StadiumPro-stadium reservation management system

V4.0

Requirement Report

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# Introduction

## 1.1 Purpose of this Report

This software product requirements analysis report is written for the coursework of the XJCO-2912 "Software Engineering project". Our delivery is called “Stadium Pro”, which is a gym management system containing multiple functions for different type of users. Using agile development theory, we completed the project in more than 3 months after four iterations. Our project has the following significances, effects and final goals to be achieved:

**Significance**

1. To help fitness centers improve management efficiency, reduce management costs and improve management effectiveness.
2. To promote the digitalization, intelligence and networking of the fitness industry.
3. To enhance the brand image and competitiveness of fitness centers.
4. To provide better data analysis and decision-making support for fitness centers.
5. To improve the service quality and customer experience of the fitness industry.

**Effect**

1. Membership management: Provide functions such as membership information management, membership card management, and membership reservation to facilitate membership management and service.
2. Equipment management: Provide functions such as equipment information management, equipment maintenance, and equipment borrowing to facilitate equipment management and maintenance.
3. Venue reservation: Provide functions such as venue reservation and venue usage inquiry to facilitate venue management and reservation.
4. Financial management: Provide functions such as financial information management, income and expense management, and report analysis to facilitate financial management and decision-making support.

**Final goals to be achieved**

1. Improve the management efficiency and operational efficiency of fitness centers, reduce management costs and increase profits.
2. Enhance customer experience and satisfaction, increase customer loyalty and promote word-of-mouth marketing.
3. Provide better data analysis and decision-making support to promote the sustainable development and growth of fitness centers.
4. Expand marketing channels, increase customer sources and sales.
5. Promote the digitalization, intelligence and networking of the fitness industry, and improve the service quality and competitiveness of the industry.

## 1.2 Expected Audience and Reading Suggestions

1. Developers: It is recommended to read the technical specifications and development requirements in the requirements document to ensure that the development process meets the requirements and quality requirements.
2. Project Manager: It is recommended that you review the overall overview and focus of the requirements document and then gain an in-depth understanding of the requirements, scope, schedule, and quality of the project for project management and decision making.
3. User representative: It is recommended that you browse the user requirements and use-case analysis information in the requirements document and then have an in-depth understanding of the system functions and services so that you can know if this system meets your requirements.
4. Teachers: It is recommended that you carefully read the entire requirements document to check the content and quality of the document so that you can evaluate and grade the assignments.

## 1.3 Document Convention

**Text style**

1. Font: Arial.
2. Font size: 12pt, 16pt, 18pt, 24pt.
3. Line Spacing: 1.5.
4. Page margin: Default.

## 1.4 Product Range

The software product is a gym management system, which aims to improve the management efficiency and service quality of gyms through digitization, intelligence, and networking, and promote the sustainable development of the fitness industry. The main goals of the software product are:

1. To help gyms improve management efficiency, reduce management costs, improve management effectiveness, and enhance the gym's brand image and competitiveness.
2. To provide better data analysis and decision-making support, provide scientific basis for gym management decisions, and promote the sustainable development and growth of the gym.
3. To improve the service quality and customer experience of the fitness industry, and provide users with more convenient, efficient, safe, and satisfying fitness services.
4. To promote the development of the fitness industry through digitization, intelligence, and networking, and promote the development of the fitness industry towards intelligence, high-end, and branding.

The development of the software product is closely related to the enterprise's goals and business strategies. With the continuous development and popularization of information technology, digitization and intelligence have become important trends in enterprise development. As a service industry, gyms also need to use the power of information technology to improve management efficiency and service quality, enhance brand image and competitiveness. Therefore, the development of the software product is in line with the development trends of the fitness industry and the strategic planning of enterprises, which is conducive to the long-term development and sustained competitive advantage of enterprises.

# Comprehensive Description

This section Outlines the scope of the software product being defined and the environment in which the software product will operate, the users who will use the software product, the limitations that are known about the software product, and the assumptions and dependencies about the software product.

## 2.1 Condition of the Product

The origin of the system can be traced from the practical problems and challenges on the management and service requirements of the fitness industry. With the rapid development of the fitness industry, the needs of gym management and services are constantly improving and evolving. The traditional management method has been unable to meet the management and service needs of the gym, and it is necessary to use the support of modern information technology to realize digitalization, intelligence and networking, improve management efficiency and service quality, and meet the growing needs and expectations of customers.

The background and origin of the system reflect the trend and demand of the development of the fitness industry, as well as the development and application of modern information technology. The development of the system is based on Java, Vue and other technologies, which can effectively solve the challenges and problems faced by the gym, including the needs of membership management, staff management, equipment management, course management and other aspects. The application of the system can improve the management efficiency and service quality of the gym, optimize the business process and resource allocation, so as to enhance the competitiveness and brand image of the gym.

