**Software Requirement Specifications**

**for**

Gym Reservation System

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### Revision history

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Date** | **Version** | **Comment** |
| Draft 1 | 02/28/2010 | 1.0 | Initial version |
| Draft 2 | 03/05/2010 | 1.5 | New Sections added |
| Draft 3 | 03/09/2010 | 2.0 | Updated and revise |
| Final Version | 05/16/2010 | 2.5 | Login case added |

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## 1. Introduction

### Purpose

This document describes the functional and nonfunctional requirement specifications of gym reservation system. These requirements represent our understanding of the system, basing on the interview with manager of sport facility and students. In later phases, such as system design, database design, implementation and testing, this document should be referred as a guide for the system.

### Intended audience

This document is aimed for the developers, project manager, and testers of the Gym Reservation System (GRS) since it focuses on the required functionality, analysis, and design of the system. Any information needed for marketing staff will be communicated by the development team. A user manual will eventually be provided along with the product for end users to familiarize themselves with the functionality of the GRS system.

* 1. Project Vision
     1. Vision Statements

Users who wish to exercise in any of KAIST sport facilities may reserve the court through our Gym Reservation System. The system is Web-based application that can accept user’s requests, list available time slots, process reservations, modification and cancellation to existing ones. Users do not have to personally go to manager of the gym in order to make the reservation, but only access GRS through any browser to book the time. By using GRS, users can save significant amount of their time.

* + 1. Main Features
* Update/add/delete facility (by administrator)
* Update/add/delete gym information (by manager of gym)
* Update/add/delete user reservation information (by manager of gym)
* Reservation inquiry for users by date and place
* Making reservation for court
* Reservation cancellation (by users)
* Frequent user login
  + 1. Project Scope

This project designs and implements GRS to fulfill all of the vision statements. Supported by database, we are planning to make every facility available for reservation to be accessed easily through a single point. A friendly user interface will be provided, so that various information of search criteria can be fetched from user and generate corresponding database search statements.

## 2. General Description

2.1 Project Perspective

GRS system is an Internet-based application executing on a Web server and connecting to databases. Besides the local server database, we are planning to integrate our system with KAIST Portal system.

###### 

**Administrator**

**User**

Search time

book court

response

manage

reservation information

updates

Student information

**Server Database**

**KAIST Database**

**Gym Manager**

View  
reservations

book court

response

Figure . Context Diagram of GRS

2.2 User Characteristics

|  |  |  |
| --- | --- | --- |
| Type | Description | Rights |
| User | A user is any member of KAIST, who uses GRS system to make reservation for court. | Able to make/modify/remove reservation |
| Manager of Gym | Every sport facility in KAIST has its own manager, by providing each manager an access to system; we can make it easier for them to manage their own gym. | Able to make/modify/remove any reservation in existing database |
| Administrator | Administrator’s responsibility is to manage back-end databases. | Adding new facilities to system. |

2.3 Constraints and Assumptions.

* On this stage, our system will be able to manage only gym in W2 building; in future system can be expanded to all sport facilities in KAIST that can be reserved.
* 1 reservation per student.
* Number of hours per reservation is 2 hours.
* System allows user reservation for next month from first day of current month.
* Manager of gym has schedule of events and courses.

2.4 User Documentation

Final release will be accompanied with a user manual to inform students how to use GRS system

System will be designed as friendly as possible

## 3. System Features and Requirements

### 3.1 The Key Points.

#### 3.1.1 The System is able to prevent cheating attempts monitored on the previous similar systems.

Fatal flow scenario: The existence of the defined time for the start of reservation period can let people to try using BOT programs for fast login and reservation.

Solution: User will be asked to enter an alpha-numeric input displayed as an image. Since simple BOT cannot have image recognition capabilities, this solution provides an efficient method for resolving the problem.

#### 3.1.2 The System has to decide on the priority for making the reservations among users.

Solution: The System follows FIFO principle. The first-come first-served principle is chosen.

This principle is fair and has no ambiguity.

#### 3.1.3 The System has to be able to handle concurrent reservation requests in one way or another.

Fatal flow scenario: Two or more users try to access the same time slot for making a reservation. The system doesn’t have a way to decide the priority to issue the reservation.

