

# Requirements Engineering

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## 1. The Purpose of the Project

### 1a. The User Business or Background of the Project Effort

#### **Content:**

Faculty members in University of Jeddah (UJ) have always been struggling to reserve an extra hall whenever they needed. The current manual hall reservation process is very time consuming since the faculty members need to wait for the deanship approval. With that being said, we have decided to build an online hall reservation system that facilitates the hall reservation process for UJ faculty members. The user will be simply required to choose the hall type (classroom or lab). Next, they will be choosing the desired date and time. Then, available and near halls will be displayed for the faculty member to choose from. Last, the faculty member will be able to confirm their hall reservation order, followed by a notification on their phones.

#### **Motivation:**

We have decided to build this system to simplify the hall reservation process from many aspects. We have concluded that manual hall reservation process is very time consuming, unprofessional, and not reliable. On the other hand, the online hall reservation process will be more timesaving for the faculty members, more professional, and more reliable. This will lead to a more simplified usage of the service.

We aim to meet some approaches: simplicity, flexibility, reliability, and timesaving (effective). By simplicity, we mean the system's online process will be easier to use and will achieve user usability goals which will eventually end up with a better user experience. By flexibility, we mean that the user can simply edit their reservations whenever they desired. The system will be reliable enough for the user to use without worrying about not finding the hall reserved ready. The system will also be timesaving since the faculty member will not be waiting for the deanship to approve for a hall reservation request.

### 1b. Goals of the Project

**Goal:** Flexibility in modifying the reservation

**Advantage:** to gain faculty member's acceptance by enabling them to edit a hall reservation at any time before the reserved date.

**Measure:** Increasing the speed by 40% of the changes made on the availability status of every hall than the manual process

**Goal:** Providing an effective, portable, and fast system that can be accessed from any device

**Advantage:** Satisfaction of faculty members, which may lead to an increase in demand for similar systems from other universities

**Measure:** Reducing the number by 20% of postponed lectures due to the slow manual hall reservation process.

**Goal:** Sending a reminder notification on the reservation date

**Advantage:** to reduce the number of missed reservations

**Measure:** 87% of the halls will not be held for reservation for any missed lectures. (No faculty member will forget about a reservation causing the hall to be held while it's empty)

## 2. The Stakeholders

### 2a. The client

CEO of University of Jeddah, Dr. Adnan Alhumaidan

### 2b. Customer

University of Jeddah

### 2c. Other Stakeholders

Faculty Members

Technicians

Deanship

Administrators

Students

Developers

"My Future" Application

Other Universities

### 2d. Hands-On Users

Faculty Members of University of Jeddah

### 3. Project Constraints

#### 3a. Solution Constraints

Constraint: The hall reservation system shall be linked to the UJ database.

Rationale: UJ database has all halls and faculty members data which will control halls availability.

Fit Criterion: UJ faculty members can reserve UJ halls.

Constraint: The hall reservation system shall only be permitted for the Faculty Members of UJ.

Rationale: The data linked to the system is based on the UJ database

Fit Criterion: Only UJ faculty members can have access to the system.

#### 3b. Schedule Constraints

Constraint: The system shall be available on September 1, 2022.

Rationale: It is the beginning of a new semester, and new faculty members can adapt to a consistent system.

Fit Criterion: The hall reservation system shall be available on “My Future” application on September 1, 2022.

