



| Training Management System | Software Requirement Specification |
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1. Introduction

The Training Management System (TMS) is a comprehensive software application specifically developed to streamline and automate various aspects of training management. It serves as an efficient and user-friendly platform designed to facilitate the effective coordination, planning, and monitoring of training programs, participants, trainers, and related administrative tasks. TMS aims to empower organizations by optimizing resource utilization, enhancing training outcomes, and simplifying the overall training management process.

With TMS, organizations can effectively centralize and digitize their training operations, eliminating manual and time-consuming administrative tasks. The system provides a robust set of features and functionalities to support all stages of the training life-cycle, from program creation and scheduling to day to day communication..

1.1 Purpose

The primary purpose of this Software Requirement Specification (SRS) document is to define the specific needs and expectations of the Training Management System (TMS) project. By clearly outlining the system's features, functionalities, and performance standards, the SRS acts as a vital communication tool between project stakeholders and the development team. It establishes a common understanding of the project's scope, serving as the foundation for decision-making, quality assurance, and effective collaboration throughout the development life-cycle.

1.2 Scope

The scope of the Training Management System (TMS) encompasses the comprehensive management of training programs, participants, trainers, and associated administrative tasks. The system will provide a wide range of functionalities, including the creation and scheduling of training programs, seamless management of participant registrations, real-time tracking of participant progress and performance, efficient assignment of trainers, generation of insightful reports, and seamless communication among stakeholders. TMS will be accessible through a secure web-based application, ensuring convenient and protected access from various devices.

Organizations using TMS will benefit from a centralized platform that enables efficient resource allocation, eliminates manual paperwork, reduces administrative overheads, and enhances overall training effectiveness. By leveraging the system's capabilities, organizations can focus on delivering high-quality training experiences, fostering skill development, and aligning training initiatives with strategic business objectives

1.3 Intended Stakeholder

The Training Management System (TMS) caters to the needs of various stakeholders involved in the training management process, including:

Training Administrator (Admin): Responsible for efficiently planning, organizing, and monitoring training programs within the organization. They rely on TMS to create comprehensive training calendars, assign trainers, and track the progress and performance of participants.

Primarily involved in managing user accounts, system configuration, and generating comprehensive reports to assess training effectiveness. Administrators utilize TMS to set up user roles, manage permissions, customize system settings, and generate data-driven insights for informed decision-making.

Trainers: Actively involved in conducting training sessions and evaluating participant performance. Trainers utilize TMS to access training materials, manage session schedules, track participant attendance, and provide assessments and feedback.

Trainees: Engage in training programs and utilize TMS to track their progress, achievements, and personalized learning paths. They can access course materials, submit assignments, participate in assessments, and communicate with trainers and peers.

1.4 References

| Reference | Location |
|---------------------------|----------|
| Requirement Specification | |
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1.5 Definitions, Acronyms, and Abbreviations

| Term/Acronym | Definition |
|--------------|---------------------------------------|
| TMS | Training Management System |
| SRS | Software Requirement Specification |
| JPA | Java Persistence API |
| API | Application Programming Interface |
| RDBMS | Relational Database Management System |

2. Overall Description

The Training Management System (TMS) is a comprehensive software solution designed to streamline and automate various aspects of training management. It provides organizations with a user-friendly and efficient platform to coordinate, plan, and monitor training programs, participants, trainers, and related administrative tasks. TMS aims to optimize resource utilization, enhance training outcomes, and simplify the overall training management process.

2.1 Overview

This area of the SRS is all about the overall influences on the product and its specifications. This section does not mention particular criteria. Instead, it offers a context for those criteria, which are stated in full in section 3, and makes them simpler to grasp.