Solution: As soon as a time slot has been accessed by any user its status changes to “LOCKED”. No user can access a locked slot. Therefore, when a slot has the status “LOCKED” access is denied to any user. A user accessing locked slot gets pop-up notification for the slot being in use.

The scenario provided resolves the problem in an efficient way thanks to the requirement of any time slot for reservation being one or two hours decided prior to locking. Therefore, the System knows exactly which slots to lock.

#### 3.1.4 The System is able to keep track of violating activities done by users.

Violations: Violations are defined by the school and gym administration. This can include cases such as equipment getting broken by users, or violation of ethical norms etc.

Punishment: The users can be punished for their violations. The punishment shall be decided by the school and gym regulations.

User Tracking: The System keeps track of the violations in the existing log file. The log file includes entries for only the users who have done some violations. A user is added to the list in case he/she is proven to have done some violation.

Advantage: The main advantage of keeping record of violating user is for deciding later policies and measures to be taken against the user in case of any regulations being broken by the user.

#### 3.1.5 The System has to provide an easy and comfortable ways for managing the reservations (add, update, delete, and track).

Solution: GUI is provided for the user and manager of the gym. User can easily identify the empty slots and get information about the slots which are occupied already.

Adding a reservation for the empty slot is easy and has no ambiguity by using defined input format for information required for making a reservation.

GUI for the manager makes the update/delete/add actions for reservations easy and fast.

#### 3.1.6 The System should not be loaded by inactive users.

System Resources are limited, so we don’t allow a user to be logged in and be inactive.

A user who is inactive more than 5 minutes is kicked out of the website and his session is closed.

Advantages: Allows the System to manage System Resources more efficiently.

Our solution prevents a time slot from being in a locked state for a long time by kicking out the user who is inactive for more than 5 minutes.

### 3.2 User Requirements

#### 3.2.1 Login/log-out

User is able to login using his Portal ID and Password.

#### 3.2.2 Reservation related

##### 3.2.2.1 Making reservation

3.2.2.1.1 Users will make reservation by principle first come, first serve. While one user is entering reservation information, “Status” field in database will be updated as “Locked”, so other users can not access to same time slot.

3.2.2.1.2 If more than one student wants to apply for same time slot, system will provide waiting list.

3.2.2.1.3 The user must complete all steps to make a reservation; in i.e. process will have a step to ensure that reservation is not made by bot to prevent system from cheating.

##### 3.2.2.2 Removing reservation

User is able to remove his reservations through “My Reservation” page.

##### 3.2.2.3 Modifying reservation

User can only modify information about his reservation, but he cannot modify date and time.

##### 3.2.2.4 View own reservations

Users can view their own reservations on “My Reservation” page and print Confirm form.

##### 3.2.2.5 Browse reservations

Users or manager should be able to inquire information about reservations by specifying date and place in a graphical-tabular-like format.

### 3.3 Manager Requirements

#### 3.3.1 Reservation related

3.3.1.1 Making reservation

System should allow manager to make reservation for any month.

3.3.1.2 Removing reservation

If manager removes student’s reservation, system should send notification to user.

3.3.1.3 Modifying reservation

Manager can modify any reservations if necessary.

### 3.4 Administrator Requirements

3.4.1 Administrator can specify new facility in a system, i.e. he can add or modify new gym to the system. It can be achieved through modularization, so that system can be easily expanded.

### 3.5 Performance Requirements

3.5. 1 System should handle approximately 400 users during the peak usage time from 9 am to 12 pm.

### 3.6 Other Requirements

3.6. 1 System will be available in 2 languages: English and Korean

## 4. Use Cases

### 4.1 Description

This section lists use cases for Gym Reservation System (GRS). Use cases and primary actors for the system are following.

|  |  |
| --- | --- |
| Primary Actor | Use Cases |
| User (KAIST members; students, faculties, staffs) | 1. Place reservation 2. Change reservation information 3. Cancel reservation 4. View others’ reservation information |
| Administrator | 1. Update/Add/Delete gym reservations |

### 

Figure . Use Case Diagram.