In summary, the background and origin of the system stems from practical problems and challenges for the management and service requirements of the fitness industry, as well as the support and application of modern information technology. Through digital, intelligent and networked means, the system aims to improve the management efficiency and service quality of gyms, and promote the sustainable development and progress of the fitness industry.

## 2.2 User categories and features

The user categories and characteristics of the system reflect the business processes and characteristics of the fitness industry, as well as the different needs and expectations of users for the system. By understanding the user categories and characteristics in-depth, the system can be better designed and implemented to improve user satisfaction and system usage effectiveness.

1. Gym manager: Gym manager is the main user of the system and need to use it to manage the daily operations of the gym, including membership management, employee management, equipment management, and course management. The characteristics of this user category include familiarity with gym business processes, understanding of digital and intelligent technologies, and emphasis on management efficiency and service quality

User Story:

As the main user of the Stadium Pro gym management system, David (Manager) wants to use the system to better manage the daily operations of the gym. He hopes that the system can help him to accomplish the following tasks:

As a gym manager, I want to easily manage member information, including personal profiles, fitness plans, and membership fees. I want to be able to conveniently view members' health status and fitness plans and provide personalized fitness recommendations based on their needs to increase their satisfaction and loyalty.

As a gym manager, I want to efficiently manage employee information, including personal profiles, work schedules, and salaries. I want to view employee work status and performance conveniently and provide training and promotion opportunities based on their performance and needs to improve employee morale and efficiency.

As a gym manager, I want to monitor and manage gym equipment in real-time, including equipment usage, maintenance, and repair information. I want to create maintenance and repair schedules based on equipment condition and usage rate to ensure equipment operates normally and prolong the equipment's lifespan.

As a gym manager, I want to easily schedule and manage fitness classes, including class scheduling, instructor assignments, and student reservations. I want to adjust course content and scheduling based on student feedback and needs to provide more personalized and high-quality services.

In summary, I hope that the Stadium Pro gym management system can help me better manage and operate the gym, improve management efficiency and service quality, attract more members and employees, and increase the gym's competitiveness and profitability.

1. Gym members: Gym members are the ultimate users of the system and need to use it to book courses, check personal fitness data, purchase membership cards, and other related services. The characteristics of this user category include varying levels of familiarity with digital and intelligent technologies, emphasis on fitness effectiveness and service quality, and awareness of gym brand image.

User Story:

As a busy professional, Leo wants to stay fit and healthy amidst his hectic schedule. He joined Stadium Pro gym as a member and hopes to use the gym management system to make his fitness journey easier and more enjoyable.

As a gym member, Leo wants to be able to book fitness classes easily through the system. He wants to browse class schedules, choose the classes that fit his schedule, and receive reminders so that he never misses a workout.

Leo also wants to track his fitness progress through the system. He hopes to be able to view his personal fitness data, including weight, body measurements, and exercise records, and receive personalized fitness guidance based on his goals and preferences.

When it comes to purchasing gym products and services, Leo wants a hassle-free experience. He hopes that the system can provide him with a clear and transparent pricing structure and a secure payment process.

Most importantly, Leo values high-quality and personalized services from the gym. He wants to receive timely and accurate feedback on his fitness progress, professional guidance from fitness coaches, and a friendly and welcoming environment from gym staff. He also hopes that the system can provide him with a convenient and efficient communication channel with the gym, so that he can easily provide feedback and receive support.

In summary, Leo hopes that the Stadium Pro gym management system can help him to achieve his fitness goals and make his fitness journey easier and more enjoyable. He wants to feel supported and motivated by the gym's high-quality services and personalized guidance.

1. Gym employee: Gym employee is also a user of the system and needs to use it to obtain business data of the gym to make decisions and plans. The characteristics of this user category include the need for and emphasis on business data and management reports, and a relatively high level of understanding of digital and intelligent technologies.

User Story:

As a recent college graduate and fitness enthusiast, Cici landed a job at Stadium Pro gym as an employee. She wants to use the gym management system to efficiently manage gym operations and provide high-quality services to gym members.

As an employee, Cici wants to easily access business data and management reports through the system. She hopes to view membership data, attendance data, revenue data, and other key performance indicators to monitor the gym's business performance and identify areas for improvement. She wants to be able to see which classes and equipment are most popular and adjust schedules and offerings accordingly.

Cici also wants to be able to analyze business data and generate reports through the system. She hopes that the system can provide her with data visualization tools and report templates to help her present data in a clear and concise way. This will help her to better communicate with her colleagues and superiors about the gym's performance.

