

## Web-Based Reservation System for Jubail Activity Center

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**Abstract:** In this project a study has been conducted on the reservation system process at Jubail's Activity Centre, located in Jubail, Saudi Arabia. Currently, the way that the reservation is implemented in the center is by manual documentation which usually leads them to face a few problems. This project is aimed to design a reservation system for the center through an object-oriented approach, develop it to be a web-based system accessed online on any device, and test the system as a whole to see the results. The system is being developed using the prototyping model of development. The system was expected to fix the main problems encountered in current system implementation, by having a reliable way of reserving the center's facilities by the customers that are using the system. With this system the goal is to make sure each customer's information is correct or as reliable as possible.

**Keywords:** *Web-Based, Reservation System, Booking.*

### 1. Introduction

In this project, study has been conducted on the reservation system process at Jubail's Centre. Currently, the way that the reservation is implemented in the center is by manual documentation. If a person wants to reserve one of the center's facilities, they have to go to the center or call the center and ask to reserve, if the facility is available, they will let the person complete the reservation process, if it's not then they will tell them it's unavailable.

Jubail's activity center at the moment is mostly ran by physical documents, meaning all applicants to the center are written on paper. The reason for this kind of documentation by the organizers and owners of the activity center, is that Jubail is a small city with less funding, and for that reason they couldn't afford to get a system until now.

The first major problem comes in the lack of enough workers at times, which can be a hardship for the center, sometimes people will have to line up in the center or have their calls postponed, due to the workers not being enough. This problem causes a lot of wasted time for the customers especially which may not be able to wait. To add to that if the customers wait through all of that or they call later, there

is a chance for them that the facility they want to reserve may not be available, which is again more time wasted for them, and less customer satisfaction for the center.

At this center people can reserve rooms, fields etc. To make their own activates at a fee of course, the problem is that people trying to reserve anything the center had to go through management to discuss about the kind of activity, time, and possible number of participants, also people are not able to know about the status of the felicity, if its available to be reserved or not unless they call the center's management. so, this process overall can be hard at times.

As the center expands, adding more services proved to be a problem, having features like a loyalty program in which participants who regularly use the center's services either through participating in the different activities offered or through reserving the center's facilities for their own activities, will get special discounts. This feature and more like it are hard to implement specially because the nature of the system itself.

The aim of this project is to develop a web-based reservation system using the object-oriented approach of developing, and test the functionality of the developed system.

The developed system is a reservation system aimed for Jubail's activity center. The system has to main user types that are administrator and Customers. Administrators is the owners/workers of the center. they are the ones who have access to all the information in the system, also have the job of accept or decline reservation requests done from the users. They can also register new staff/administrator to the system. Meanwhile, the normal Users gain access to the list of facilities available for reservation. They can request to reserve one of the center's facilities for their own activity (This request needs to be approved by the administrator).

The functions that will be provided in the newly developed system are registration and login, browsing of facilities, reservation requests, facility information management, timetable, and report generation.

By the end of the development the system is expected to fix the main problems encountered in current system implementation. The system should have a reliable way of reserving the center's facilities by the customers that registered to the system. It should show the center's facilities and their status, and let users reserve them. Lastly the system will be able to regenerate reports of the functions above.

The organization of this paper goes as follows: The first section includes a general introduction of the problem project and the problem statement, objective, scope and expected results for it. The second section describes related systems to the one being developed. The third section focuses on the methodology used on the project. Section IV presents the system analysis and implementation as well as the tests that were done on the system. The last section is a conclusion on the project.

## **2. Related Work**

In this section a discussion about related works to the system being developed will be shown. Three systems were chosen that have similar functionally to the developed system.

The first system to be talked about is Booking.com, it is one of the biggest booking sites around the world currently, the website promises the users to "Make it easier for everyone to experience the world" [1]. Booking.com has a wide selection of types of bookings, from hotels to flights, and even car rentals. It has an impressively large amount of diversity in the services it offers. To add to that, it offers these services to all around the world, as it is not just made for one place, you can book places to stay in from most countries.

After registration, users can simply choose where they want to book, what date they will check in and check out, and how many people, rooms are needed for the booking. After doing that they will simply be booked or if the place can't be booked, the system will inform the user. You can also browse the website itself to find other listings if you don't have one in mind. When you chose a place, all information needed about the place will be presented to you in the page, you will find the location, price, facilities offered, rules etc. Pictures of the place are also provided for a better visual reference. Lastly, guests who have already booked that place before can leave a review in the listing page for the future customers.