#### 3c. Budget Constraints

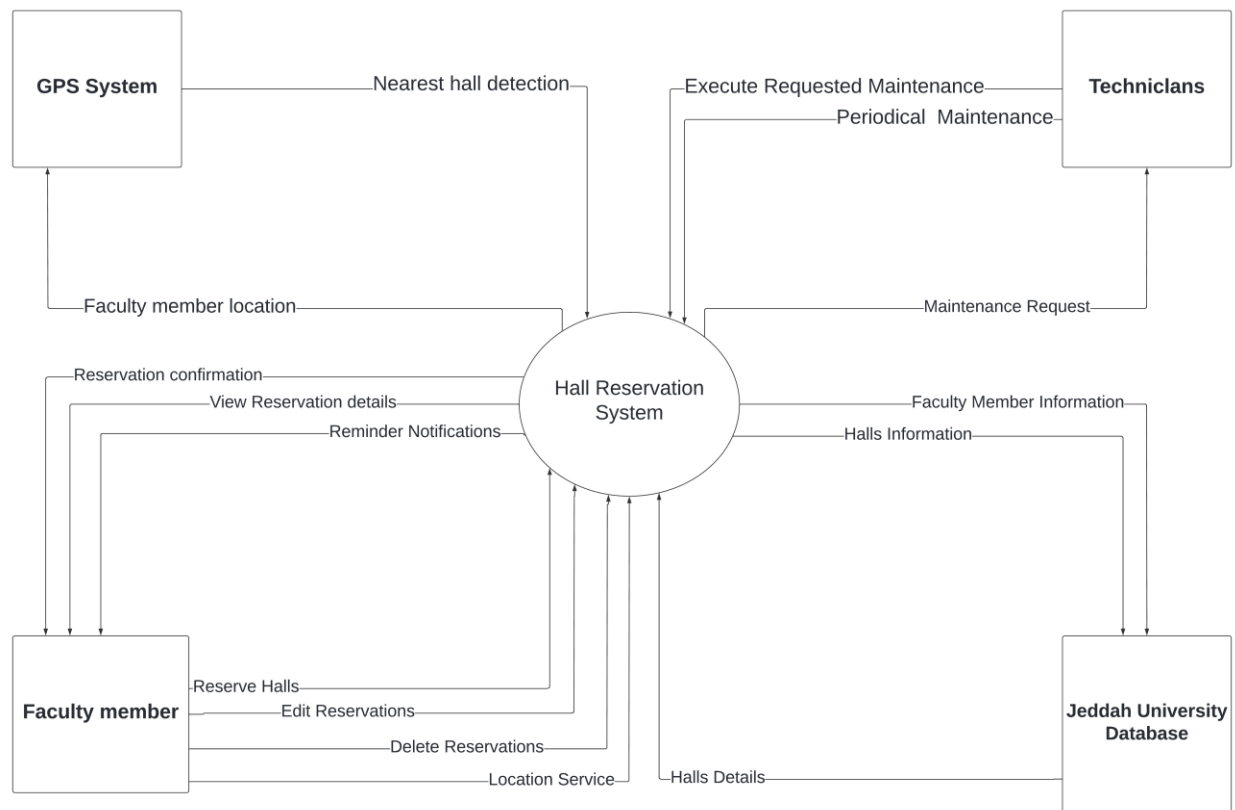
The hall reservation system budget is 150,000 SAR

### 4. The Scope of the Work

#### 4a. The Current Situation

The hall reservation system at the mean time is a very complex process. The faculty member must manually call the deanship to reserve a hall, then wait for a response. Also, faculty members may be forced to choose a hall that doesn't match their needs in whatever services they choose in a hall. The process is hard to deal with and inflexible. It is a very old and unprofessional way to reserve a hall, and it can evolve to a much better, advanced, and more professional way.

#### 4b. The Context Diagram



#### 4c. Work Partitioning

No.	Event Name	Input	Output
1.	Faculty member reserves a hall.	Reserved hall	Hall Reservation System confirmation
2.	GPS system will detect and choose the nearest hall to the faculty member.	Faculty member turns on location service.	Nearest hall detected
3.	Faculty member edits or cancel reservation.	Confirmed reservation	Edit or cancel successfully
4.	Faculty member can view reservation details.	Confirmed reservation	Reservation display
5.	Faculty member receives a reservation reminder notification.	Confirmed reservation	Reminder notification
6.	Technicians will provide periodical maintenance for the system.	-	Executed maintenance
7.	The system will request for maintenance when needed	Maintenance request	Executed maintenance
8.	UJ database provides data	Faculty members and halls data	Halls details