When it comes to managing gym operations, Cici wants a system that can help her to streamline workflows and improve efficiency. She hopes that the system can provide her with tools to manage gym employee schedules, equipment maintenance, and customer service requests, so that she can focus on providing high-quality services to gym members. She wants to be able to quickly assign tasks to her colleagues and monitor their progress.

In addition to her management responsibilities, Cici also works as a gym employee and wants the system to simplify her work tasks. She hopes to use the system to manage gym member check-ins, monitor equipment usage, and track customer feedback. She wants to be able to quickly check members in and out of classes and track their progress over time.

Overall, Cici hopes that the Stadium Pro gym management system can help her to efficiently manage gym operations and provide high-quality services to gym members, so that the gym can continue to grow and thrive in the highly competitive fitness industry.

## 2.3 Functionality Requirements Analysis

### 2.3.1 Functional Requirements

#### 2.3.1 a) View timetable of all facilities on a specified range of time/days

* + 1. UI Components: Customer, Employee, Manager.
    2. Priority: High.
    3. Description: This requirement allows the user to view the schedule of all facilities within a specified time/date range. This helps users plan their activities to ensure they book within the available facilities and arrange their time properly. In addition, this requirement can help facility managers or staff better understand facility usage so that they can perform more efficient scheduling and resource management.
    4. Notice:
       - Clear display: The page should present the schedule of all facilities in a clear, easy-to-understand manner. Use easy-to-read fonts and appropriate colors to ensure that the information is easy to understand and access.
       - Interactivity: To enhance user experience, the page can be interactive to a certain extent. For example, when a user selects a time period, a prompt indicating the selected time period will be displayed

#### 2.3.1 b) View timetable of specified facility on a range of time/days

* + - 1. UI Components: Customer, Employee, Manager.
      2. Priority: High.
      3. Description: This requirement allows the user to view the schedule of a specified facility within a specified time/date range. This helps users plan their activities to ensure they book within the available facilities and arrange their time properly. In addition, this requirement can help facility managers or staff better understand facility usage so that they can perform more efficient scheduling and resource management.
      4. Notice:
         * Clear display: The page should present the schedule of all facilities in a clear, easy-to-understand manner. Use easy-to-read fonts and appropriate colors to ensure that the information is easy to understand and access.
         * Interactivity: To enhance user experience, the page can be interactive to a certain extent. For example, when a user selects a time period, a prompt indicating the selected time period will be displayed.

#### 2.3.1 c) Pay for monthly or annual membership

* + - 1. UI Components: Customer, Employee.
      2. Priority: High.
      3. Description: This requirement allows users to pay a monthly or annual membership fee for access to the facility or other membership privileges. By paying the membership fee, users can enjoy more facility services and other benefits, such as longer opening hours, more facility hours, more courses and activities, more special discounts, etc.
      4. Notice:
* Security: Since users will be making payments on the site, the designer must ensure that the site and payment system are secure. Security protocols can be used to ensure that the user's payment information is protected.
* Multiple payment methods: Users should be provided with multiple payment methods, such as credit card, debit card, electronic payment, etc., so that they can choose the appropriate payment method according to their preferences and convenience.
* Cancellation and refund Policies: Information about cancellation and refund policies should be provided on the page so that users understand their rights and responsibilities. In addition, a simple process for cancellation and refund should be provided so that users can cancel or refund quickly and easily.
* Provide a receipt: Once the user has paid, a receipt or order confirmation information should be provided so that the user can confirm that their payment has been successfully completed. In addition, receipts or order confirmation information can also be used for user records or reimbursement.

#### 2.3.1 d) Book and pay for an activity at a specified date and time

* + - 1. UI Components: Customer, Employee.
      2. Priority: High.
      3. Description: This requirement allows users to select the activity they would like to attend, such as classes, team events, competitions, etc., and book and pay for the event at the specified date and time.
      4. Notice:
         * Inventory control: If an event has a limited number of participants or requires specific equipment or materials, inventory control should be implemented to ensure that the event does not exceed capacity or run short.
         * Security: Since users will be making payments on the site, the designer must ensure that the site and payment system are secure. Security protocols can be used to ensure that the user's payment information is protected.
         * Multiple payment methods: Users should be provided with multiple payment methods, such as credit card, debit card, electronic payment, etc., so that they can choose the appropriate payment method according to their preferences and convenience.
         * Cancellation and refund Policies: Information about cancellation and refund policies should be provided on the page so that users understand their rights and responsibilities. In addition, a simple process for cancellation and refund should be provided so that users can cancel or refund quickly and easily.
         * Provide a receipt: Once the user has paid, a receipt or order confirmation information should be provided so that the user can confirm that their payment has been successfully completed. In addition, receipts or order confirmation information can also be used for user records or reimbursement.

