RMS^2
Room Management and Scheduling System

REQUIREMENT SPECIFICATIONS

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RMS² -- Requirement Specifications

1. Introduction

1.1. Purpose of the System
The system provides a flexible software package for room scheduling, which will be distributed and used for various events in organizations of different sizes.

1.2. Scope of the System
RMS² is a program that allows the management of room scheduling in organizations of different sizes such as convention centers, academic institutions, hotels, etc. It may be used by a variety of people, with different privileges and different levels of access. For the initial implementation, the system will be intended for a single-machine, but its design will allow for maximum portability onto an interactive webpage.

1.3. Objectives and Success Criteria
1.3.1. Produce a complete and working system that will run on a local network.
1.3.2. The system should provide a convenient and reliable way for different users to book rooms on-site.
1.3.3. The system will provide a reliable and detailed search that will satisfy all necessary room query needs.
1.3.4. The system will provide alternative suggestions in case of booking conflicts.

1.4. Definitions
1.4.1. *Room* – a space within a building or other structure, defined by certain attributes, which is occupied or available for booking.
1.4.2. *Attributes* – characteristics of a room defined by the operator when initially setting up the rooms for booking, e.g. capacity, price, nickname, etc.
1.4.3. *Booking* – reserving one or multiple rooms for a future event.
1.4.4. *Event* – The reason why the room is booked for that specific time, e.g. conference, anniversary, reception, bar mitzvah, etc.
1.4.5. *Timetables* – Detailed listing of room bookings set up by the system in a chronological table (week-by-week basis).
1.4.6. *Guest* – A non-registered user of the system that can only search rooms and view limited information regarding the bookings.
1.4.7. *Regular User* – A registered user of the system that is like a guest, but can also book rooms.
1.4.8. *Operator* – An on-site employee with tools for room management and booking modification.
1.4.9. *Administrator* – A managerial employee with tools for viewing billing/invoice information and handling financial aspects of room bookings.

1.4.10. *Login* – A screen prompting a user for username and password for *wider access to the system.

1.4.11. *Location* – the complete address of a particular room (Ex: 4545 Maisonneuve, 4th floor, room 67).

1.4.12. *Unique name* – a unique word or group of words identifying a specific room.

1.5. References

1.5.1. RMS^2 client description (handed in on 20/09/2006)

1.5.2. Meeting with the client (see meeting minutes attached)

1.5.3. *Object Oriented Software Engineering: Using UM, Patterns and Java, 2nd Edition*, Bernd Bruegge & Allen H. Dutoit

1.6. Overview

RMS^2 will allow clients to optimize room allocation and scheduling to manage various events, such as conferences, meetings and courses, without conflicts. The software will allow users to view timetable reports and calendars, and request room assignments. A user friendly interface will allow for a variety of users, from occasional users who need a room for a small meeting to professional users who need to schedule academic courses. Operators of the system will be permitted to add, remove, and edit information about each room. Administrators can manage the different users of the system and authorize a line of credit to particular users.

2. Systems Overview

2.1. Current
The users must call the client and reserve rooms, communicating directly with an on-site employee by phone or e-mail for all their booking needs. This is quite time consuming and costly, and an automated system would effectively eliminate these issues.

2.2. Proposed
The users will be able to interact with a user-friendly computer-based system which will present them with several options. By implementing such a system, the interaction with on-site employees will be kept to a minimum, and ultimately the client saves time and money by having less people on staff taking care of tedious booking tasks.

