



DAR AL-HEKMA UNIVERSITY PROVOST OFFICE

FACULTY INFORMATION MANAGEMENT SYSTEM
BBIS4301 INTERNSHIP
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Abstract

Students under the Management of Information Systems (MIS) program at Dar Al-Hekma University are required to develop a system to award a Bachelor of Science degree in MIS. The project of developing a system is divided into two semesters. In the first semester the student is required to take a course entitled "Internship". In this course the student will perform the first three phases of the System Development Life Cycle (SDLC). In the second semester, the student will take a "Capstone" course and will complete the rest of the phases. This report will state the work of the first semester (Spring 2019- 2020), and it will include the planning, analyzing and designing phases of the SDLC. The developing system will be for Dar Al-Hekma University (Provost Office), because DAH is the project sponsor. The proposed system for DAH according to their need is the Faculty Information Management System. The main purpose of this system is to easily maintain and manage the things that are related to the faculties in a shorter time and efficient way. Moreover, the activities that are being done in this part from the project, initiate the project idea, initiate the project management plan, collect the requirements from the stakeholders, and convert these requirements into functional, behavioral, conceptual and logical models. Finally, the last activity is designing the database. The things that will be completed in Capstone are, user interface design, dashboard and reports design, APIs design, and the implementation phase which is to program the system.

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Chapter 1. Project Charter

1.1 Project Description

The Faculty Information Management System (FIMS) is a system for the Provost Office at Dar AL-Hekma University. The system will manage and maintain four main processes that were happening manually.

The first module of the system will be handling the appointment faculties' process. Where currently it was happening manually.

The second module of the system will be managing offices to the new and current faculties. Under this part, the process was happening through Excel sheets now will be easier and with added features in the FIMS.

The third module is managing resources requests for the faculty office. Currently to complete this, it must be done through emails that are going to be sent to each department such as the IT department, and then the request is considered placed. But in the FIMS, these requests will be placed in the system.

The fourth module is part of the Central Academic Advising Unit (CAADU) where they assign for the faculty their credit (workload) and a teacher assistant (TA). So, the process of assigning was done manually through forms.

The FIMS will include other features that are related to the faculties and their information. An example of one of the features is generating reports per semester. The admin can find a ready-to-print report in the dashboard that will be in the system. Moreover, one of the features will be updating faculties information not through using excel sheets, but it will be through the system.

Moreover, this project will use an iterative model where it will go through different phases. It will start from the planning phase, which includes the project initiation report. The second phase will be the analysis phase where all the requirements will be collected and analyzed. Thirdly, the design phase. In this phase, the system will be designed according to the requirements that have been collected from the stakeholders. The fourth phase is the implementation phase. In this phase the system will be implemented in the real world, and where the stakeholders can use it to check if it is as requested or not. The fifth phase is the maintenance phase, and in this phase where the system can be maintained and managed if there are any issues or bugs in the system which will be done by the IT department at Dar Al-Hekma.

1.2 Project Purpose

According to the interviews that are being done with the Director of the Provost Office and the administrative clerk of the department, they do all the processes that are related to the faculties manually either through Excel sheets or forms. These processes when happening manually took a double amount of work and time. The following are other purposes for developing this system.

The first purpose is that the current process for appointment faculty is happening manually, from receiving appointment requests to the acceptance form, now it will be done through the system. So, the admin will be aware about the approvals and which department did not approve the request.

The second purpose is that managing offices will be much easier than it is. Now, the managing either assigning or modifying the office for a faculty happens in different Excel sheets, which time is consuming. Because if one admin modified one of the faculties office and did not inform the other admin, the other admin will again modify the same office for the same faculty.

The third purpose is that it will help the Provost Office in requesting resources. In the FIMS, there will be a unified form for the requests. So, the admin will request using these forms and submit it in the system rather than writing emails.

The fourth purpose is that the FIMS will help the Provost Office from knowing the assigned workload for each faculty. So according to this they can approve the workload and if it was below the required load through the system they can inform the CAADU to modify the workload.

According to the previous parts, the main processes of the department were happening manually and it took time to get solved or handled. Also, there is no other option to follow up on the process easily. So, by developing the FIMS the Provost Office can be more efficient in their work and have more time to do other tasks.

So, the Faculty Information Management System (FIMS) will aid in completing these processes in a shorter time with efficiency in the work. Moreover, the system will organize the process in one place rather than in different excel sheets. FIMS will help the Provost Office to declare many tasks and keep track of all the processes at the same time.

FIMS is an innovative system idea. Also, these days computerization has made things easier, so the Provost Office is in need of a system like this to help them increase their efficiency, to do multiple tasks at one time, and to monitor easily.

1.3 Project Objectives

Project objectives describe the desired and wanted result from applying this project. So the following table shows the objectives of the FIMS.

Objective	Success Factor
OBJ-01: Provost Office is able to conduct a faculty appointment.	OBJ-SF01: Faculty profile created and added to the system
OBJ-02: Provost office is able to keep a list of potential faculty candidates.	OBJ-SF02:
OBJ-03: Provost Office is able to manage offices for faculties.	OBJ-SF03: Offices is managed and assigned appropriate offices to all faculties
OBJ-04: Provost Office is able to request resources for faculties from Purchase and Support Services and IT Departments.	OBJ-SF04: Requests are placed in the system
OBJ-05: Provost office manager is able to generate reports and dashboards every semester related to the AA department.	OBJ-SF05: Reports are generated and shown in the system
OBJ-06: Provost office is able to update faculty information every semester/year.	OBJ-SF06: Faculty information list is updated
OBJ-07: Central academic advisor is able to manage faculty workload for upcoming semesters.	OBJ-SF07: Faculties workload is assigned and approved
OBJ-08: Central academic advisor is able to manage TA and CA assignment to faculty for upcoming semesters	OBJ-SF08: TA and CA are assigned and approved
OBJ-09: Provost office is able to view the assigned workload for each faculty	OBJ-SF09: Faculty workload is shown
OBJ-10: Provost office is able to manage rejected, canceled and resigned faculties	OBJ-SF10: Rejected, canceled and resigned faculties are managed and moved to the databank
OBJ-11: The HR office is able to manage new faculties	OBJ-SF11: HR managed the new faculties

OBJ-12: Purchase and Support Services and IT departments are able to manage the resource request	OBJ-SF12: Support Services and IT departments fulfilled the resource request
OBJ-13: The provost office, HR, CADDU, IT, Information disk, and Maintenance are able to use the system	OBJ-SF13: The provost office, HR, CADDU, IT, Information disk, and Maintenance used the system
OBJ-14: The HR, CADDU, IT, Information disk, and Maintenance are not able to use all the features in the system	OBJ-SF14: The HR, CADDU, IT, Information disk, and Maintenance cannot use faculties information
OBJ-15: The provost office are able to use all the features in the system	OBJ-SF15: The provost office using all the features in the system

Table 1: Project Objectives

1.4 Project Exclusions

Project exclusions are the things that are out of the project boundaries. Sometimes it is called project out scoop. It states the things that will not happen in this project and will happen later in future. So the following table shows the FIMS project exclusions.

Exclusions
E01: The schools can not request a new candidate (Faculty) through the system
E02: Hiring process is the responsibility of the HR department
E03: Automatic resource assignment for faculties
E04: Automatic workload assignment for faculties
E05: Faculty assessment
E06: Faculty teaching performance
E07: Faculty promotion
E08: Faculty mentoring

Table 2: Project Exclusions

1.5 Assumptions

Project assumptions are the things that are expected to happen to the project during any phase of the life cycle. So the following table, shows the project manager assumption for this project FIMS.

Assumptions
A01: DAH IT Department deploys and maintains the system
A02: System is deployed on DAH servers
A03: The provost office is responsible for system
A04: The project budget stays fix during the completion of the project
A05: The time allotted to the project stays fix
A06: Sponsor provides necessary help to collect requirements
A07: Requirements may change by only 5% when system design starts
A08: Requirements may be added after system design starts
A09: Application complies to DAH, guidelines, regulations and policies

Table 3: Project Assumptions

1.6 Constraints

Project constraints are the things that limit the project work and actions, and it sometimes redirects to actions that were not desired. The following table shows the business and technical constraint for the FIMS project.

1.6.1 Business constraints
BC01: Limited budget that is dedicated to this project
BC02: Project time and schedule are shorter (limited to one semester)
BC03: stakeholders delaytion for interviews
1.6.2 Technical constraints
TC01: Lack of knowledge in designing some diagrams
TC02: Interfaces with systems used by support services department
TC03: The system shall operate only inside the campus

Table 4: Project Constraints

1.7 High-level Requirements

The high level requirements and the requirements that are collected from the stakeholders at the beginning of the project. It states what they want and expect from the project. Also, it states the specification of the project and its behavior. So the following table shows the high level requirements of this project.

Requirements
REQ01: The system shall notify all system users
REQ02: System shall include dashboards about faculty employment type
REQ03: The system shall assign an office as the faculty get accepted
REQ04: System shall be deployed on DAH servers
REQ05: System shall be web-based
REQ06: System shall include authentication and authorization features
REQ07: The system shall fully backup automatically every weekend days
REQ08: The provost office have the full authorization on the system

Table 5: Project Requirements

1.8 Overall Project Risks

Project risks are certain events that may or may not occur. If it occurs it can cause a negative or a positive effect. The table shows the overall risks that may occur during the execution of this project.

Risk	Rating (High, Medium, Low)	Mitigation
R01: Project has a tight schedule	High	Combine tasks and work in parallel
R02: Unavailability of the stakeholders to conduct interviews	Medium	<ul style="list-style-type: none">Conduct interviews with the available one and get back to the unavailable.Vary in requirements gathering technique
R03: IT Department rejects the deployment and maintenance of the system	High	Inform the provost office and they will handle the risk
R04: Lack of skills in programming	High	Revise all materials covered in programming and read documentations
R05: Lose all materials related to the project	High	Backup each single time 5 backup project material and documents every week on the cloud and external hard disks)
R06: Changes in project deliverables due dates	High	Combine tasks and work in parallel

Table 6: Project Risks

1.9 Deliverables

The following table shows the deliverable that will be delivered to the stakeholders and at the end of this project.

Deliverables
D01: Project charter document
D02: Requirement analysis document
D03: Project management plan document
D04: System design document
D05: Implementation of the system
D06: User manual document
D07: Admin manual document
D08: System training sessions
D09: A faculty information management system (FIMS)

Table 7: Project Deliverables

1.10 Summary Milestones Schedule

Milestone	Estimated Completion Date
10.1. Start the project	16-02-2020
10.2. Completion of the project charter	26-02-2020
10.3. Start collecting requirements	19-02-2020
10.4. Completion of requirement analysis	10-04-2020
10.5. Start working on the project management plan document	19-02-2020
10.6. Completion of the project management plan	10-04-2020
10.7. Start designing the system	11-04-2020
10.8. Completion of system design	07-05-2020
10.12. Project closing	07-05-2020

Table 8: Project Milestone Schedule

Note:

The dates are subject to change

1.11 Key Project Stakeholders

The following table shows the project stakeholders and their roles in the system and from which department they belong.

Name or Position	Role	Department
11.1. Ms. Ishraq Barakat	Admin of the system	Provost Office
11.2. Ms. Nouf Barasheed	Admin of the system	Provost Office
11.3. Ms. Hadeer Alroshan	Admin of the system	Provost Office
11.4. IT staff	<ul style="list-style-type: none"> • Admin of the system (To maintain purpose) • IT staff (To deliver the equipment) 	IT department
11.5. Receptionist	Deliver the door sign	PSSD department
11.6. Maintenance	Deliver the equipment	PSSD department
11.7. Recruitment officer	HR officer	HR department
11.8. Central Advisor	Assign workload and TA	CAADU
President	Approve	President Office
Department Chair/ Council	Approve	All department
School dean/ council	Approve	All schools

Table 9: Project Stakeholders

1.12 Budget Estimate

Grant	Amount (SAR)
Internship Grant	2000 SAR

Table 10: Project Grant

Budget Item	Amount (SAR)
Software License	887 SAR for 4 Month
LucidChart	19 SAR/month
Balsamic	34 SAR/month
Draw IO	19 SAR/month
SQL Server Development Edition	Free
Visual Studio 2019 Community Edition	599 SAR
Printing	200 SAR
Laptop Maintenance	200 SAR
Total Cost	1,887 SAR

Table 11: Budget

Note

This budget is only for learning purposes, student will not request this amount from the internship organization

1.13 Alternatives

For this project, there are no similar systems. Because the idea of the project is innovative and new. According to the search results, there is research about Enterprise Systems for Faculty Information in Universities: Implementation Challenges (April 2017). This research talks about the necessity of a system to be available to manage faculties' information. Basically, the idea of this research is to create a database where all university members can have access to it to look for any information related to a specific faculty. The information could be a personal, academic record, or a resume of the faculty.

As mentioned previously, the idea if this project is unique. It has its own features that help the stakeholders or the organization that request it.

Moreover, the search result found systems which can be under alternatives and cannot be similar because it has other functions and modules that are not necessary in this project. In the following table are the alternatives and its advantages and disadvantages compared to FIMS.

Alternative System	Advantages	Disadvantages
ALT01: MasterSoft's University Management System	<ul style="list-style-type: none">• It has many modules in the system regarding any university process• It has capability to modified and customized according to the needs• It has 24x7 online and offline support	<ul style="list-style-type: none">• Does not eliminate the work of assigning offices for faculties• Does not include the faculty hiring process• Does not manage faculties information
ALT02: University Management System (UMS) by M/s Robosoft Technologies, India	<ul style="list-style-type: none">• Self-service systems with simple to use with little or no training.• Elimination of duplicate data entry processes• Ease and accuracy of reporting.	<ul style="list-style-type: none">• Does not generate reports• Does not provide a dashboard to the user• Does not provide a limit access to each and different user
ALT03: University examination Management System by CyberVision	<ul style="list-style-type: none">• It has complete ERP solutions for universities	<ul style="list-style-type: none">• Does not provide an automatic backup

	<ul style="list-style-type: none">• It has limited for each and different user• It handles all the functions of employee hiring process	<ul style="list-style-type: none">• Does not provide a notification function
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Table 12: Project Alternatives

1.14 Project Exit Criteria

Exit Criteria
PE01: The developed system is tested and deployed on DAH IT servers
PE02: Software requirements are tested and accepted
PE03: Training sessions and workshops are conducted
PE04: Project reports are updated and delivered

Table 13: Exit Criteria

Chapter 2. Requirement Analysis

2.1 Introduction

The Faculty Information Management System (FIMS) is a system for the Provost Office at Dar Al-Hekma University. It helps the user in certain areas, such as doing some work through the system rather than manually. Also, they can have a database where all their Excel sheets are combined together in one place. Furthermore, this system will reduce paper-based work.

This report will be mentioning all the stakeholder's personas that will interact with the system. Then will list all the requirements (functional and non-functional) that the previous stakeholders asked for. To collect the requirements, certain fact-finding techniques will be used such as Interviews, Document Analysis and Brainstorming. In addition, during the execution phase, the stakeholders might want to modify, add, or delete some requirements. So the requirements are adjustable and can be changed during the execution-only by 5%. It cannot exceed this percentage, because it will lead to the need for changing the whole system then the delivery time will be changed. Moreover, these requirements will be analyzed to illustrate and model in multiple diagrams. The models that will be developed for this document are Functional Modeling which will include Use Case and Activity Diagrams. Also, will develop Behavioral Modeling which will include the State Diagrams. Finally, the Entity-Relationship Diagram will be designed under the Conceptual Data Modeling section.

Apart from the previous section, the purpose of this document is that it will help both the project manager and the sponsor to know what exactly needs and should be done. So, it helps the system developer to know what the system should do, how it should perform, and what the system should include. Also, the diagrams will help the team to visualize how the project will work. On the other hand, the project sponsor will be aware of the things that will be developed, and they can have a better view and understanding of the system. Finally, they can know what are the features that will be included in the system and imagine easily the flow of the process.