#### 4d. Business Use Case

**Business Event 1:** Faculty member wants to reserve a hall.

**Business Use Case:** extra hall reservation

**Trigger:** Hall reservation request

**Preconditions:** The faculty member must be a member of UJ.

**Interested Stakeholders:** Administrators, students

**Active Stakeholders:** Deanship, faculty member

- The faculty member starts a new hall reservation order through UJ “My future” application.
- The faculty member selects their desired date and time.
- The faculty member chooses their desired hall type and services.
- The faculty member is asked to turn on location service to detect the nearest hall
- If faculty member turns on location service  
then  
The nearest available hall to the faculty member is chosen.  
otherwise  
A randomly available hall is selected to the faculty member.
- The faculty member confirms order

**Outcome:** The faculty member has a reserved hall ready for them.

**Business Event 2:** Faculty member wants to edit a hall.

**Business Use Case:** Editing a hall

**Trigger:** Hall reservation edit request

**Preconditions:** The faculty member must have a valid and confirmed reservation.

**Interested Stakeholders:** Administrators, students

**Active Stakeholders:** Deanship, faculty member

- The faculty member view hall reservations list through UJ “My future” application.
- The faculty member selects the hall they like to edit.
- The faculty member chooses the “hall editing” icon
- The faculty member chooses their desired edits whether in hall type or services.
- The faculty member confirms and saves changes.

**Outcome:** The faculty member has an updated reserved hall ready for them.

**Business Event 3:** Faculty member wants to delete a hall.

**Business Use Case:** Delete a hall reservation

**Trigger:** Hall reservation deletion request

**Preconditions:** The faculty member must have a valid and confirmed reservation.

**Interested Stakeholders:** Administrators, students

**Active Stakeholders:** Deanship, faculty member

- The faculty member view hall reservations list through UJ “My future” application.
- The faculty member selects the hall they like to delete.
- The faculty member is asked to confirm the deletion operation

**Outcome:** The hall reservation is deleted.

**Business Event 4:** A faculty member wants to view reservation details

**Business Use Case:** View reservation details

**Trigger:** Request to view reservation details

**Preconditions:** The faculty member must have a valid and confirmed reservation.

**Interested Stakeholders:** Administrators, students

**Active Stakeholders:** Deanship, faculty member

- The faculty member view hall reservations list through UJ “My future” application.
- The faculty member selects the hall they like to display.

**Outcome:** The faculty member can see the desired hall reservation details

**Business Event 5:** Technical problem

**Business Use Case:** Maintenance

**Trigger:** Maintenance request

**Preconditions:** The system must have bugs or technical problems.

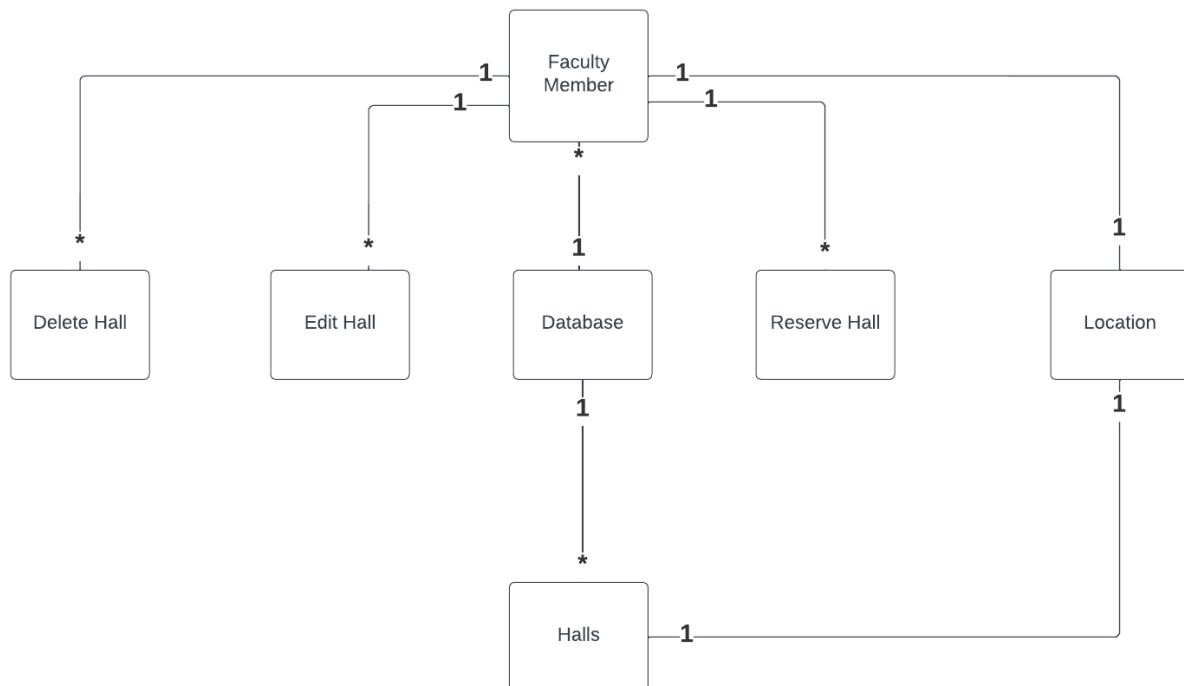
**Interested Stakeholders:** Administrators