3. **Functional Requirements**

   3.1. Inputs *(All input will be keyboard/mouse based commands)*
      3.1.1. *Login Screen [4, 1]*
         3.1.1.1. Username field (for registered users) [4, 1]
         3.1.1.2. Password field (for registered users) [4, 1]
         3.1.1.3. Continue as guest button [3, 1]
      3.1.2. *User Main Screen [4, 2]*
         3.1.2.1. View Schedule button [4, 1]
         3.1.2.2. Search Room button [4, 4]
         3.1.2.3. Book button (locked for guests) [4, 4]
      3.1.3. *Schedule Screen [4, 2]*
         3.1.3.1. Date field (DD/MM/YYYY) [4, 1]
         3.1.3.2. Back 1 week button [3, 2]
         3.1.3.3. Forward 1 week button [3, 2]
      3.1.4. *Search Room Screen [4, 2]*
         3.1.4.1. Date field (DD/MM/YYYY) [3, 1]
         3.1.4.2. Calendar button (the user can click on the day) [3, 1]
         3.1.4.3. Room capacity field [4, 1]
         3.1.4.4. Optional attributes in checkboxes or lists [3, 1]
         3.1.4.5. Search/Cancel buttons [3, 1]
      3.1.5. *Booking Screen [4, 2]*
         3.1.5.1. Credit card/Line of credit options [4, 2]
         3.1.5.2. Credit card number field and expiration date fields [4, 1]
         3.1.5.3. Define event type field [4, 1]
         3.1.5.4. Email list field [4, 2]
         3.1.5.5. Confirm/Cancel buttons [4, 1]
      3.1.6. *Forgotten Password Screen [3, 1]*
         3.1.6.1. Answer field (to the 'hint' question) [3, 1]
      3.1.7. *Operator Main Screen [4, 2]*
         3.1.7.1. Add/ Room button [4, 2]
         3.1.7.2. Delete/Suspend Room button [4, 2]
         3.1.7.3. Edit Room Attributes button [4, 2]
         3.1.7.4. See **3.1.2.** for all user options [4, 2]
      3.1.8. *Add Room Screen [4, 2]*
         3.1.8.1. Input fields for: [4, 1]
            3.1.8.1.1. Location
            3.1.8.1.2. Room type
            3.1.8.1.3. Capacity
            3.1.8.1.4. Unique Name
            3.1.8.1.5. Price
         3.1.8.2. Checkboxes/Additional details for optional attributes: [4, 2]
            3.1.8.2.1. Multimedia Equipment
            3.1.8.2.2. Video-conferencing equipment
            3.1.8.2.3. Auxiliary Equipment
            3.1.8.2.4. Presentation platform

3.1.8.2.5. Food permitted

3.1.8.3. Confirm/Cancel options

3.1.9. *Delete/Suspend Room Screen [4, 2]*

3.1.9.1. List of all rooms (with option to select rooms) [4, 2]

3.1.9.2. Search option (by various attributes) [4, 4]

3.1.9.3. Delete/Suspend selected rooms button [4, 2]

3.1.9.4. Cancel button [4, 1]

3.1.10. *Edit Room Screen [4, 2]*

3.1.10.1. Same setup as in **3.1.8.** except, all previous definitions will also be displayed

3.1.10.2. Added option of canceling a booking [4, 2]

3.1.11. *Administrator Main Screen [4, 2]*

3.1.11.1. List of all users and operators(with option to select users) [4, 1]

3.1.11.2. Add Operator/Administrator option [4, 2]

3.1.11.3. View/Edit User Account option (including line of credit option) [4, 2]

3.1.11.4. Edit User Privileges option [4, 3]

3.1.11.5. See **3.1.2.** for all user specific options and **3.1.7.** for all operator specific options

3.1.12. *Add Operator/Administrator Screen [4, 2]*

Administrator can add an operator or administrator here. User ID and password are essential, but there will also be the option to limit access or options (if desired).

3.1.13. *Edit User Account Screen [4, 2]*

Administrator will have the option to view and edit a selected user's account here. This includes editing the account balance and creating or removing a line of credit.

3.1.14. *Edit User Privileges Screen [4, 3]*

Administrator will be able to limit the options and information available to a selected user. This includes editing user prices for the various rooms (in case certain users are offered discounts).

3.2. Outputs

3.2.1. *Timetables [4, 2]*

3.2.1.1. Billing/invoice information requested by the administrator [4, 2]

3.2.1.2. Weekly schedules requested by the regular users and operators [3, 1]

3.2.2. *Search results [4, 3]*

3.2.2.1. Presented in a lightly detailed list (name, capacity, price), where all of the room details can be viewed by selecting one of the rooms [4, 2]

3.2.2.2. List can be sorted, by clicking/selecting a certain attribute (it will be sorted based on the selected attribute) [4, 2]

3.2.2.3. Alternative suggestions for room bookings may also be presented (in the case where no suitable matches are found) [4, 3]

3.2.3. *Room Details Screen [3, 2]*

Basic room details will be presented along with all the information present on additional attributes, such as multimedia equipment. (Information may be limited by the administrator. See **3.1.13**)

3.2.4. *Booking history [3, 2]*

3.2.4.1. Presents a list of past and currently booked rooms with all relevant information, including account balance (line of credit) [3, 1]

3.2.4.2. List may also be sorted as in **3.2.2.2.** [3, 2]

3.2.5. *Help Screen [4, 2]*

Available at all times for consultation and contains additional information on how to navigate the system and the client's contact information

3.3. Event flow

3.3.1. *Login Screen* [4, 1]

3.3.1.1. User prompted for valid username and password [4, 1]

3.3.1.2. Search through the database for validity of the above [4, 2]

3.3.1.2.1. If found, proceed to **3.3.2.**

3.3.1.2.2. If not found, return to **3.3.1.** to retry login or go to **3.1.6.** to retrieve forgotten password

3.3.1.3. For operator and/or administrator, available only on-site for security purposes [4, 1]

3.3.1.3.1. Requires a username and password

3.3.2. *Main Screen* [4, 2]