### 4.2 Login Use case

|  |  |  |  |
| --- | --- | --- | --- |
| Use Case ID: | 1 | | |
| Use Case Name: | User is able to login/logout | | |
| Created By: | Viktor Shin | Last Updated By: | Viktor Shin |
| Date Created: | 05/17/2010 | Date Last Updated: | 05/17/2010 |
| Actors: | User | | |
| Description: | Users who logged in SRS can browse all the reservation information. | | |
| Preconditions: | User is registered to the system and has ID and Password | | |
| Post conditions: |  | | |
| Normal Flow: | 1. User goes to main page. 2. User enters user ID and password 3. System Verifies ID and password 4. Systems create new session variables 5. User presses logout button 6. System goes to main page | | |
| Alternative Flows: | None | | |
| Exceptions: | None | | |
| Includes: | None | | |
| Priority: | High | | |
| Frequency of Use: | 5 times per user for a month on average | | |
| Special Requirements: | None | | |
| Assumptions: | None | | |
| Notes and Issues: | None | | |

### 4.3 Reservation Use case

|  |  |  |  |
| --- | --- | --- | --- |
| Use Case ID: | 2 | | |
| Use Case Name: | Place reservation | | |
| Created By: | Yeongju Kim | Last Updated By: | Viktor Shin |
| Date Created: | 03/07/2010 | Date Last Updated: | 03/09/2010 |
| Actors: | User | | |
| Description: | A user accesses the GRS from the Internet and places reservation. | | |
| Preconditions: | User is logged in the system with a portal ID/password. | | |
| Post conditions: | Modified database has been saved. | | |
| Normal Flow: | Making reservation   1. User selects a month and a date on which the user wants to make a reservation. 2. System displays a table of time slots for the date which differentiates available slots and reserved slots. 3. User selects start time for reservation. As assumed, duration is 2 hours. 4. Database of status of the slot is updated as ‘locked’ in order to make sure the user who came first is entering information for the reservation. 5. User enters some information such as group name, number of members, and phone number. 6. User clicks Confirm button. 7. System displays overall information of the slot. 8. User checks the information and clicks Confirm button. 9. The reservation is placed and database of status of the slot is updated as ‘reserved’. 10. System redirects to ‘My reservation’ page and displays overall information of the reservation. 11. User clicks Print button to print out the information sheet. | | |
| Alternative Flows: | **1.1 Click a locked/reserved slot** (branch after step 4)  7. An error message states that some user is accessing/has reserved the slot.  8. Return to step 3.  **1.2 5 minutes passed during step 5~10**.  1. Database of status of the slot is updated as ‘free’.  2. An error message states that the time is run out.  3. Return to step 3. | | |
| Exceptions: | None | | |
| Includes: | None | | |
| Priority: | High | | |
| Frequency of Use: | Approximately 300 users, average of one usage at the first day of a month. | | |
| Special Requirements: | 1. User can place reservation for current month and next month only. 2. User shall be able to cancel/modify the reservation at any time prior to confirming the reservation. 3. User who has placed a reservation of some month cannot make any more reservation of the month. | | |
| Notes and Issues: | 1. Database checking is important just after step 4 because the system should identify whether the slot has been already set to locked/reserved before the access or the user has another reservation on that month.  2. The information sheet is used to certificate the specified user has the right to use the gym at the specified time. | | |