**Active Stakeholders:** Deanship, technicians, and faculty member

- Technicians will temporarily turn off the system
- Technicians will perform the necessary examination of the system to find out the cause of the malfunction and the problem
- The technicians will fix the problem, while the system remains under maintenance until everything is fixed.

**Outcome:** The problem will be fixed.

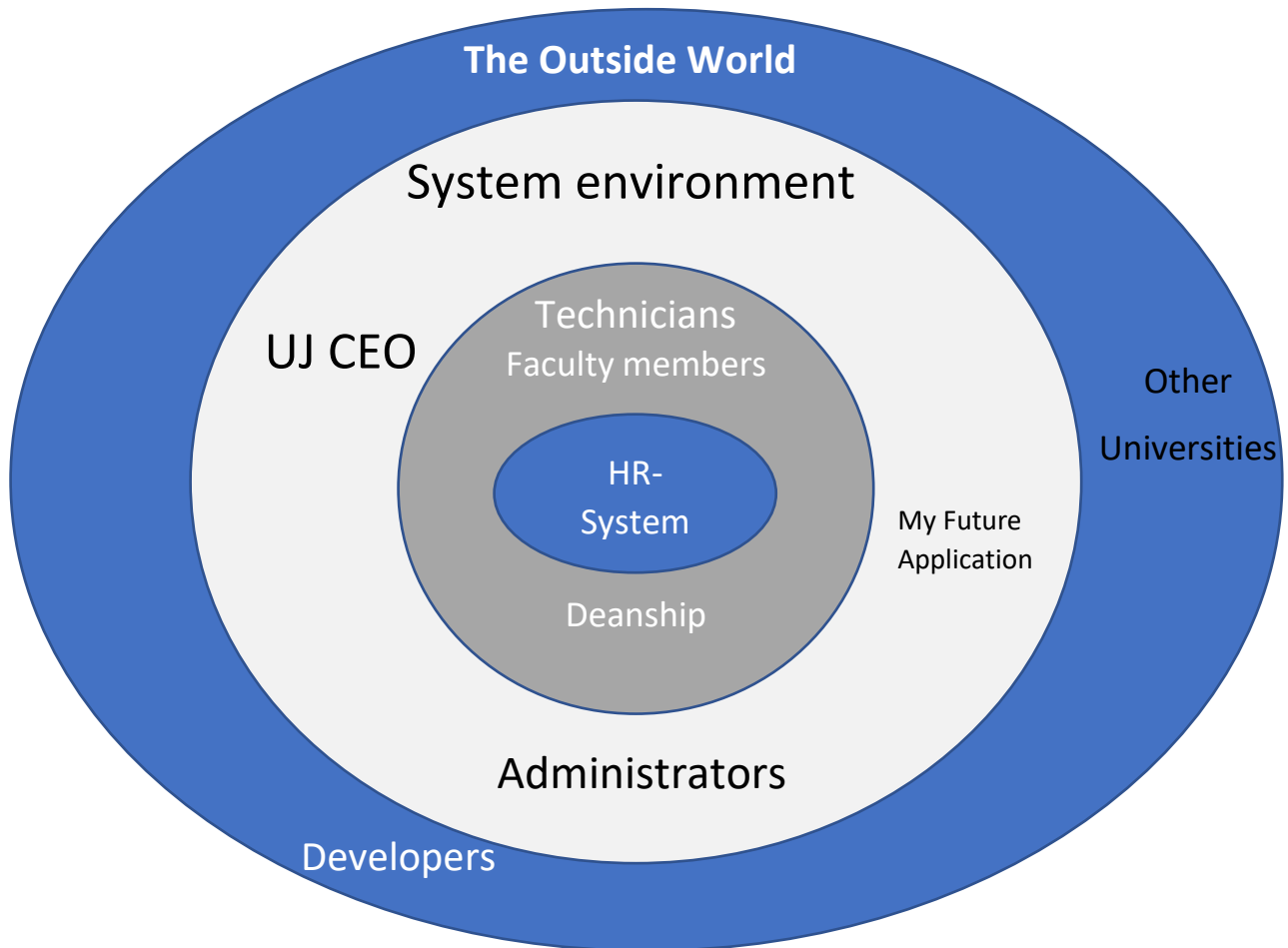
## 5a. Business Data Model



## 6. Requirements Elicitation

### 6a. Stakeholder Identification

#### Stakeholders Map





## Interviewing the Stakeholders

Stakeholders	Requirements elicitation technique	Justification
Interrogative conversations with Deanship	Interview	Deanship has full control on all halls information that system needs. The deanship will control the system in the future.
Interrogative conversations with Faculty members	Prototype	Faculty members have only a vague understanding of the system.
Interrogative conversations with Technicians	Observations	Technicians need to observe the application to implement maintenance.
Interrogative conversations with UJ CEO	Negotiation Risk Analysis Cost/Benefit	CEO cares most about the financial gains of the system.
Interrogative conversations with Students	Observation / Site visits	Observe students' attendance before creating the system.

## 7. Elicitation Techniques

### 7a. Interrogative questions with Managers

Q1: What is the problem of the current system?

Q2: What do you want in this system exactly?

Q3: What services and features would you like the system to provide?

Q4: Will this system improve the current hall reservation system?