The Training Management System (TMS) encompasses the following key aspects:

1. **Product Perspective:** The TMS is intended to be an all-in-one solution that empowers organizations to efficiently manage their training programs. It enables users to create and schedule training programs, manage participant enrollments, track progress and performance, assign trainers, generate reports, and facilitate seamless communication among stakeholders.
2. **Product Functions:** The TMS will include the following features:
 - **Trainers and Trainee Registration:** Admins register trainers and trainees, capturing relevant information for communication.
 - **Batch Creation:** Admins create training batches with unique identifiers and dates for specific programs.
 - **Course Creation:** Admins create training courses and assign trainers to ensure efficient delivery.
 - **Trainers/Trainees Assignment to batches:** Admins assign trainers and trainees to specific batches.
 - **Batch Scheduling:** Admins schedule training sessions within each batch for structured learning.
 - **Assignment/Daily Task Creation:** Trainers create and assign tasks to batches with set deadlines.
 - **Assignment Submission:** Trainees submit assignments in various formats, allowing trainers to evaluate and provide feedback.
 - **Classroom Features and Notice Board:** Virtual classroom allows sharing of messages, files, and comments with chronological organization and a notice board for announcements.
 - **Group Chat Feature:** Participants engage in textual communication, sharing images and files for collaboration.
3. **User Characteristics:**
 - i. **Admin:** The administrator is responsible for managing the Training Management System (TMS). They have full access to all features and functionalities of the system, including user registration, batch creation, course management and overall system configuration. The admin has advanced technical skills and the authority to set user roles and permissions within the system.

- ii. **Trainers:** Trainers are professionals who deliver training programs within the TMS. They have expertise in specific domains and possess instructional abilities to facilitate effective learning. Trainers can create and assign assignments, manage the virtual classroom, communicate with trainees, and provide feedback.
- iii. **Trainees:** Trainees are individuals participating in training programs within the TMS. Trainees use the system to access course materials, submit assignments, engage in classroom discussions, and communicate with trainers and fellow trainees. They may have different learning styles and preferences, requiring user-friendly interfaces and clear instructions within the system.

Considering these user characteristics will help ensure that the TMS is tailored to the needs and abilities of the different user roles involved in the training process.

- 4. **Constraints:** The development of the Training Management System (TMS) is subject to certain constraints that need to be considered:
 - I. **Time Constraint:** The development timeline for the TMS is limited to 24 days. This requires efficient project management and adherence to a structured development plan to ensure timely delivery of the system.
 - II. **Technical Constraints:** The TMS must be compatible with the technical infrastructure and resources available. It should be developed using technologies and frameworks that align with the project's technical capabilities.
 - III. **Legal and Ethical Constraints:** The use of personal data, including trainer and trainee information, must comply with legal and ethical guidelines. The system should ensure the privacy and security of user data, adhering to relevant data protection regulations.
 - IV. **User Acceptance and Adoption:** The successful implementation of the TMS relies on user acceptance and adoption. The system should be designed in a user-friendly manner, considering the technical expertise and varying levels of familiarity with technology among trainers and trainees.
 - V. **Scalability and Performance:** The TMS should be designed to accommodate potential growth in the number of users, courses, and training programs. It should be scalable and capable of handling concurrent user interactions without compromising performance.

These constraints play a crucial role in the development and implementation of the Training Management System (TMS) and should be carefully considered throughout the project lifecycle.

- 5. **Assumptions and Dependencies:** During the development of the Training Management System (TMS), the following assumptions and dependencies are considered:
 - I. **User Availability:** It is assumed that the trainers, trainees, and administrators will be available and actively participate in the system. Their engagement and timely interaction with the TMS are crucial for effective course management and communication.
 - II. **Internet Connectivity:** The TMS assumes that all users will have a stable internet connection to access the system and its features. Continuous internet connectivity is necessary for real-time communication, file uploads, and system interaction.

- III. **Hardware and Software Requirements:** It is assumed that users will have access to compatible hardware devices (such as computers or mobile devices) and supported software environments (web browsers) to access and utilize the TMS effectively.
- IV. **Training Program Availability:** The TMS assumes that the necessary training programs, course materials, and curriculum content will be provided by the relevant stakeholders. The availability and readiness of training programs are essential for successful implementation.
- V. **Compliance with Policies and Regulations:** The TMS assumes that the system will adhere to organizational policies, legal requirements, and data protection regulations. It is expected that privacy, security, and confidentiality guidelines will be followed while handling user data within the system.
- VI. **System Maintenance and Support:** It is assumed that regular system maintenance, including bug fixes, updates, and technical support, will be provided to ensure the smooth functioning of the TMS. This support may involve addressing user queries, resolving technical issues, and implementing system enhancements.
- VII. **User Training:** The successful utilization of the TMS assumes that necessary training and onboarding sessions will be conducted to familiarize trainers, trainees, and administrators with the system's features and functionalities. Training materials and user guides may be provided to facilitate user understanding.
- VIII. **Database Management:** The TMS assumes the availability of a properly designed and maintained database infrastructure. This includes storage capacity, data backup procedures, and data retrieval mechanisms to support efficient data management within the system.

