Badminton Court Management System Project

Software Requirements Specification

3/6/2024

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# **Introduction**

## **1.1 Purpose**

This document details the software requirements for a badminton court management system, facilitating court search, booking, account management, payment, and feedback functionalities for guests, customers, court managers, court staff, and system administrators.

## **1.2 Scope**

* In scope: Functional requirements for the system, including search, booking, payment, and management of court and user information.
* Out of scope: Non-functional requirements such as performance testing, cross-browser compatibility beyond specified versions, and automation testing.

## **1.3 Definitions, Acronyms, and Abbreviations**

* Guest: Unregistered user of the system.
* Customer: Registered user who can book courts.
* Court Manager: Administrator responsible for managing court information and bookings.
* Court Staff: Personnel assisting with check-ins and court maintenance.
* System Admin: Administrator managing user accounts and system configurations.

## **1.4 References**

* No references listed.

# **Specific Requirements**

|  |  |
| --- | --- |
| **Administrator** | **Customer** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
| Login & Logout | Login & Logout |

## **2.1 Front-end Details**

The Badminton Court Management System will provide a user-friendly interface to facilitate easy booking, management, and usage of badminton courts. The system will cater to two main user roles: Administrator and User. Below is a detailed description of the front end for each module:

**Login**

- Username

- Password

- Login

**Create user account**

- First name

- Last name

- Phone

- Email

- Username

- Password

- Submit

**Edit user account**

- First name

- Last name

- Phone

- Username

- Password

- Submit

**Create a Court**

- Court name

- Location

- Image

- Opening Hours

- Submit

**Create Sub-Court**

- SubCourtName

- Start time

- End time

- Price

- Type

- CourtID

- Submit

**Edit Court**

- Court name

- Location

- Image

- Opening Hours

- Update

**Search Courts**

- Location

- Search

**Book a Court**

- CourtName

- SubCourtName

- Start time

- End time

- Type

- Total Price

- Date

- Number of players

- Submit

**Cancel Booking**

- Reason

- BookCourtID

- Confirm

- Cancel

**Payment**

- Payment method: Card

- Card number

- Country

- Price

- Submit

- Cancel

**CheckIn**

- CourtID

- UserName

- Number of players

- Time

- QR code

- Back to Home page

**Evaluate**

-CourtName

- UserName

- Comment

- Rate

- Submit

- Cancel

## **2.2 Technical Requirements (TRD)**

**Login**

**T1** Username - Username must not be blank  
**T2** Username - Special characters are not allowed  
**T3** Username - Spaces are not allowed  
**T4** Password - Password must not be blank  
**T5** Password - Spaces are not allowed

**Create user account**

**T6** First name - First name must not be blank  
**T7** First name - Special characters are not allowed  
**T8** First name - Numbers are not allowed  
**T9** First name - Spaces are not allowed  
**T10** First name - First character cannot have space

**T11** Last name - Last name must not be blank  
**T12** Last name - Special characters are not allowed  
**T13** Last name - Numbers are not allowed  
**T14** Last name - Spaces are not allowed  
**T15** Last name - First character cannot have space

**T16** Phone - Phone number must not be blank  
**T17** Phone - Special characters are not allowed  
**T18** Phone - Letters are not allowed  
**T19** Phone - Spaces are not allowed  
**T20** Phone - Must be a valid phone number format

**T21** Email - Email must not be blank  
**T22** Email - Email must be a valid format  
**T23** Email - Spaces are not allowed  
**T24** Email - First character cannot have space

**T25** Username - Username must not be blank  
**T26** Username - Special characters are not allowed  
**T27** Username - Spaces are not allowed  
**T28** Username - First character cannot have space

**T29** Password - Password must not be blank  
**T30** Password - Spaces are not allowed  
**T31** Password - Must meet complexity requirements (e.g., minimum length, includes both letters and numbers)

**Edit user account**

**T32** First name - First name must not be blank  
**T33** First name - Special characters are not allowed  
**T34** First name - Numbers are not allowed  
**T35** First name - Spaces are not allowed  
**T36** First name - First character cannot have space

**T37** Last name - Last name must not be blank  
**T38** Last name - Special characters are not allowed  
**T39** Last name - Numbers are not allowed  
**T40** Last name - Spaces are not allowed  
**T41** Last name - First character cannot have space