3.3.2.1. If the person is a <u>guest</u>, then he has three choices:

3.3.2.1.1. View schedule [4, 2]

3.3.2.1.2. Search for available rooms [4, 3]

3.3.2.1.3. To book a room, he is prompted to become a registered user, by going to **3.3.3.,** or contact the operator [3, 1]

3.3.2.2. If the person is a <u>regular user</u>, he has four choices:

3.3.2.2.1. View schedule [4, 2]

3.3.2.2.2. Search for available rooms [4, 3]

3.3.2.2.3. Book a room [4, 2]

3.3.2.2.4. View room booking history [3, 1]

3.3.2.3. If the person is an <u>operator</u>, he has the following choices:

3.3.2.3.1. Add/delete/suspend rooms [4, 2] (suspend is equivalent to removing a room for a specific amount of time, i.e. renovations)

3.3.2.3.2. Add/remove/modify room attributes and bookings (bookings can only be removed in exceptional cases) [4, 2]

3.3.2.4. If the person is an <u>administrator</u>, he has the following choices:

3.3.2.4.1. Add operators [4, 1]

3.3.2.4.2. Edit User Privileges (including deleting users in extreme cases) [4, 2]

3.3.2.4.3. View/Edit User Accounts [4, 2]

3.3.3. *Registration* [4, 1]

> To successfully become a registered user of the system, the following must happen:

3.3.3.1. User provides unique username & password [4, 1]

3.3.3.2. System verifies if the previous is valid [4, 2]

3.3.3.3. Once approved, the user is asked to provide mandatory personal information [4, 1]

> **3.3.3.3.1.** Full name

> **3.3.3.3.2.** Valid credit card number for credit verification and future payments

3.3.3.4. User can provide optional information [3, 1]

> **3.3.3.4.1.** Personal address

> **3.3.3.4.2.** Phone number(s)

> **3.3.3.4.3.** Email address to receive booking updates

3.3.4. *View Schedule* [4, 2]

> The user is prompted to enter a date and is presented with a weekly timetable of room bookings. He has the following options:

3.3.4.1. Moving the weeks backwards and forwards [3, 1]

3.3.4.2. Selecting one of the rooms to see all its attributes [3, 2]

> Information regarding the current booker is confidential; therefore it is only viewable by the operators, administrator, and booker

3.3.5. *Search rooms* [4, 2]

3.3.5.1. User is prompted to fill out two mandatory criteria [4, 1]

> **3.3.5.1.1.** Date of event or range of date

> **3.3.5.1.2.** Desired room capacity

3.3.5.2. User can also fill out optional fields to focus the search [3, 1]

> **3.3.5.2.1.** Price range

> **3.3.5.2.2.** Assign priorities to some or all fields

> **3.3.5.2.3.** A/V equipment, dance floor (checkboxes)

> **3.3.5.2.4.** Type of room (conference, auditorium, hall) (list)

3.3.5.3. When the "Search" button is pressed, two things can happen:

> **3.3.5.3.1.** <u>Exact match(es):</u> a list of the convenient rooms is displayed, sorted by ascending price. The user can then select the desired room and book it. [4, 2]

> **3.3.5.3.2.** <u>No matches found:</u> there are two options:

>> **3.3.5.3.2.1.** User goes back and does another search [4, 1]

>> **3.3.5.3.2.2.** User gets alternatives from the system as described in **3.3.6.** [4, 3]

3.3.6. *Alternative Rooms* [4, 3]

> The system recommends alternate rooms based on the user's priorities based on **3.3.5.2.2**. For example, if the user does not mind paying more for a similar room, then price would be a low priority, but if a capacity of 200 minimum is all-important, then capacity should be set to high.

3.3.7. *Booking History* [3, 2]

> If the user has never booked a room before, the booking history will be empty. Otherwise, as mentioned in **3.2.3.**, the user will be able to

navigate a list of all the rooms he has booked. These rooms can be sorted in many ways, such as chronologically or by capacity.

3.3.8. *Booking Procedure* [4, 2]

When the user is ready to book a room, he must follow these procedures:

3.3.8.1. Choose a method of payment, credit card or line of credit (if available) [4, 1]

3.3.8.2. User defines the type of event [4, 1]

3.3.8.3. As an option, user can provide a distribution list of emails for the people attending the event [4, 2]

3.3.8.4. Confirm/Cancel the transaction [4, 2]

3.4. Maintenance and support activities (Services provided to the user)

3.4.1. There is a help screen for the user as explained in section **3.2.4.**

3.4.2. A backup of the database will be done on a fixed interval determined by the operator and upon request from the operator. [4, 3]

