CS4400 Database Project
Fall Semester 2015
Version 1.1
Fancyhotel.com

Look at the last page for edits made for each version

Please read the entire description of the project before starting to work on it.

Purpose of the Project

Analyze, specify, design, implement, document and demonstrate an online system for hotel reservations at fancyhotel.com. You are required to use the Classical Methodology for Database Development. The system should be implemented using a relational DBMS that supports standard SQL queries. Class administrators will provide you with information about how to access a college-managed MySQL server in order to implement your database and the application. The professors must approve any other alternative implementations. ***In no circumstances can you use a tool that automatically generates SQL or automatically maps programming objects into the database. You also cannot use any other software like Access.***

Project Phases

The three phases of the project cover the following work-processes from the Classical Methodology for Database Development (see notes on T-square under resources). Slides on database design methodology will be useful for phases I and II: These slides have been posted on t-square.

Phase		Due Date
I	Analysis & Specification	Oct 1 (Thurs)
II	Logical Database Design	Nov 3 (Tues)
III	Implementation & Testing	Dec 1 (Tues)
	Demonstrations	Dec 2 to Dec 4

Groups

Project groups may have 3 or 4 members. Groups of more than 4 or less than 3 will **NOT** be allowed. You are allowed to form groups across the two sections (A & B) of the class.

A group may remove a member from further participation in the group when Phase I is turned in or when Phase II is turned in. A written notification with a proper justification must be provided to the professor and the head TA at that time in hard-copy form.

Deliverables

Phase I (Soft copy and hard copy)

The deliverables include:

1. A cover page listing all members in the team with their respective sections and email addresses and T-square username.
2. Enhanced Entity Relationship (EER) Diagram
3. Information Flow Diagram
4. A list of logical constraints that will be enforced. Do not include any constraints that can be shown in the ER diagram, but rather semantic, business logic related constraints. You are required to include at least three constraints, although a fully-specified system will probably have more than that. Constraints that can be specified directly using ER notation will not count toward the three required. Constraints related to data type are not accepted as constraints.
5. Any assumptions made with explanations.

Notes:

1. The EER must capture the constraints of the system as much as possible whenever applicable, i.e. total participation, super/sub class, weak entities.
2. The design of your system must satisfy all the constraints. You are allowed to make up additional assumptions and constraints as long as they do not conflict with the specified constraints and requirements. If possible, those additional assumptions and constraints should be included in the ER diagram.

You must turn in a hard copy of your report in class/TA office hours. One hard copy should be turned in for the entire group, although each group member should upload a soft copy on t-square individually. Group numbers will be assigned to the groups after they are declared in Phase 1. **For all subsequent submissions, please note down your Group Number clearly on anything you record or submit.**

Phase II (Soft copy and hard copy)

1. Cover Page with group number and group member names.
2. Copy of the ER Diagram (either from phase I (with any revisions) or from the solution provided)
3. Copy of the Information Flow Diagram from phase I (either from phase I (with any revisions) or from the solution provided)
4. Relational Schema Diagram (with primary and foreign keys identified, referential integrity is shown by arrows)
5. Create Table statements, including domain constraints, integrity constraints, primary keys, and foreign keys.

Phase III (Soft copy and hard copy)

1. SQL statements for each task (*follow the template in the phase II design methodology*)

   Notes: A set of SQL statements may be required in order to complete one task. However, in such cases, the last SQL statement should show the output according to the specification. Views and nested queries may be used to support the tasks. A nested query can be broken down into views to make the query more readable.

2. Prior to the demo, the TAs will give guidelines for populating the database with data. The database has to be populated with this data set prior to the demo. **5% will be deducted from the grade otherwise.**

   Implement a working application with all functionality described in this document. For light-weight, you will implement the SQL queries individually and demonstrate them one by one. Your source code should be uploaded on t-square by the deadline.

Deliverables for Phase 3:

When the deadline for Phase 3 occurs (midnight of Dec 1st), you will be uploading the SQL query text file and all your code on T-square as instructed.

1. Bring your laptop for the demo.

Heavyweight option:

The heavy weight option requires you to develop the entire application as a stand-alone application including the front end, menu options and the control flow.

2. Make sure you have a text file (soft copy) with all your SQL queries. (This is just in case your implementation doesn't work.)
   You must include a cove page with the group number assigned to you and the group members' names.
3. Working functional application with embedded SQL statements that accesses your database (This is your actual application.)

Lightweight option:

The lightweight option requires you to do the SQL queries and statements to accomplish each task independently.

2. Make sure you have a text file (soft copy) with all your SQL queries.

Grading

The project will consist of three phases (deliverables) as well as a final demonstration to the TA.

Phase I and Phase II of the project are each worth 10% credit.

Phase III (20% for heavy-weight or 10% credit for light-weight, depending on option):

Heavy Weight Option (20 %): The students would be required to use the embedded SQL feature of MySQL which allows you to embed SQL statements in a

Java program or web application. (You can use whatever programming language you are comfortable with)
Light Weight option (10%): The students would be required to demo the SQL queries on the MySQL console. Those who do the light weight option would be required to take the Final exam.
Final Exam (10%): This would be only taken by students who have opted for the lightweight phase III. Under no circumstances would a heavy weight option student be allowed to take the Final.

Note that the declaration whether the team is doing heavy-weight project or light-weight project is announced only at the time of the demo. You need NOT declare that ahead of time.

FancyHotel.com

FancyHotel.com is an online hotel reservation platform which allows the customers to make a reservation in any of the five locations – Atlanta, Charlotte, Savannah, Orlando, or Miami. The customers can use this online system to either make a reservation, update the dates of an existing reservation, cancel a reservation or provide a review about the hotel. The online system can also be accessed by managers for viewing reports of different kinds but nothing else.

NOTE: This system does not cater to anything that relates to an actual stay at the hotel. It just helps customers' make/update/cancel reservations online. We are also assuming that customers are making reservations for specific room numbers in designated hotels (which is a bit of a departure from normal practice). These things are done to simplify the task you have to perform to implement this application.

The following sections contain a functional description of the system along with some mockup screens. Each section would explain a particular functionality and then present an example screen about it. You don't have to follow the UI designs shown exactly; it is rather encouraged that you come up with your own design whenever possible. A complete reorganization of the user interface is permissible as long as your application supports all the functionality listed below. The sections have been grouped by customer's functionalities and management's functionalities.

You may implement the project as a traditional standalone application (e.g., using Java GUIs) or as a web application (e.g., using a web scripting language like PHP). **There is no restriction on the choice of language.**

CUSTOMER FUNCTIONALITIES

1. Logging In

Figure 1 shows the login screen.