These assumptions and dependencies provide a foundation for the development and implementation of the Training Management System (TMS). They should be taken into account during the project lifecycle to ensure the smooth functioning and success of the system.

The above-mentioned points provide an overview of the project's perspective, functions, user characteristics, constraints, assumptions, and dependencies. A comprehensive and well-defined project scope statement can ensure that the project is completed within the given time, and resource constraints, and that all stakeholders are aligned with the project's goals and expectations.

2.2 Technical platform

The Training Management System (TMS) will be developed using a robust and scalable technical platform to ensure efficient performance and seamless user experience. The following technical components and considerations will be incorporated:

- 1) **Web Application Framework:** The TMS will be built using a modern and widely adopted web application framework such as Spring Boot. This framework will provide a solid foundation for developing the system and implementing its various features.
- 2) **Programming Languages:** The backend logic of the TMS will be implemented using language like java depending on the chosen framework. Java is known for their versatility, ease of use, and extensive libraries and frameworks that facilitate rapid development.

- 3) **Relational Database Management System (RDBMS):** The TMS will leverage a reliable RDBMS such as MySQL and Spring Data JPA store and manage data efficiently. The choice of database will be based on factors such as scalability, performance, and compatibility with the selected framework.
- 4) **Front-end Technologies:** The user interface of the TMS will be developed using flutter to enhance interactivity, responsiveness, and overall user experience.
- 5) **Security Measures:** The TMS will incorporate robust security measures to protect user data and maintain system integrity. Role based authentication will be done using JWT token.
- 6) **Responsiveness:** The TMS will be designed to be mobile-responsive, ensuring that users can access and use the system efficiently from various devices, including smartphones and tablets. Responsive design principles and techniques will be applied to optimize the user experience across different screen sizes.
- 7) **Testing and Quality Assurance:** Thorough testing and quality assurance processes will be implemented to ensure the reliability, performance, and usability of the TMS. This includes unit testing, integration testing, and user acceptance testing to identify and resolve any issues before deployment.

3. Functional Requirements

The functional requirements of the Training Management System (TMS) encompass the essential features and capabilities that the software must offer. These requirements include user registration and login, the ability to create and manage training batches and courses, scheduling of training programs, assignment and task creation, virtual classroom features, assignment submission, and group chat functionality. The TMS should provide a seamless and user-friendly experience, allowing administrators to efficiently manage training processes and participants to access and engage with training materials effectively. These are some examples of the functional criteria that the Android cricket app must achieve in order to give its customers with a complete and engaging experience.

3.1 Overview

This section sums up in the below table the main functionalities or services provided by the system, which will be detailed in the following sections.

| Serial No | Main Features | Description |
|-----------|-------------------------------------|--|
| 1 | Login/ Registration | Users can either register or login with proper credentials |
| 2 | Batch Creation | Administrators can create training batches with unique identifiers and associated details. |
| 3 | Course Creation | Administrators can create various training courses and assign trainers to specific courses. |
| 4 | Assign Trainers/Trainees to Batches | Administrators/Admin can assign trainers and trainees to specific batches. |
| 5 | Batch Scheduling | Administrators can schedule training programs within each batch, specifying dates and times. |

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|---|-------------------------------------|---|
| 6 | Assignment/Daily Task Creation | Trainers can create assignments or daily tasks and assign them to specific batches. |
| 7 | Assignment Submission | Trainees can submit their assignments in various formats, and trainers can evaluate them |
| 8 | Classroom Features and Notice Board | Trainers can share messages, files, and comments in a virtual classroom. |
| 9 | Group Chat Feature | Participants (both trainee and trainer) within a batch can engage in textual communication and share files or image |

