation**: Conduct thorough testing of the progress tracking mechanism to ensure it accurately updates based on user actions.

8**. SCHEDULE**:

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| **TASK** | **DURATION** |
| Requirement Analysis | 10 Working Days  - Start Date: August 12, 2023 (Saturday) - End Date: August 23, 2023 (Wednesday) |
| Test Planning Phase | 6 Working Days  - Start Date: August 28, 2023 (Monday) - End Date: September 1, 2023 (Saturday) |
| Test Case Preparation | 10 Working Days  - Start Date: September 4, 2023 (Monday) - End Date: September 15, 2023 (Friday) |
| Test Execution | 15 Working Days  - Start Date: September 18, 2023 (Monday) - End Date: October 6, 2023 (Friday) |
| Defect Resolution and Retesting | - Ongoing during Test Execution Phase |
| Regression Testing | 7 Working Days  - Start Date: October 9, 2023 (Monday) - End Date: October 17, 2023 (Tuesday) |
| Performance Testing | 7 Working Days  - Start Date: October 18, 2023 (Wednesday) - End Date: October 26, 2023 (Thursday) |
| Usability Testing | 5 Working Days  - Start Date: October 27, 2023 (Friday) - End Date: November 2, 2023 (Thursday) |
| Documentation and Reporting | - Ongoing throughout Testing Phase |
| Test Summary and Review | 3 Working Days  - Start Date: November 3, 2023 (Friday) - End Date: November 7, 2023 (Tuesday) |

**9) HIRING AND TRAINING:**

**Testing Team Composition**:   
**1. *Test Manager***:   
**- Experience**: 6+ years of QA experience, including leadership and managerial roles.  
**- Skills**: Test planning, strategy development, team management, stakeholder coordination.  
  
**2. *Domain Expert***:   
**- Experience**: 5+ years of experience in education or coding instruction.  
**- Skills**: In-depth knowledge of coding concepts, curriculum, and assessment design.  
  
**3. *Test Lead***:   
**- Experience**: 5+ years of QA experience, including leadership roles.  
**- Skills**: Test case design, execution, team coordination, reporting.  
  
**4. *Senior QA Testers (3)*:**  
**- Experience:** 3+ years of QA experience.  
**- Skills**: Test case design, execution, defect reporting, mentorship.  
  
**5. *Test Engineers (5)*:**  
**- Experience**: 1+ years of QA experience.  
**- Skills**: Test case execution, defect reporting, test documentation.  
  
**6. *Automation Tester*:**   
**- Experience**: 2+ years of experience in test automation.  
**- Skills**: Automation tools (e.g., Selenium), scripting languages, framework development.  
  
**7. *Performance Tester*:**   
**- Experience**: 2+ years of experience in performance testing.  
**- Skills**: Performance testing tools (e.g., JMeter), load testing, performance analysis.

***Hiring Process*:**   
**1. *Test Manager***:   
- Recruit candidates with extensive QA experience, proven leadership in managing testing projects, and effective stakeholder management skills.  
  
**2. *Domain Expert*:**  
- Seek individuals with a background in coding education, curriculum design, and understanding of student needs.  
  
**3. *Test Lead*:**   
- Identify candidates with leadership experience, strong test planning skills, and the ability to coordinate testing efforts.  
  
**4. *Senior QA Testers*:**   
- Look for candidates experienced in manual testing, test case design, and mentoring junior testers.  
  
**5. *Test Engineers*:**   
- Consider candidates with foundational testing knowledge and a willingness to learn and grow.  
  
**6. *Automation Tester*:**   
- Recruit individuals with expertise in test automation, scripting languages, and framework development.  
  
**7. *Performance Tester*:**   
- Source candidates with a background in performance testing, load testing, and performance analysis.

***Training Plan*:**   
**1. *Test Manager*:**   
- Offer leadership training, focusing on project management, effective communication, and strategic planning.  
  
**2. *Domain Expert*:**   
- Provide an orientation to the application's educational context and align the testing efforts with real-world student needs.  
  
**3. *Test Lead*:**   
- Provide training on test planning, coordination, and reporting, along with mentorship skills to guide the team effectively.  
  
**4. *Senior QA Testers*:**   
- Provide advanced training on test case design, execution, and defect reporting, emphasizing mentorship and leadership skills.  
  
**5. *Test Engineers*:**   
- Conduct training on testing fundamentals, including test case execution, defect reporting, and test documentation.  
  
**6. *Automation Tester*:**   
- Offer hands-on training on automation tools (e.g., Selenium), scripting languages, and framework development.  
  
**7. *Performance Tester*:**   
- Provide training on performance testing methodologies, load testing tools (e.g., JMeter), and *performance analysis techniques.*

**10)TEST ENVIRONMENT*:*** The test environment for the "HCL LMS" web application is a crucial component of the testing process. It ensures that the application is thoroughly tested across various platforms, browsers, and devices to deliver a seamless user experience. The following details outline the specifics of the test environment:   
  
***Supported Browsers*:**

* Google Chrome
* Mozilla Firefox
* Microsoft Edge
* Apple Safari

***Supported Devices*:**

* Desktop Computers
* Laptops
* Tablets (iOS and Android)
* Smartphones (iOS and Android)

***Operating Systems*:**

* Windows
* macOS
* iOS
* - Android

***Browser Settings*:**

* Disable browser extensions or ad-blockers during testing.
* Enable cookies and JavaScript for full application functionality.

***Network Conditions*:**

* Test under various network conditions, including high-speed and low-speed connections.

***Test Data*:**

* Utilize mock data for quizzes and login credentials during testing to avoid affecting real user data.

***Screen Resolutions*:**

* Test across various screen resolutions to ensure responsiveness and layout consistency.

**11)ASSUMPTIONS**:

* The functional requirements provided are accurate and complete.
* The test environment will remain stable throughout the testing phases.
* The development team will promptly address and fix reported defects.
* Realistic and relevant test data will be available for testing.
* Stakeholders, including the domain expert and educational advisors, will be available for clarifications.
* Communication channels between the testing team, development team, and stakeholders will remain effective.
* The selected automation tools will be compatible with the application's technology stack.
* Target users will be available for usability testing during the specified timeframe.
* The required resources for conducting performance testing, including tools and test environment, will be available.
* The testing team members possess the necessary skills and are available for the specified testing phases.

***12)APPROVAL INFORMATION***:

* *Test plan approval*: The Test lead will approve the test plan before execution.
* *Test case approval*: Test cases will be reviewed and approved by the Test lead.
* *Test execution approval*: Test lead's approval will be sought after test cases have been executed and reported.
* *Regression test approval*: The Test lead will approve the results of regression testing.
* *Performance test approval*: Test lead and performance tester will jointly approve performance test results.
* *Usability test approval*: The Test lead will approve the usability test findings.
* *Test summary and review approval*: The Test lead will review and approve the comprehensive test summary report.
* *Deployment approval*: The Test Manager and Project Manager will jointly approve deployment readiness.

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