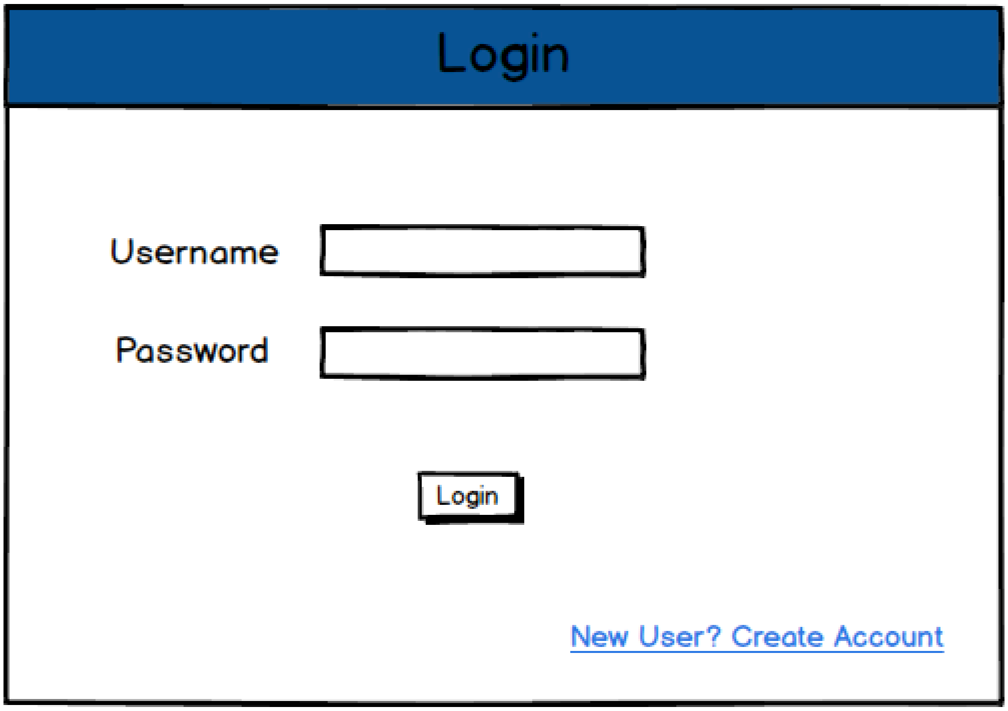


Figure 1: Login

There are two kind of users of the system – customers and management. All users are identified by their username. A valid Username and Password combination is required to use the system. If the user provides invalid login credentials then the system should throw an error message to the user.

2. Create Account

A new user needs to register before using the system. The management already has credentials created behind the scene. Clicking on 'Create Account' link on the login screen displays the new user registration screen as shown in Figure 2.

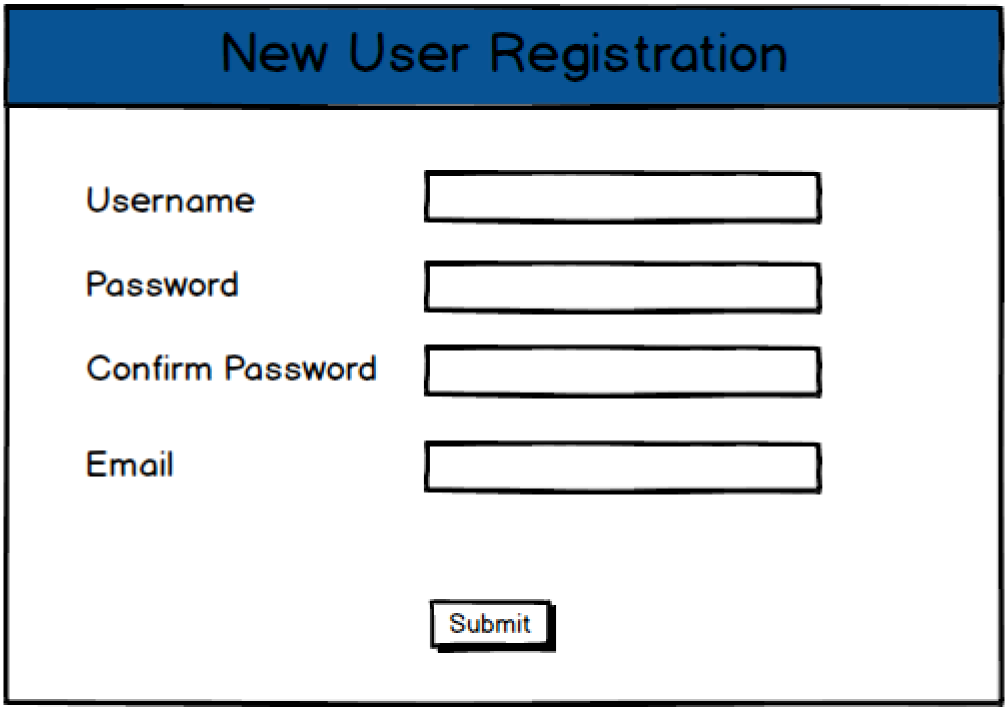


Figure 2: New User Registration

After the user clicks Submit, the system should verify that all fields are filled and that the username is not already registered, that the Password and Confirm Password fields are same, and that the email is valid. In case any of these validations fail, an appropriate error message should be displayed for the user.

3. Choose functionality

The user (existing or new) should be taken to a screen which lists out the different functionalities for him (we will use 'him'/'he' from here onwards to represent the user without any intended bias).

Figure 3 shows a mockup screen.