### 

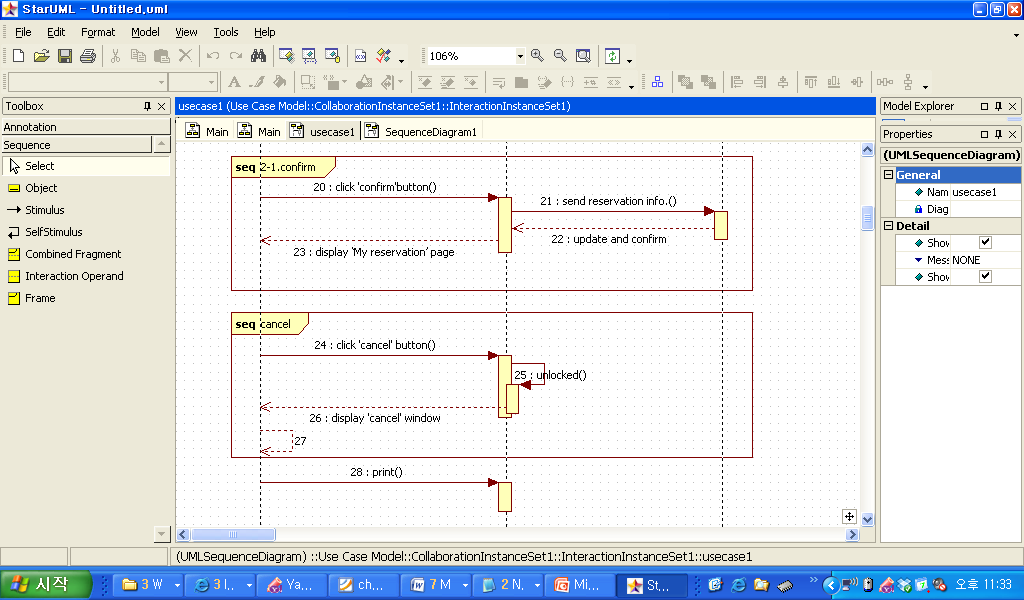
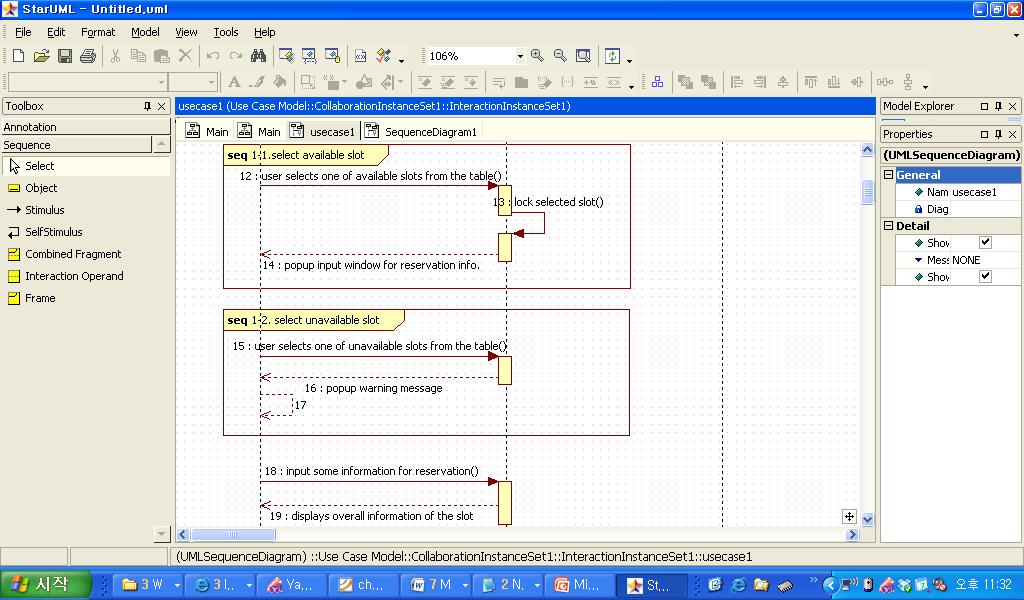


Figure . Making reservation Swim Lane Diagram.

### 4.4 Change or Cancellation Use Case

|  |  |  |  |
| --- | --- | --- | --- |
| Use Case ID: | 3,4 | | |
| Use Case Name: | User change or cancel reservation | | |
| Created By: | Yeongju Kim | Last Updated By: | Yeongju Kim |
| Date Created: | 03/07/2010 | Date Last Updated: | 03/07/2010 |
| Actors: | User | | |
| Description: | Users who have reservations in GRS should be able to modify or cancel the reservation. | | |
| Preconditions: | User is logged into GRS | | |
| Post conditions: | Modified database has been saved. | | |
| Normal Flow: | **2.0 Reservation modification or cancellation**   1. User goes to ‘My reservation’ page. 2. System displays the reservations of current month and next month, if any. 3. User chooses one of the reservations to modify or cancel. 4. User confirms desire to do modification or cancellation. 5. System asks User to confirm his or her decision. 6. System sends corresponding update information to the database of slot information. | | |
| Alternative Flows: | None | | |
| Exceptions: | None | | |
| Includes: | None | | |
| Priority: | High | | |
| Frequency of Use: | Once per user on average | | |
| Special Requirements: | 1. User cannot change the date and the time of the reservation. | | |
| Assumptions: | None | | |
| Notes and Issues: | None | | |