**T42** Phone - Phone number must not be blank  
**T43** Phone - Special characters are not allowed  
**T44** Phone - Letters are not allowed  
**T45** Phone - Spaces are not allowed  
**T46** Phone - Must be a valid phone number format

**T47** Username - Username must not be blank  
**T48** Username - Special characters are not allowed  
**T49** Username - Spaces are not allowed  
**T50** Username - First character cannot have space

**T51** Password - Password must not be blank  
**T52** Password - Spaces are not allowed  
**T53** Password - Must meet complexity requirements (e.g., minimum length, includes both letters and numbers)

**Create a Court**

**T54** Court name - Court name must not be blank  
**T55** Court name - Special characters are not allowed  
**T56** Court name - Numbers are not allowed  
**T57** Court name - Spaces are not allowed  
**T58** Court name - First character cannot have space

**T59** Location - Location must not be blank  
**T60** Location - Special characters are not allowed  
**T61** Location - Numbers are not allowed  
**T62** Location - Spaces are not allowed  
**T63** Location - First character cannot have space

**T64** Opening Hours - Opening hours must not be blank  
**T65** Opening Hours - Invalid time format

**Create Sub-Court**

**T66** SubCourtName - SubCourt name must not be blank  
**T67** SubCourtName - Special characters are not allowed  
**T68** SubCourtName - Numbers are not allowed  
**T69** SubCourtName - Spaces are not allowed  
**T70** SubCourtName - First character cannot have space

**T71** Start time - Start time must not be blank  
**T72** Start time - Invalid time format

**T73** End time - End time must not be blank  
**T74** End time - Invalid time format

**T75** Price - Price must not be blank  
**T76** Price - Letters are not allowed  
**T77** Price - Special characters are not allowed  
**T78** Price - Spaces are not allowed

**Edit Court**

**T79** Court name - Court name must not be blank  
**T80** Court name - Special characters are not allowed  
**T81** Court name - Numbers are not allowed  
**T82** Court name - Spaces are not allowed  
**T83** Court name - First character cannot have space

**T84** Location - Location must not be blank  
**T85** Location - Special characters are not allowed  
**T86** Location - Numbers are not allowed  
**T87** Location - Spaces are not allowed  
**T88** Location - First character cannot have space

**T89** Opening Hours - Opening hours must not be blank  
**T90** Opening Hours - Invalid time format

**Search Courts**

**T91** Location - Location must not be blank  
**T92** Location - Special characters are not allowed  
**T93** Location - Numbers are not allowed  
**T94** Location - Spaces are not allowed  
**T95** Location - First character cannot have space

**Book a Court**

**T96** CourtName - Court name must not be blank  
**T97** CourtName - Special characters are not allowed  
**T98** CourtName - Numbers are not allowed  
**T99** CourtName - Spaces are not allowed  
**T100** CourtName - First character cannot have space

**T101** SubCourtName - SubCourt name must not be blank  
**T102** SubCourtName - Special characters are not allowed  
**T103** SubCourtName - Numbers are not allowed  
**T104** SubCourtName - Spaces are not allowed  
**T105** SubCourtName - First character cannot have space

**T106** Start time - Start time must not be blank  
**T107** Start time - Invalid time format

**T108** End time - End time must not be blank  
**T109** End time - Invalid time format

**T110** Type - Type must not be blank  
**T111** Type - Special characters are not allowed  
**T112** Type - Numbers are not allowed  
**T113** Type - Spaces are not allowed  
**T114** Type - First character cannot have space

**T115** Total Price - Price must not be blank  
**T116** Total Price - Letters are not allowed  
**T117** Total Price - Special characters are not allowed  
**T118** Total Price - Spaces are not allowed

**T119** Date - Date must not be blank  
**T120** Date - Invalid date format

**T121** Number of players - Must not be blank  
**T122** Number of players - Letters are not allowed  
**T123** Number of players - Special characters are not allowed  
**T124** Number of players - Spaces are not allowed

**Cancel Booking**

**T125** Reason - Reason must not be blank  
**T126** Reason - Special characters are not allowed  
**T127** Reason - Numbers are not allowed  
**T128** Reason - Spaces are not allowed