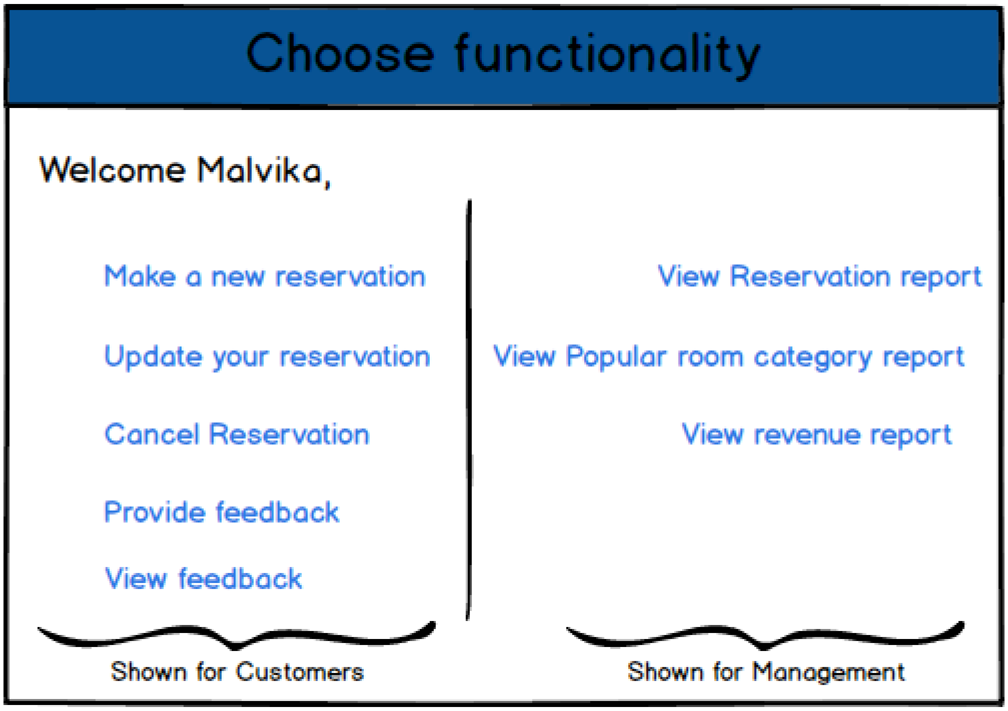


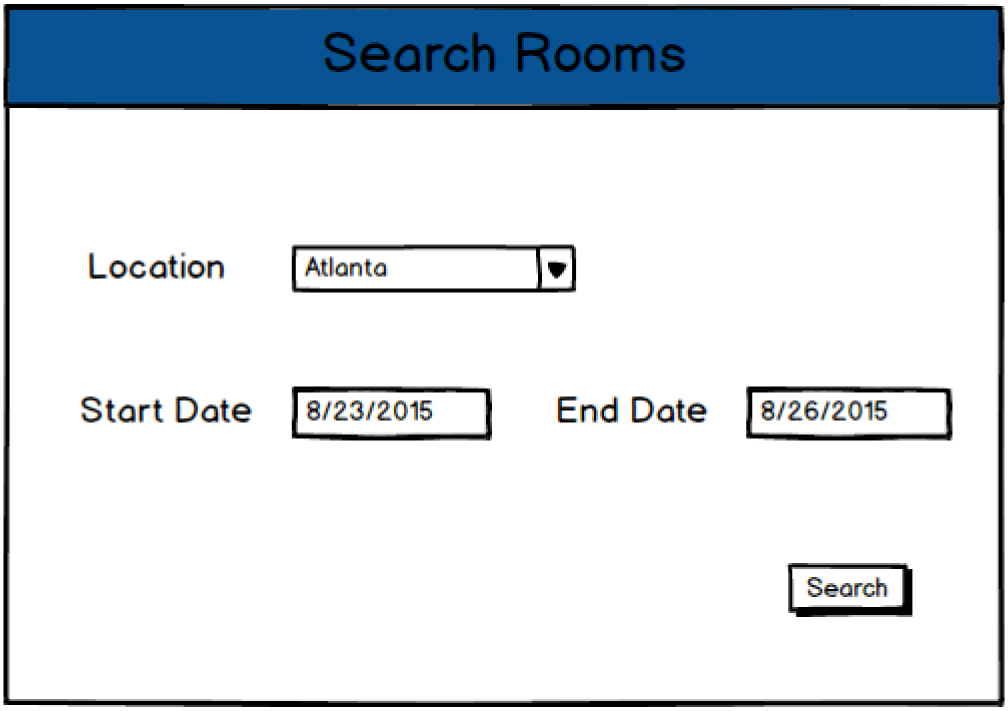
Figure 3: Select functionality

After the user selects a functionality, he should be taken to the next appropriate screen.

4. Find Rooms

If the user wants to make a reservation, he should be directed to this screen first where he could search for rooms.

Figure 4 shows a mockup.