2.2 Current System

The current situation in the Provost Office is that they manage faculties and things that are related to them manually (paper-based). They do not use any system regarding managing or pursuing the processes. The approval of appointing the new faculty process done manually. Also, the follow-up process achieved by emails and calls. In addition, the processes of managing faculties' offices either new or old are attained manually. Moreover, due to the missing database in the department, they save the information and documents in different Excel sheets. Apart from this concern, the user finds difficulty in integrating the files and doing a specific task. An example of the difficulty, when updating a faculty office number in the offices list the user needs to update also in the faculties information list. Where in the mentioned example, the user needs to do the process manually, and it might cause that the user forgets to update. Moreover, they find difficulty preparing reports or managing faculties' information periodically.

However, the FIMS idea will help in improving the current process. In addition, it will decrease the percentage of the difficulties that are happening now in the current system by approximately 80%. So, the FIMS will improve the efficiency of the work. It will help in the previous example that when the user updates in one list the other list will be updated automatically. Moreover, the system will reduce the occurrences of mistakes that might happen during the manual process. For example, when the user updates specific information in one of the lists it must be updated in another list. So, this specific information in the second list could be different than in the first one.

2.3 Personas

In the following tables, are the personas and information about the stakeholders' character and roles

Persona	2.3.1 System Supervisor
Name	Ishraq Barakat
Photo	
Job Title and Responsibilities	<p>Job Title: Director of the provost office</p> <p>Responsibilities:</p> <ul style="list-style-type: none"> • Interacts effectively with student, faculty, staff, and visitors in response to their inquiries and requests • Carries out all duties with a high degree of accuracy and attention to deadlines. • Acts as the first point of contact for the provost • Assist the provost in resolving the student/ faculty related issues and complaints and make the necessary follow-ups. • Advise staff, faculty, and student with divisions policies and procedures • Plan and coordinate meeting for academic councils • Communicate with divisions department to answer questions • Obtain information and resolve issues provides information concerning related functions including assistance with questions, reports and budget issues • Serve on various division /Institutes committees and teams • Train supervise and evaluate the performance of executive admin, admin assistance and support staff. • Ensure that the staff in the office are working properly and efficiently.
Demographics	<p>Age: 48 years old</p> <p>Gender: Female</p> <p>Education Level: Master</p>
Goals	<ul style="list-style-type: none"> • She wants to follow up with the faculty hiring process easily • She wants to find the data easily and generate reports from the data • She wants to know the workload for each faculty. • She wants to know the occupied TA and the non-occupied one.

Challenges	<ul style="list-style-type: none"> • She finds difficulty in preparing periodic reports. • She finds different information in Excel sheets for the same columns
Computer experience	She is comfortable using computers and systems and knows her way around them.
Environment	The application will be used daily to follow up on the workflow. It will be used in desktop computers from inside the campus. It will run on the Windows operating system.

Table 14: Supervisor Persona

Persona	2.3.2 System Admin
Name	Nouf Barashid
Photo	
Job Title and Responsibilities	<p>Job Title: Admin clerk Responsibilities:</p> <ul style="list-style-type: none"> • Update faculty recruitment status. • Assign offices for faculties • Update Faculties information list • Generate periodical statistics for new and current faculty members • Resoundingly for DAH curriculum records of new and revised courses • Managing academic-related committees such as teaching and learning and graduate council committees • Prepare a faculty development plan
Demographics	<p>Age: 32 years old Gender: Female Education Level: Master</p>
Goals	<ul style="list-style-type: none"> • She wants to have a database which will combine all the current different Excel sheets in one place • She wants to use the database to integrate the different excel sheets easily • She wants to retrieve data easily • She wants to update faculties information easily • She wants to generate periodically reports
Challenges	<ul style="list-style-type: none"> • She finds it difficult to integrate the different Excel sheets. • Due to the difficulty in integration, she finds difficult to retrieve data easily • Difficulties while updating faculties information • Difficulty to generate periodically reports
Computer experience	<p>She is a professional in using computers and spends most of the time working with the system.</p>
Environment	<p>She uses the computer a lot at work and considers herself a professional user. She uses a desktop computer that uses the Windows operating system.</p>

Table 15: System Admin Persona

Persona	2.3.3 System Admin Assistant
Name	Hadeer Alroshan
Photo	
Job Title and Responsibilities	<p>Job Title: AA admin clerk Responsibilities:</p> <ul style="list-style-type: none"> • Assist the admin clerk and the department • Organize and review files • Gather information regarding the canceled classes and register them in Excel sheets • Gather information regarding the student's trips and register them in Excel sheets
Demographics	<p>Age: 28 years old Gender: Female Education Level: Bachelor</p>
Goals	While using the system it will link the flow of the information without repeating or missing some of them
Challenges	<ul style="list-style-type: none"> • Missing information while integrating data from different Excel sheets. • Update the faculty information in excel sheets for each semester. • Update the room assignment in excel sheet for each semester • Update the recruitment of faculties in excel sheet for each semester
Computer experience	She is an intermediate computer user, and comfortable with using computers and systems.
Environment	The computer is being used a lot at work. She uses a desktop computer that uses the Windows operating system.

Table 16: System Admin Assistant Persona

Persona	2.3.4 CAADU User
Name	Rima Mokhtar
Photo	
Job Title and Responsibilities	<p>Job Title: Central academic advisor Responsibilities:</p> <ul style="list-style-type: none"> • Prepare department schedule • Assign faculties workload • Assign teacher assistant and academic clerk for each faculty • Arrange new faculties for the department
Demographics	<p>Age: 32 years old Gender: Female Education Level: Bachelor</p>
Goals	<ul style="list-style-type: none"> • She wants easily to get approval for the faculty workload • She wants easily to know which TA is not assigned and then assign them to a faculty
Challenges	<ul style="list-style-type: none"> • She faces some delays while getting the workload approval • She faces difficulty while filtering the assigned and not assigned TAs manually
Computer experience	She is a professional in using computers and spends most of the time working with the system.
Environment	She uses a computer daily at work. She uses a desktop computer that uses the Windows operating system.

Table 17: CAADU User

Persona	2.3.5 HR User
Name	Amal Naitah
Photo	
Job Title and Responsibilities	<p>Job Title: Assistant-Recruitment/Government Relations Office</p> <p>Responsibilities:</p> <ul style="list-style-type: none"> • Search good candidates for the available vacancies (Faculty / Staff) • Share more qualified candidates CV's with the department chairs • Conduct appointments for interviews • If there is a hiring request, gather necessary documents • Check the reference for the previous work experience for each candidate • Send documents to the candidates that need to be signed along with the contract
Demographics	<p>Age: 28</p> <p>Gender: Female</p> <p>Education Level: Bachelor</p>
Goals	Facilitate the daily work in the recruitment office
Challenges	Delay in receiving the recruitment requisitions
Computer experience	She is an intermediate computer user, and comfortable with using computers and systems.
Environment	She does her daily work on a computer, which has a windows operating system. She uses multiple software daily

Table 18: HR User

Persona	2.3.6 Maintenance Coordinator
Name	Merna
Photo	
Job Title and Responsibilities	<p>Job Title: Maintenance help desk Responsibilities: [1]</p> <ul style="list-style-type: none"> • Conducting routine inspections of premises and equipment. • Handling basic repairs and maintenance • Diagnosing mechanical issues and correcting them • Complete equipment and electricity requests
Demographics	<p>Age: 45 years old Gender: Female Education Level: High School (Diplomas)</p>
Goals	<ul style="list-style-type: none"> • She wants to know detail information about the requests so she can easily complete it as requested • She wants to know the lists of requests so according to it she can manage her schedule
Challenges	<ul style="list-style-type: none"> • She faces difficulty in to complete the request on time because either the request details are missing or she forgets about it and did not note in her schedule
Computer experience	She is an intermediate computer user, and comfortable with using computers and systems.
Environment	She will be able to use the desktop computer that uses the Windows operating system every time she receives a request.

Table 19: Maintenance Coordinator Persona

Persona		2.3.7 Information Desk Coordinator
Name	Arwa Attar	
Photo		
Job Title and Responsibilities	<p>Job Title: Information desk officer Responsibilities:</p> <ul style="list-style-type: none"> • Manage the entering and exiting of visitors. • Answer visitors' questions and give instructions. • Manage telecommunication • Complete door sign requests 	
Demographics	<p>Age: 28 years old Gender: Female Education Level: Bachelor</p>	
Goals	<ul style="list-style-type: none"> • She wants to know detail information about the requests so she can easily complete it as requested • She wants to know the lists of requests so according to it she can manage her schedule 	
Challenges	<ul style="list-style-type: none"> • She faces difficulty in to complete the request on time because either the request details are missing or she forgets about it and did not note in her schedule 	
Computer experience	<p>She is an intermediate computer user and comfortable with using computers and systems.</p>	
Environment	<p>She will be able to use the desktop computer that uses the Windows operating system every time she receives a request.</p>	

Table 20: Information Desk Coordinator Persona

Persona	2.3.8 IT Coordinator
Name	Ohoud Alrefi
Photo	
Job Title and Responsibilities	<p>Job Title: Operation Manager Responsibilities:</p> <ul style="list-style-type: none"> • Monitor IT Servers and Systems • Direct IT Technicians Resolve Help Desk Escalations • Oversee Upgrades and Installations
Demographics	<p>Age: 35 Gender: Female Education Level: Bachelor</p>
Goals	<ul style="list-style-type: none"> • To have a secure and easy to manage system • She wants to know detail information about the requests so she can easily complete it as requested • She wants to know the lists of requests so according to it she can manage her schedule
Challenges	<ul style="list-style-type: none"> • She faces difficulty in to complete the request on time because either the request details are missing or she forgets about it and did not note in her schedule
Computer experience	She is a professional in using computers and spends most of the time working with the system.
Environment	She does her daily work on a computer, which has a windows operating system. She uses multiple software daily

Table 21: IT Coordinator Persona

Note:

The Information Desk Coordinator and IT Coordinator's goals and challenges build upon Maintenance's goals and challenges. Because they are going to use the system for the same purpose.

2.4 Requirements Determination

Before designing any system, it must-have requirements, and requirements mean that what are the things the stakeholders want to see and practice in the system. Also, how these things that they want to see will behave or look like. According to these things, the system can be built and designed. The requirements can be gathered through many techniques. For this system, the techniques that it follows to gather the requirements are Interviews, Document Analysis, Brainstorming, and Assumptions. The assumptions have been chosen due to the limitations that occurred during the collecting phase. The following two sections will mention the functional and non-functional requirements for this project:

2.4.1. Functional Requirements

The functional requirements (FR) are the tasks that the system will perform or should do. The following are the requirements that some of it is from the stakeholder and some are assumptions:

2.4.1.1 System Supervisor User Stories

FR01.1:

As a system supervisor, I want to see the assigned workload for each faculty, so I can review before I approve it.

FR01.2:

As a system supervisor, I want to view the assigned teacher assistant for each faculty, so this can help to know the un-assigned TA's.

FR01.3:

As a system supervisor, I want to generate the following reports about faculties, so I can use it in the annual meetings as a reference.

- Full-time Faculties
- Part-time Faculties
- Workload
- Assigned TAs
- Underload Faculties
- Overload Faculties

FR01.4:

As a system supervisor, I want to view the faculties profile, so that I can manage the faculties list and instruct the system admin assistant for changes.

FR01.5:

As a system supervisor, I want to view the offices list, so that I can manage the list and instruct the system admin assistant for changes

FR01.6:

As a system supervisor, I want to view the available resources in offices , so that I can manage the resources in each office.

FR01.7:

As a system supervisor, I want to view attached documents to a candidate profile, so that I can use it for future reference.

FR01.8:

As a system supervisor, I want to send notifications to the following users, so that I can notify them if there are any notes to their tasks.

- System supervisor
- System Admin
- System admin assistant
- CAADU user
- HR user
- Maintenance coordinator
- Information desk coordinator
- IT coordinator

FR01.9:

As a system supervisor, I want the following faculties information to be added to the databank automatically so that it can be used for future purpose.

- Rejected faculties
- Canceled faculties
- Resigned faculties

FR01.10:

As a system supervisor, I want the newly hired faculties to add them automatically in the following lists, so I can ensure that new faculties have been added to the lists.

- Faculty information list
- Faculty offices list
- Faculty workload list

2.4.1.2 System Admin User Stories

FR02.1:

As a system admin, I want to record the following data so that I can create a new candidate profile.

- First name
- Last name
- Email address
- Mobile Number

- Type of contract
- Part time courses
- Total credit hours
- Date needed
- Recruitment status
- Position title
- Employment type
- Program type (Ex. Undergraduate)
- School name (Ex. School of Business and Law)
- Department name (Ex. MIS department)
- Division
- Temporary office number

FR02.2:

As a system admin, I want to upload the hiring documents in the following formats in the system, so I can have a backup for the documents.

- .pdf
- .png
- .gif
- .jpg

FR02.3:

As a system admin, I want to perform the following tasks, so I can manage candidate profile

- View candidate profile
- Edit candidate profile
- Remove candidate profile
- List Candidates
- Search for a candidate

FR02.4:

As a system admin, after creating a candidate's profile I want to update the status with the decision of the approval as it gets from the following committees, so I can continue with the process and keep other departments updated with the decision.

- HR
- Department Recruitment Panel
- Department/Program Council
- School Council
- Scientific Council
- President

FR02.5:

As a system admin, I want to submit resource requests about the following resources, so other coordinators can perform according to the request

- Equipment

- Computer
- Printer
- Door Sign

FR02.6:

As a system admin, I want to submit an electronic devices and computer software request to IT coordinators, so they can act according to the request

FR02.7:

As a system admin, I want to specify the following electronic devices and computer softwares in the request, so the IT coordinator can provide me the exact resource

- Computer (Windows, MAC)
- Printer
- Speakers
- Projector
- Scanner
- Paper Shredder
- Microphone
- Webcam

FR02.8:

As a system admin, I want to submit an equipment request to maintenance coordinators, so they can act according to the request

FR02.9:

As a system admin, I want to specify the following equipment in the request, so the maintenance coordinator can provide me the exact resource

- Desk
- Chairs
- Electricity Extensions
- Cabinets
- Phones
- Phone Extension

FR02.10:

As a system admin, I want to submit an door sign request to information desk coordinators, so they can act according to the request

FR02.11:

As a system admin, I want to perform the following tasks, so that I can manage the resources list

- View resources list
- View request details
- List requests

- Search request
- Edit resource request
- Edit resources list

FR02.12:

As a system admin, I want to record the following information, so that I can request resources

- Office number
- Faculty name
- Position title
- Resource name
- Resource quantity
- Resource responsible department (Ex. IT)
- Note
- Request status (Ex. Open, Completed)
- Request date and time
- Delivery date and time

FR02.13:

As a system admin, I want to search for a specific office to view the available resources in the office, so I can manage the resources

FR02.14:

As a system admin, I want to generate reports about the following, so I can analyze data

- Faculties employment type reports (Full-Time / Part-Time)
- Faculties in each school report
- Faculties in each department report
- Faculties workload report
- Teacher Assistant status report (Assigned / Not-Assigned)

FR02.15:

As a system admin, I want to generate a dashboard about faculties employment type so I can use it to check periodically reports

FR02.16:

As a system admin, I want the generated reports to be saved in one specific list, so that I can re-use it again in future

FR02.17:

As a system admin, I want to export the generated reports in the following formats, so that I can use it when needed

- .pdf
- .png
- .gif
- .jpg

- .xlsx
- .pptx

FR02.18:

As a system admin, I want to receive a notification about the following changes on my email so I can be able to follow up:

- Faculty recruitment status
- Completion of each resource request

2.4.1.3 System Admin Assistant User Stories

FR03.1:

As a system admin assistant, I want to assign a temporary office to faculty as get accepted (hired) so the faculty can have an office

FR03.2:

As a system admin assistant, I want to search for the new faculty in the office's list, so I can re-assign a permanent office

FR03.3:

As a system admin assistant, I want to perform the following tasks in the offices list, so that I can manage the offices list

- View the offices list
- Add faculty to the list
- Edit the offices list
- Remove faculty from the office list
- Remove office from the list

FR03.4:

As a system admin assistant, I want to record the following data so that I can add a faculty to the offices list

- Office number
- Area
- Person name
- Available resource

FR03.5:

As a system admin assistant, I want to search the accepted candidate profile using one of the following, so that I can convert the profile from candidate profile to faculty profile

- First name
- Last name
- Mobile Number
- Email address
- Type of contract

- Recruitment status
- Position title
- Employment type
- Program type (Ex. Undergraduate)
- School name (Ex. School of Business and Law)
- Department name (Ex. MIS department)
- Division
- Temporary office number

FR03.6:

As a system admin assistant, I want to add the following information to the faculty profile, so I can add the profile to the faculty information list

- Nationality
- Highest Education
- Institution
- Rank
- Number Of Credits Taught In Each Course
- Course Teaching Type
- Total Credits Hours
- Total Contact Hours
- Required Load
- Load Type
- Conversion Rate
- Status
- Hiring Date
- Release Date
- Application Date
- Date Of Birth
- Permanent office number
- Phone extension

FR03.7:

As a system admin assistant, I want to perform the following tasks, so that I can manage the faculty information list.