Second system is Expedia, the hotel search on Expedia has a simple, easy-to-use interface with a variety of filters. The way the system works is much like Booking.com, where hotel owners, home owners etc. Post their listings on the site for people interested in booking. Just like the previous system, Expedia is a general booking system, meaning it offers stay-ins, flights, car rentals, and the like. [2]. The advantage of Expedia, is that it offers a reward program, every 1 US dollar spent on the different kind of bookings in the site, you get a certain amount of points, these points can then be used to get discounts/coupons for your next booking, or if you have enough points, you can cover the whole booking fee with them.

The third system used made by the University of Hong Kong on its sport center, offer the ability for their student and staff alike to book any of their facilities from within the system [3]. When a student or a staff member tries to book a facility, the request will be sent to the center's management where they will check if the one requesting a booking meets the requirements to book or not. If the requirements are met and satisfied the management, then the booking is accepted for whoever made the request. People who are not a student at HKU or a staff member, can still book from the center, but they have to apply to a sport member card from the center, meaning they will be registered in the system. After obtain their sport member card, they can apply to booking normally like the students and staff. HKU sport center offers a priority-based booking, the management will check the booking request and the reason, then decide who has priority to book the facility. You can either book as an individual or book for a group. Table 1 show a comparison of the three mentioned systems with the developed system.

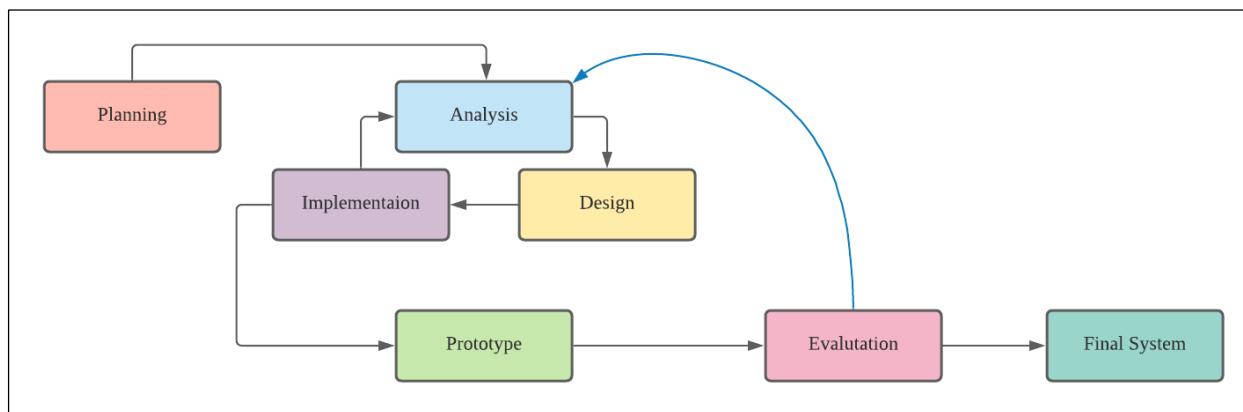
**Table 1: System's Comparison**

<b>Features/System</b>	<b>Booking.com</b>	<b>Expedia</b>	<b>HKU Center</b>	<b>Jubail Activity Center System</b>
Registration / Login	√	√	Login Only (Students and staff)	√
Facility browsing/information	√	√	X	√
Reservation	√	√	√ (Students and staff)	√
Reports	X	X	X	√
Booking Availability	√	√	√	√

### 3. Methodology

The development methodology used on this project is Prototyping development, it is a development model in which a prototype of a system will be built, tested and then adjusted, this process repeats until

the wanted outcome is achieved, meaning the final system was reached with its requirements and design. Prototyping development is usually used when the requirements are not quite clear, or when the system being developed will be testing by users and given feedback on, meaning it will gain more requirements with time depending on the feedbacks. Prototyping model consist of five main phases, planning, analysis, design, implementation and testing. This process was chosen because the ability to use the prototype of the system and continue refining it and adding to it until it reaches the final version where all the system requirements are reached, additionally more requirements can be acquired through each prototype in form of feedback.