**T129** BookCourtID - BookCourtID must not be blank  
**T130** BookCourtID - Special characters are not allowed  
**T131** BookCourtID - Letters are not allowed  
**T132** BookCourtID - Spaces are not allowed

**Payment**

**T133** Payment method - Payment method must not be blank

**T134** Card number - Card number must not be blank  
**T135** Card number - Special characters are not allowed  
**T136** Card number - Letters are not allowed  
**T137** Card number - Spaces are not allowed  
**T138** Card number - Must be a valid card number format

**T139** Country - Country must not be blank  
**T140** Country - Special characters are not allowed  
**T141** Country - Numbers are not allowed  
**T142** Country - Spaces are not allowed  
**T143** Country - First character cannot have space

**T144** Price - Price must not be blank  
**T145** Price - Letters are not allowed  
**T146** Price - Special characters are not allowed  
**T147** Price - Spaces are not allowed

**CheckIn**

**T148** CourtID - CourtID must not be blank  
**T149** CourtID - Special characters are not allowed  
**T150** CourtID - Letters are not allowed  
**T151** CourtID - Spaces are not allowed

**T152** UserName - UserName must not be blank  
**T153** UserName - Special characters are not allowed  
**T154** UserName - Spaces are not allowed  
**T155** UserName - First character cannot have space

**T156** Number of players - Must not be blank  
**T157** Number of players - Letters are not allowed  
**T158** Number of players - Special characters are not allowed  
**T159** Number of players - Spaces are not allowed

**T160** Time - Time must not be blank  
**T161** Time - Invalid time format

**T162** QR code - QR code must not be blank  
**T163** QR code - Invalid QR code format

**Evaluate**

**T164** CourtName - Court name must not be blank  
**T165** CourtName - Special characters are not allowed  
**T166** CourtName - Numbers are not allowed  
**T167** CourtName - Spaces are not allowed  
**T168** CourtName - First character cannot have space

**T169** UserName - UserName must not be blank  
**T170** UserName - Special characters are not allowed  
**T171** UserName - Spaces are not allowed  
**T172** UserName - First character cannot have space

**T173** Comment - Comment must not be blank  
**T174** Comment - Special characters are not allowed  
**T175** Comment - Numbers are not allowed  
**T176** Comment - Spaces are not allowed

**T177** Rate - Rate must not be blank  
**T178** Rate - Must be a valid rating (e.g., between 1 and 5)

## **2.3 Functional Validations**

This section outlines the functional validations for different features in the badminton court reservation system. Each validation ensures that the system behaves as expected under specific conditions.

**Court Availability Enquiry**

Manager:

F1: Manager can view the availability of all courts.

F2: Court ID entered should exist in the database.

Customer:

F3: Customer can view the availability of courts.

F4: Court ID entered should exist in the database.

**Book Court**

Manager:

F5: If the court ID is invalid, the system displays an error.

F6: If the court is already booked for the desired time slot, the system displays an error.

F7: If the booking details conflict with existing reservations, the system displays an error.

Customer:

F8: If the court ID is invalid, the system displays an error.

F9: If the court is already booked for the desired time slot, the system displays an error.

F10: If the booking details conflict with existing reservations, the system displays an error.

**Cancel Booking**

Manager:

F11: If the booking ID is invalid, the system displays an error.

F12: If the booking ID does not associate with the manager's bookings, the system displays an error.

Customer:

F13: If the booking ID is invalid, the system displays an error.

F14: If the booking ID does not associate with the customer's bookings, the system displays an error.

**Edit Booking**

Manager:

F15: If the booking ID is invalid, the system displays an error.

F16: If the new booking details conflict with existing reservations, the system displays an error.

F17: If the booking ID does not associate with the manager's bookings, the system displays an error.

Customer:

F18: If the booking ID is invalid, the system displays an error.

F19: If the new booking details conflict with existing reservations, the system displays an error.

F20: If the booking ID does not associate with the customer's bookings, the system displays an error.

**Delete Customer**

Manager:

F21: If Customer ID is invalid, the system displays an error.

F22: If bookings are associated with the Customer ID, the system displays an error.

F23: If the Customer ID is not associated with the manager, the system displays an error.