- List all faculties
- Search faculty profile
- Edit faculties profiles
- Remove faculty from the list

FR03.8:

As a system admin assistant, I want the removed faculty from the faculty list to moved automatically to the databank list, so it can be used in future

FR03.9:

As a system admin assistant, I want to receive the following types of notification, so that it reminds me for the updating the faculty information list

- In-app notification
- Email notification
- Calendar notification

FR03.10:

As a system admin assistant, I want to search for the faculty in the faculty information list using one of the following, so I can update his/ her profile

- Name
- Employment type (Full-Time / Part-Time)
- Position title
- Mobile number
- Email address
- School name
- Department name
- Office number
- Extension number

2.4.1.4 CAADU User Stories

FR04.1:

As a CAADU user, I want to receive a notification as new faculty get hired, so that I can prepare his/her workload and ensure for them a TA

FR04.2:

As a CAADU user, I want to record the following information, so that I can assign a workload for a faculty.

- Faculty ID
- Faculty Name
- Rank
- Position
- Course Code
- Course Title
- Course Type
- Course Credits
- Contact Hours
- Section Number
- Semester
- Academic Year
- Total workload

FR04.3:

As a CAADU user, I want to perform the following tasks, so that I can manage the workload lists

- View list
- Add faculty to the list
- Edit information on the list
- Remove faculty from the list
- Remove workload from the faculty
- Update faculty workload
- List faculty workload

FR04.4:

As a CAADU user, I want to be updated if the assigned workload is approved or not, so that I can re-assign if not approved.

FR04.5:

As a CAADU user, I want to receive a notification about workload and TA/ Course Admin assignments from the following departments, so I can proceed with the next step.

- Department chair or Program director
- Head of CAADU
- Dean of school
- Provost

FR04.6:

As a CAADU user, I want to know the current faculties in the department, so I can add new workload for faculty each semester.

FR04.7:

As a CAADU user, I want delete faculty workload for the following cases, so that I can manage the faculty workload list

- Case of error
- Faculty leave
- Faculty change position

FR04.8:

As a CAADU user, I want to search for faculty by the following data, so that I can manage their workloads.

- Faculty ID
- Faculty name
- Department

2.4.1.5 HR User Stories

FR05.1:

As a HR user, I want to be notified when a new candidate is approved and added in the system, so that I can proceed with the hiring process.

FR05.2:

As a HR user, I want to view the hiring documents for specific candidates using one of the following information, so I can take the decision of hiring.

- First name
- Last name
- Email address
- Mobile Number
- Type of contract
- Date needed
- Recruitment status
- Position title
- Employment type
- Program type (Ex. Undergraduate)
- School name (Ex. School of Business and Law)
- Department name (Ex. MIS department)
- Division

FR05.3:

As a HR user, I want to perform the following tasks in the candidates profiles, so I can manage the requests

- View candidate/ faculty profile
- Search for faculties by status
- List all faculties
- Edit recruitment status (Accept, Cancel, Reject)

FR05.4:

As a HR user, I want the rejected and canceled candidates to move automatically to the databank list, so that it can be used in future

2.4.1.6 Maintenance Coordinator User Stories

FR06.1:

As a maintenance coordinator, I want to receive a notification in the following places when the request sent, so I can update my schedule according to the request

- Email
- FIMS application
- Calendar

FR06.2:

As a maintenance coordinator, I want to know the following information about the request, so I can manage the request easily

- Equipment name
- Equipment quantity
- Problem type (If available, Ex. Broken Desk)
- Electricity extension type (Ex. 110, 220)
- Note
- Delivery date and time
- Office number

FR06.3:

As a maintenance coordinator, I want to perform the following changes to the requests that is related to me, so I can manage the resources list

- View request details
- List requests
- Search for request
- Accept the request
- Reject the request
- Change delivery date
- Change request status (Ex. Complete)

2.4.1.7 Information Desk Coordinator User Stories

FR07.1:

As a information desk coordinator, I want to receive a notification in the following places when the request sent, so I can update my schedule according to the request

- Email
- FIMS application
- Calendar

FR07.2:

As a information desk coordinator, I want to know the following information about the request, so I can manage the request easily

- Faculty name
- Faculty position title
- Office number
- Delivery date and time

FR07.3:

As a information desk coordinator, I want to know the faculty name and the position title in the following languages, so I can print the door sign correctly

- English
- Arabic

FR07.4:

As a information desk coordinator, I want to perform the following changes to the requests that is related to me, so I can manage the resources list

- View request details
- List requests
- Search for request
- Accept the request
- Reject the request
- Change delivery date
- Change request status (Ex. Complete)

2.4.1.8 IT Coordinator User Stories

FR08.1:

As a IT coordinator, I want to receive a notification in the following places when the request sent, so I can update my schedule according to the request

- Email
- FIMS application
- Calendar

FR08.2:

As a IT coordinator, I want to know the following information in the request, so I can manage the request easily

- Office number
- PC type
- Printer type (If needed)
- Problem type (If available)
- Scanner type (If needed)
- Paper Shredder(if needed)
- Microphone(if needed)
- Webcam(if needed)
- Speakers

FR08.3:

As a IT coordinator, I want to perform the following changes to the requests that is related to me, so I can manage the resources list

- View request details
- List requests
- Search for request
- Accept the request
- Reject the request
- Change delivery date
- Change request status (Ex. Complete)

Note:

The three coordinators (Maintenance, Information Desk, and IT) have almost the same user stories. Due to the same purpose of using the system.

2.4.2. Nonfunctional Requirements

The non-functional requirements (NFR) are the system behaviors or how the system should be designed. The following are the requirements that some of it is from the stakeholder and some are assumptions grouped into categories:

2.4.2.1 Accessibility

NFR01.1:

The provost office, HR, CADDU, IT, Information disk, and Maintenance shall have access to the system

NFR01.2:

The HR, CADDU, IT, Information disk, and Maintenance shall have limited access in the system

NFR01.3:

The provost office shall have the full access and authorization on the system

NFR01.4:

The system shall be accessible by users who do not have a prior experience in systems and computers

2.4.2.2 Security

NFR02.1:

The system shall include authentication and authorization features like different username and password for each user.

NFR02.2:

The user shall change the initially assigned login password immediately after completion of each semester, and the initial should never be reused.

NFR02.3:

The system shall be locked after three incorrect authentication and send a notification to the user email to unlock the account

NFR02.4:

The system while generating passwords shall not accept weak specifications. It must have strong specifications like the password should be a combination of upper, lower case letters, numbers, and symbols.

NFR02.5:

The system shall encrypt the password during the login stage

2.4.2.3 Performance

NFR03.1:

The system shall be capable enough to handle 1000 users without affecting its performance

NFR03.2:

The system shall update all other lists when specific data in one list has been modified within 2 seconds

NFR03.3:

The system shall handle 100 requests per second

2.4.2.4 Operability & Portability

NFR04.1:

The system shall be portable. So opening from one operating system and then from another does not create any problem.

NFR04.2:

The system shall be deployed on DAH servers

NFR04.3:

The system shall work on both client devices either Windows or MacOS

2.4.2.5 Backup & Recoverability

NFR05.1:

The system shall fully backup automatically every week on the weekend days

NFR05.2:

The faculties Information shall be fully backed up every month on the weekend days

2.4.2.6 Privacy

NFR06.1:

The system shall not allow other users rather than provost office to access faculties information list

NFR06.2:

The system shall allow the HR user to only view the candidate profile

NFR06.3:

The system shall keep the data private

2.4.2.7 Usability

NFR07.1:

The system shall be web-based because it is easy for the users in the work environment

NFR07.2:

The system shall be user friendly, that the user can learn how to use it in one week

NFR07.3:

The system shall have a maximum of 3 clicks to reach any content

NFR07.4:

The system shall have a single login to access all content

NFR07.5:

The system shall have a consistent UI (in all the views and dialogs, the UI elements behave and are placed in a similar way)

2.4.2.8 Documentation

NFR08.1:

The system shall provide an admin manual hard and soft copy for helping the admins in interact with the system

NFR08.2:

The system shall provide a user manual hard and soft copy for helping the users in using the system

2.4.2.9 Availability

NFR09.1:

The system shall be available 95% - 99% of the time during the year

NFR09.2:

The system shall be available during the working days from Sunday 7:30 AM to Thursday 5:30 PM

NFR09.3:

The system shall update during the off days from Thursday 7:00 PM to Sunday 5:00 AM

NFR09.4:

The system shall have high availability

NFR09.5:

The system shall not have unexpected downtime

NFR09.6:

The system shall have downtime at most 4 hours/month

NFR09.7:

The system shall have its expected downtime announced at least 48 hours in advance

NFR09.8:

The system shall have downtime only during scheduled update days

2.4.2.10 Efficiency**NFR10.1**

The system shall request the resource in 3 steps

NFR10.2

The system shall create the faculty profile in 3 steps

2.4.2.11 Maintainability**NFR11.1**

The system shall be easily maintainable

2.4.3 Requirement Traceability Matrix (RTM)

The following table will trace all the requirements that are proposed in the previous section, during the project life and check whether it has been met or not. So the table will be updated till the end of the project.

Requirement ID	User Story or Requirement	Priority	Category	Business Objective
FR01.1	As a system supervisor, I want to see the assigned workload for each faculty, so I can review before I approve it	High	Functional	Provost office admins will be able to know each faculty workload and assigned teacher assistant
FR01.2	As a system supervisor, I want to view the assigned teacher assistant for each faculty, so this can help to know the un-assigned TA's	High	Functional	Provost office admins will be able to know each faculty workload and assigned teacher assistant
FR01.3	As a system supervisor, I want to create periodical reports about the faculties employment type, so I can know how many full-time and part-time faculties we have	Medium	Functional	The Provost office manager is able to generate reports and dashboards every semester related to the AA department.
FR01.4	As a system supervisor, I want to view periodically reports about the faculties employment type, so I can use it in the annual meetings as a reference	Medium	Functional	The Provost office manager is able to generate reports and dashboards every semester related to the AA department.
FR01.5	As a system supervisor, I want to view the faculties profile, so that I can manage the	High	Functional	The Provost office is able to update faculty information

	faculties list an instruct the system admin assistant for changes			every semester/year.
FR01.6	As a system supervisor, I want to view the offices list, so that I can manage the list and instruct the system admin assistant for changes	High	Functional	The Provost office is able to manage offices for faculties.
FR01.7	As a system supervisor, I want to view the offices list, so that I can know what resources are available in each office	High	Functional	The Provost office is able to manage offices for faculties.
FR01.8	As a system supervisor, I want to view the uploaded hiring documents so that I can use it for future reference	High	Functional	Provost office is able to keep a list of potential faculty candidates.
FR01.9	As a system supervisor, I want the following users to receive notifications on emails for tasks that related to them, so the users will be notified <ul style="list-style-type: none"> • System supervisor • System Admin • System admin assistant • CAADU user • HR user • Maintenance coordinator • Information desk coordinator • IT coordinator 	High	Functional	Provost office is able to request resources for faculties from Purchase and Support Services and IT Departments.

FR01.10	<p>As a system supervisor, I want the following faculties information to be added to the databank automatically so that it can be used for future purpose</p> <ul style="list-style-type: none"> • Rejected faculties • Canceled faculties • Resigned faculties 	Low	Functional	Provost office is able to manage rejected, canceled and resigned faculties
FR01.11	<p>As a system supervisor, I want the newly hired faculties to add them automatically in the following lists, so I can ensure that new faculties have been added to the lists</p> <ul style="list-style-type: none"> • Faculty information list • Faculty offices list • Faculty workload list 	High	Functional	Provost office is able to keep a list of potential faculty candidates.
FR02.1	<p>As a system admin, I want to record the following information so that I can create a new candidate profile.</p> <ul style="list-style-type: none"> • Candidate name • Position title • Employment type • School name (Ex. School of Business and Law) 	High	Functional	The Provost office is able to conduct a faculty appointment.

	<ul style="list-style-type: none"> • Department name (Ex. MIS department) • Recruitment status • Temporary office number 			
FR02.2	<p>As a system admin, I want to upload the hiring documents in the following formats in the system, so I can have a backup for the documents.</p> <ul style="list-style-type: none"> • .pdf • .png • .gif • .jpg 	High	Functional	Provost office is able to keep a list of potential faculty candidates.
FR02.3	<p>As a system admin, I want to perform the following tasks, so I can manage candidate profile</p> <ul style="list-style-type: none"> • View candidate profile • Add new information in the candidate profile • Edit candidate profile • Remove information from candidate profile • Remove candidate profile 	High	Functional	The Provost office is able to conduct a faculty appointment.
FR02.4	As a system admin, I want the approved candidate to be shown in the system, so the recruitment department	High	Functional	Provost office is able to keep a list of potential faculty candidates.

	can proceed with the next step of hiring			
FR02.5	As a system admin, I want to submit a resource request about the following resources, so other coordinators can act according to the request <ul style="list-style-type: none"> • Equipment • Computer • Printer • Door Sign 	High	Functional	Provost office is able to request resources for faculties from Purchase and Support Services and IT Departments.
FR02.6	As a system admin, I want to submit a request about the following equipment, so the coordinator can act according to the request <ul style="list-style-type: none"> • Desk • Chairs • Electricity Extensions • Cabinets 	High	Functional	Provost office is able to request resources for faculties from Purchase and Support Services and IT Departments.
FR02.7	As a system admin, I want to perform the following tasks, so that I can manage the resources list <ul style="list-style-type: none"> • View resources list • Add new request to the resources list • Edit resource request • Remove information from the request • Remove request from the list 	High	Functional	Provost office is able to request resources for faculties from Purchase and Support Services and IT Departments.

FR02.8	<p>As a system admin, I want to record the following information, so that I can request resources</p> <ul style="list-style-type: none"> • Office number • Faculty name • Position title • Resource name • Resource quantity • Resource responsible department (Ex. IT) • Delivery date and time 	High	Functional	Provost office is able to request resources for faculties from Purchase and Support Services and IT Departments.
FR02.9	<p>As a system admin, I want to search for a specific office to view the available resources in the office, so I can manage the resources</p>	High	Functional	The Provost office is able to manage offices for faculties.
FR02.10	<p>As a system admin, I want to generate reports about the following, so I can analyze data</p> <ul style="list-style-type: none"> • Faculties employment type reports (Full-Time / Part-Time) • Faculties in each school report • Faculties in each department report • Faculties workload report 	Medium	Functional	The Provost office manager is able to generate reports and dashboards every semester related to the AA department.

	<ul style="list-style-type: none"> • Teacher Assistant status report (Assigned / Not-Assigned) 			
FR02.11	As a system admin, I want to generate a dashboard about faculties employment type so I can use it to check periodically reports	Medium	Functional	The Provost office manager is able to generate reports and dashboards every semester related to the AA department.
FR02.12	As a system admin, I want the generated reports to be saved in one specific list, so that I can re-use it again in future	Medium	Functional	The Provost office manager is able to generate reports and dashboards every semester related to the AA department.
FR02.13	<p>As a system admin, I want to export the generated reports in the following formats, so that I can use it when needed</p> <ul style="list-style-type: none"> • .pdf • .png • .gif • .jpg • .xlsx • .pptx 	Medium	Functional	The Provost office manager is able to generate reports and dashboards every semester related to the AA department.
FR02.14	As a system admin, I want to receive a notification about the following changes on my email so I can be able to follow up:	Medium	Functional	Provost office is able to keep a list of potential faculty candidates.