**Figure 1: Prototyping development**

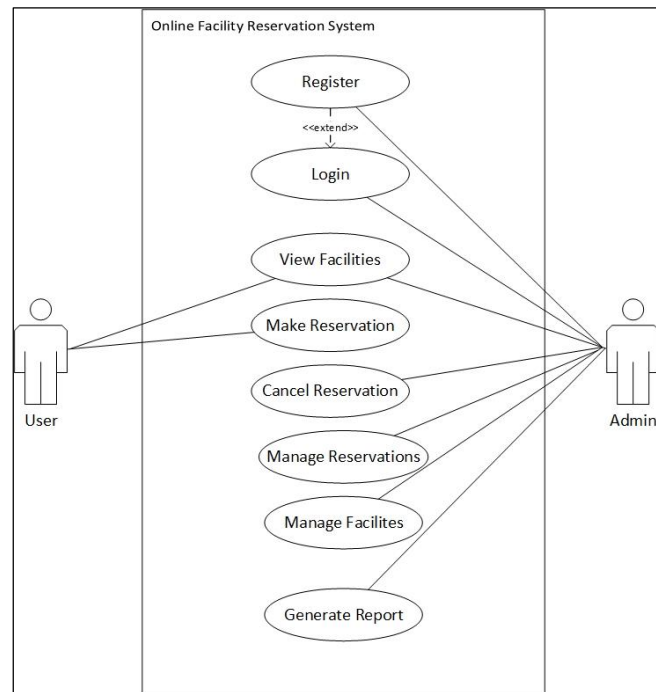
There are total of five main phases from within the prototype model. As shown in Table 2, each phase is listed with its own task or tasks, also the output that need to produce during the entire project development. Besides that, the output had been completed within the specific days that have been given.

**Table 2: Software development activities and their task**

Phase	Task	Output
Planning	<ul style="list-style-type: none"> <li>- Proposed the project</li> <li>- Determine the project schedule, activities and output</li> </ul>	<ul style="list-style-type: none"> <li>- Project proposal</li> <li>- Develop Gantt chart</li> </ul>
Analysis	Analysing the information gathered in planning hardware and software requirements of a given prototype.	<ul style="list-style-type: none"> <li>- System Requirements</li> <li>- UML Diagram</li> <li>- Use Case Diagram</li> <li>- Flowchart</li> </ul>
Design	Create the system interface, designing the diagrams, and features of the system.	<ul style="list-style-type: none"> <li>- System Architecture</li> <li>- User Interface</li> <li>- Database Design</li> </ul>
Implementation	Coding the system functions and features into the prototype/system, based on the design phase	<ul style="list-style-type: none"> <li>- Working Features (Code)</li> <li>- Prototype</li> <li>- Finished system.</li> </ul>
Testing/Evaluation	Testing the functions and features of the developed prototype/system and evaluating them.	<ul style="list-style-type: none"> <li>- Prototype Evaluation</li> <li>- More Features (If needed)</li> <li>- Testing plan</li> </ul>

#### 4. System Analysis

The results of the analysis phase and design phase in the object-oriented model of development are presented in this section. The Use case and class diagrams are shown, as well as the overall system flowchart, and lastly some interface designs of the system.



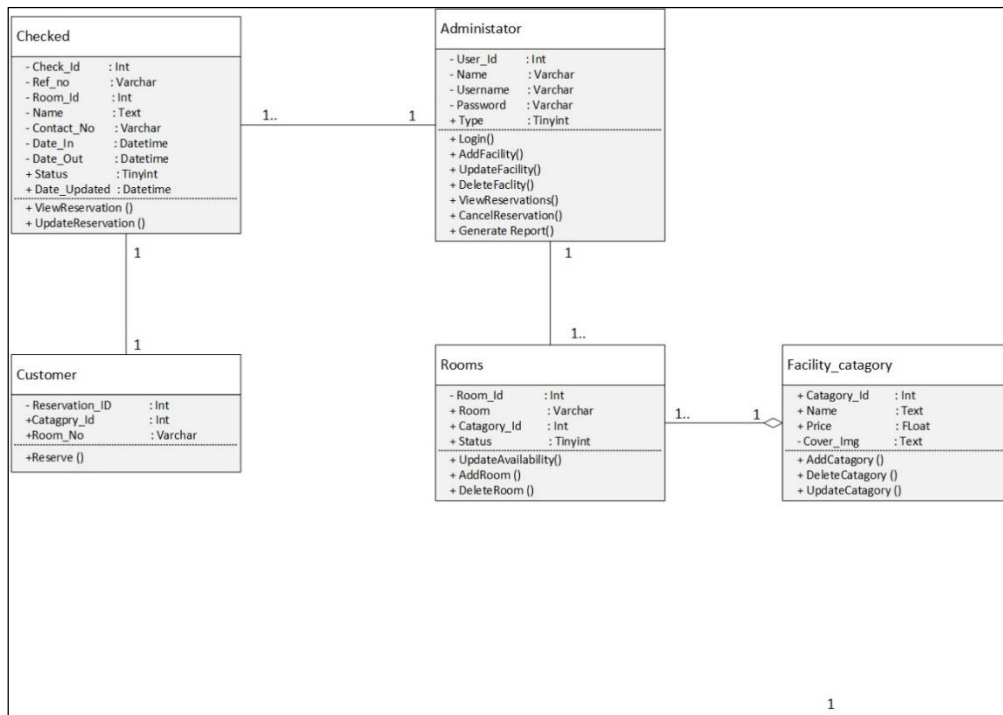
**Figure 2: Use Case Diagram of Jubail's activity centre reservation system**