#### 2.3.1 e) Cancel membership

* + - 1. UI Components: Customer, Employee.
      2. Priority: Medium.
      3. Description: This requirement allows users to better manage their membership status and avoid unnecessary fees or waste of expenses. For facility administrators or staff, this requirement can also help them better manage and maintain membership information and direct resources to where they are more needed.
      4. Notice:
         * Cancellation Policy: Information about the cancellation policy should be provided on the page so that users understand their rights and responsibilities, as well as the possible consequences of cancelling membership. In addition, a simple process for canceling should be provided so that users can cancel quickly and easily.
         * Cancellation Fees: If cancellation of membership will incur fees, these fees should be clearly stated on the page and the user's consent should be obtained before they cancel.

#### 2.3.1 f) Cancel booking

* + - 1. UI Components: Customer, Employee.
      2. Priority: High.
      3. Description: This requirement allows users to manage their time and schedule, and avoid unnecessary expenses or wasted expenses. For the facility administrator or staff, this requirement can also help them to better manage and maintain the reservation information of the facility and to direct resources to where they are more needed.
      4. Notice:
         * Cancellation Policy: Information about the cancellation policy should be provided on the page so that users understand their rights and responsibilities, as well as the possible consequences of cancelling membership. In addition, a simple process for canceling should be provided so that users can cancel quickly and easily.
         * Cancellation Fees: If cancellation of membership will incur fees, these fees should be clearly stated on the page and the user's consent should be obtained before they cancel.

#### 2.3.1 g) Option to book regular sessions (weekly) at a discounted rate

* + - 1. UI Components: Customer, Employee.
      2. Priority: Low.
      3. Description: This requirement allows users to better plan and manage their time and get access to the facilities they want to use or attend the services they want to attend at a lower cost. For facility managers or staff, this requirement can also help them better arrange and manage facility usage in order to provide better services and facilities and increase customer loyalty.
      4. Notice:
         * Discount Policy: Information about the discount policy should be provided on the page so that users understand their rights and responsibilities, as well as the possible consequences of regular booking. In addition, a simple process for booking regularly should be provided so that users can complete the booking quickly and easily.
         * Multiple payment methods: Users should be provided with multiple payment methods, such as credit card, debit card, electronic payment, etc., so that they can choose the appropriate payment method according to their preferences and convenience.

#### 2.3.1 h) Handle card payment for booking (simulated)

* + - 1. UI Components: Customer, Employee.
      2. Priority: High.
      3. Description: This requirement allows users to more easily complete transactions and do not need to use cash or other payment methods. For facility managers or staff, this requirement can also help them better manage and maintain booking information and direct resources to where they are more needed.
      4. Notice:
         * Payment process: The page should provide a simple, easy-to-understand payment process so that users can pay quickly and easily. The payment process should include steps such as entering credit card information, verifying payment information, and confirming payment.
         * Security: Since users will be making payments on the site, the designer must ensure that the site and payment system are secure. Security protocols can be used to ensure that the user's payment information is protected.
         * Payment of fees: Payment of fees should be clearly stated on the page and consent should be obtained from users before they pay to avoid any unauthorized payments.
         * Payment feedback: After payment is complete, the page should provide payment feedback so that users can confirm that their payment has been successfully completed and understand what to do next.

#### 2.3.1 i) Handle cash payment for booking (simulated)

* + - 1. UI Components: Employee.
      2. Priority: High.
      3. Description: This requirement allows users to more easily complete transactions and do not need to use credit cards or other forms of payment. For facility managers or staff, this requirement can also help them better manage and maintain booking information and direct resources to where they are more needed.
      4. Notice:
         * Logic process of payment: User makes an appointment order → Employee receives the request → User pay in cash →Employee receives money and confirm the order.
         * Payment of fees: Payment of fees should be clearly stated on the page and consent should be obtained from users before they pay to avoid any unauthorized payments.
         * Payment feedback: After payment is complete, the page should provide payment feedback so that the user can confirm that their payment has been successfully completed and know what to do next.

#### 2.3.1 j) Send receipt via email

* + - 1. UI Components: Employee.
      2. Priority: High.
      3. Description: This requirement allows users to send a receipt via email after the payment has been made. With this requirement, users can receive an email with details about their payment information and receipts when they complete the payment.
      4. Notice:
         * Content of the email: The content of the email should include payment information and receipt details, and should clearly state that this is a receipt. The message should contain both sender and recipient information so that users can quickly identify the source of the message.
         * Delivery time: The email should be sent immediately after the user has made the payment so that they can quickly get the relevant information and save it. Mail should be sent as quickly as possible to avoid long waits for users.
         * Senders: The system should ensure that the person sending the message has the necessary permissions and access permissions so that they can access and send the relevant information.