3.1.1. Login/ Registration

Requirements

| REQUIREMNT ID | Requirement Description | Acceptability/ Completion Criteria | Limitations/ Constraints | Test case Identifier |
|---------------|---|------------------------------------|-----------------------------|----------------------|
| TMS_001 | Trainees can be registered by the admin using the following fields: Full name, Profile Picture, Gender, Date of birth, Valid G-mail account, Contact number, Degree name, Educational institute, CGPA, Passing year, Present address. | Essential | None | TC_001 |
| TMS_002 | Trainers can be registered by the admin using the following fields: Full name, Profile Picture, Designation, Joining Date, Total years of experience, Expertise, Contact number, Present address. | Essential | None | TC_002 |
| TMS_003 | Once registered by the admin, trainees can log in using their email address and a password provided by the admin. | Essential | User may not be registered. | TC_003 |
| TMS_004 | Once registered by the admin, trainers can log in using their email address and a password provided by the admin. | Essential | User may not be logged in. | TC_004 |

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| TMS_005 | Trainees and trainers should have the option to recover their password if they forget it. | Essential | User may not be registered | TC_005 |
| TMS_006 | Trainees and trainers can log out of their accounts at any time by clicking the logout button in the application's menu. | Essential | User may not be logged in | TC_006 |

3.1.2. Batch Creation

Requirements

| REQUIREMENT ID | Requirement Description | Acceptability/Completion Criteria | Limitations/Constraints | Test case Identifier |
|----------------|--|-----------------------------------|-------------------------|----------------------|
| TMS_007 | Admin can create a new batch with the necessary fields, including a unique batch name and the starting and ending dates. | Essential | None | TC_007 |
| TMS_008 | After creating a batch, the admin should be able to update the batch information, including the starting and ending dates if needed. | Essential | None | TC_008 |

3.1.3. Course Creation

Requirements

| REQUIREMNT ID | Requirement Description | Acceptability/ Completion Criteria | Limitations/ Constraints | Test case Identifier |
|---------------|--|--|-----------------------------|-------------------------|
| TMS_009 | Admin can create a new course of a batch using course name, such as "Domain Specific Training (J2EE)", "Soft Skill Training", "SCRUM Training", "Analytical Skill Development", etc. | Essential | None | TC_009 |
| TMS_010 | After creating a course, the admin should be able to update the course information, if needed. | Essential | None | TC_010 |

3.1.4. Assign Trainee/Trainer to batches

Requirements

| REQUIREMNT ID | Requirement Description | Acceptability/ Completion Criteria | Limitations/ Constraints | Test case Identifier |
|---------------|---|--|-----------------------------|-------------------------|
| TMS_011 | Admin can assign trainer/trainee to a specific batch, such as "YSD_B02_J2EE", by selecting the batch and assigning one or more trainers/trainees to it. | Essential | None | TC_011 |

3.1.5. Batch Scheduling

Requirements

| REQUIREMNT ID | Requirement Description | Acceptability/ Completion Criteria | Limitations/ Constraints | Test case Identifier |
|---------------|--|------------------------------------|--------------------------|----------------------|
| TMS_12 | Admin can create batch scheduling within a batch, such as "YSD_B02_J2EE", and assign them to specific courses like Domain Specific Training, Soft Skill Training, SCRUM Training, etc. | Essential | None | TC_012 |
| TMS_13 | The scheduling feature should allow the admin to easily manage and update the training program schedule, accommodating changes and additions as needed. | Essential | None | TC_013 |

3.1.6. Assignment/Daily Task Creation

Requirements

| REQUIREMNT ID | Requirement Description | Acceptability/ Completion Criteria | Limitations/ Constraints | Test case Identifier |
|---------------|--|------------------------------------|--------------------------|----------------------|
| TMS_14 | Admin can create batch scheduling within a batch, such as "YSD_B02_J2EE", and assign them to specific courses like Domain Specific Training, Soft Skill Training, SCRUM Training, etc. | Essential | None | TC_014 |

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| TMS_15 | The scheduling feature should allow the admin to easily manage and update the training program schedule, accommodating changes and additions as needed. | Essential | None | TC_015 |
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3.1.7. Assignment Submission

Requirements

| REQUIREMNT ID | Requirement Description | Acceptability/ Completion Criteria | Limitations/ Constraints | Test case Identifier |
|---------------|--|--|-----------------------------|-------------------------|
| TMS_16 | Trainees should have the ability to submit their assignments before deadline through the system. The system should accept files in various formats such as PDF, DOC, Word, or PNG. | Essential | None | TC_016 |
| TMS_17 | Trainees should be able to see the assignments they submitted | Essential | None | TC_017 |
| TMS_18 | Trainers should be able to see how which trainees able to submit the assignment before deadline | Essential | None | TC_018 |