Location Atlanta

Start Date 8/23/2015 End Date 8/26/2015

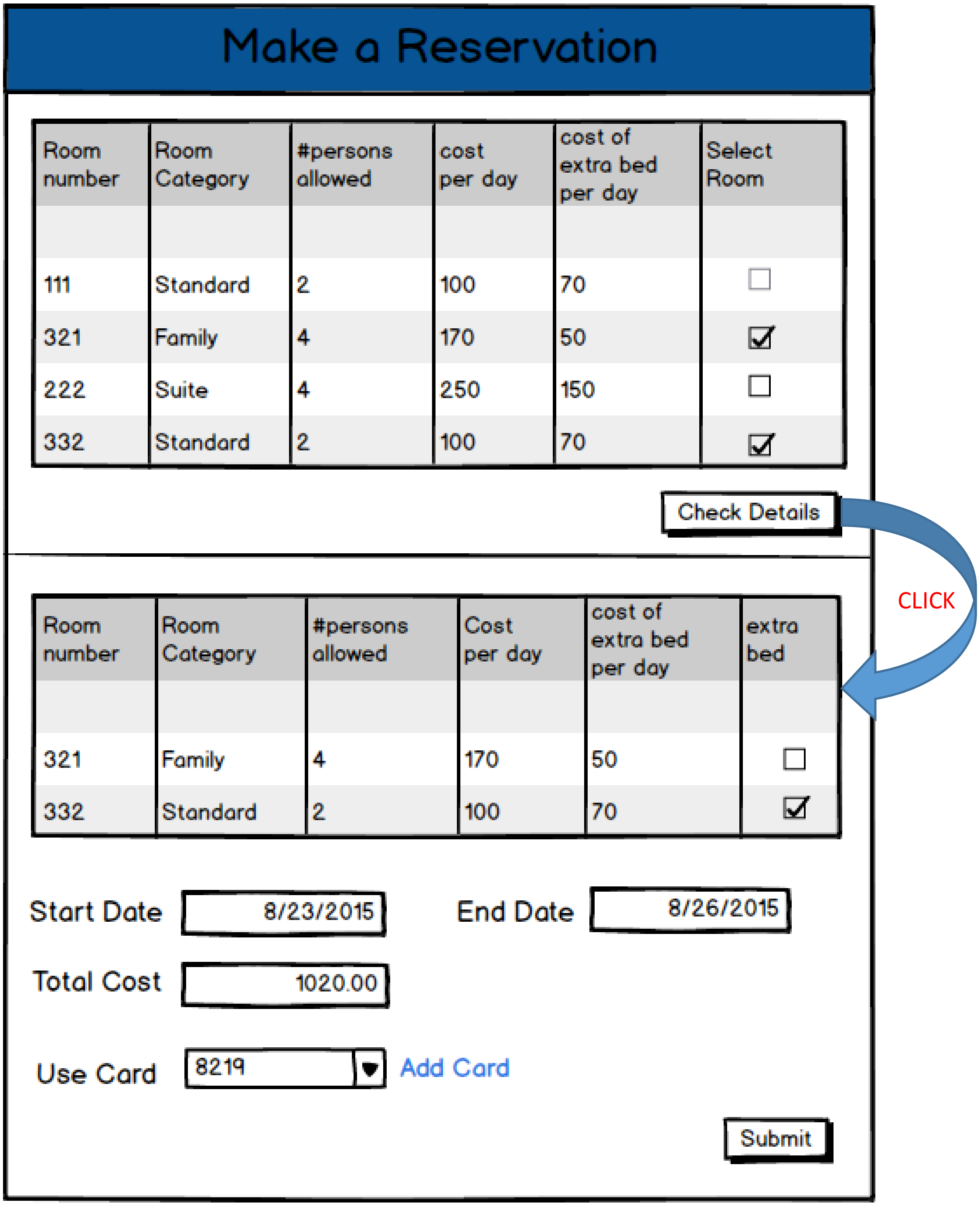
Figure 4: Search rooms

The location should be a dropdown with 5 locations – Atlanta, Charlotte, Savannah, Orlando and Miami. After he enters his search criteria, he should be shown the list of rooms available and satisfying his search criteria as shown on the next screen. The dates cannot be dates in the past.

5. Make a Reservation

After the search is completed, the list of **available** rooms fitting the customer's search criteria is listed on the screen with all the room details – Room Number, Room Category, Number of people allowed in the room, Cost of the room per day, cost per extra bed per day.

Figure 5 shows a mockup. (You don't have to follow the same design, you can break it into multiple screens if you wish. Remember these screens are just to help you get a better idea of the system)



Room number	Room Category	#persons allowed	cost per day	cost of extra bed per day	Select Room
111	Standard	2	100	70	□
321	Family	4	170	50	☑
222	Suite	4	250	150	□
332	Standard	2	100	70	☑

Room number	Room Category	#persons allowed	Cost per day	cost of extra bed per day	extra bed
321	Family	4	170	50	□
332	Standard	2	100	70	☑

Start Date 8/23/2015 End Date 8/26/2015

Total Cost 1020.00

Use Card 8219

Figure 5: Make Reservation

When the customer clicks on ‘Check Details’ the lower half of the screen becomes visible to the customer with all details. Depending on if the extra bed is chosen, the total cost is then calculated and displayed on the screen.

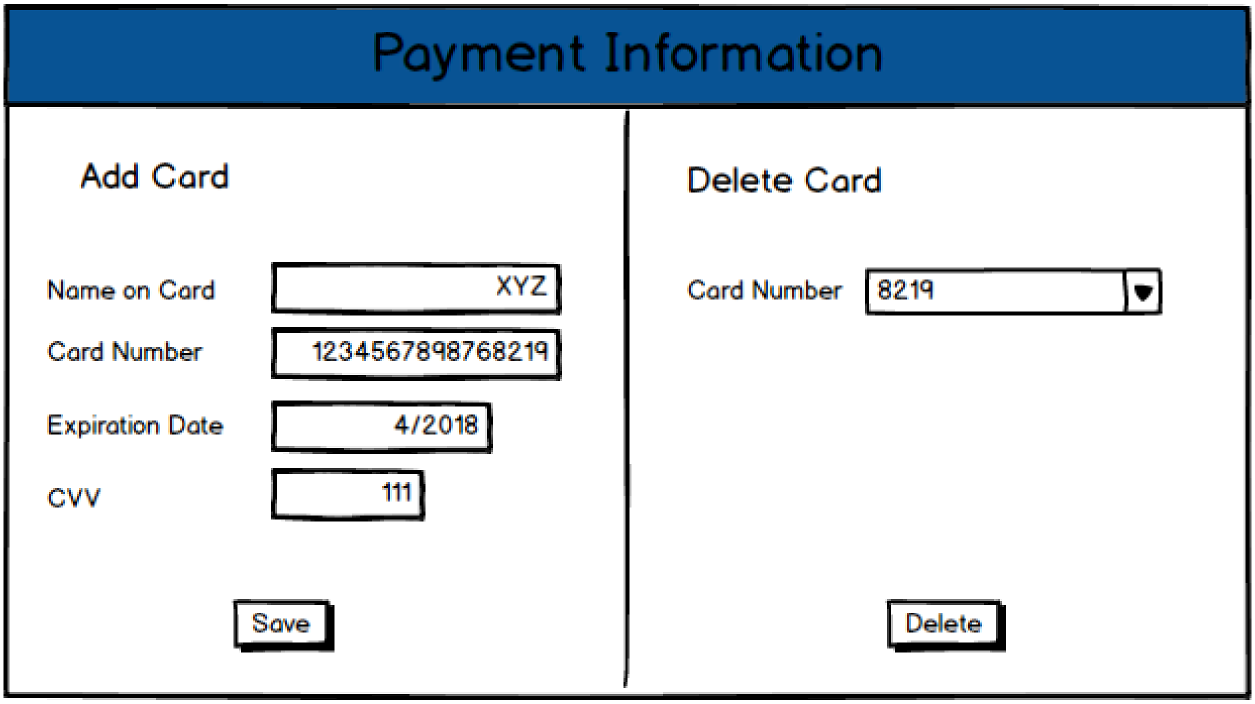
Note that any person above the age of 5 years is considered as an adult and is counted towards number of beds required. Check-in time is 12 noon for all reservations, and check-out time is 11:55 am on the checkout date. No more than reserved beds (in room and extra) are allowed at any cost.

Each room has the following attributes – Room number, location(any of the 5 locations), category (Standard – can accommodate 2, Family – can accommodate 4 people, Suite – can accommodate 4 people), number of maximum people allowed in the room, cost of room per day, cost of each extra bed per day. **Each room only allows one extra bed**. The cost of the extra bed can be different for different room categories.

6. Payment Information

After ‘Submit’ from Figure 5 and Figure 6, the customer should be taken to the Payment screen. If he doesn’t have Credit Card details already stored then he should be asked to save that information first and then pay using the stored card. A resident can add multiple cards in the system. He can also delete information about cards from the system. Remember he cannot make a reservation unless he has added information about at least one card. And he can use only one card for transactions for a particular reservation. Also, he cannot delete a card if it is being used in a transaction which hasn’t ended yet (i.e. the end-date has not passed yet).

Figure 6 shows a mockup.