#### 2.3.1 k) Store receipt, and display it on demand

* + - 1. UI Components: Customer, Employee.
      2. Priority: High.
      3. Description: This requirement allows users to store the receipt after completing the payment and view it when needed. Through this requirement, the user can store the receipt information in the system after completing the payment, and can check it at any time when needed.
      4. Notice:
         * Security: Payment information and receipt details may involve the user's personal and payment information. Receipts must be secured.
         * Storage location: The system should store receipt information in a reliable system and ensure that it can be accessed and retrieved at any time. The storage location should be easily accessible and should have enough storage space to store all payment information and receipt details.
         * Display format: Receipts should be presented in an easy-to-read format, including tables or lists, so that users can quickly understand and access relevant information.

#### 2.3.1 l) Print receipt (or generate a PDF)

* + - 1. UI Components: Customer, Employee.
      2. Priority: High.
      3. Description: This requirement allows users to print a receipt or generate a PDF file after completing the payment. With this requirement, users can print receipts or generate PDF files when needed to save and manage relevant information.
      4. Notice:
         * Print Format: Receipts should be presented in a printable format, including standard paper size, appropriate margins, etc., so that users can easily print receipts.
         * PDF format: If users need to generate PDF files, they should provide features that make it easy to generate PDF files and ensure that the generated PDF files are easy to read and print.
         * Storage location: The system should store receipt information in a reliable system and ensure that it can be accessed and retrieved at any time. The storage location should be easily accessible and should have enough storage space to store all payment information and receipt details.

#### 2.3.1 m) Barcode or QR code on receipt, for validation

* + - 1. UI Components: Customer, Employee.
      2. Priority: Low.
      3. Description: This requirement allows users to have a barcode or QR code to the receipt so that it can be used to verify payment information or booking information. With this requirement, users can verify the validity of their payment information or booking information using a barcode or QR code after receiving the receipt.
      4. Notice:
         * Scanning capabilities: easy-to-use scanning capabilities should be provided so that users can quickly scan a barcode or QR code on a receipt and verify the validity of their payment information or booking information.
         * Verification capabilities: easy-to-use verification capabilities should be available so that users can quickly verify the validity of their payment information or booking information and ensure its correctness.
         * Barcode or QR code generation: Barcode or QR code should be automatically generated in the system, and ensure its uniqueness and correctness.

#### 2.3.1 n) Support user accounts and user login

* + - 1. UI Components: Customer, Employee, Manager.
      2. Priority: Medium.
      3. Description: This requirement allows users to support user accounts and user logins. With this requirement, users can create their own account and log in to access personal information, historical orders, and other relevant information.
      4. Notice:
         * Privacy Policy: A clear privacy policy should be provided to ensure that users' personal information is protected and that users know and understand how to use their personal information.
         * User registration: There should be a user registration function that is easy to understand and use so that users can create their own accounts and store personal information, historical orders, and so on.
         * User login: A user login function should be provided that is easy to understand and use so that users can access personal information, historical orders, and other relevant information.

#### 2.3.1 o) Store user’s payment card details for quicker checkout

* + - 1. UI Components: Customer, Employee.
      2. Priority: Low.
      3. Description: This requirement allows users to store their payment card information in the system and pay directly with the stored payment card information at the next checkout, avoiding the hassle of re-entering payment card information.
      4. Notice:
         * User choice: Users should be allowed to choose whether to store their payment card information in the system and use it at the next checkout.
         * Storage location: Payment card information should be stored in a reliable system and made readily accessible and retrievable. The storage location should be easily accessible and should have enough storage space to store all payment card information.
         * Security verification: Before users store payment card information, it should be verified for security to ensure the accuracy and security of the information.

#### 2.3.1 p) View weekly usage and income: overall, per-activity and per-session

* + - 1. UI Components: Manager.
      2. Priority: High.
      3. Description: This requirement allows the manager to quickly understand facility usage and revenue and make adjustments and improvements as needed. It also helps the manager better manage and maintain the facility and develop better marketing strategies.
      4. Notice:
         * Real-time update: Usage and income information should be updated in real time, ensuring its accuracy and real-time performance.
         * Data visualization: Data visualization tools, such as charts and graphs, can be used to enable administrators or staff to better understand and analyze usage and revenue information.
         * Filtering and sorting: Filtering and sorting capabilities should be provided so that administrators or staff can view different usage and revenue information as needed.