	<ul style="list-style-type: none"> Completion of each resource request 			
FR03.1	As a system admin assistant, I want to assign a temporary office to faculty as get accepted (hired) so the faculty can have an office	High	Functional	The Provost office is able to manage offices for faculties.
FR03.2	As a system admin assistant, I want to search for the new faculty in the office's list, so I can re-assign a permanent office	High	Functional	The Provost office is able to manage offices for faculties.
FR03.3	<p>As a system admin assistant, I want to perform the following tasks in the offices list, so that I can manage the offices list</p> <ul style="list-style-type: none"> View the offices list Add faculty to the list Edit the offices list Remove faculty from the office list Remove office from the list 	High	Functional	The Provost office is able to manage offices for faculties.

FR03.4	<p>As a system admin assistant, I want to record the following date so that I can add a faculty to the offices list</p> <ul style="list-style-type: none"> • Office number • Area • School • Department • Person name • Position title • Employment type • Status (Ex. New) • Phone extension • Available resource 	High	Functional	The Provost office is able to manage offices for faculties.
FR03.5	<p>As a system admin assistant, I want to search the accepted candidate profile using one of the following, so that I can convert the profile from candidate profile to faculty profile</p> <ul style="list-style-type: none"> • Candidate name • Position title • Employment type • School name (Ex. School of Business and Law) • Department name (Ex. MIS department) • Recruitment status • Temporary office number 	High	Functional	Provost office is able to keep a list of potential faculty candidates.

FR03.6	<p>As a system admin assistant, I want to add the following information to the faculty profile, so I can add the profile to the faculty information list</p> <ul style="list-style-type: none"> • Mobile number • Email address • Highest education • Institution • Permanent office number • Phone extension 	High	Functional	The Provost office is able to update faculty information every semester/year.
FR03.7	<p>As a system admin assistant, I want to perform the following tasks, so that I can manage the faculty information list.</p> <ul style="list-style-type: none"> • View the list • Add faculty to the list • Edit information in the list • Remove faculty from the list 	High	Functional	The Provost office is able to update faculty information every semester/year.
FR03.8	<p>As a system admin assistant, I want the removed faculty from the list to moved automatically to the databank list, so it can be used in future</p>	Low	Functional	Provost office is able to manage rejected, canceled and resigned faculties
FR03.9	<p>As a system admin assistant, I want to receive the following types of notification, so that it reminds me for</p>	High	Functional	The Provost office is able to update faculty information every semester/year.

	<p>the updating the faculty information list</p> <ul style="list-style-type: none"> • In-app notification • Email notification • Calendar notification 			
FR03.10	<p>As a system admin assistant, I want to search for the faculty in the faculty information list using one of the following, so I can update his/ her profile</p> <ul style="list-style-type: none"> • Name • Employment type (Full-Time / Part-Time) • Position title • Mobile number • Email address • School name • Department name • Office number • Extension number 	High	Functional	The Provost office is able to update faculty information every semester/year.
FR04.1	<p>As a CAADU user, I want to receive a notification as new faculty get hired, so that I can prepare his/her workload and ensure for them a TA</p>	High	Functional	<ul style="list-style-type: none"> • Central academic advisor is able to manage faculty workload for upcoming semesters. • Central academic advisor is able to

				manage TA and CA assignment to faculty for upcoming semesters
FR04.2	<p>As a CAADU user, I want to record the following information, so that I can assign a workload for a faculty.</p> <ul style="list-style-type: none"> • Faculty name • Position title • Employment type • Courses assigned • Total workload 	High	Functional	Central academic advisor is able to manage faculty workload for upcoming semesters.
FR04.3	<p>As a CAADU user, I want to perform the following tasks, so that I can manage the workload lists</p> <ul style="list-style-type: none"> • View list • Add faculty to the list • Edit information on the list • Remove faculty from the list • Remove workload from the faculty 	High	Functional	Central academic advisor is able to manage faculty workload for upcoming semesters.
FR04.4	<p>As a CAADU user, I want to be updated if the assigned workload is approved or not, so that I can re-assign if not approved</p>	High	Functional	Central academic advisor is able to manage faculty workload for upcoming semesters.

FR05.1	As a HR user, I want to be notified when a new candidate is approved and added in the system, so that I can proceed with the hiring process.	High	Functional	The HR office is able to manage new faculties
FR05.2	As a HR user, I want to view the hiring documents for specific candidates using one of the following information, so I can take the decision of hiring. <ul style="list-style-type: none"> • Candidate name • Position title • Employment type • School name (Ex. School of Business and Law) • Department name (Ex. MIS department) • Recruitment status • Temporary office number 	High	Functional	The HR office is able to manage new faculties
FR05.3	As a HR user, I want to perform the following tasks in the candidates profiles, so I can manage the requests <ul style="list-style-type: none"> • View the profile • Edit recruitment status (Accept, Cancel, Reject) 	High	Functional	The HR office is able to manage new faculties

FR05.4	As a HR user, I want to move the reject and cancel candidates automatically to the databank list, so that it can be used in future	Low	Functional	The HR office is able to manage new faculties
FR06.1	As a maintenance coordinator , I want to receive a notification in the following places when the request sent, so I can update my schedule according to the request <ul style="list-style-type: none"> • Email • FIMS application • Calendar 	High	Functional	Purchase and Support Services and IT departments are able to manage the resource request
FR06.2	As a maintenance coordinator , I want to know the following information about the request, so I can mange the request easily <ul style="list-style-type: none"> • Equipment name • Equipment quantity • Problem type (If available, Ex. Broken Desk) • Electricity extension type (Ex. 110, 220) • Delivery date and time • Office number 	High	Functional	Purchase and Support Services and IT departments are able to manage the resource request
FR06.3	As a maintenance coordinator , I want to perform the following changes to the requests that is related to me, so	High	Functional	Purchase and Support Services and IT departments are able to manage the resource request

	I can manage the resources list <ul style="list-style-type: none"> • Accept the request • Reject the request • Change delivery date • Change request status (Ex. Complete) 			
FR07.1	As a information desk coordinator , I want to receive a notification in the following places when the request sent, so I can update my schedule according to the request <ul style="list-style-type: none"> • Email • FIMS application • Calendar 	High	Functional	Purchase and Support Services and IT departments are able to manage the resource request
FR07.2	As a information desk coordinator , I want to know the following information about the request, so I can mange the request easily <ul style="list-style-type: none"> • Faculty name • Faculty position title • Office number • Delivery date and time 	High	Functional	Purchase and Support Services and IT departments are able to manage the resource request
FR07.3	As a information desk coordinator , I want to know the faculty name and the position title in the following languages, so I can print the door sign correctly	High	Functional	Purchase and Support Services and IT departments are able to manage the resource request

	<ul style="list-style-type: none"> • English • Arabic 			
FR07.4	<p>As a information desk coordinator , I want to perform the following changes to the requests that is related to me, so I can manage the resources list</p> <ul style="list-style-type: none"> • Accept the request • Reject the request • Change delivery date • Change request status (Ex. Complete) 	High	Functional	Purchase and Support Services and IT departments are able to manage the resource request
FR08.1	<p>As a IT coordinator, I want to receive a notification in the following places when the request sent, so I can update my schedule according to the request</p> <ul style="list-style-type: none"> • Email • FIMS application • Calendar 	Low	Functional	Purchase and Support Services and IT departments are able to manage the resource request
FR08.2	<p>As a IT coordinator, I want to know the following information in the request, so I can manage the request easily</p> <ul style="list-style-type: none"> • Office number • PC type • Printer type (If needed) 	Low	Functional	Purchase and Support Services and IT departments are able to manage the resource request

	<ul style="list-style-type: none"> • Problem type (If available) 			
FR08.3	<p>As a IT coordinator, I want to perform the following changes to the requests that is related to me, so I can manage the resources list</p> <ul style="list-style-type: none"> • Accept the request • Reject the request • Change delivery date • Change request status (Ex. Complete) 	Low	Functional	Purchase and Support Services and IT departments are able to manage the resource request
NFR01.1	The provost office, HR, CADDU, IT, Information disk, and Maintenance shall have access to the system	High	Non- Functional (Accessibility)	The provost office, HR, CADDU, IT, Information disk, and Maintenance are able to use the system
NFR01.2	The HR, CADDU, IT, Information disk, and Maintenance shall have limited access in the system	High	Non- Functional (Accessibility)	The HR, CADDU, IT, Information disk, and Maintenance are not able to use all the features in the system
NFR01.3	The provost office shall have the full access and authorization on the system	High	Non- Functional (Accessibility)	The provost office are able to use all the features in the system
NFR01.4	The system shall be accessible by users who do not have a prior experience in systems and computers	Medium	Non- Functional (Accessibility)	Users will be able to use the system

NFR02.1	The system shall include authentication and authorization features like different username and password for each user.	High	Non- Functional (Security)	-
NFR02.2	The user shall change the initially assigned login password immediately after completion of each semester, and the initial should never be reused.	High	Non- Functional (Security)	-
NFR02.3	The system shall be locked after three incorrect authentication and send a notification to the user email to unlock the account	High	Non- Functional (Security)	-
NFR02.4	The system shall send an email notification if the system open from a new device	High	Non- Functional (Security)	-
NFR02.5	The system while generating passwords shall not accept weak specifications. It must have strong specifications like the password should be a combination of upper, lower case letters, numbers, and symbols.	High	Non- Functional (Security)	-
NFR02.6	The system shall encrypt the password during the login stage	Low	Non- Functional (Security)	-

NFR02.7	The system shall allow only the provost office users to create candidate profiles	High	Non- Functional (Security)	The Provost office is able to conduct a faculty appointment.
NFR03.1	The system shall be capable enough to handle 100 users without affecting its performance	Medium	Non- Functional (Performance)	-
NFR03.2	The system shall update all other lists when specific data in one list has been modified within 2 seconds	High	Non- Functional (Performance)	-
NFR03.3	The system shall handle 50 requests per second	Low	Non- Functional (Performance)	-
NFR04.1	The system shall be portable. So opening from one OS and then from another does not create any problem.	Medium	Non- Functional (Operability & Portability)	-
NFR04.2	The system shall be deployed on DAH servers	High	Non- Functional (Operability & Portability)	-
NFR04.3	The system shall work on both devices either Windows or MacOS	High	Non- Functional (Operability & Portability)	-
NFR05.1	The system shall backup automatically every week on the weekend days	Medium	Non- Functional (Backup & Recoverability)	-
NFR05.2	The faculties Information shall be fully backed up every month on the weekend days	Medium	Non- Functional (Backup & Recoverability)	-

NFR05.3	The system shall record each activity done by the user in a history folder	Medium	Non- Functional (Backup & Recoverability)	-
NFR06.1	The system shall not allow other users rather than provost office to access faculties information list	High	Non- Functional (Privacy)	-
NFR06.2	The system shall allow the HR user to only view the candidate profile	High	Non- Functional (Privacy)	The HR office is able to manage new faculties
NFR06.3	The system shall protect the user's privacy	High	Non- Functional (Privacy)	-
NFR07.1	The system shall be web-based because it is easy for the users in the work environment	High	Non- Functional (Usability)	-
NFR07.2	The system shall be user friendly, that the user can learn how to use it in one week	High	Non- Functional (Usability)	-
NFR07.3	The system shall have a maximum of 3 clicks to reach any content	Low	Non- Functional (Usability)	-
NFR07.4	The system shall have a single login to access all content	Low	Non- Functional (Usability)	-
NFR07.5	The system shall have a consistent UI (in all the views and dialogs, the UI elements behave and are placed in a similar way)	Low	Non- Functional (Usability)	-
NFR08.1	The system shall provide an admin manual hard	Medium	Non- Functional (Documentation)	-

	and soft copy for helping the admins in interact with the system			
NFR08.2	The system shall provide an user manual hard and soft copy for helping the users in using the system	Medium	Non- Functional (Documentation)	-
NFR09.1	The system shall be available 90% of the time during the year	High	Non- Functional (Availability)	-
NFR09.2	The system shall be available during the working days from Sunday 7:30 AM to Thursday 5:30 PM	High	Non- Functional (Availability)	-
NFR09.3	The system shall update during the off days from Thursday 7:00 PM to Sunday 5:00 AM	High	Non- Functional (Availability)	-
NFR09.4	The system shall have high availability	High	Non- Functional (Availability)	-
NFR09.5	The system shall not have unexpected downtime	Medium	Non- Functional (Availability)	-
NFR09.6	The system shall have downtime at most 4 hours/month	Medium	Non- Functional (Availability)	-
NFR09.7	The system shall have its expected downtime announced at least 48 hours in advance	Medium	Non- Functional (Availability)	-
NFR09.8	The system shall have downtime only during scheduled update days	Medium	Non- Functional (Availability)	-

NFR10.1	The system shall be follow DAH regulations and policy	High	Non- Functional (Legal or Regulatory)	-
NFR11.1	The system shall request the resource in 3 steps	Low	Non- Functional (Efficiency)	-
NFR11.2	The system shall create the faculty profile in 3 steps	Low	Non- Functional (Efficiency)	-
NFR12.1	The system shall be easily maintainable	High	Non- Functional (Maintainable)	-

Table 22: Requirement Traceability Matrix (RTM)

Note:

The cells that are empty (-) means there is no business objective in the charter is met with requirement

2.5 Functional Modeling

Functional modeling in system developing is a structured representation of functions or activities in the developing system. It is a graphical modeling that defines the process of the system, the activities in the system and how the user will interact with these activities or processes.

In object-oriented systems development, two types of models are used to describe the functionality of an information system: use cases and activity diagrams. So, in the following sections are the diagrams for FIMS

2.5.1 Use Case Diagrams

Use case diagrams represent how the users will interact with the system and what actions they will perform. So, the following diagram shows what are the features in the system and how the stakeholders will interact with the system and what they will perform.

2.5.1.1 Manage Faculty Use Case Diagram

The following diagram shows the actors that include in managing the faculty starting from appointing the faculty till the faculty get hired and updating his/ her profile. Also, the diagram mentions the actions that will happen during the previous stages.