Figure 2 shows the use case diagram that represents the overall activity of Jubail's activity center and what it will be used for. The system has two main users; each user has their own activity that can be done through the system.

Customers would be able to view the different facilities offered by the centre, and they are able to request a reservation for their chosen facility. The facilities will be shown for the customers depending on their availability. If the facility is already reserved or not available, then the customer will not be able to see it or request to reserve it.

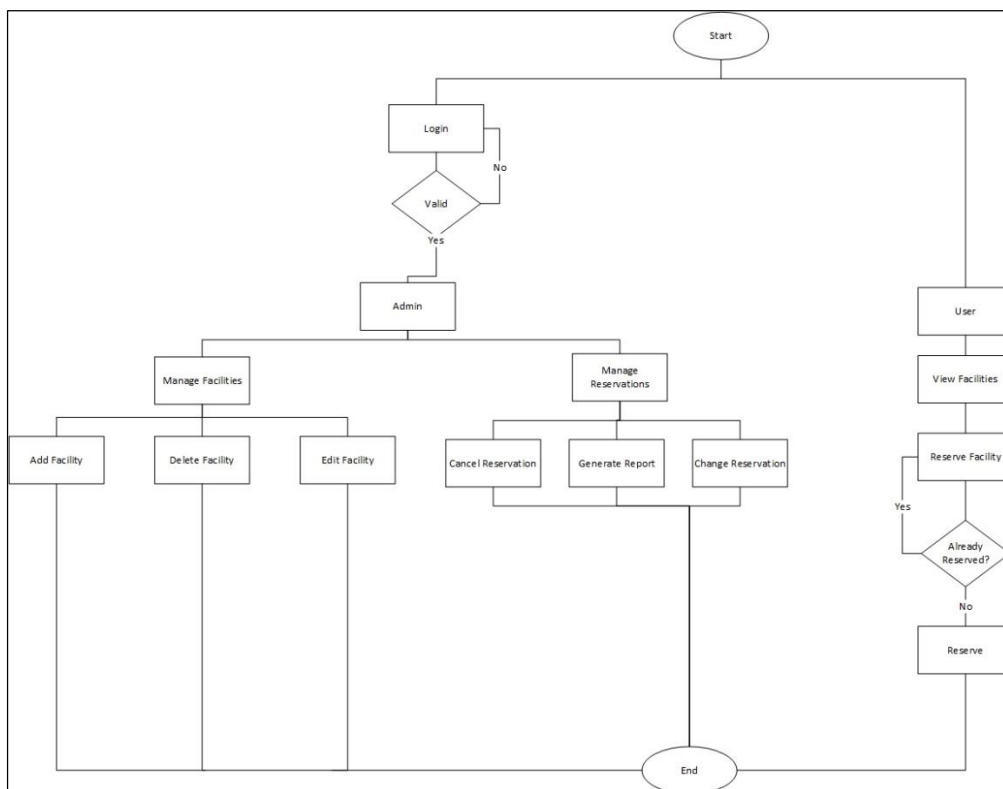
Administrators are able to login in to the system directly, they are able to manage the facilities offered on the system, meaning they can add new facilities, delete facilities, or just edit the information displayed on a facility. Administrators are also able to view and manage all customer's reservations, if a facility has some kind of problem, but it was already reserved by a user, administrators could, cancel the reservation, or edit the time and date of the reservation, until the problem is fixed. Lastly administrators are able to generate reports from the system.

The Figure 3 show the structure of the system by its classes. Each class has attributers, operations, and a relation between each other. From the Figure 3, the customers interact with the system based on the reservation request they make. In which an administrator will check that request and approve it or cancel it. The administrator assigns the specific room for the request that is linked to the category that the customer has chosen.