3.1.8. Classroom features with a dashboard, notice board

Requirements

| REQUIREMNT ID | Requirement Description | Acceptability/ Completion Criteria | Limitations/ Constraints | Test case Identifier |
|---------------|-------------------------|--|-----------------------------|-------------------------|
|---------------|-------------------------|--|-----------------------------|-------------------------|

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| TMS_19 | Trainers can upload messages, files, and comments in the classroom module associated with a specific batch. | Essential | None | TC_019 |
| TMS_20 | All the uploaded data in the classroom module should be displayed in chronological order, sorted by date. | Essential | None | TC_020 |
| TMS_21 | Trainees/Trainers should be able to comment on the posts made by trainers in the classroom module, facilitating communication and collaboration. | Essential | None | TC_021 |
| TMS_22 | A notice board feature should be available in the classroom module, allowing trainers to manage and share important announcements or updates | Essential | None | TC_022 |

3.1.9. Group Chat

Requirements

| REQUIREMNT ID | Requirement Description | Acceptability/ Completion Criteria | Limitations/ Constraints | Test case Identifier |
|---------------|---|------------------------------------|--------------------------|----------------------|
| TMS_23 | The system should provide a group chat feature for participants within a specific batch. Participants should be able to engage in textual communication.. | Essential | None | TC_023 |

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| TMS_24 | Participants should have the ability to share images or files within the group chat for enhanced communication. | Essential | None | TC_024 |
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4. User Interface

| UI No. | UI Name | Related Function Requirement ID | Description | Test case Identifier |
|------------|-------------------------------|---------------------------------|--|----------------------|
| TMS_UI_001 | Registration/Login | | Screens that contains input fields for the specific user. | TC_025 |
| TMS_UI_002 | Batch Dashboard | | Contains all the components of the batches. For instance, notice board classroom card and so on. | TC_026 |
| TMS_UI_003 | Classroom | | A screen displaying all the post from the trainer and comments from the trainees and trainers | TC_027 |
| TMS_UI_004 | Group Chat | | A screen where texts from the trainee and trainer will be shown | TC_028 |
| TMS_UI_005 | Add Participants to the batch | | A Screen where admin will be to add trainee and trainer to a particular batch | TC_029 |
| TMS_UI_006 | Assignments | | Screens that shows trainees the assignments and trainers so create assignment and ability to see which users created assignments | TC_030 |

5. Non-Functional Requirements

| REQUIREMNT ID | Requirement Description | Acceptability/ Completion Criteria | Limitations/ Constraints | Test case Identifier |
|---------------|-------------------------|------------------------------------|--------------------------|----------------------|
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| TMS_025 | The software should have a fast and responsive user interface with minimal latency. The average response time should not exceed 2 seconds, and the maximum response time should not exceed 5 seconds. | Essential | May require optimization of the code and the use of efficient algorithms to ensure good performance | TC_031 |
| TMS_023 | The software should use appropriate encryption techniques to protect user data. It should also have a secure login system to prevent unauthorized access. | Essential | May require regular security audits and updates to ensure protection against emerging threats | TC_032 |
| TMS_024 | The software should have a user-friendly interface with clear navigation and intuitive controls. It should be easy to use for users of all ages and skill levels. | Essential | May require regular user testing and feedback to improve the user experience | TC_033 |

5.1 Performance Requirements

1. Response Time:

- a) A transaction's average response time should be less than 2 seconds.
- b) A transaction's maximum response time should not exceed 5 seconds.

2. Throughput:

- a) The software must be able to process at least 50 transactions per second.

3. Capital Utilization:

- a) Optimizing disk utilization will reduce storage use
- b) The use of communications should be improved to reduce data consumption

4. Reliability:

- a) The software should feature error-handling capabilities to maintain stability and reduce accidents.

5. Security:

- a) Encryption and secure authentication measures should be used to safeguard the software against unwanted access and data breaches.

6. Scalability:

- a) The software should be able to accommodate an increase in the number of users and transactions without seeing a noticeable decrease in performance.
- b) Future additions and functions should be readily included into the software's design.