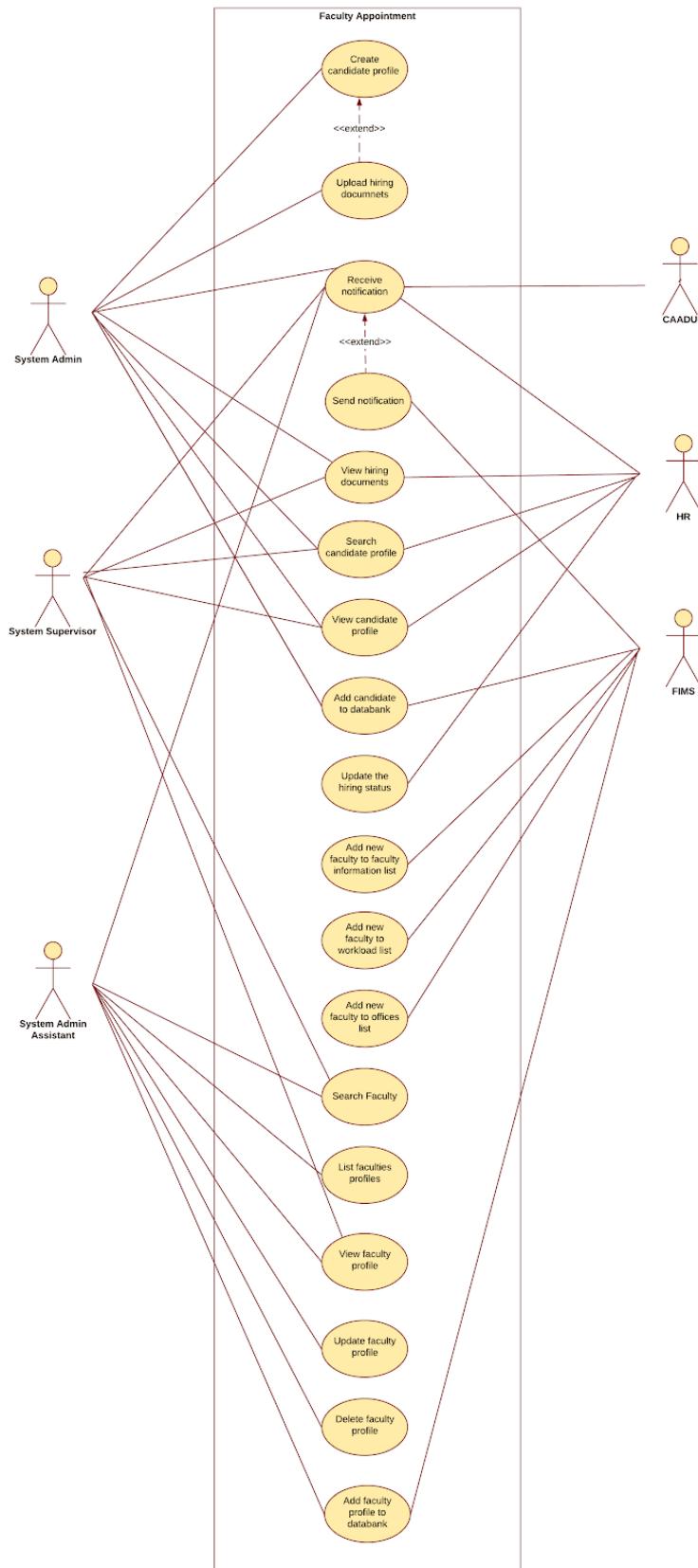


Figure 1: Manage Faculty Use Case Diagram

2.5.1.2 Manage Offices Use Case Diagram

The following diagram shows the actors that include in managing the office starting from assigning till manage it after assigning, Also, it mentions the actions that occur during the managing the office.

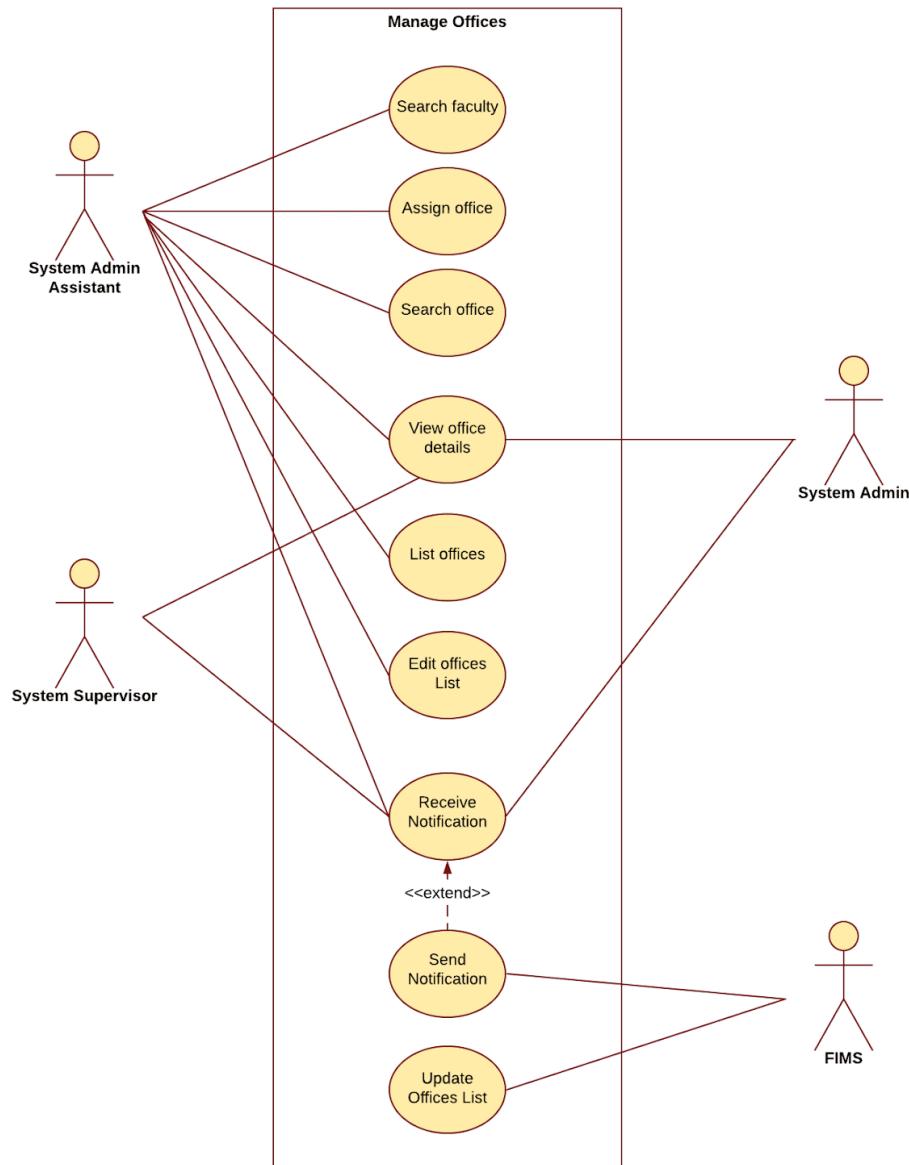


Figure 2: Manage Offices Use Case Diagram

2.5.1.3 Manage Requests and Resources Use Case Diagram

The following diagram shows the actions that happen during requesting resources from a specific department and which actors will interact with this part of the system.

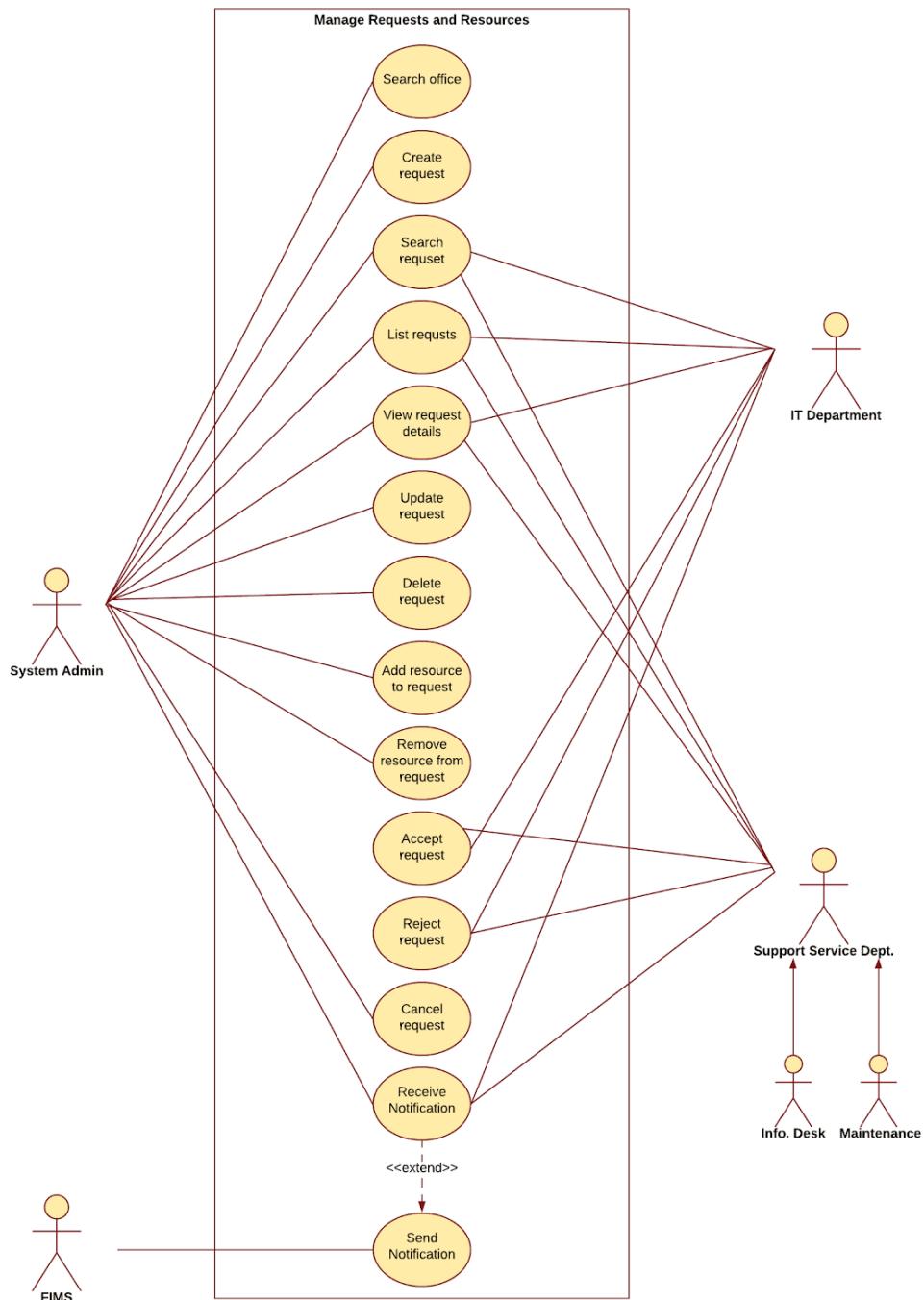


Figure 3: Manage Requests and Resources Use Case Diagram

2.5.1.4 Manage Workload Use Case Diagram

The following diagram shows the actions that occur during assigning a workload for a faculty, and which actors will interact with these processes.



Figure 4: Manage Workload Use Case Diagram

2.5.1.5 Manage Teacher Assistant Use Case Diagram

The following diagram shows the actors that interact to assign a TA to a section. Also, what actions will occur during this phase.



Figure 5: Manage Teacher Assistant Use Case Diagram

2.5.1.6 Generate Reports Use Case

The diagram, shows the actions to generate a report in FIMS, and what type of reports Can be generated. Also, it shows which actors can generate reports.

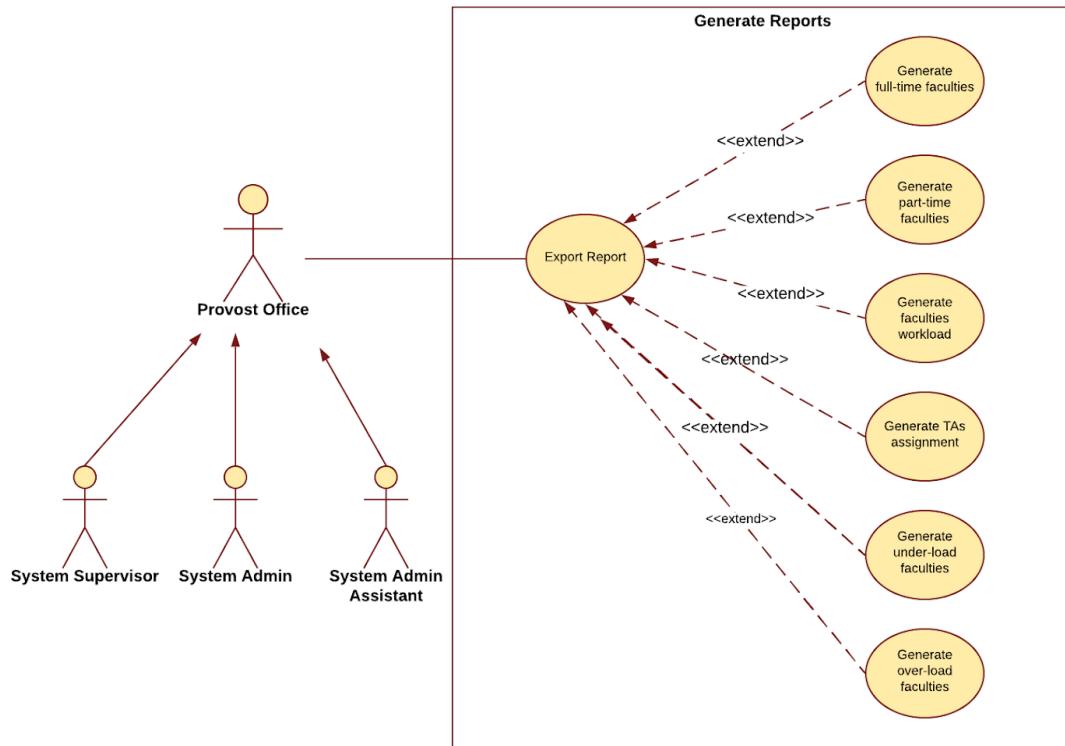


Figure 6: Generate Reports Use Case Diagram

2.5.2. Activity Diagrams

Activity diagrams are a workflow diagram. It is used to illustrate the flow of control in a system and refer to the steps involved in the execution of a use case. So, basically the activity diagram depicts the workflow of the system visually. Also, the activity diagram concentrates on the conditions of the flow and the sequence in which it happens. [2]

So, the following diagrams show the activities that happen in each phase of the system.

2.5.2.1 Faculty Appointment Activity Diagram

The following diagram shows the workflow of appointing a faculty and how they get hired.

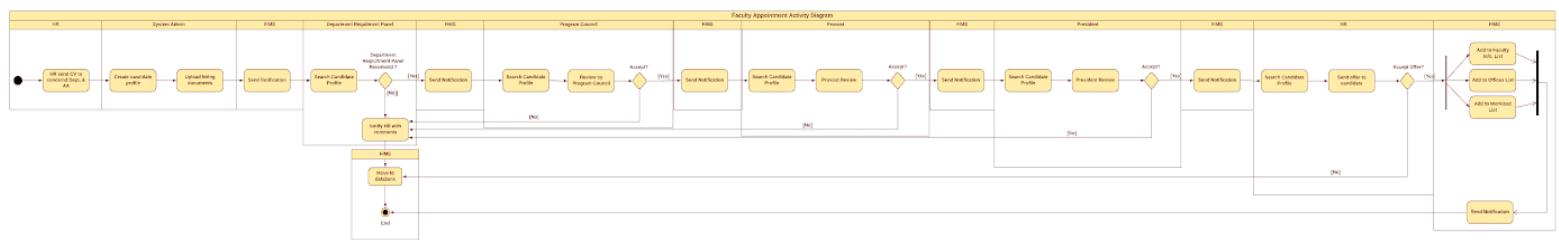


Figure 7: Faculty Appointment Activity Diagram

2.5.2.2: Manage Offices Activity Diagram

The following diagram shows the workflow of assigning an office for either new faculty or a current faculty.

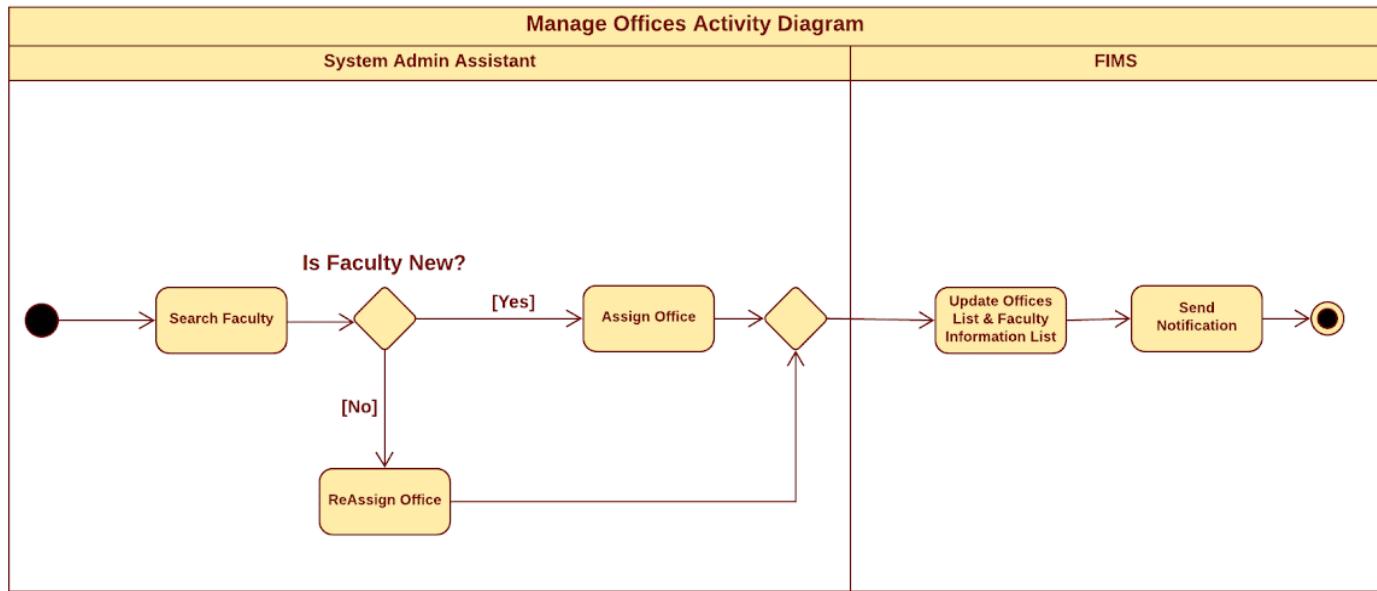


Figure 8: Manage Offices Activity Diagram

2.5.2.3: Manage Requests Activity Diagram

The following diagram shows the workflow of requesting a resource from a specific department (Coordinator).