Name on Card: XYZ

Card Number: 1234567898768219

Expiration Date: 4/2018

CVV: 111

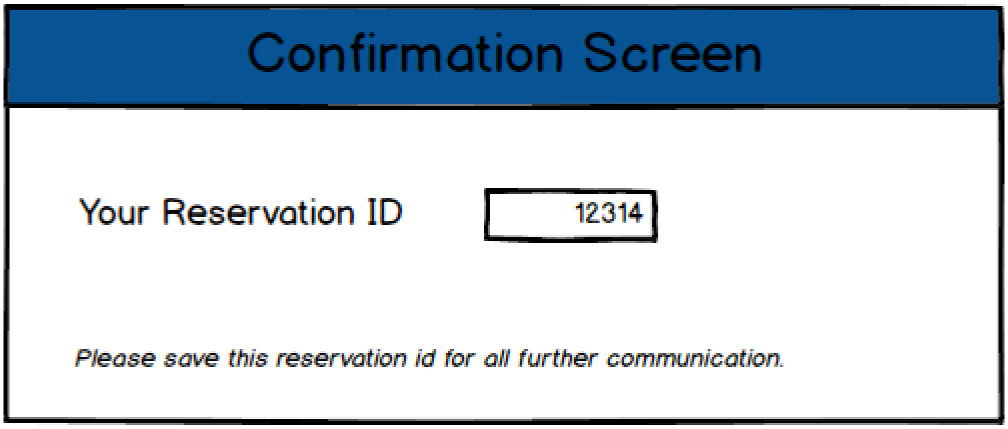
Card Number: 8219

Figure 6: Payment Information

You can either show the last 4 digits of the card to be deleted or the complete card number.

7. **Confirmation Screen**

After a reservation is made, a reservation ID is generated for the customer. The confirmation screen should show him the reservation ID.



Your Reservation ID: 12314

Please save this reservation id for all further communication.

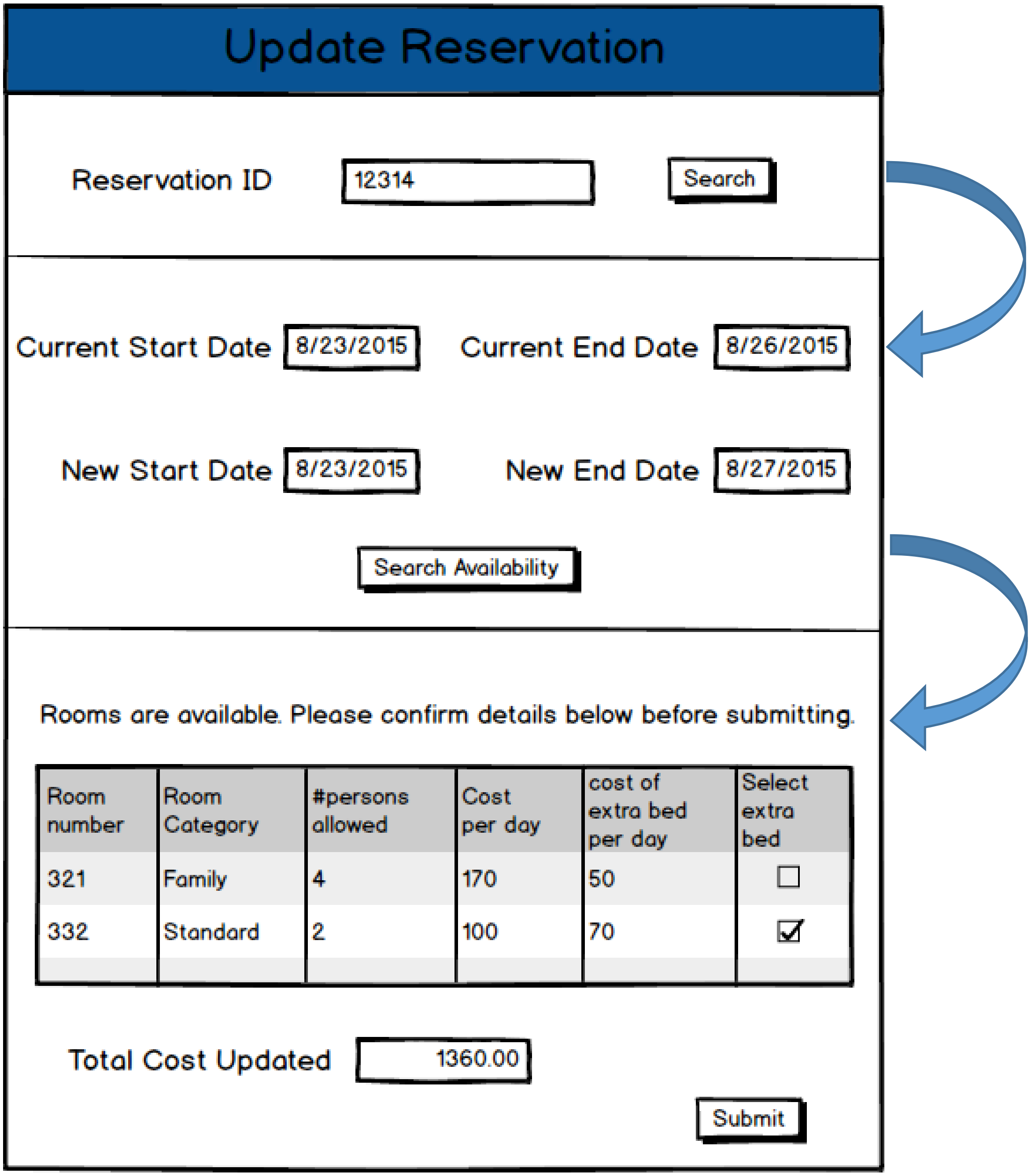
Figure 7: Confirmation of reservation

8. Update Reservation

Updating a reservation is allowed only in terms of the dates of stay. This system is not capable of updating anything else.

The update is only allowed if the same rooms that were originally reserved are available for the new dates of stay, otherwise an appropriate message is shown to the user asking him to cancel and make a new reservation for the new period of stay. The period of reservation cannot include dates in the past.

Figure 6 shows a mockup.



Update Reservation

Reservation ID 12314 Search

Current Start Date 8/23/2015 Current End Date 8/26/2015

New Start Date 8/23/2015 New End Date 8/27/2015

Search Availability

Rooms are available. Please confirm details below before submitting.

Room number	Room Category	#persons allowed	Cost per day	cost of extra bed per day	Select extra bed
321	Family	4	170	50	□
332	Standard	2	100	70	☑

Total Cost Updated 1360.00

Submit

Figure 8: Update Reservation

Remember nothing else except the dates of stay can be changed. The total cost is then recalculated for the new days of stay and updated on the screen. The new stay period is checked for availability and the update is accepted only after availability is confirmed.

Again, this is just a mockup screen, you are allowed to redesign it in your way.

9. Cancel Reservation

A customer can use this functionality to cancel a previously made reservation. The cancellation charges are calculated as follows – For any cancellation made one day before the start date - the customer is not refunded anything. For any cancellations made within 3 day window with respect to the start date - 20% of total reservation cost is forfeited and the rest 80% refunded to the customer. If the cancellation is made earlier than 3 days before the start date - full 100% refund is given.