### 4.5 View others’ reservation information

|  |  |  |  |
| --- | --- | --- | --- |
| Use Case ID: | 5 | | |
| Use Case Name: | User views others’ reservation information | | |
| Created By: | Yeongju Kim | Last Updated By: | Viktor Shin |
| Date Created: | 03/07/2010 | Date Last Updated: | 03/09/2010 |
| Actors: | User | | |
| Description: | Users who logged in SRS can browse all the reservation information. | | |
| Preconditions: | User is logged into GRS | | |
| Post conditions: |  | | |
| Normal Flow: | **3.0 View others’ reservation information**   1. System displays a calendar of a month. 2. User selects a month and a date on which the user wants to browse. 3. System displays a table of time slots for the date which differentiates available slots and reserved slots. 4. User selects one of reserved slots from the table. 5. System displays the information of the slot such as charger, group name, number of members, and phone number. 6. User can click Print button and print out the information sheet. | | |
| Alternative Flows: | None | | |
| Exceptions: | None | | |
| Includes: | None | | |
| Priority: | High | | |
| Frequency of Use: | 5 times per user for a month on average | | |
| Special Requirements: | None | | |
| Assumptions: | None | | |
| Notes and Issues: | None | | |

### 4.6 Administrative Use Case

|  |  |  |  |
| --- | --- | --- | --- |
| Use Case ID: | 6 | | |
| Use Case Name: | Update/Add/Delete gym reservations | | |
| Created By: | Yeongju Kim | Last Updated By: | Yeongju Kim |
| Date Created: | 03/07/2010 | Date Last Updated: | 03/07/2010 |
| Actors: | Manager | | |
| Description: | The manager may Update/Add/Delete gym reservations in special cases. School events are reserved through this function in advance. | | |
| Preconditions: | The manager is logged in with manager’s ID. | | |
| Post conditions: | Modified database has been saved. | | |
| Normal Flow: | **4.0 Update/Add/Delete user reservations**   1. Manager goes to ‘Reservation’ page. 2. System lists all the slots, clicking on any slot opens pop-up window. 3. Manager Update/Add/Delete the reservations. 4. If the change is about user reservations, send notification to users by e-mail. | | |
| Alternative Flows: | None | | |
| Exceptions: | None | | |
| Includes: | None | | |
| Priority: | High | | |
| Frequency of Use: | Approximately 20 times per year for specific school events | | |
| Special Requirements: | 1. Administrator can access any slot at any time.  2. Slots reserved through administrator’s ‘My reservation’ page is highlighted in order to notice it is a school event. | | |
| Assumptions: | None | | |
| Notes and Issues: | 1. Overriding users’ reservations is not recommended, unless any cheating or error is occurred. | | |

## Database Design

### Entity Relationship Diagram

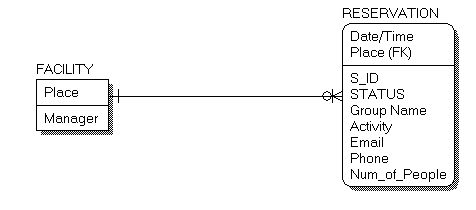


Figure . ER Diagram

### 5.2 Entity Description

As it can be seen from the ER diagram, there are two entities. The First Entity “FACILITY” as it follows from its name stands for the different gyms and stadiums on campus. The Second Entity “RESERVATION” stands for the actual reservations made in one of the available gyms.

The relationship among the entities is one-to-many relationship. This means that for any instance of FACILITY entity there might be zero, one, or more than one instances of “RESERVATION” entity.

### 5.3 Table description:

5.3.1 FACILITY

The table has two attributes: Place and Manager.