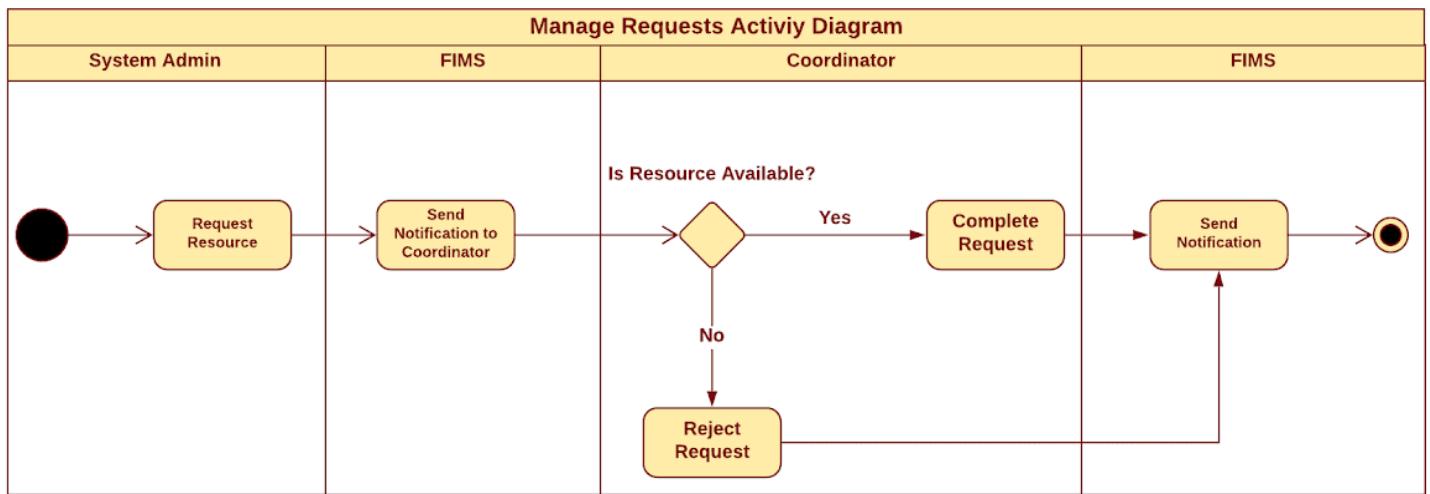


Figure 9: Manage Requests Activity Diagram

2.5.2.4: Manage Workload and Teacher Assistant Activity Diagram

The following diagram shows the workflow of assigning a workload and TA for both a new or current faculty, and the workflow of the approval.

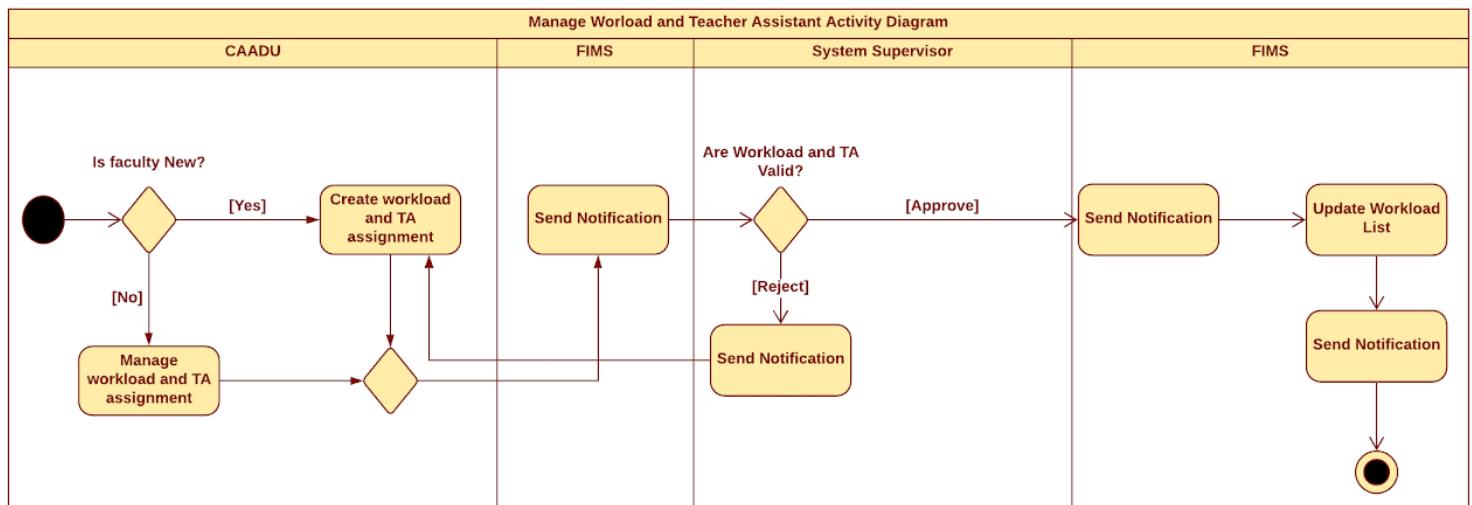


Figure 10: Manage Workload & TA Activity Diagram

2.5.2.5: Manage Faculty Information List Activity Diagram

The following diagram shows the workflow of updating the faculty profile.

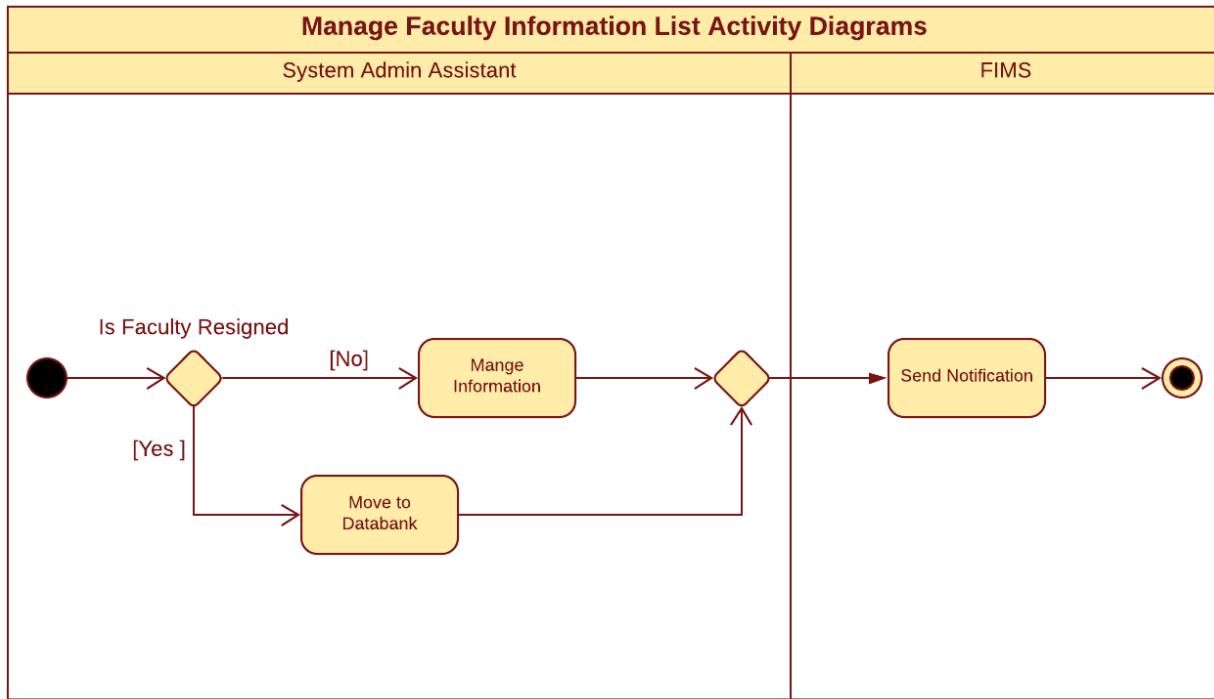


Figure 11: Manage Faculty Information List Activity Diagram

2.6 Behavioral Modeling

The behavioral models describe the internal behavior of a system. It describes how the objects of the system work. Also, it describes the internal logic of the processes without describing how the process will implement. Under the behavioral modeling there are many diagrams such as the sequence diagram and a behavioral state machine diagram. For the FIMS only state diagrams will be developed. Due to the time limitation. [3]

2.6.1 State Diagrams

A state diagram shows the behavior and states of classes in response to external events. Specifically a state diagram describes the behavior of a single object in response to a series of events in a system. Also, state diagrams illustrate the actions in response to the events that it faces.

So, the following diagrams will model the behavior and state of the FIMS objects in response to events, to help the stakeholders in understanding [4][5]

2.6.1.1: Faculty State Diagram

The following diagram shows the states of a faculty starting from applying to his regular actions after hiring.

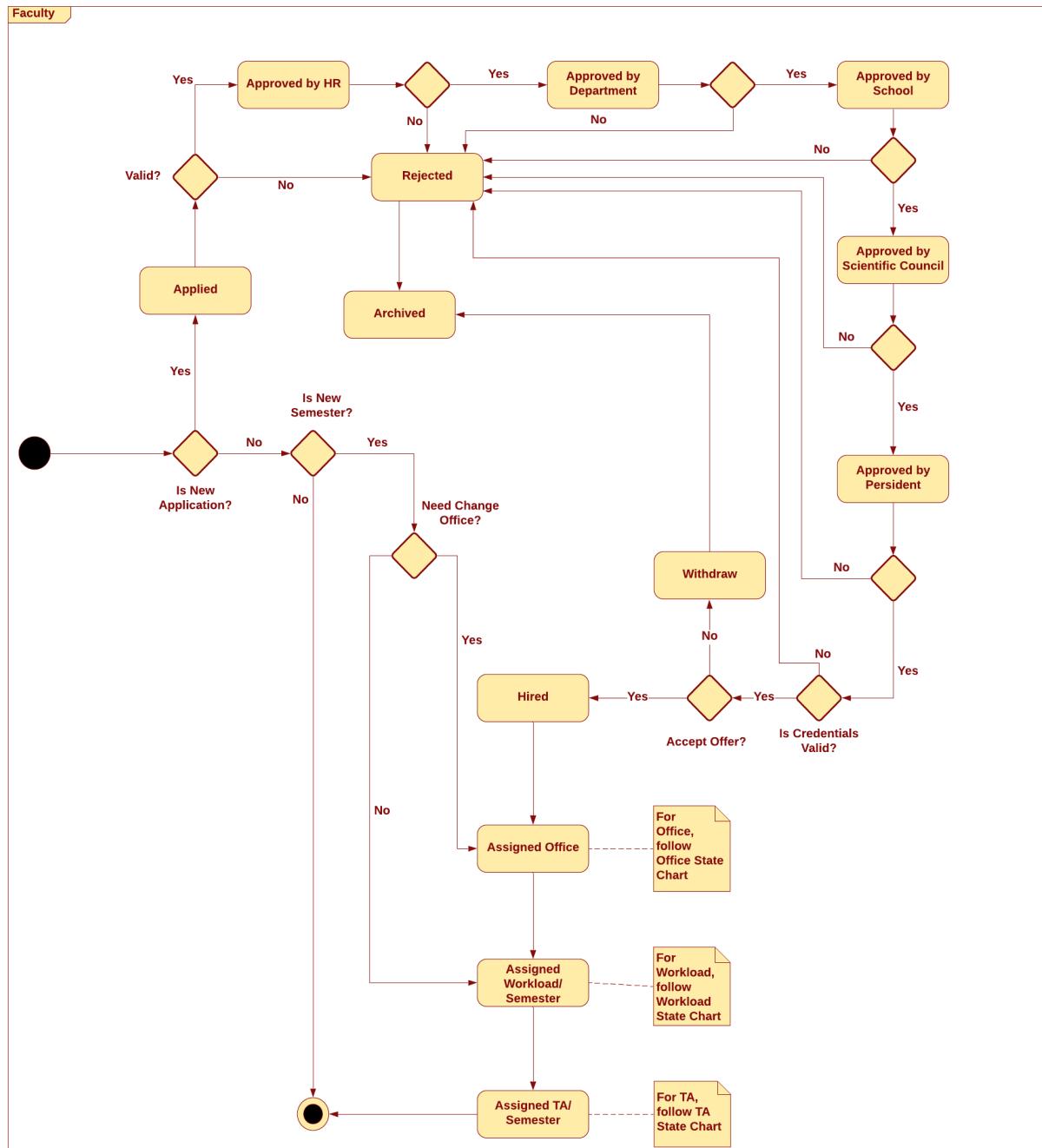


Figure 12: Faculty State Diagram

2.6.1.2: Office State Diagram

The following diagram shows the states of an office and how it gets assigned and what happens to it during this phase.

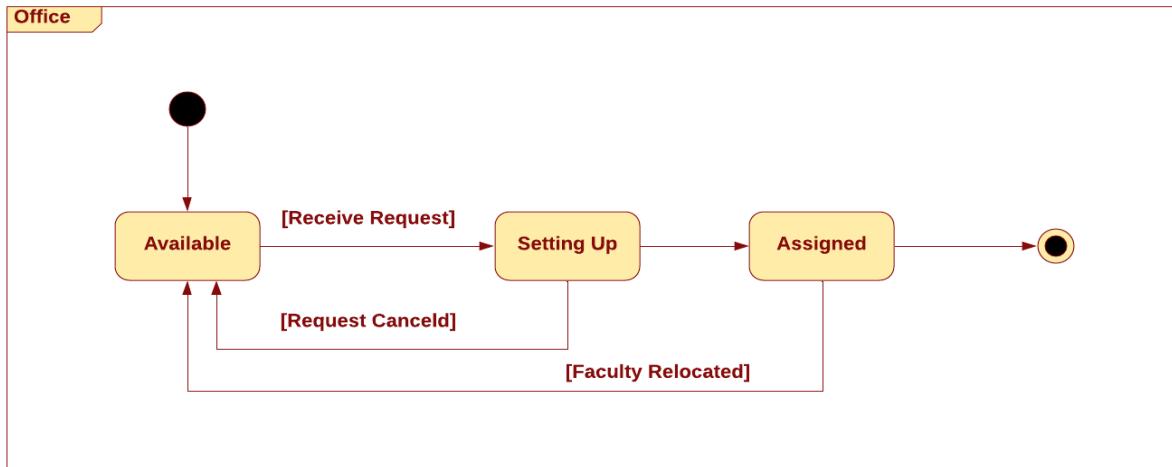


Figure 13: Office State Diagram

2.6.1.3: Request State Diagram

The following diagram shows the states of the request and how it gets fulfilled.