#### 2.3.1 q) Display weekly usage graphically

* + - 1. UI Components: Manager.
      2. Priority: Medium.
      3. Description: This requirement allows the manager to view the weekly usage of facilities more directly, which helps to better understand customers’ preference to make adjustments and improvements as needed and develop better marketing strategies.
      4. Notice:
         * Using labels: Adding labels next to data points gives the manager a clearer idea of what each data point represents.
         * Use appropriate graph types: Select graph types suitable for data types, such as bar charts, line graphs, scatter charts, etc., to improve the ease of differentiation.
         * Resize the graph: Resize the graph so that the distance between data points is larger, which improves the distinguishability.

#### 2.3.1 r) Support usage by multiple clients simultaneously

* + - 1. UI Components: Customer, Employee, Manager.
      2. Priority: Low.
      3. Description: This requirement allows multiple clients simultaneously to access facility usage information, such as facility availability, reservation status, historical order, payment information, and so on.
      4. Notice:
         * Concurrency control: To avoid data conflicts and race conditions, concurrency control mechanisms are needed to ensure data consistency when multiple clients access facility usage information simultaneously.
         * Scalability: A scalable system should be designed to support more clients accessing facility usage information at the same time.
         * Real-time update: Facility usage information should be updated in real time for all clients visiting the website, and ensure its accuracy and real-time performance.

#### 2.3.1 s) Configure facilities and activities

* + - 1. UI Components: Manager.
      2. Priority: High.
      3. Description: This requirement allows manager to configure facilities and activities. With this requirement, the manager can add, edit, or remove facility and activity information, including facility name, description, activity, price, and so on.
      4. Notice:
         * Convenience of addition & edition to facilities and activities: Methods such as filling prompts, batch adding, and image uploading can be used to improve convenience. This will help the manager to quickly add information about facilities and activities, improving management efficiency.
         * Real-time update: Information about facilities and activities should be updated in real time to ensure accuracy and timeliness.

### 2.3.2 Non-functional Requirements

#### 2.3.2 a) Display images of facilities

* + 1. UI Components: Customer.
    2. Priority: Low.
    3. Description: This requirement allows customers to view pictures of the facility to better understand information such as the facility's appearance, equipment, and environment. For facility managers, this requirement also helps to better advertise the facility and raise awareness of the facility.
    4. Notice:
       - Picture quality: Facility pictures should be of high quality so that users can better understand information such as the appearance, equipment and environment of the facility.
       - Image management: Image management should be provided so that administrators or staff can view and manage facility images.

#### 2.3.2 b) Display pricing list for facilities

* + 1. UI Components: Customer, Employee.
    2. Priority: Low.
    3. Description: This requirement allows users to view the price list of the facility in order to better understand the cost of using the facility and make more reasonable decisions.
    4. Notice:
       - Clear display: The interface should present the price list of the facility in a clear and easy to understand manner, including the facility's name, description, price and other information.
       - Update in real time: The facility price list should be updated in real time and ensure its accuracy and timeliness.
       - Price management: A price management function should be provided so that the administrator or staff can view and manage the prices of the facility.

#### 2.3.2 c) good security for user accounts and data

* + 1. UI Components: Customer, Employee.
    2. Priority: Medium.
    3. Description: This requirement provides users with security guarantee, allowing them operate the system and enjoy the happiness from exercising in a safe environment.
    4. Notice:
       - Password security: Require users to use strong passwords and periodically require users to update their passwords. Passwords should use high complexity combinations, including uppercase and lowercase letters, numbers, and symbols.
       - Two-factor authentication: Provide two-factor authentication to enhance the security of user accounts. For example, use mobile SMS, applications, or hardware keys for authentication.
       - Data encryption: Encrypt personal and payment information of users to protect the security of user data. Use secure socket layer (SSL) or other security protocols to encrypt data.
       - Secure storage: Store user data on secure servers and take necessary security measures such as firewalls, intrusion detection, and prevention systems.
       - Record security: Record user activity and periodically check and audit records to ensure the security of user accounts and data.
       - Security updates: Regularly update and maintain the application to correct potential security vulnerabilities and issues.

#### 2.3.2 d) Provide a responsive, mobile-friendly user interface

* + 1. UI Components: Customer.
    2. Priority: Medium.
    3. Description: The purpose of this requirement is to provide users with a responsive, mobile-friendly user interface. With this requirement, users can use the application on mobile devices and have the same user experience as on PC.
    4. Notice:
       - Responsive design: Using responsive design, the interface can be adapted to a variety of screen sizes and device types. Ensure that users can use the application on different devices and have the same user experience.
       - Image and Media Optimization: Optimize images, videos, and other media so that they load quickly on mobile networks and don't take up too much bandwidth.
       - Simplify navigation: Simplify navigation and menus so that users can easily use them on their mobile devices. Use simple ICONS and menus instead of complex text labels.
       - Design accessibility: Ensure that the app's interface and functionality are accessible to everyone, including people with disabilities. Use large fonts, high contrast, and easy-to-use buttons and menus to make the application accessible to everyone.