## 7b. Prototyping and sketching



As shown, the faculty member will be asked to choose the hall type by simply clicking on the photo.



Then, they choose the desired tools and services for the hall followed by the “next” arrow.



The faculty member gets to see their confirmed hall reservations  
(Assuming the faculty member has reserved these halls already).

## 8. Creativity Technique

Remember the Future.

# REMEMBER

the future

by klaxoon

**INFO**  
preparation: 5 min  
meeting: 30 min  
niveau: 🍌 🍌 🍌

- 🟢 Things that worked
- 🔴 Things that don't work so well
- 🟡 Things we should keep
- 🟠 Questions from your future "self"
- 🟢 Risks
- 🟠 To do

**PROJECT** Hall Reservation System **DATE** 29 April, 2022

Ruby Nam 2020001	May Alarashi 2020003	Raghad Alshady 2020005
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### THINGS THAT WORKED

- Successfully reserving a hall
- Cancelling Reservations
- Choose date and time
- Choose between classes and labs

### THINGS THAT DIDN'T WORK SO WELL

- Exiting on reservations
- Deleting request halls using QR
- Reminder notifications
- Choosing halls online
- Empty
- Save of use
- Display hall reservations
- Quickly reserving halls

### THINGS WE SHOULD KEEP

- Successfully reserving a hall
- Cancelling Reservations
- Choose between classes and labs
- Choose date and time

### QUESTIONS FROM YOUR TEAM OF THE FUTURE

- What is the impact of the Hall Reservation System on reserving halls?
- What is the next step of the Hall Reservation System?
- What improvements are we making next?
- What is the percentage of improvements on the hall reservation system from the previous system?