**Figure 3: Class Diagram for JAC Reservation System**

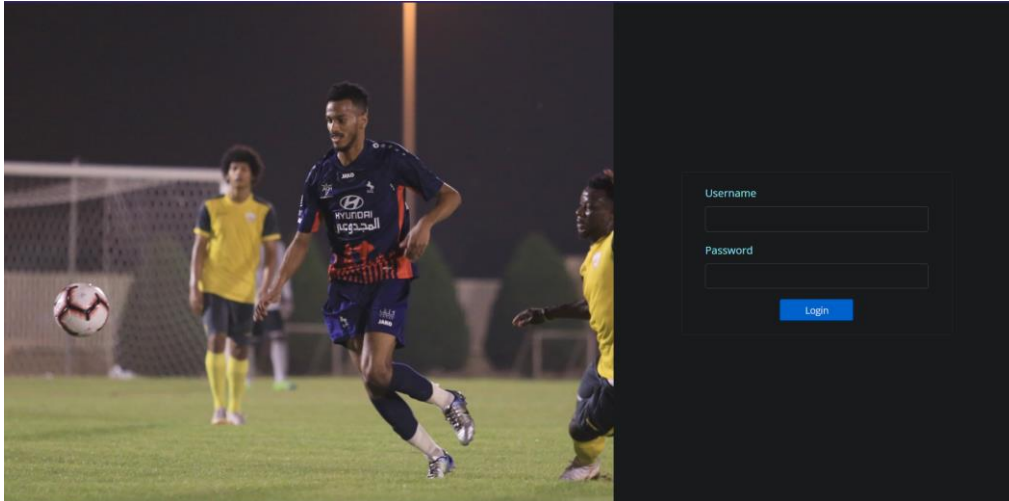
Figure 4 shows the process of both users and administrators in JAC reservation system. The customers can view and then reserve a facility if it is not already reserved. Administrators can manage the reservations done by users through changing or canceling the reservation, as well as they can make new reservations. They can also generate a report of the reservation. Lastly, administrators can manage the facilities, by adding, deleting, or editing the information of a facility.



**Figure 4: Flowchart of JAC Reservation System**

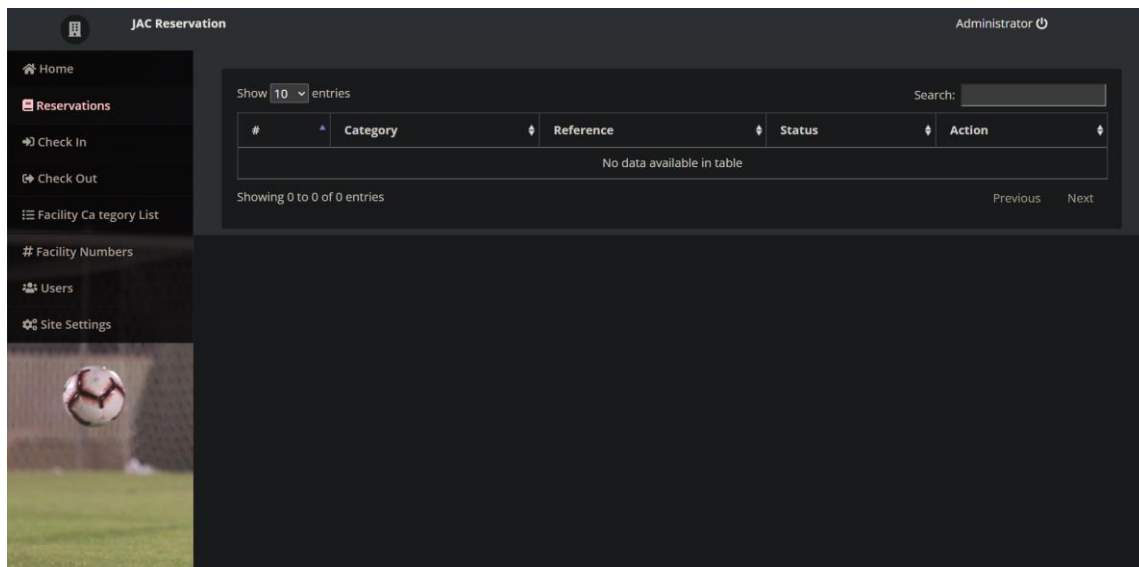
#### 4.1 System Interface Implementation

The interface of a system is an important aspect of it, since it will be the only thing that users will be able to see. So, keeping the interface simple and clean makes it easier for users to use the system efficiently. These are the two interface pages for the JAC reservation system that will be shown here, which are the login page and the main page from the admin side.