#### 2.3.2 e) Address issues of accessibility (color & font choices, etc.)

* + 1. UI Components: Customer, Employee, Manager.
    2. Priority: Medium.
    3. Description: The purpose of this requirement is to address the accessibility of the application to ensure that the application is accessible to all users, including people with disabilities.
    4. Notice:
       - Color Selection: Choose a high-contrast color scheme and ensure that the contrast between the text and background colors is high enough. Given that color-blind users may not be able to distinguish some colors, different colored text and backgrounds should be used instead of relying solely on color to convey information.
       - Font selection: Use an easy-to-read font such as Arial, Helvetica, or Verdana. The font size should be large enough so that the user can easily read the text without having to zoom in or out of the page.
       - Images and visual elements: For images and visual elements, textual descriptions and alternative texts should be provided so that users can understand what they represent. This is important for blind users and users of screen readers.
       - Video and audio: For video and audio content, captions and text descriptions should be provided so that all users can understand the content. This is very important for users with hearing and vision impairments.
       - Test and feedback: Test the accessibility of the application and accept user feedback. Through testing and feedback, designers can learn what users want and improve the accessibility of their applications.

## 2.4 Operating environment

* 1. Hardware platform: a server or PC based on x86 or ARM architecture.
  2. Operating system: Windows, Linux and MacOS.
  3. Supporting environment:

|  |  |
| --- | --- |
| Database | MySQL |
| Web Server | Apache |
| Server Management Tool | BaoTa Linux panel |
| Integrated Development Environment  (IDE) | WebStorm 2022.1.2  IntelliJ IDEA 2023.1  Visual Studio Code |

* 1. Third party component (Software):

|  |  |
| --- | --- |
| Payment | WeChat, Alipay, Official Bank Software |
| Email | QQ Mail, Gmail, etc. |

## 2.5 Design and Implementation Limitations

* 1. Minimum facilities of the sports stadium:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Facility | Swimming pool | Fitness Room | Squash Courts | Sports Hall |
| Quantity | 1 | 1 | 4 | 1 |
| Capacity | 32 | 25 | 4(each) | 20 |
| Activities | General use | General use | 1-hour sessions | 1-hour sessions |
| Lane swimming |  | Team events |  |
| Lessons |  |  |  |
| Team events |  |  |  |

* 1. Developing Method: Agile Development.

Agile development is an iterative, incremental, and flexible software development approach that emphasizes teamwork, rapid response to change, continuous delivery, and customer satisfaction. Here is a detailed introduction to agile development:

* 1. Iterative and incremental development: Agile development uses an iterative and incremental approach, dividing the development process into multiple small cycles, each of which contains one or more increments. At the end of each cycle, the team delivers a usable software version, allowing the customer to quickly see the product's progress and provide feedback.
  2. Teamwork: Agile development emphasizes cross-functional teamwork, including developers, testers, product managers, designers, and others. Team members should collaborate closely, work together to complete projects, and resolve issues promptly.
  3. Rapid response to change: Agile development believes that requirements and customer needs are constantly changing, so the team should respond quickly to changes, adjust project plans and development directions in a timely manner. This can be achieved through iterative development and continuous delivery.
  4. Continuous delivery: Agile development focuses on continuous delivery, meaning delivering usable software versions early and frequently. This helps customers provide feedback in a timely manner and adjust development directions and requirements.
  5. Customer satisfaction: Agile development emphasizes customer satisfaction, and the team should always pay attention to customer needs and feedback, and adjust development directions and requirements in a timely manner. Through continuous optimization and improvement, customer satisfaction can be increased, achieving the ultimate goal.

In conclusion, agile development is a flexible, iterative, and incremental software development approach that emphasizes teamwork, rapid response to change, continuous delivery, and customer satisfaction. By using methods such as iterative development, teamwork, rapid response to change, continuous delivery, and focusing on customer satisfaction, agile development can help teams better complete software development projects and improve software quality and customer satisfaction.

Agile development has the following advantages:

Faster delivery: Agile development uses iterative and incremental methods, delivering usable software versions at the end of each iteration, which can quickly respond to customer needs, shorten delivery cycles, and improve delivery efficiency.

Higher customer satisfaction: Agile development emphasizes customer needs and feedback, adjusts development directions and requirements in a timely manner, reduces unnecessary development work, and improves customer satisfaction.