7. Compatibility:

The software should be compatible with a broad variety of devices and versions and have minimum influence on device performance.

5.2 Safety Requirements

| REQUIREMNT ID | Requirement Description | Acceptability/ Completion Criteria | Limitations/ Constraints | Test case Identifier |
|---------------|--|------------------------------------|---|----------------------|
| TMS_025 | The software should not expose users to any potential harm or danger, including physical harm or psychological harm. | Essential | May require regular user testing and feedback to ensure safety | TC_034 |
| TMS_027 | The software should protect the privacy and security of user data, including personal information and login credentials. | Essential | May require regular security audits and updates to ensure data safety | TC_035 |
| TMS_028 | The software should not cause damage to the device or equipment being used. | Essential | May require regular testing and compatibility checks to ensure equipment safety | TC_036 |

5.3 Security Requirements

To prevent unauthorized or malicious access, use, modification, destruction, or disclosure of software, the following security measures may be implemented:

1. **Utilize Encryption:** Encrypt sensitive data such as user passwords to prevent unwanted access. A powerful encryption method should be used by the application to guarantee data security.
2. **Access Control:** The software should have an authentication method to guarantee that only authorized users may access sensitive data. This may consist of a login procedure and password rules.
3. **Role-based Access:** Access should be controlled based on the user's role and permissions. Modules should be allocated functions depending on the user's role and permissions. This will aid in preventing unauthorized access to and alteration of sensitive data.
4. **Auditing and Logging:** The application should preserve logs and historical data sets to monitor user activity and identify unusual conduct. These logs should be checked and analyzed on a regular basis to detect possible security concerns.
5. **Integrity of Data:** The software should verify the integrity of crucial variables to guarantee that data is not changed or damaged during transmission. SHA-256 and other hashing algorithms may be used to verify the integrity of data.

| REQUIREMENT ID | Requirement Description | Acceptability / Completion Criteria | Limitations/ Constraints | Test case Identifier |
|----------------|---|-------------------------------------|---|----------------------|
| TMS_029 | The software should use appropriate encryption techniques to protect user data, such as passwords and personal information. | Essential | May require regular security audits and updates to ensure data encryption remains secure | TC_037 |
| TMS_030 | The software should have a secure login system to prevent unauthorized access to user accounts. | Essential | May require regular security audits and updates to ensure the login system remains secure | TC_038 |

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| TMS_031 | The software should check the integrity of critical data to ensure that it has not been modified or tampered with. | Essential | May require regular security audits and updates to ensure data integrity | TC_039 |
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6. Design Constraints

The design constraints for this app are as bellow:

1. The user interfaces should have a consistent and cohesive design across all screens.
2. The UI elements should be appropriately sized and positioned for optimal usability.
3. The color scheme should be visually pleasing and ensure proper contrast for readability.
4. The typography and font choices should be legible and suitable for the content.
5. The user interfaces should be responsive and adaptable to different screen sizes and orientations.
6. Navigation within the user interfaces should be intuitive and easily accessible.
7. Error messages and notifications should be displayed clearly to assist users in understanding and resolving any issues.
8. The UI should follow accessibility guidelines to ensure usability for users with disabilities.
9. The use of appropriate visual cues, such as icons and buttons, should facilitate user interaction and navigation.
10. The user interfaces should prioritize the most relevant and important information to provide a streamlined user experience.

7. Software Quality Attributes

| REQUIREMENT ID | Requirement Description | Acceptability/ Completion Criteria | Limitations/ Constraints | Test case Identifier |
|----------------|---|------------------------------------|---|----------------------|
| TMS_032 | The software should be easy to use and intuitive for users, with a clear and straightforward interface. | Essential | May require regular user testing and feedback to refine usability | TC_040 |

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| TMS_033 | The software should have a fast and responsive interface, with minimal lag or delay in interactions. | Essential | May require regular performance testing and optimization to ensure high performance | TC_041 |
| TMS_034 | The software should be able to handle an increasing number of users and transactions without degradation in performance. | Essential | May require regular testing and scalability improvements to ensure scalability | TC_042 |
| TMS_035 | The software should have high availability and minimal downtime, with the ability to recover from failures and errors. | Essential | May require regular testing and reliability improvements to ensure reliability | TC_043 |