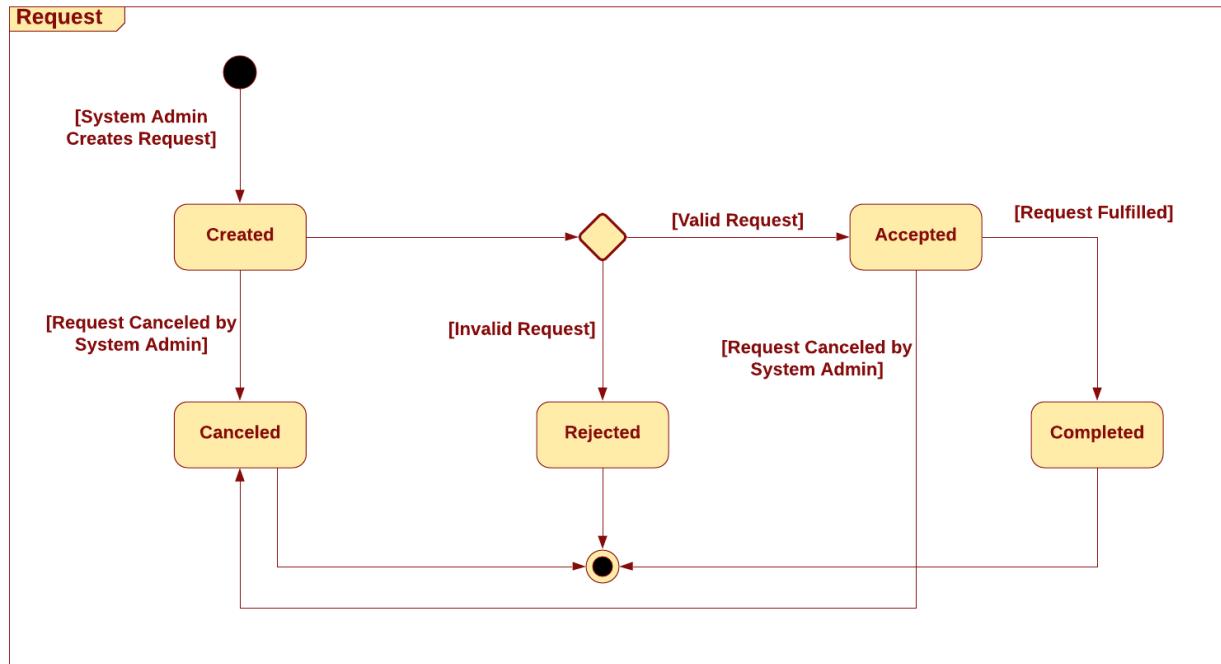


Figure 14: Request State Diagram

2.6.1.4: Workload State Diagram

The following diagram shows the states of assigning a workload for a faculty.

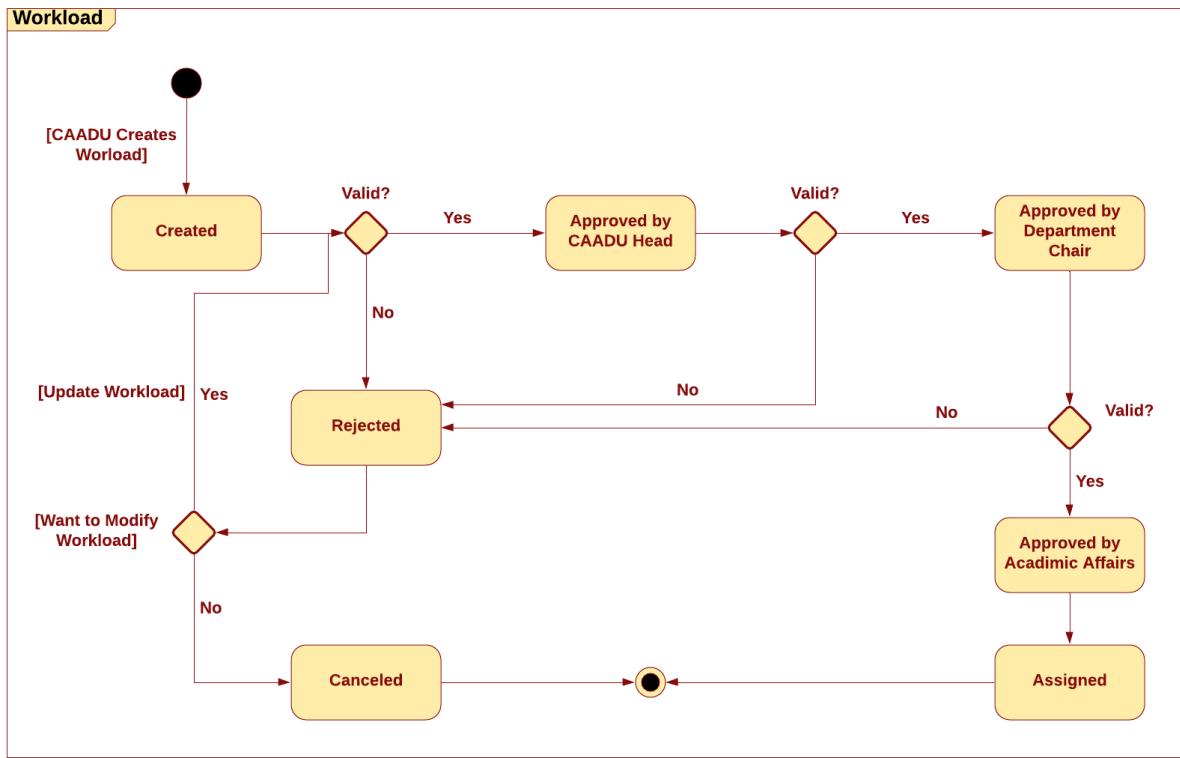


Figure 15: Workload State Diagram

2.6.1.5: Teacher Assistant State Diagram

The following diagram shows the states of assigning a TA.

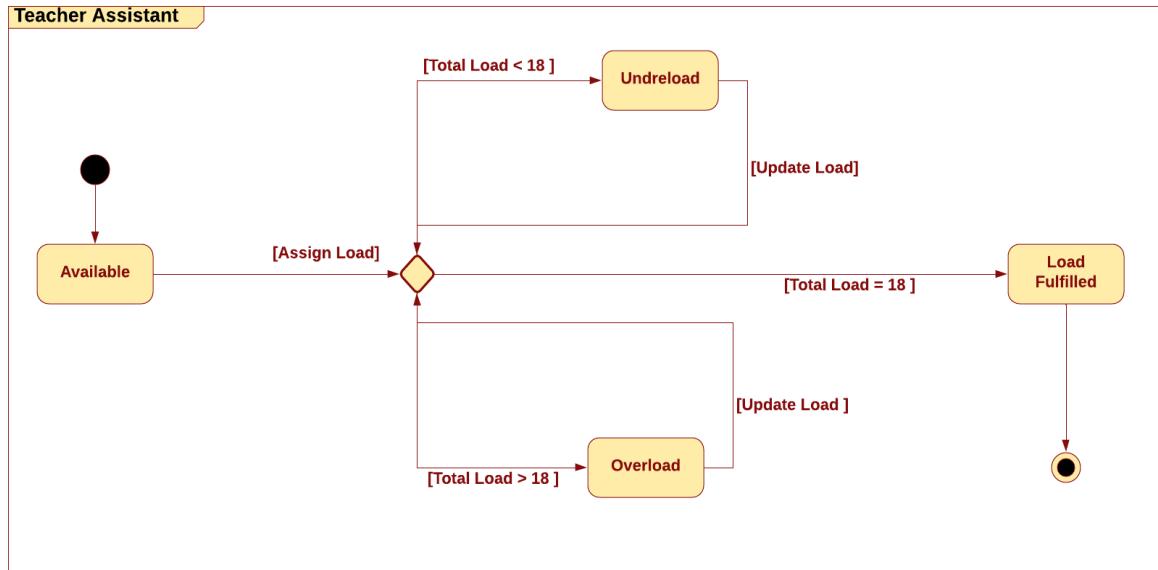


Figure 16: Teacher Assistant State Diagram

2.7 Conceptual Data Modeling

Entity relationship diagram (ERD) is a graphical model that shows the relationships between entities. Also, it is used in software development to organize data within databases or information systems. Where the enhanced entity relationship diagram (EERD) is basically an expanded version of the ERD. It is a helpful tool for designing databases with high-level models. Moreover, the ERD helps in giving a visual representation of database design. Also, it helps the designer when explaining to the stakeholders. While the EERD, it helps in modeling the software more completely and more accurately.

The following ERD represents the conceptual database for the FIMS, and is being drawn in Lucidchart platform using the crow's foot notation. [6, 7, 8]

2.7.1: FIMS Entity Relationship Diagram

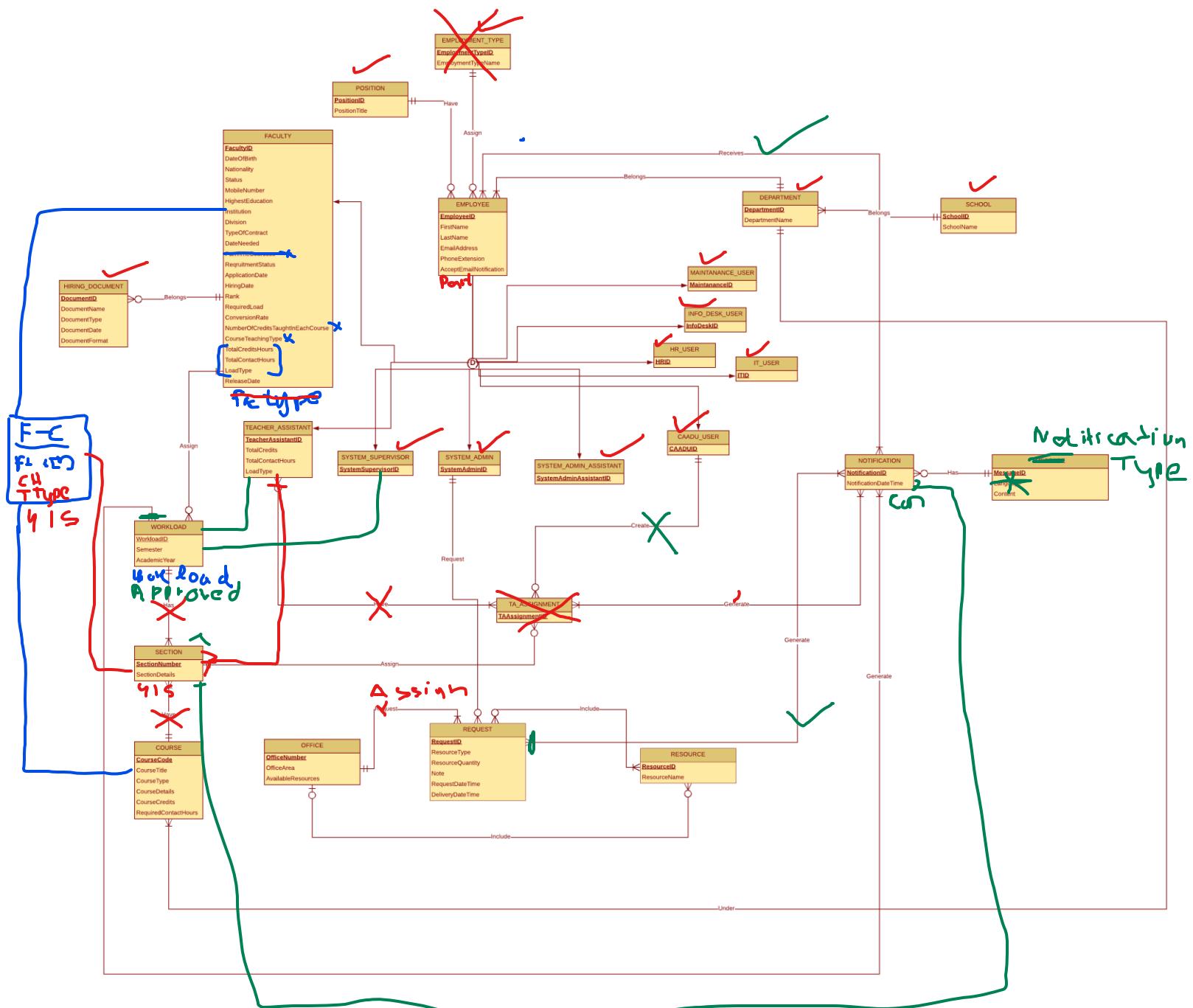


Figure 17: FIMS ERD

Chapter 3: Project Management

3.1 Introduction

The project management plan (PMP) is a formal approved document between the key stakeholders and the project team. The PMP states how the project will be executed, monitored, and controlled. Also, the project team mention in this document their decision on what process will be used and to what degree the process will be used. Also, the document can be detailed or summarized and it includes other planning documents. [1]

The purpose of the project management plan is that it is a document that can be used by everyone involved with the project to help in communicating and provide detailed information and describe processes that the project will undertake. [2] Moreover, the PMP adds structure to the process by assigning an order to all the important parts involved in the plan. Apart from this, another purpose is that it helps in determining the project outcome, how a successful outcome will be achieved, who will be involved in the project, and how the project will be measured and communicated. [3]

As mentioned, the project management plan consists of other planning documents these documents consider primary components of PMP. The following list is the primary plans. [4]

- Scope Statement
- Critical Success Factors
- Deliverables
- Work Breakdown Structure
- Schedule
- Budget
- Quality
- Human Resources Plan
- Stakeholder List
- Communication
- Risk Register
- Procurement Plan

The plans that will be discussed in this document are four plans. Stakeholder, communication, schedule, and risk management plans.

3.2 Project Stakeholder Management

Project Manager: Ateqa Bin Mahfodh

Date Prepared: 21/03/2020

Project Sponsor: Dar Al-Hekma University

Version	Date	Author	Comment
1.0	21/03/2020	Ateqa	Initial Draft
2.0	22/03/2022	Ateqa	Write the Introduction
3.0	02/04/2030	Ateqa	Modify The Stakeholders Identification and Stakeholder Engagement Assessment Matrix tables

Table 22: Stakeholder Plan History

3.2.1 Introduction

Communication is a way of exchanging information, ideas, and feelings among certain people by writing, using, and speaking these things. In dictionaries, communication is the act of conveying meanings from one person or group of people to another through using mutually understood signs, symbols, and semiotic rules. Moreover, communication is not only speaking or hearing from people but also understanding the complete message. Communication has different ways, it can be done through calls, messages, emails, meetings, or interviews. In projects, communication means that the project manager keeps contacting with the project sponsor and the stakeholders to update them and take from them feedbacks. [5]

In projects, it is important to manage the communication within an organization, and between organizations, because it will help in knowing certain things, such as:

- What information needs to flow in and out of the project
- Is the project follow the right track or not
- Is the project satisfying the need for the project or not
- If a problem in a stage of occurring what procedures should be undertaken

Also, communication is one of the reasons for the success of the project, because when the communication is managed it helps both the project manager and the project sponsor to control the whole project. [6]

During the execution of the project, communication will be managed in certain ways. It can be through regular reporting of the project's progress and status. Following up periodically with the project team. In addition, it can be done by conducting progress monitoring meetings. [7]

3.2.2 Stakeholders Identification

The following table identifies the stakeholders that interact with the system, their information, and expectations

Name	Position	Contact Information	Power (High, Law)	Interest (High, Law)	Expectations
Mohamed Fares	Assistant Professor	Email: mfares@dah.edu.sa	High	High	A system that has organized and well-formatted documentation and based on his rubric
Ishraq Barakat	Director of the Provost Office	Mobile Number: 0504684210 Email: ibarakat@dah.edu.sa	High	High	A system that can be used to develop periodical reports and can follow up easily through the system
Nouf Barasheed	Administrative Clerk	Mobile Number: 0566066685 Email: nbarashid@dah.edu.sa	High	High	A system that combines different Excel sheets in one place and access to these sheets easily
Hadeer Alroshan	AA Admin Clerk	Mobile Number: 0565504672 Email: hroshan@dah.edu.sa	High	High	A system that can request resource easily and can update faculty information without any mistakes
Amal Naitah	Assistant-Recruitment/Government Relations Office	Mobile Number: 0559759658 Email: anaithah@dag.edu.sa	High	Low	A system that can be used to follow the faculty hiring process
Rima Mokhtar	Central academic advisor	Email: rmokhtar@dah.edu.sa	High	Low	A system that can be used to assign the faculty workload and minimize the paperwork

Arwa Attar	Information desk officer	Email: arattar@dah.edu.sa	Low	Low	To receive a notification when there are a request and a reminder about the request
Merna	Maintenance help desk	Email: MHD@dah.edu.sa	Low	Low	A system that identifies the request specification.
IT Coordinator	Operation Management	Email: sdp@dah.edu.sa	Low	Low	Not Available

Table 23: Stakeholder Identification

2.2.3 Stakeholder Engagement Assessment Matrix

The following table, show the current stakeholder's engagement with the project and the desired engagement that the project team expects from the stakeholders.

