SoftwareEngineering CSE-327.9

SOFTWARE REQUIREMENT SPECIFICATION (SRS)

Title: TurfMate - A Game Hall Booking System

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Chapter 1 - Introduction

1.1 Purpose

The purpose of the **Game Hall Booking System (Turfmate)** is to create a web-based platform where customers can easily browse available game halls, book slots for games, and make online payments. The system also allows the administrator to manage hall information, booking history, maintenance schedules, and payment updates. By moving the entire process online, our management system aims to eliminate issues like double bookings, scheduling conflicts, and manual record-keeping. This system will ensure transparency, accuracy, and ease of use for both customers and game hall administrators.

1.2 Intended Audience

The **Game Hall Booking System** is developed for the following groups of users and stakeholders:

- **Customers (Players):**
  Individuals or teams who want to book game hall slots for football, cricket, or other recreational sports. They will use the system to explore nearby halls, view facilities, compare prices, check available slots, and make bookings with secure online payments.
- **Administrator (Turf Owner/Manager):**
  The administrator will use the system to manage all backend operations, including adding or editing hall information, setting time slots, marking maintenance periods, and verifying payments. The admin can also review booking histories, monitor business performance, and ensure smooth operation of all hall-related activities.
- **Developer (Individual):**
  Responsible for designing, developing, and maintaining the entire web-based platform. The developer ensures the system is user-friendly, secure, and scalable, while meeting all functional and performance requirements.
- **Instructor/Evaluator:**
  The course instructor or project evaluator will use the system and its documentation to assess whether it fulfills the intended academic objectives, technical functionality, and software engineering principles.

1.3 Intended Use

The **Game Hall Booking System** is designed to serve as a complete end-to-end solution for game hall booking and management. It will be primarily used to streamline the reservation process and simplify administrative tasks.

Specifically, the system will be used to:

- **Customer Usage:**
    - Register and log in securely to their accounts.
      Browse all available halls with complete information (location, facilities, rates and surface type).
    - View real-time slot availability and make online bookings.
    - Confirm bookings, view booking history, and download receipts or invoices.
    - Complete payments using integrated online payment gateways.

- **Administrator Usage:**
    - Manage hall listings by adding, updating, or removing hall details and images.
    - Monitor booking records and payment transactions for all customers.
    - Toggle hall availability during maintenance or repair periods.
    - Add or update details about scheduled games or events.
    - Update payment statuses

1.4 Product Scope

Purpose:

The Game Hall Booking System is developed to digitalize and streamline the process of booking and managing game halls for sports and recreational activities. It provides a unified online platform where customers can view available halls, check time slot availability, make secure payments, and manage their bookings efficiently. At the same time, administrators can oversee hall listings, booking schedules, payment records, and maintenance activities through a secure, centralized dashboard.

Primary Objectives:

- To develop a web-based platform that automates booking and payment workflows.
- To provide real-time hall availability updates, preventing double bookings and scheduling conflicts.
- To enable secure user authentication, payment processing, and digital receipt generation.
- To offer administrators full control over hall listings, slot management, and maintenance scheduling.
- To maintain accurate and up-to-date records of bookings, payments, and hall utilization.
- To generate reports and analytical insights for improved decision-making and performance monitoring.

Key Benefits:

- Efficiency: Automates administrative tasks, reducing the need for manual record keeping and minimizing errors.
- User Convenience: Allows customers to browse, book, and pay online anytime, improving accessibility and satisfaction.
- Accuracy and Transparency: Ensures consistent real-time synchronization between hall availability, booking status, and payment confirmation.
- Security: Protects user and transaction data through secure authentication and encryption methods.
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- Performance Tracking: Provides data-driven insights on bookings, payments, and utilization trends for strategic evaluation.
- Reduced Operational Costs: Decreases dependency on manual labor and paperwork, improving cost-effectiveness.

Alignment with Corporate Goals:

- Strengthen customer trust and engagement by providing a seamless booking experience.
- Improve staff productivity by automating repetitive administrative tasks.
- Enhance the institution's reputation as a modern, service-oriented organization that values digital innovation.
- Scale its services to accommodate future growth and additional features, such as mobile applications or multi-location management.

Relation to Business Strategy:

- Digital Transformation: Shifting from traditional booking methods to a web-based, automated system.
- Customer-Centric Service Delivery: Prioritizing ease of access, transparency, and real-time responsiveness.
- Operational Excellence: Streamlining booking and payment operations to minimize delays and human errors.