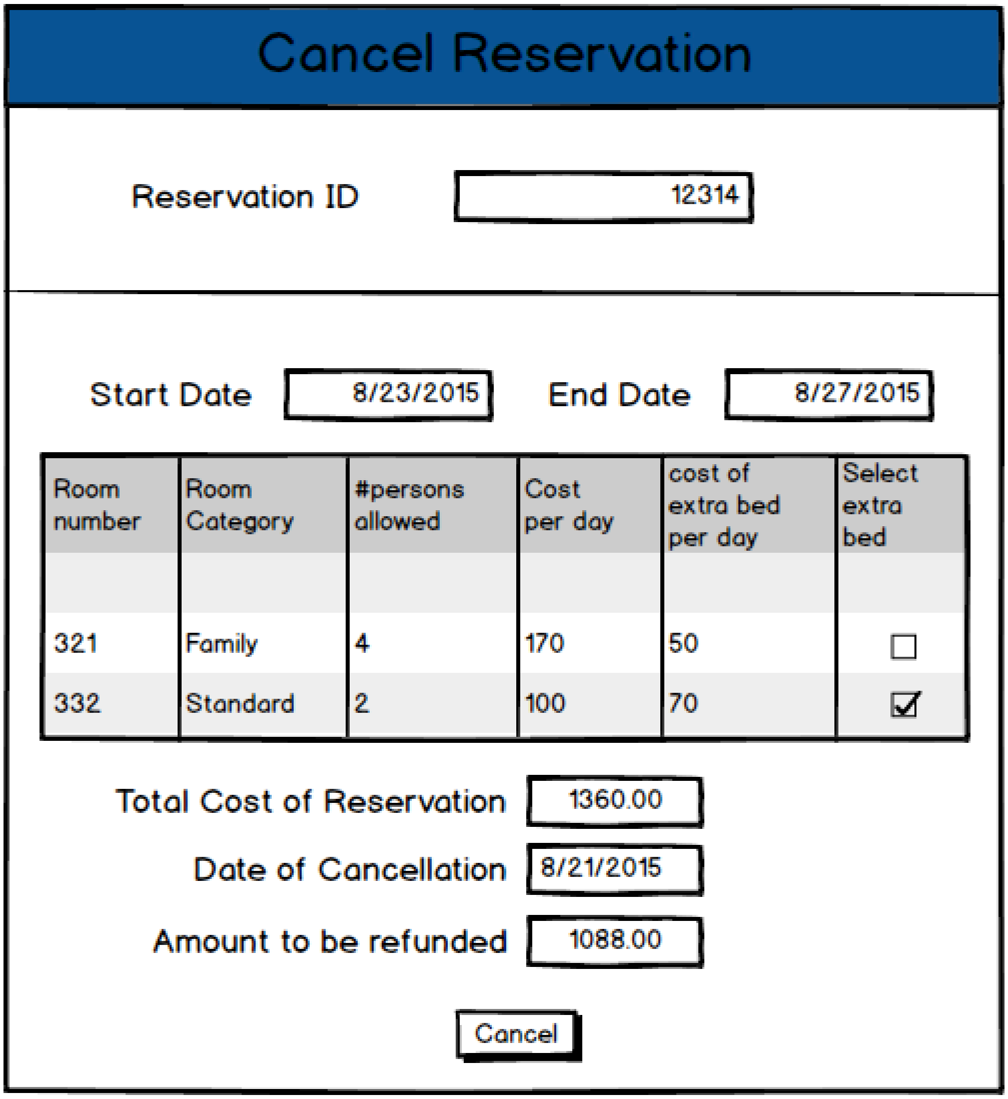
For e.g. for the reservation starting 9/23/2015:

If a customer cancels any time on 8/22/2015 or 8/23/2015 – no refund is given.

If he cancels on 8/20/2015 or 8/21/2015 – he gets 80% of the amount refunded.

If he cancels on 8/19/2015 – 100% amount is refunded.

Cancelled reservations are flagged appropriately in the system.



Cancel Reservation

Reservation ID: 12314

Start Date: 8/23/2015 End Date: 8/27/2015

Room number	Room Category	#persons allowed	Cost per day	cost of extra bed per day	Select extra bed
321	Family	4	170	50	☐
332	Standard	2	100	70	☑

Total Cost of Reservation: 1360.00

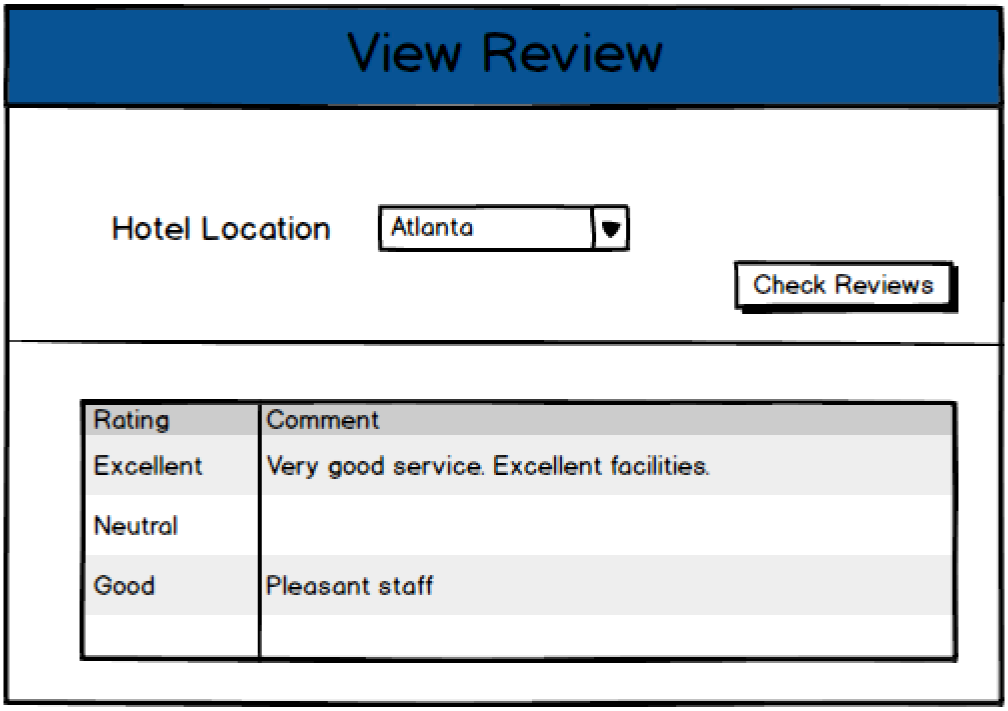
Date of Cancellation: 8/21/2015

Amount to be refunded: 1088.00

Figure 9: Cancel Reservation

10. View Hotel Review

A customer can also view reviews given by other customers about their stay in the hotel.