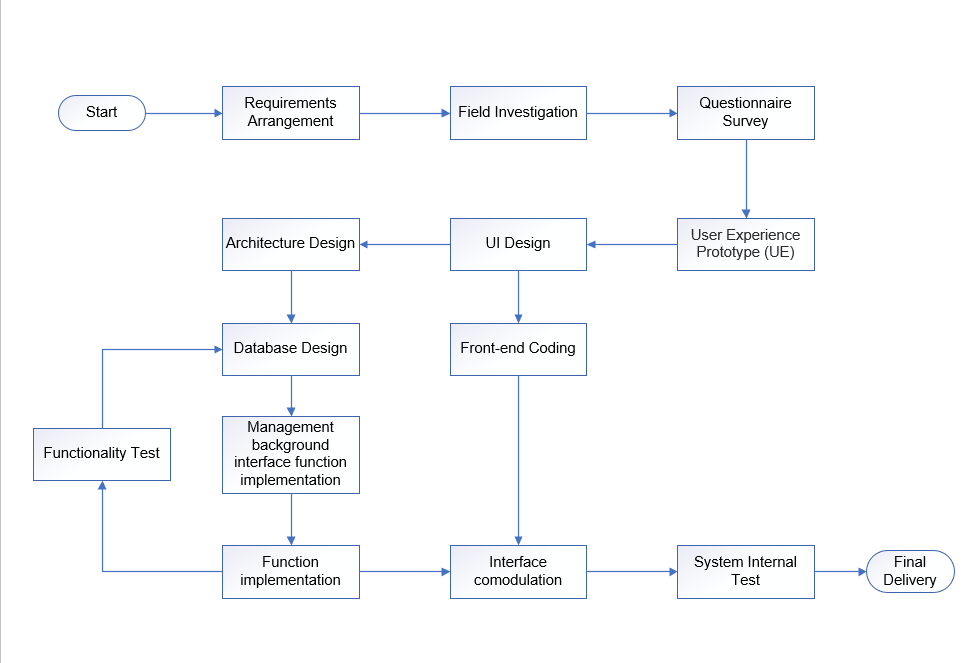
Better adaptation to change: Agile development believes that change is inevitable, and using iterative and incremental methods can quickly respond to change, adjust development directions and requirements in a timely manner, and ensure that software development meets customer needs.

Better teamwork: Agile development emphasizes cross-functional teamwork, which can promote communication and collaboration among team members, improve work efficiency and quality. In our development process, we performed a high quality of pair work, which saved much time for our team, significantly increasing the efficiency

Higher product quality: Agile development focuses on continuous integration, testing, and delivery, which can identify and fix software defects and issues in a timely manner, and improve software quality.

In summary, agile development can improve software development efficiency and quality by delivering faster, improving customer satisfaction, better adapting to change, promoting better teamwork, and achieving higher product quality. It can meet customer needs and improve team work efficiency and quality.

# Project Development Cycle



* Requirements Arrangement: Identify software development goals and requirements, including functionality, performance, user experience, security, and so on.
* Field Investigation: Field investigation of the scenarios involved in software development is carried out to understand the user requirements and current situation and provide reference for the subsequent design and development. For our team, we visited different kinds of gyms and sports venues and obtained much valuable information that played an enlightening role in our project design.
* Questionnaire Survey: Surveys are conducted online to collect users' requirements and feedback on software development and provide references for subsequent design and development. Our team perform online surveys before and during the development. The former one was to design services, the latter one was to collect data and feedback to improve our projects.
* User Experience Prototype (UE): A simplified but high-fidelity interactive model, can simulate a variety of product operation process, page layout, interaction effect, so that designers, developers, users can better understand the product design ideas and functional requirements.
* UI Design: UI design according to user experience prototype, including interface style, layout, color matching and so on.
* Front-end Coding: According to the UI design, write code to draw the corresponding website layout, and write the corresponding user operable interface and buttons according to the requirements.
* Architecture Design: According to the requirements and UI design, software architecture design, determine the overall structure and technical program of the software.
* Database Design: According to the requirements and architecture design, database design, determine the structure of the database and data table design.
* Management background interface function implementation: Realize the interface function of the management background, including login, permission management, data management and so on.
* Function implementation: According to the requirements and UI design, the realization of various functional modules, including front-end and back-end.
* Functionality Test: Following the principles of agile development, our team will put developed features to test immediately and separate testing from development to achieve higher standards
* Interface Comodulation: The front-end and back-end interfaces are coordinated to ensure the coordination and data consistency between modules.
* System Internal Test: System testing of developed software, including functional testing, performance testing, safety testing, etc., to ensure software quality and stability.