### ANSWERS FROM YOUR FUTURE "SELF"

- speediness, short time and ease of the process
- expanding the scope of the system so that it become comprehensive for all adult universities
- By adding an option to remind the students about their extra classes
- Modification on the interface of the system
- It improved by about 87%

### RISKS

- failure of the system
- technical risks
- poor quality code
- bad management
- Error in Scope Definition
- not meeting the requirements
- Unreliable cash flow
- Unmet expectations
- Being over budget
- Not testing the application

### TO DO

- Using best costing practices
- Good communication with stakeholders
- Using the best techniques to deal with the emergency situations
- Clarifying the probability of the estimates for more realistic expectations for the project
- Adjust a highly accurate budget plan
- Develop a complete and proper plan to work on the project
- Set accurate cash flow studies for more reliable cash flow
- Precisely understanding the scope definition

### 1. BACK TO THE PAST

Remember what we did right and what went wrong in the last sprint or project and what lessons can be learned.

### 2. FORWARD TO THE FUTURE

Let the team imagine what's going to happen and field questions and answers.

### 3. BACK TO THE PRESENT

Now's the time to take stock! Use your "time travels" to design your action plan.

<https://app.klaxoon.com/join/GXHGAFS>

Req #	Requirement Type	Description	Rationale	Fit Criterion
01	Functional	The system shall provide translations to either English or Arabic	To deal with faculty members with different nationalities.	The faculty member can choose 1 of 2 languages: Arabic or English.
02	Functional	The system shall allow faculty members to choose a hall type.	To satisfy the course content environment.	The faculty member can choose 1 of 2 hall types: Class or Lab.
03	Functional	The system shall ask the faculty member if they wanted to open location service to use GPS for detecting the nearest hall.	Faculty members may reserve a hall from outside the campus scope.	The faculty member will choose from radio buttons 1 of 2 choices: Open location or Do not open location
04	Functional	The system shall allow faculty members to reserve any available hall without using GPS		The faculty member can choose a random hall from the system.
05	Functional	The system shall choose the nearest available hall from the faculty member by using GPS if faculty members activated GPS usage.	To facilitate reaching to the hall quickly.	The faculty member finds the nearest hall from them is reserved.
06	Functional	The system shall allow faculty member to choose hall services and tools depending on hall type.	Different courses require different tools and services that not be available in all halls.	The faculty member can choose all the tools they need using the checkboxes.
07	Functional	The system must allow the user to choose the date and time.	To match faculty member	The faculty member can choose any date and time.

			desired timing.	
08	Functional	The system should be able to display the faculty member's reserved halls as a confirmation.	To check the reserved halls information	The faculty member can view all reserved halls
09	Functional	The system shall allow the faculty member to choose whether they would like a reminder notification or not.	Not all faculty members would like to receive a notification	The faculty member can choose between 1 of 2 choices: Add reminder or No reminder.
10	Functional	The system shall allow the faculty member to choose the notification method (SMS, e-mail, Phone Call).	Different faculty members prefer different confirmation methods.	The faculty member can choose 1 of 3 choices after selecting "Add reminder": SMS, e-mail, or phone call
11	Functional	The system shall allow the faculty member to cancel the reservation.	The faculty member may not need the hall anymore	The faculty member can choose to cancel reservation by choosing the "trash" icon.
12	Functional	The system shall allow the faculty member to edit their hall reservation	To bear with changes required in a hall	The faculty member can choose to edit a reservation by selecting the "pen" icon
13	Functional	After editing, the system shall update hall to the nearest hall with the new features.	The old, reserved hall may not contain the chosen tools and services.	The faculty member notices a change in the hall reserved (hall changed).
13	Usability	Faculty members must easily make a reservation	To avoid time wastage.	The system is user-friendly, the faculty member reserves a hall