Hotel Location: Atlanta

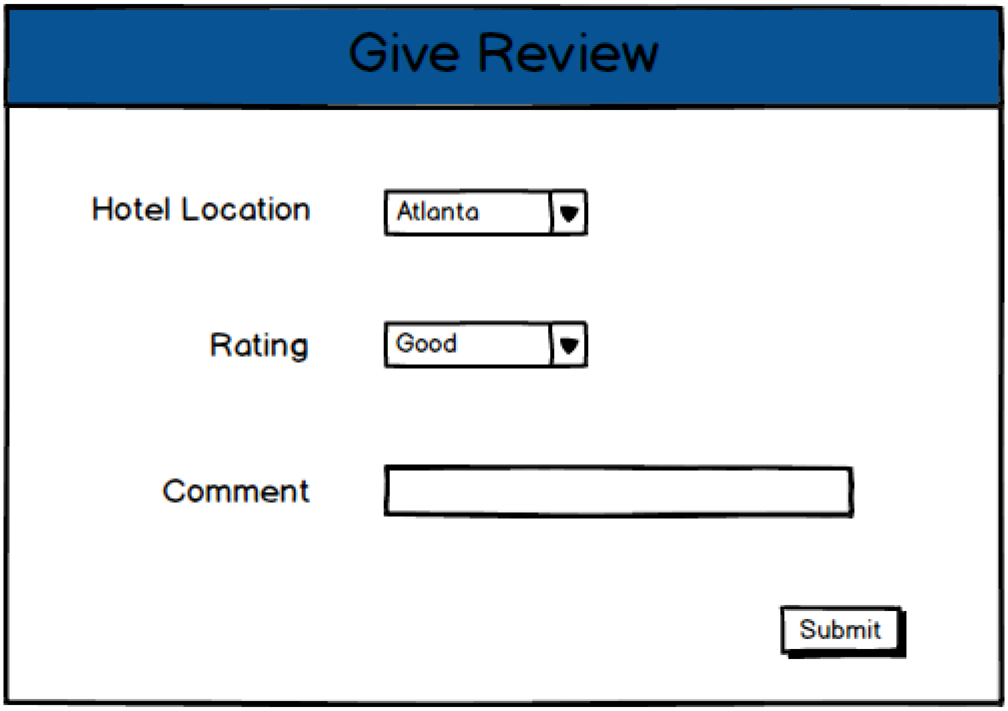
Rating	Comment
Excellent	Very good service. Excellent facilities.
Neutral	
Good	Pleasant staff

Figure 10: View hotel reviews

A customer can view reviews about any location. Once 'Check Reviews' is clicked, the bottom half of the screen would show the reviews stored in the system.

11. Provide Review

All customers can provide hotel reviews. We will assume here that all customers will only provide review after their stay, there is no check needed for the same.



Give Review

Hotel Location: Atlanta

Rating: Good

Comment:

Figure 11: Give review

The Rating field should be a dropdown with values – Excellent, Good, Bad, Very Bad, and Neutral.

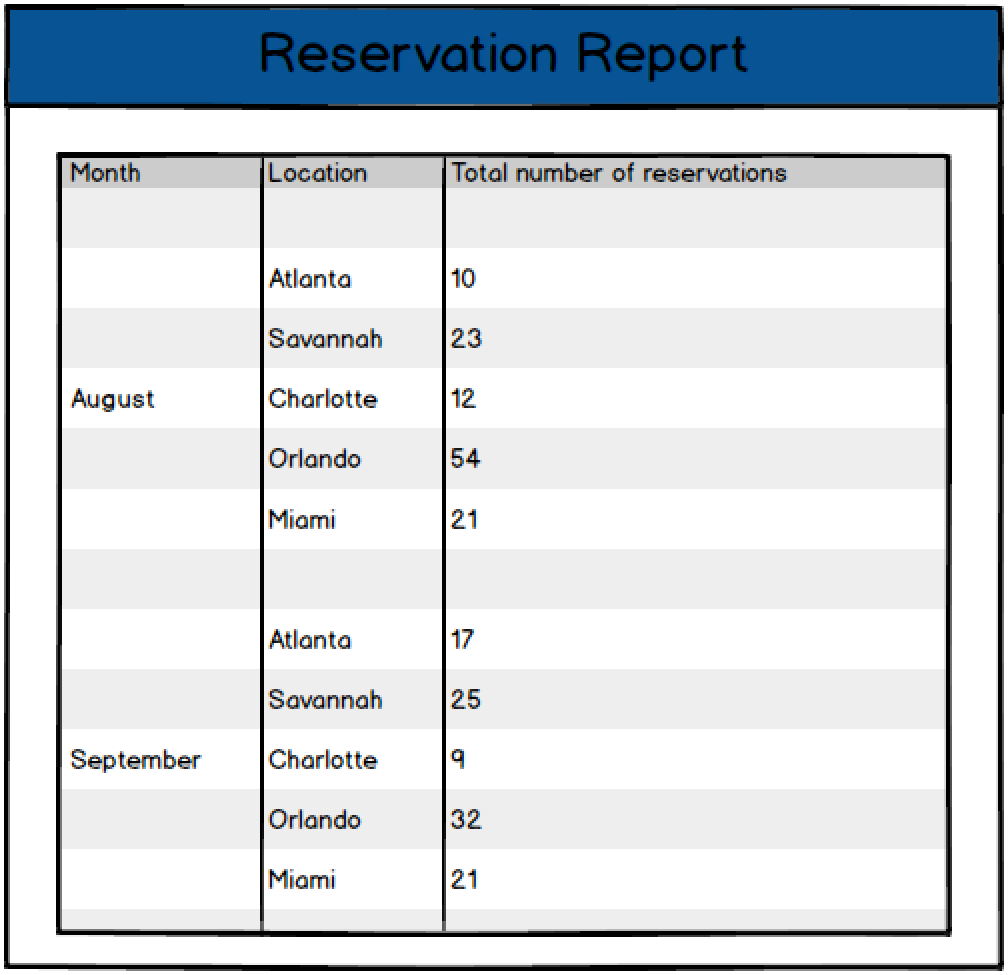
MANAGER FUNCTIONALITIES

Management can only check reports for different aspects. These are just processes performed by management using the data. Hence, they are NOT represented on the EER diagram.

The manager would use the same login screen and then choose from functionalities as shown in figure 3.

1. View Reservation Report

This report shows the number of reservations made per location for the month of August and September.