3.5. Initialization of the system

3.5.1. The system will automatically connect to the database. [4, 2]

3.5.2. The login screen will be presented. [4, 1]

3.6. Description of the user interface

Simple to use, window-based layout of information

3.6.1. *Search Rooms*

3.6.2. *Login Screen*

3.6.3. *Booking Screen*

4. <u>Non-functional requirements (and constraints)</u>

4.1. Usability [4, 2]
4.1.1. The user interface, will be similar to present-day online retail websites [3, 1]
4.1.2. Navigation through the site should be easy and intuitive. [4, 2]
4.1.3. The software will be packaged with efficient documentation, and users will have access to a *Help* menu from within the system. [4, 2]

4.2. Reliability [4, 2]
4.2.1. The system must be available and respond reliably 99.9% of the time. [4, 3]
4.2.2. In the event of a failure, access to the system database will be locked and only the system operator will be able to unlock/or restart the system. [4, 1]
4.2.3. The system should be extremely robust and prevent any data loss. [4, 2]
4.2.4. Strong access limitations will prevent other users and operators from viewing private information of others. These access privileges will be reserved for the administrator. [4, 1]
4.2.5. The system will backup the database over user-defined time intervals. [3, 2]

4.3. Performance [4, 3]
4.3.1. The user will experience latency for response of less than 1 second on most screens and menus, 99.9% of the time. [4, 3]
4.3.2. For all searches, the latency will be at most 5 seconds. [4, 2]
4.3.3. On all room queries, the latency will be at most 10 seconds. [4, 3]

4.4. Adaptability [3, 2]
4.4.1. The system can be easily adapted to work with different databases and operating systems. [3, 2]
4.4.2. The operators will be able to add new types of rooms and events, and are free to edit all room attributes (allowing to system to be adapted to a variety of organizations). [4, 1]
4.4.3. Regular user access can be controlled (and limited when required) through the administrator or the operator interface. [3, 1]

4.5. Security [4, 1]
4.5.1. Only authorized users can access booking sub-menus/tools. [4, 1]
4.5.2. Only operators can access booking and room management sub-menus/tools. [4, 1]
4.5.3. Only administrators can access user and financing sub-menus/tools. [4, 1]

4.6. Maintainability [4, 1]
4.6.1. RMS² shall provide updates and fixes when known bugs are found. [4, 1]
4.6.2. The fixes mentioned above shall be available on the RMS² website in the form of self-installing patches.[4, 1]

4.6.3. When new technologies or demands appear, RMS^2 will be expanded to meet these new requirements. [3, 2]

4.7. Portability [3, 2]

4.7.1. *Software Portability*

4.7.1.1. RMS^2 may be transported to any operating system able to run Java and support the database of choice. [3, 3]

4.7.2. *Hardware Portability*

4.7.2.1. <u>Initially:</u>

4.7.2.1.1. RMS^2 should be operational on a stable Intel based or similar machine capable of running at least Java. [4, 1]

4.7.2.1.2. RMS^2 will be completely functional and stable on a single machine [4, 1]

4.7.2.2. <u>Future:</u>

4.7.2.2.1. RMS^2 may be transported to any other hardware system if the system meets the following conditions: [2, 3]

4.7.2.2.1.1. Runs a stable operating system.

4.7.2.2.1.2. The operating system must have the ability to display graphical user interfaces.

4.7.2.2.1.3. The operating system must be able to run at least Java 1.5.

4.7.2.2.2. RMS^2 will be setup as a web-based service, where users can log in on line and book rooms in the required organization. [4, 3]

4.7.2.3. RMS^2 shall only run normally if all the basic conditions in **4.7.2.2.1.** are met. [4, 1]

4.8. Pseudo Requirements

4.8.1. *Implementation*
RMS^2 will work on a stable system meeting the conditions set forth in **4.7.2.2.** [4, 1]

4.8.2. *Interface*
There is no legacy system support; the system will only function on up-to-date computers. [3, 1]

4.8.3. *Packaging*
RMS^2 will be shipped with an installation CD, along with the manual [4, 1]

4.8.4. *Legal*
RMS^2 will adhere to all Canadian laws and regulations. [4, 1]

5. **Glossary (every time an un-defined word is used in the document, define here)**

   5.1. *Username* — A unique user-defined ID used for login purposes.
   5.2. *Password* — A user-defined identifier, unique to a username, used for login purposes.
   5.3. *Multi-booking* — Action of reserving a room for an extended period of time, or multiple rooms at once.
   5.4. *Database* — Medium used to store the information about the users, the rooms, and events.
   5.5. *Backup* — It is the action of making another copy of the database for security purposes.
   5.6. *Search* — Any request made for room schedules, including requests for time-table reports, and sorting based on room-attributes.
   5.7. *Room Query* — A more specific request to the system, to look for suitable matches based on user-defined conditions, when booking(searching) a room. This includes alternative suggestions provided by the system.