**Figure 5: Login Interface**

Figure 5 displays the Login page which will be the first page for administrators/staff working on the system. If they are registered, They can login normally. The login page shows a simple design that request the user to input a username and a password, after which they click the log in button to get access to the system.



**Figure 6: Main Page interface (Administrator View)**

The main page design is shown in Figure 6, on the left side of the page, there is the list of pages that users are able to access, mainly the reservations tap, in which the administrator can see each reservation request that has been received, and check their information. All pages of the system have been explained in the full report.

## 4.2 System Testing

System functionality testing was performed to establish which features were available in the final product, and to ensure that there were no bugs or errors faced with said features. Table 3, shows the list of tests that had been performed.

**Table 2: Software development activities and their task**

No.	Test Cases	Description
1.	TEST_100_001	<p>Login</p> <ul style="list-style-type: none"> <li>• Administrators can login to the system using a valid username and password.</li> <li>• Administrator clicks the login button.</li> <li>• System goes to admin interface for valid login.</li> <li>• System display login failed message for invalid login</li> </ul>
2.	TEST_100_002	<p>Register</p> <ul style="list-style-type: none"> <li>• Administrators can add new admins using a new username and a password.</li> <li>• System shows success message.</li> <li>• System lets the new admin login using the new registered username and password.</li> <li>• System display error messages for unsuccessful registration.</li> </ul>
3.	TEST_100_003	<p>View Facilities</p> <ul style="list-style-type: none"> <li>• Customers can view available facilities.</li> <li>• System will not show facilities that are reserved or unavailable.</li> </ul>
4.	TEST_100_004	<p>Send Reservation Request</p> <ul style="list-style-type: none"> <li>• Customers can send reservation request for an available facility.</li> <li>• Customers click book to start the reservation process.</li> <li>• Customers add their information in the reservation form.</li> <li>• Customers click save to send the request to the administrators.</li> <li>• System shows success message if the request is sent.</li> <li>• System shows and error message if the request is not sent.</li> </ul>
5.	TEST_100_005	<p>Manage Reservations</p> <ul style="list-style-type: none"> <li>• Administrators can see current reservations of the facilities.</li> <li>• Administrators can confirm the reservation.</li> <li>• Administrators can make a new reservation.</li> <li>• Administrators can cancel the reservation.</li> </ul>



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- Administrators can edit the reservation information.

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No.	Test Cases	Description
	TEST_100_005	<ul style="list-style-type: none"> <li>• System will show success message for any of the above actions if the action is successful.</li> <li>• System will show error message for any of the above actions if the action is not successful.</li> </ul>
6.	TEST_100_006	Manage Facilities <ul style="list-style-type: none"> <li>• Administrators can see current facilities.</li> <li>• Administrators can add new facilities.</li> <li>• Administrators can delete existing facilities.</li> <li>• Administrators can edit facility information.</li> <li>• System will show success message for any of the above actions if the action is successful.</li> <li>• System will show error message for any of the above actions if the action is not successful.</li> </ul>
7.	TEST_100_007	Reservation Information/Report <ul style="list-style-type: none"> <li>• Administrators can view a specific reservation detail with all information about that reservation.</li> </ul>

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#### 4.3 Advantages and disadvantages of the system.

This system was made for the Jubail Activity Center, as a replacement for their manual on paper system. The system aimed to help the center in their usual procedures, and make it easier and more reliable for both the staff of the center and the customers. All things like reservation requests, managing the reservations and their information, managing the facilities and their information etc. can be done in the system.

This system is not without its faults. There are some limitations to the system that ruin the experience of users a little, like not offering customers to register to the system. Another disadvantage is that the system doesn't have any payment done within it although it calculates the price of the reservations.

## 5. Conclusion

The plan that was made for this project and its development has been followed successfully. JAC reservation system that was made for the Jubail Activity Center. Has been completed with the help of said plan, and has all features that were intended to be added to the system. The goals and objectives of the project have been met. A study of previous similar systems was also done in the form of a literature review. And the plan, mythology and implementation process were also shown and discussed throughout this project. Additionally, the project was tested to ensure full functionality of all the requirements. In the end, the advantages and disadvantages of using the system were mentioned, as well as what can be improved in the system in the future.

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