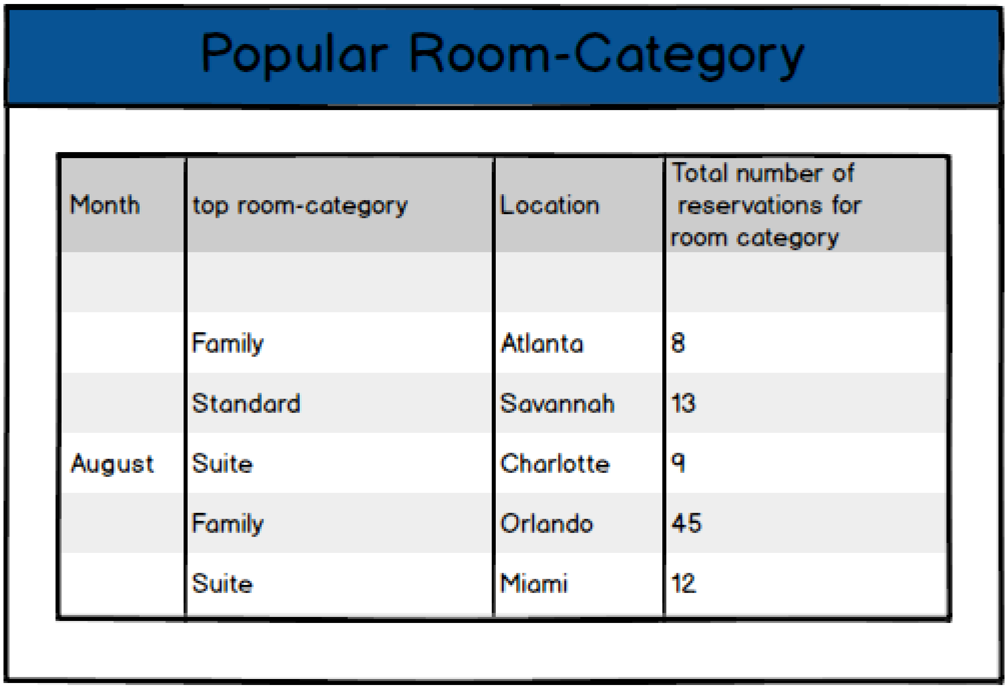
Reservation Report

Month	Location	Total number of reservations
	Atlanta	10
	Savannah	23
August	Charlotte	12
	Orlando	54
	Miami	21
	Atlanta	17
	Savannah	25
September	Charlotte	9
	Orlando	32
	Miami	21

Figure 12: Reservation Report

2. View Popular room-category Report

This report shows the top room-category per location for the month of August. Consider the start date of reservation for calculating the month.



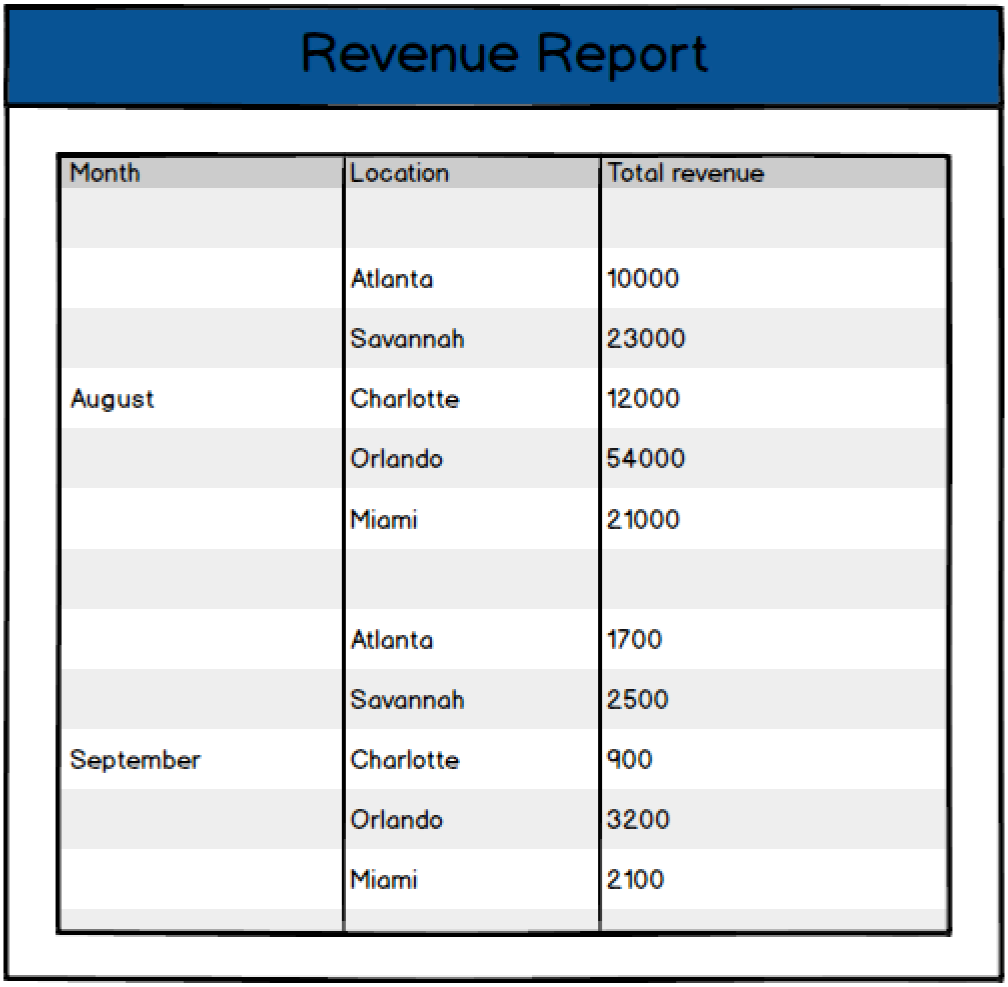
Popular Room-Category

Month	top room-category	Location	Total number of reservations for room category
August	Family	Atlanta	8
	Standard	Savannah	13
	Suite	Charlotte	9
	Family	Orlando	45
	Suite	Miami	12

Figure 13: Popular room category Report

3. View Revenue Report

This report shows the total earnings at each location for the months of August and September.



Revenue Report

Month	Location	Total revenue
August	Atlanta	10000
	Savannah	23000
	Charlotte	12000
	Orlando	54000
	Miami	21000
September	Atlanta	1700
	Savannah	2500
	Charlotte	900
	Orlando	3200
	Miami	2100

Figure 14: Revenue Report

END OF PROJECT RESCRIPTION (v1)

Version Changes

V1.1 – Pg 16 - Cancelled reservations are flagged appropriately in the system.