Place: refers to the item that can be reserved for a period of time. Therefore it might be a single gym or stadium, or some part of a big sports complex. All reservations are identified by the place, so Place attribute is PRIMARY KEY.

Manager: attribute refers to the manager of the gym, since every gym or stadium has a manager. Two or more gyms might have same manager, for this reason Manager attribute is not included in KEY.

#### 5.3.2 RESERVATION

Date/Time: refers to the date and time the reservation is made. It specifies the starting time of the reservation period, since each reservation lasts for a limited period of time.

Place: Same as in FACILITY table, but here it’s not a unique attribute. The reason is that there might be many reservations for a single facility.

Date/Time and Place attributes together make the PRIMARY KEY in the RESERVATION table, because the date and time together with place uniquely identify a reservation.

S\_ID: refers to the Student ID of the student who has made the particular reservation.

Status: refers to the status of the reservation slot. It might be ‘reserved’, ‘locked’, or ‘free’. Locked here means that someone is currently trying to make a reservation for the slot, and it’s not available for the rest of the users.

Group Name: specifies the group name of people organizing the activity for the time of the reservation.

Activity: specifies the activity of the people for the time of the reservation.

Email: the email address of the person who has reserved the slot, used for contacting in case of change of reservation status or other reasons.

Phone: the phone number of the person who has reserved the slot, used for contacting in case of change of reservation status or other reasons.

Num\_of\_People: specifies the number of people involved in the activity during the reserved period of time. This information is needed for other students to view and see if there is any free space in the gym for the time when reservation is made.

## 6. GUI

### 6.1 User Interface

#### 6.1.1 Reservation Page

Figure . Reservation Page for User

#### 6.1.2 Pop-up Window

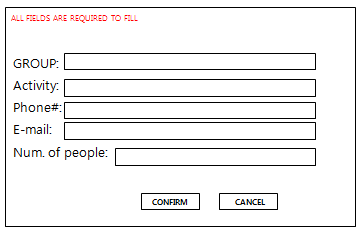


Figure . Pop-window for filling information (User Interface)

### 6.2 Manager Interface

#### 6.2.1 Reservation Page

Figure . Reservation Page for Manager

#### 6.2.2 Pop-up Window

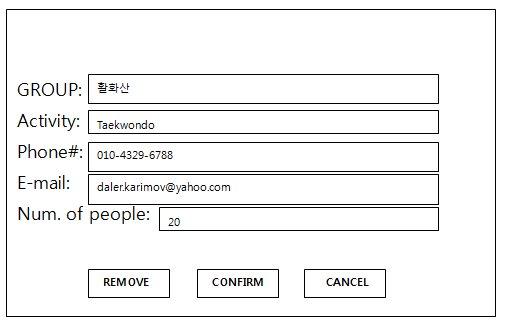


Figure . Pop-window for modifying. (Manager interface)

Authorship

|  |  |
| --- | --- |
| Description | Person in Charge |
| Functional Requirements | Viktor Shin |
| Uses Cases | Yeongju Kim |
| Entity Relationship diagram | Rashad Aliyev |
| Use Case Diagram, System Overview | Hangil Kim |
| GUI | Daler Karimov |
| Others | Guillaume Reveillere |

### Glossary

|  |  |
| --- | --- |
| **Expression** | **Meaning** |
| GRS | Gym Reservation System (this project) |
| FR | Functional Requirement |
| Reservation | One or two  adjacent time slot |
| time slot or slot (§ 3.1.5 and various places) | The indivisible interval of time for the system. It is set to 1 hour An user can reserve two adjacent slot. |
| Cancel reservation (§ 3.1.5) | The reservation is canceled, the user can do another reservation and the time slot becomes free |
| Modify reservation  (§4.2) | Updating information such as phone number, email address… |
| Update/Add/Delete reservation  (by manager) | Basically modifying any time slot: takes priority over any other mean such as a student reservation |
| Month (various places) | January, February…  Not an interval of time. The day of the start of the month is defined by the manager. By default it is the first. |
| Browse (§4.2) | Display this day information |
| ER diagram (§5) | Entity Relationship diagram |
| facility (§5) | A gym |

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