1.5 Risk Definition

The development and operation of the Game Hall Booking System may face potential risks that could impact the system's functionality, performance, and delivery timeline. These risks are categorized and defined as follows:

1. Technical Risks:

- *Database Failure:* The centralized MySQL database could experience downtime or data corruption, affecting booking and payment operations.
- *Security Threats:* Unauthorized access, hacking, or weak encryption could lead to data breaches or payment-related vulnerabilities.
- *Integration Issues:* Problems with third-party payment gateways or network APIs could disrupt payment transactions.

2. Operational Risks:

- *Server Downtime:* Poor server configuration or limited hosting resources might cause slow performance or system outages.

- *Network Dependence:* Since the system is web-based, unstable internet connectivity may interrupt user operations.

- *Hardware Limitations:* Limited computing resources may affect testing and real-time data processing.

3. Project Risks:

- *Time Constraints:* Tight academic deadlines may affect module completion or quality assurance.

- *Limited Resources:* As an academic project, the absence of financial and technical support may restrict advanced feature implementation.

- *Team Coordination Issues:* Miscommunication or inconsistent collaboration among team members could delay development milestones.

4. User Risks:

- *User Errors:* Incorrect data input during booking or payment may cause system confusion or failed transactions.

- *Low Adoption Rate:* Some users may lack familiarity with online booking systems, resulting in limited early adoption.

Chapter 2 - Overall Description

2.1 User Classes and Characteristics

The Game Hall Booking System is designed to support multiple user classes with varying privileges and system interactions. Each user class has distinct roles and responsibilities that contribute to the functionality, management, and security of the system.

User class: Customers (Players)

Customers are individuals or teams who use the system to explore, book, and manage game hall reservations for sports or recreational activities.

Characteristics:

- Possess basic computer and internet skills.
- Access the system via mobile or desktop browsers.
- Require a simple, intuitive, and user-friendly interface.
- Expect secure authentication and easy navigation.

Responsibilities:

- Register and log in securely.
- Browse available halls and check real-time slot availability.
- Book halls for the desired time slots and complete online payments.
- View and manage booking and payment history.
- Cancel bookings as per the defined policy.

User Class: Administrator (Hall Manager/Owner)

The administrator oversees all backend operations, ensuring the smooth functioning of the system, including hall listings, bookings, payments, and maintenance management.

Characteristics:

- Experienced in using web dashboards and managing digital records.
- Frequently uses the system for data entry, monitoring, and report generation.
- Requires secure access credentials with full administrative privileges.

Responsibilities:

- Add, update, or remove hall details, images, and pricing.
- Monitor booking activities and verify payment transactions.
- Manage hall availability during maintenance or repair periods.
- Generate analytical reports on bookings, payments, and hall utilization.
- Maintain data accuracy and handle customer inquiries.

User Class: Developer (System Maintainer)

The developer is responsible for designing, testing, and maintaining the system's codebase, ensuring stable functionality and long-term performance.

Characteristics:

- Skilled in web development technologies such as PHP, HTML, CSS, JavaScript, and MySQL.
- Possesses strong problem-solving and debugging skills.
- Understands both frontend and backend architecture.

Responsibilities:

- Debug and resolve technical issues within the system.
- Maintain and update the system for performance optimization.
- Perform data backups and ensure system security.
- Enhance the platform's scalability and implement new features.
- Conduct periodic testing to ensure compatibility and reliability.

5. Invited Collaborators

Invited collaborators are external or temporary users who are granted limited access by the administrator to support specific tasks such as testing, auditing, or analytical review.

Characteristics:

- May include supervisors, testers, or third-party contributors.
- Have restricted access based on assigned permissions.
- Use the system for evaluation or data verification tasks only.

Responsibilities:

- Access designated system modules for testing or validation.
- Review booking or payment data without modification rights.
- Provide feedback for performance improvement or feature enhancement.
- Maintain confidentiality and integrity of accessed information.

2.2 User Needs

The **Game Hall Booking System** is designed to simplify the process of managing and booking sports halls through an online platform. The system will cater to two main user groups: customers and administrators. Their needs are summarized below.

2.2.1 Customer Needs

- **Account Management:** Customers need the ability to register, log in, and securely manage their personal accounts.
- **Hall Information:** Customers should be able to view detailed information about available halls, facilities, pricing, and availability status.
- **Slot Booking:** Customers need a simple and fast interface to check available time slots and book halls for specific games.
- **Payment System:** Customers want to make payments online securely and view their payment history and receipts.
- **Dashboard Access:** A dashboard should display booking history, payment details, and hall availability.