**New Customer**

Manager:

F24: If the same Email ID exists in the system, it shows an error.

**Edit Customer**

Manager:

F25: If the same Email ID exists in the system, it shows an error.

F26: If the Customer ID is invalid, the system displays an error.

F27: If the Customer ID is not associated with the manager, the system displays an error.

**Change Password**

Manager:

F28: If the old password is invalid, the system shows an error.

Customer:

F29: If the old password is invalid, the system displays an error.

**Booking History**

Manager:

F30: If the customer ID is invalid, the system displays an error.

F31: If the booking records do not exist in the system, the system displays an error.

Customer:

F32: If the customer ID is invalid, the system displays an error.

F33: If the booking records do not exist in the system, the system displays an error.

This section ensures the system's functional correctness and aligns with the business requirements for managing badminton court reservations and customer-related operations for both managers and customers.

## **2.4 Classes / Objects**

### **2.4.1 User**

Attributes:

- UserID: Integer

- Name: String

- Email: String

- Password: String

- PhoneNumber: String

- UserType: Enum (Admin, Customer)

Functions:

- Register()

- Login()

- Logout()

- UpdateProfile()

### **2.4.2 Court**

Attributes:

- CourtID: Integer

- CourtName: String

- Location: String

- PricePerHour: Decimal

- AvailabilityStatus: Boolean

Functions:

- AddCourt()

- UpdateCourt()

- RemoveCourt()

- CheckAvailability()

### **2.4.3 Booking**

Attributes:

- BookingID: Integer

- UserID: Integer

- SubCourtID: Integer

- TimeSlotID: Integer

- ScheduleID: Integer

- BookingDate: Date

- TotalHours: Integer

- TotalAmount: Decimal

Functions:

- CreateBooking()

- CancelBooking()

- ViewBooking()

## **2.5 Non-Functional Requirements**

- Performance: The system should handle up to 1000 concurrent users with no performance degradation.

- Usability: The interface should be user-friendly and intuitive, allowing users to make a booking in less than 5 minutes.

- Reliability: The system should have an uptime of 99.9%.

- Security: User data must be encrypted in transit and at rest. Users should be authenticated before accessing the system.

- Scalability: The system should be able to scale to accommodate a growing number of users and courts.

- Compatibility: The system should be compatible with the latest versions of major browsers (Chrome, Firefox, Safari, Edge).

## **2.6 Inverse Requirements**

- The system should not store plain text passwords.

- The system should not allow booking outside of operational hours (5 AM to 11 PM).

- The system should not accept bookings less than 1 hour in advance.

## **2.7 Design Constraints**

- The system should be built using a responsive design framework to ensure compatibility with mobile and desktop devices.

- The database should use a relational model for easy maintenance and scalability.

- The application should be developed using a modern web framework such as React for the frontend and ASP.NET for the backend.

## **2.8 Logical Database Requirements**

Users Table

- UserID (Primary Key)

- Name

- Email (Unique)

- Password

- PhoneNumber

- UserType

Courts Table

- CourtID (Primary Key)

- CourtName

- Location

- PricePerHour

- AvailabilityStatus

SubCourts Table

- SubCourtID (Primary Key)

- CourtID (Foreign Key)

- Name

- AvailabilityStatus

Bookings Table

- BookingID (Primary Key)

- UserID (Foreign Key)

- SubCourtID (Foreign Key)

- TimeSlotID (Foreign Key)

- ScheduleID (Foreign Key)

- BookingDate

- TotalHours

- TotalAmount

## **2.9 Other Requirements**

- Email Notifications: The system should send email notifications for booking confirmations, cancellations, and reminders.

- Reporting: The system should provide reports on court utilization, booking statistics, and user activity.

- Support: The system should include a help section with FAQs and contact information for support.

# **Analysis Models**

Use Case Diagrams:

- User Registration

- Court Booking

- Booking Cancellation

- Court Management

- User Management

Class Diagrams:

- User Class

- Court Class

- SubCourt Class

- Booking Class

Sequence Diagrams:

- User Registration Sequence

- Booking Process Sequence

- Booking Cancellation Sequence

Entity-Relationship Diagram (ERD):

- Users, Courts, SubCourts, Bookings relationships and constraints