				in under 10 minutes
14	Portability	The system supports different types of operation systems.	Different faculty members have different devices.	Code the application on android and iOS. A faculty member can download and use our software regardless of their device.
15	Performance	The system shall respond to orders within at least 0.5 seconds.	To save faculty member's time.	The faculty member does not wait more than 0.5 seconds for the system to respond.
16	Availability	The system shall be completely operational at least 95% of the time.	To help encourage faculty members to choose our system as their first option	The faculty member can choose a hall anytime 95% of the time.
17	Security	The system must have security controls to protect faculty members data.	To make faculty members rely on our system	Faculty member's data is secure, and no one can view it.
18	Security	The system must transmit data in an encrypted form.		No one can read the data transmitted (encrypted data)
19	Privacy	The faculty member's information must only be visible to themselves.		The faculty member receives a one-time password (OTP) to their phone number when logging in.

20	Privacy	The system must only allow faculty members of UJ to access the system.	This hall reservation system only serves the faculty members of UJ.	Link the system to the UJ database so only faculty member of UJ can access the system
21	Maintenance	The system shall not exceed 2 hours while its down.	To encourage a successful system	The faculty member can reserve halls after less than 2 hours from the system crash.
22	Capacity	The system shall be able to support 1,000 users simultaneously.	To make as much reservations as possible	The system will not crash if users up to 1,000 are online.
23	Compatibility	Relying on GPS service, the system will provide available halls inside the campus.	To limit GPS on campus scope	Only halls inside the campus can be viewed in the system.
24	Nonfunctional	The system must link its database to the UJ database.	To check hall availability and faculty members' data	The system accepts UJ faculty members and views UJ halls.
25	Nonfunctional	The system shall retrieve halls back to the application if faculty member cancelled the hall or reservation time expired.	To make the hall reservable again	A faculty member can reserve cancelled hall. A faculty member can reserve a specific hall again when the previous reservation time expires.



Snow Cards:

Satisfaction: 1 = Uninterested, 3 = Extremely Pleased

Unsatisfaction: 1 = Hardly Matters, 3 = Extremely Displeased

**Requirement #: 02**      **Requirement type:** Functional      **Event/Use Case #'s:** 1

**Description:** The System shall allow faculty member to choose a hall type

**Rationale:** To satisfy the course content environment

**Originator:** Mona Altherwi

**Fit Criterion:** The faculty member can choose a 1 of 2 hall type: class or Lab

**Customer Satisfaction:** 3

**Customer Dissatisfaction:** 3

**Priority:** High

**Conflicts:** None

**History:** Created May 9,2022

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**Requirement #: 05**      **Requirement type:** Functional      **Event/Use Case #'s:** 1

**Description:** The system shall choose the nearest available hall from the faculty member by using GPS if faculty members activated GPS usage.

**Rationale:** To facilitate reaching to the hall quickly.

**Originator:** Mona Altherwi

**Fit Criterion:** The faculty member finds the nearest hall from them is reserved.

**Customer Satisfaction:** 2

**Customer Dissatisfaction:** 2

**Priority:** Medium

**Conflicts:** 04

**History:** Last amended May 15,2022

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**Requirement #: 15      Requirement type: Non-Functional      Event/Use Case #'s: -**

**Description:** The system shall respond to orders within at least 0.5 seconds.

**Rationale:** To save faculty member's time.

**Originator:** Sara AL Qahtani (Technician).

**Fit Criterion:** The faculty member does not wait more than 0.5 seconds for the system to respond.

**Customer Satisfaction:** 3

**Customer Dissatisfaction:** 3

**Priority:** High

**Conflicts:** None

**History:** Created May 9,2022

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**Requirement #: 22      Requirement type: Non-Functional      Event/Use Case #'s: 5**

**Description:** The system shall be able to support 1,000 users simultaneously.

**Rationale:** To make as much reservations as possible.

**Originator:** Rawan Alassaf (Technician-Tester)

**Fit Criterion:** The system will not crash if users up to 1,000 are online.

**Customer Satisfaction:** 3

**Customer Dissatisfaction:** 3

**Priority:** High

**Conflicts:** None

**History:** Created May 9,2022

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