2.2.2 Administrator Needs

- **Admin Authentication:** Secure login to access the management portal.
- **Hall Management:** CRUD operations on hall details such as name, location, availability, price, and maintenance status.
- **Slot and Booking Management:** Monitor and manage bookings, and update hall availability in real time.
- **Payment Management:** View, verify, and update payment records.
- **Maintenance Management:** Mark halls as “Under Maintenance” or “Available.”
- **Reports and Insights:** Generate reports on bookings, payments, and hall utilization.

2.2.3 General User Needs

- **Security:** Both users and admins require a safe environment with password protection and encrypted communication.
- **Usability:** The system should be intuitive and responsive across desktop and mobile devices.

2.3 Operating Environment

- Platform: Web-based (HTML, CSS, PHP, MySQL)
- Browser Compatibility: Chrome, Edge, Firefox
- Server Environment: XAMPP
- Database: MySQL

2.4 Constrains

Technical Constraints

- The system will be a web-based application, requiring a stable internet connection for all admin and user operations.
- The admin dashboard must be compatible with major browsers (Google Chrome, Mozilla Firefox, Microsoft Edge).
- The application will rely on a centralized database (e.g., MySQL), meaning any downtime or corruption may affect system availability. The database server (MySQL) must support real-time updates to handle CRUD operations efficiently.
- Implementation of secure password management, including hashing and email-based verification for password changes.
- The system's performance may depend on server configuration, bandwidth, and network latency.

Time Constraints:

- Development is divided into milestone-based sprints for key admin modules, including login authentication, turf management, CRUD operations, maintenance control, and payment update features.
- The deadline for a fully functional module completion is set within two months, aligning with the academic project schedule.
- Sufficient time allocation is ensured for testing and validation of admin actions such as login verification, turf creation and update flows, maintenance toggling, and data synchronization with the database.

Budget Constraints

- The project is developed for academic purposes, so there is no dedicated funding for commercial software or paid APIs.
- Only open-source or free technologies (e.g., PHP, HTML, CSS, MySQL) will be used.
- No paid third-party services, plugins, or hosting will be utilized.
- Hosting and database usage will rely on free-tier services or institutional servers with limited resources.

Regulatory and Compliance Constraints:

- Compliance with relevant data protection and privacy standards for handling admin and customer information (e.g., names, email addresses, payment details).
- All passwords must be securely hashed, and no sensitive data should be stored in plain text within the database.
- Data access must be restricted to authorized admin users only, preventing unauthorized viewing or modification of turf information.
- The system must follow academic and institutional software ethics, avoiding the use of any copyrighted code or materials.
- Secure handling of admin actions such as payment updates and maintenance toggling must be ensured to prevent data misuse or manipulation.

Resource Constraints:

- The development team is limited to four members, which may reduce the speed of module implementation and testing.
- Hardware and software resources are limited to personal computers and free-tier platforms (e.g., XAMPP, MySQL).
- UI/UX design may be constrained by the availability of design tools and the team's workload.
- Testing and debugging will be handled internally, as there are no dedicated QA or testing resources available.
- Technical guidance will rely on academic supervision and online developer communities rather than professional consultants.

2.5 Assumptions

- Assumes that users (customers and administrators) will actively use the platform to book or manage turf slots, update schedules, and monitor payments.
- Assumes that customers have basic knowledge of online booking systems and can navigate through dashboards, slot selection, and payment interfaces.
- Assumes that administrators have the required access permissions and technical understanding to perform CRUD operations, manage turf availability, and handle maintenance toggling.
- Assumes that all users will provide valid credentials and contact information (e.g., email, phone number) for verification and payment confirmations.
- Assumes that users have consistent access to the internet and compatible devices (mobile or desktop) to interact with the system's real-time booking and payment features.

- Assumes that the database and server will operate reliably, ensuring smooth data synchronization between booking, payment, and admin modules.
- Assumes that third-party integrations, such as the payment gateway, will remain functional during the booking and payment process.
- Assumes that stakeholders (developers, testers, and supervisors) have access to the project documentation and understand its functional and non-functional requirements.
- Assumes effective communication and collaboration among the development team to ensure on-time completion within the two-month project timeline.
- Assumes that role-based authentication, data security, and future scalability (e.g., mobile version, analytics, multiple admin roles) will be achievable with additional time and resources.

3. Requirements

3.1 Functional Requirements

3.3.1 User Authentication (Login)

As a customer, I want to log in securely to the system so that I can access my dashboard, view available game halls, and make bookings.

Success:

- If the provided login credentials are valid, the customer is redirected to the dashboard successfully.
- Access is granted based on the customer role.

Failure:

- The system displays “Invalid email or password.”
- The system redirects the customer back to the login page for another attempt.

3.3.2 User Registration

As a new customer, I want to register by providing my personal information so that I can create an account and use the system's services.

Success:

- If all required details are valid, the system creates a new customer account.

Failure:

- If required fields are missing or invalid, the system displays appropriate error messages.
- Registration fails if the email already exists in the system.

3.3.3 View Game Hall Information

As a customer, I want to view the list of available game halls so that I can see details like location, price, facilities, and availability before making a booking.

Success:

- The system displays a list of all game halls with relevant details.

Failure:

- If no game halls are available, the system displays "No game halls available at the moment."
- The system notifies the user if an error occurs while fetching hall data.

3.3.4 Book Game Hall Slot

As a customer, I want to book an available game hall slot for a specific date and time so that I can reserve it for my game.

Success:

- If the selected slot is available, the booking is confirmed and stored in the database.

Failure:

- If the selected slot is already booked, the system notifies the customer.
- If payment is not completed, the booking remains pending or is canceled automatically.

3.3.5 Make Payment

As a customer, I want to make a secure online payment for my booking so that I can confirm my reservation.

Success:

- Payment is successfully processed, and the transaction record is stored in the system.
- A digital receipt or confirmation message is displayed.

Failure:

- If payment fails, the system notifies the customer with the message "Transaction failed. Please try again."
- The booking remains pending until payment is successfully completed.

3.3.6 View Booking History

As a customer, I want to view my previous and upcoming bookings so that I can track my reservations and payment status.

Success:

- The system displays a list of all bookings with details such as game hall name, date, time, and payment status.
- Customers can filter bookings by date or status (completed, canceled, or upcoming).

Failure:

- If no bookings are found, the system displays “No booking records available.”
- If data retrieval fails, the system displays an appropriate error message.

3.3.7 Cancel Booking

As a customer, I want to cancel a previously booked slot so that I can release it for others and manage my schedule.

Success:

- The booking is canceled successfully, and the game hall slot becomes available for others.
- If applicable, the system initiates a refund process based on the cancellation policy.

Failure:

- If the cancellation window has expired, the system displays “Cancellation not allowed for this slot.”
- If an error occurs, the system notifies the customer with a failure message.

3.3.8 View Payment History

As a customer, I want to view my previous payment transactions so that I can verify completed and pending payments.

Success:

- The system displays all payment records linked to the customer’s bookings.
- Payment details include transaction ID, amount, status, and date.

Failure:

- If no payment records exist, the system displays “No payment history available.”
- If the database query fails, the system shows an error message.

3.2 Non-Functional Requirements

This section outlines the non-functional requirements that define the overall quality, performance, and operational standards of the **Game Hall Booking System (GHBS)**.

3.2.1 Performance Requirements

- **Response Time:** The system should respond to user actions, such as booking, login, or payment, within 2 seconds under normal operating conditions to ensure a smooth user experience.
- **Scalability:** The system must be capable of handling up to a 20% increase in concurrent users during peak hours (such as weekends or tournaments) without noticeable performance degradation.

3.2.2 Safety Requirements

- **User Data Protection:** The system must employ robust measures to ensure the confidentiality, integrity, and availability of user data, preventing unauthorized access or data loss.
- **Transaction Integrity:** In the event of a system crash, power failure, or interruption, the system must preserve all booking and payment records to maintain transaction integrity.

3.2.3 Security Requirements

- **User Authentication:** Both customers and administrators must undergo secure authentication before accessing the system, ensuring that only authorized users can perform system operations.
- **Data Encryption:** All sensitive data, including login credentials and payment information, must be encrypted during both transmission and storage using SSL/TLS protocols.

- **Access Control:** Different user roles (Customer, Admin) must have restricted access to system functionalities according to their privileges.

3.2.4 Software Quality Attributes

- **Usability:** The system should provide an intuitive, responsive, and user-friendly interface, achieving at least a 90% satisfaction rate in user evaluations or feedback.

- **Reliability:** The system must maintain at least 99% uptime during operational hours to ensure continuous service availability.

- **Maintainability:** The system's codebase should be modular, well-documented, and easy to update for future improvements or feature extensions.

- **Compatibility:** The system should be fully compatible across major web browsers (Chrome, Firefox, Edge, Safari) and mobile devices.

3.2.5 Business Rules

- **Booking Eligibility:** Only registered and logged-in customers are permitted to book available game hall slots.

- **Payment Confirmation:** Bookings are considered valid only after successful payment confirmation is recorded in the system.

- **Maintenance Mode:** Admins can set a hall's status to "Under Maintenance," during which booking for that hall will be temporarily disabled.

- **Cancellation Policy:** Customers must cancel bookings at least 2 hours before the scheduled slot, and refunds will be processed according to the admin's policy.