Stakeholder	Unaware	Resistant	Neutral	Supportive	Leading
Mohamed Fares					CD
Ishraq Barakat				C	D
Nouf Barashid					CD
Hadeer Alroshan				C	D
Amal Naitah				C	D
Rima Mokhtar			C		D
Arwa Attar	C			D	
Merna			C	D	
IT Coordinator		C		D	

Table 24: Stakeholder Engagement Assessment Matrix

Table Legends
<ul style="list-style-type: none"> • C: indicates the current engagement level of the stakeholder. • D: indicates the level that the project team has assessed as essential to ensure project success (i.e. desired engagement).

2. 3. Project Stakeholder Engagement Log

Project Manager: Ateqa Bin Mahfodh

Project Sponsor: Dar Al-Hekma University

Date	Stakeholder	Change	Approach
25/03/2020	Amal Naitah	Unaware to Supportive	Conduct a meeting to introduce the idea of the system, how the HR will interact with the system and what benefits they will gain from using the system

Table 25: Engagement log

2.4 Project Communication Management

Project Manager: Ateqa Bin Mahfodh

Date Prepared: 21/03/2020

Project Sponsor: Dar Al-Hekma University

Version	Date	Author	Comment
1.0	21/03/2020	Ateqa	Initial Plan Draft
2.0	24/03/2020	Ateqa	Write the Introduction
3.0	28/03/2020	Ateqa	Prepare the communication Plan
4.0	06/04/2020	Ateqa	Defined the Assumptions & Constraints

Table 26: Communication Plan History

2.4.1 Introduction

Communication plan is an approach designed for communication purposes, so through this plan, the project manager knows when he/she should meet with each stakeholder. On the other hand, the stakeholder can predict when they will be updated. The plan is designed to answer the (Wh Questions). So, it defines to whom the information should be delivered, what information should be delivered, when it should be delivered, and how it should be delivered. [8]

This document considers one of the important documents for the project manager. It can guide the project manager throughout the project on how to communicate with the project sponsor. Also, this document can be the first step to manage communication during the execution of the project. Moreover, through this document, the project manager can define a convenient and appropriate way to communicate with stakeholders. Finally, this document not only can benefit the project manager, but also the stakeholders. This document helps stakeholders to be aware of the meetings when it can be and about what it will be. In addition, experts agree that the threat to the success of any project is a failure to communicate. [9]

This document will be updated during the execution by referring back to it. If the project manager found other stakeholders that might influence the project, it can be added to this document. Also, whenever the project manager collects requirements regarding the project, the information about the requirement can be added to the communication plan table.

2.4.2 Communication Plan

The following table shows the key stakeholders that influence the project and details about how and when to communicate them and what information will be gained from the stakeholder.

Stakeholder	Information	Method or Media	Timing or Frequency
Mohamed Fares	<ul style="list-style-type: none"> Project updates Questions about the project 	<ul style="list-style-type: none"> Individual meeting Email 	Weekly
Ishraq Baraket	<ul style="list-style-type: none"> Expectations Needs to be fulfilled through the system Questions regarding the new system 	<ul style="list-style-type: none"> Meeting 	As needed
Nouf Barashid	<ul style="list-style-type: none"> System components and features Project review and feedback The current state of the process Samples of the Excel sheets that exist to analyze Difficulties in the current process Questions regarding the new system 	<ul style="list-style-type: none"> Meeting Email Whatsapp Messages 	After each phase
Hadeer Alroshan	<ul style="list-style-type: none"> The current state of the process Difficulties in the current process Recommendations to be available in the system Questions regarding the new system 	<ul style="list-style-type: none"> Meeting Email Whatsapp Messages 	As needed
Amal Naitah	<ul style="list-style-type: none"> The current process of hiring new faculty Hiring documents Recommendations for the new system Challenges in the current process Questions regarding the new system Recruitment Policy and Procedures Document 	<ul style="list-style-type: none"> Email Whatsapp Messages 	As needed
Rima Mokhtar	<ul style="list-style-type: none"> The current process of assigning workload Recommendations for the new system Challenges in the current process 	<ul style="list-style-type: none"> Meeting Email 	As needed

	<ul style="list-style-type: none"> • Questions regarding the new system 		
Arwa Attar	<ul style="list-style-type: none"> • The current process of receiving a request and complete the request • Recommendations for the new system 	<ul style="list-style-type: none"> • Email 	As needed
Merna	<ul style="list-style-type: none"> • The current process of receiving a request and complete the request • Recommendations for the new system 	<ul style="list-style-type: none"> • Meeting • Email 	As needed
IT Coordinator	<ul style="list-style-type: none"> • The current process of receiving a request and complete the request • Recommendations for the new system 	<ul style="list-style-type: none"> • Meeting • Email 	As needed

Table 27: Communication Plan

2.4.3 Assumptions

In the following list, the assumptions that are expected to happen after this communication plan:

CPA01:

The stakeholders will be available for answering the questions when needed

CPA02:

The email will be a faster and convenient way to get answers

CPA03:

The stakeholders will be informed before scheduling any meeting or interview

CPA04:

The stakeholder Ms.Nouf Barshid will be updated about the system after each phase

2.4.4 Constraints

In the communication plan, the information that will be asked has constraints. Such as, the document that will be requested from the recruitment stakeholder, will not be available for analysis as needed. Also, the samples from the Excel sheets will not be provided with data.

Moreover, the plan might have restrictions according to the method of communication. Some stakeholders do not reply back to the email during weekends or they do not check their email regularly. In addition to this, some stakeholders do not prefer to share their contact numbers in case they do not use email regularly.

3.5 Project Schedule Management

Project Manager: Ateqa Bin Mhafodh

Date Prepared: 04/04/2020

Project Sponsor: Dar Al-Hekma University

Version	Date	Author	Comment
1.0	04/04/2020	Ateqa	Initial Draft
2.0	05/04/2020	Ateqa	Complete the Introduction and complete the Activity List
3.0	10/04/2020	Ateqa	Draw the Gantt and Network Diagrams
4.0	12/04/2020	Ateqa	Defined Resources

Table 28: Schedule Plan History

3.5.1 Introduction

The project schedule is listing all the activities either the main activity or sub-activity that will occur from the beginning to the completion of the project. Also, these activities have a start and end date so it helps in knowing the completion date of a specific task. In addition, the schedule includes a list of the resources that will be needed for a specific activity and the estimated budget for that activity. Scientifically, the project schedule can be the tool that communicates what work needs to be performed, which resources of the organization will perform the work and the timeframes in which that work needs to be performed. [10]

However, the purpose of this schedule or time management helps the project manager to define each activity in more detail, then divide activities among the team. Also, it helps in predicting the completion time of the project. Moreover, it helps both the project manager and the sponsor in providing the basis for monitoring project progress for the time dimension of the project. [11]

To manage and update the schedule during the executions of the project there are many ways. One of the ways is to conduct performance reviews. In performance reviews, the project manager compares the outcome from each activity with planned value in the schedule. So then it can be decided if the project is on the track or not. [12]

3.5.2 Activity List

The following table shows the activities that will happen to complete this system

Activity ID	Activity	Predecessor	Duration
1	Project Initiation	-	34 Days
1.1	Find Multiple Project Sponsor	-	20
1.1.1	Do multiple Interviews	-	13
1.1.2	Choose One Project	1.1.1	5
1.2	Sign Internship Agreement	1.1.2	1
1.3	Sign Risk Assessment Form	1.2	1
1.4	Completion Project Charter Document	1.1.2	10
1.4.1	Collect Requirements	1.2	5
1.4.2	Finalize the Document	1.4.1	5
1.5	Approve the Charter from the Sponsor	1.4	2
2	Requirement Analysis	1	52 Days
2.1	Prepare Personas	1	4
2.1.1	Send Questions to System Users	1.4.1	4
2.2	Write Functional Requirements As Users Stories	2.1	14
2.2.1	Conduct Interviews with System Users	2.1.1	5
2.2.2	Analyze the Policy and Procedures Documents	2.2.1	5
2.2.3	Make Assumptions	2.2.2	3
2.2.4	Divide the Functional Requirements According to the Users	2.2.3	1
2.3	Write Nonfunctional Requirements	2.2	10
2.3.1	Conduct Interviews with System Users	2.2.1	5
2.3.2	Analyze the Policy and Procedures Documents	2.3.1	1

2.3.3	Make Assumptions	2.3.2	3
2.3.4	Grouping the Nonfunctional Requirements	2.3.3	1
2.4	Draw Use Case Diagrams	2.3	2
2.5	Draw Activity Diagrams	2.4	2
2.6	Draw State Diagrams	2.5	5
2.7	Draw Entity-Relationship Diagram	2.6	5
3	Project Management	1	14 from 52
3.1	Communication Management	1.2	2
3.2	Stakeholder Management	1.4.1	2
3.3	Schedule Management	1.4	4
3.3.1	Do Activity List	1.4.2	1
3.3.2	Draw Gantt Chart	3.3.1	1
3.3.3	Draw Network Diagrams	3.3.2	1
3.3.4	Prepare the Resources List	3.3.3	1
3.4	Risk Management	1.4.2	2
4	System Design	2	25 Days
4.1	Requirements Verification	2	5
4.1.1	Exchange the Requirements Analysis Documents with Another Student	2	1
4.1.2	Inspect the Document	4.1.1	1
4.1.3	Identify the Defects	4.1.2	1
4.1.4	Correct Defects Provided by the Inspector	4.1.3	1
4.1.5	Calculate the Metrics	4.1.4	1
4.2	Logical Data Modeling	2.7	6

4.2.1	Map the Entity-Relationship Diagram to Relational Schemas	2.7	3
4.2.2	Normalize the Relations to the Third Normal Form	4.2.1	1
4.2.3	Denormalize the Relations	4.2.2	1
4.2.4	Specify Information About Each Attribute	4.2.3	1
4.3	Physical Data Modeling	2.3	6
4.3.1	System Architecture	2.3.4	2
4.3.2	Draw Deployment Diagrams	4.3.1	2
4.3.3	Define Hardware and Software Specifications	4.3.2	2
5	Project Closure	4	8 from 25
5.1	Final Report	4	4
5.2.1	Apply Feedbacks to the Previous Documents	1 - 2 - 3 - 4	1
5.2.2	Prepare Project Stakeholder Engagement Log	5.2.1	1
5.2.3	Prepare Project Communication Log	5.2.2	1
5.2.4	Prepare Lessons Learned Register	5.2.3	1
5.2	Prepare Final Presentation	5.1	2
5.3	Submit All Deliverables to The Stakeholders	5.1	1
5.4	Field Supervisor Evaluation	5.3	1

Table 29: Activity List

3.5.3 Gantt Chart

Gantt chart is listing all project activities and their corresponding start and finish dates in a chart format. Also, the Gantt chart helps in providing a basis for monitoring the project progress. So, in the following diagram shows the Gantt chart for this project and a table that explains the start and end time of each activity, the duration of activities in days and all milestones.

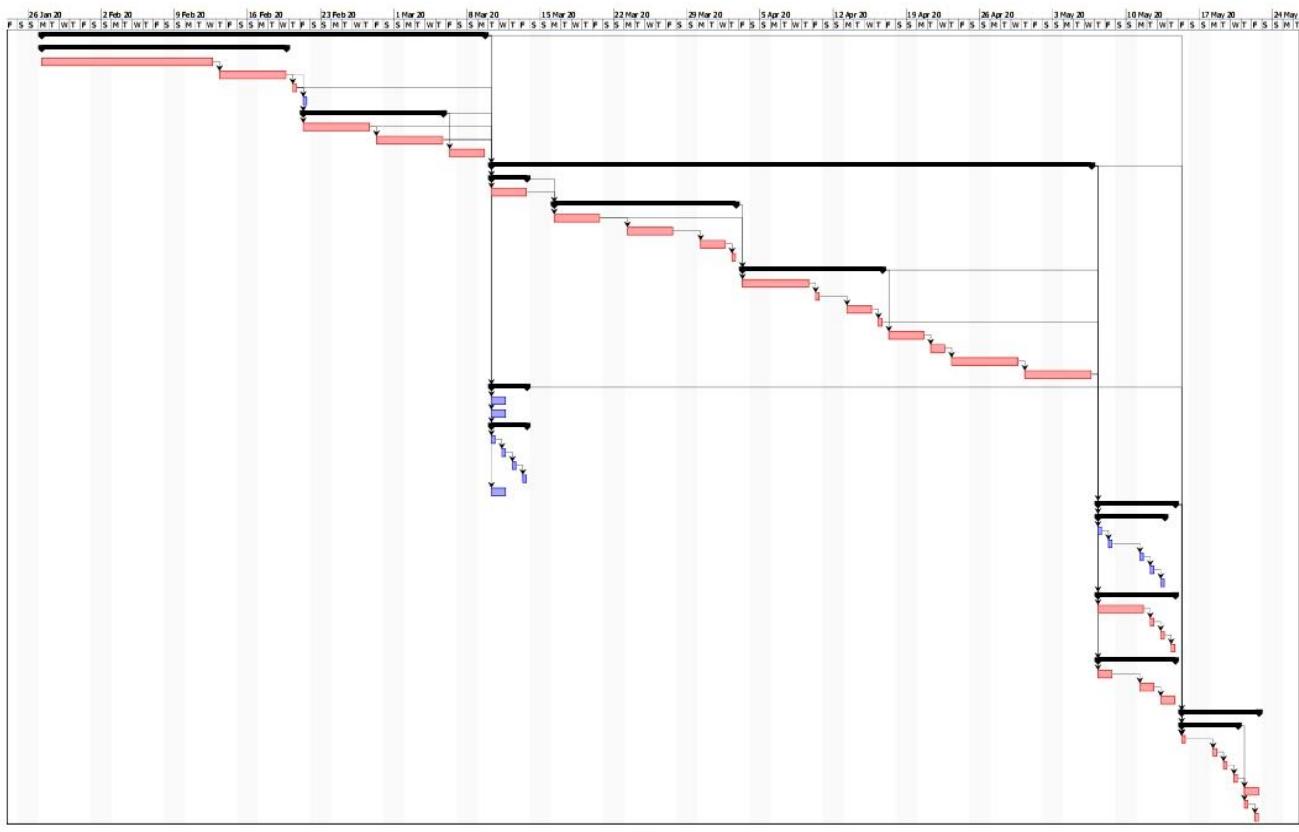


Figure 18: FIMS Gantt chart

Diagram Legends

- Start and end dates are shown as horizontal bars
- Arrows show the tasks dependencies

	Name	Duration	Start	Finish	Predecessors
1	Project Initiation	31 days	1/27/20 8:00 AM	3/9/20 5:00 PM	
2	Find Multiple Project Sponsor	18 days	1/27/20 8:00 AM	2/19/20 5:00 PM	
3	Do multiple Interviews	13 days	1/27/20 8:00 AM	2/12/20 5:00 PM	
4	Choose One Project	5 days	2/13/20 8:00 AM	2/19/20 5:00 PM	3
5	Sign Internship Agreement	1 day	2/20/20 8:00 AM	2/20/20 5:00 PM	4
6	Sign Risk Assessment Form	1 day	2/21/20 8:00 AM	2/21/20 5:00 PM	5
7	Completion Project Chater Document	10 days	2/21/20 8:00 AM	3/5/20 5:00 PM	4
8	Collect Requirements	5 days	2/21/20 8:00 AM	2/27/20 5:00 PM	5
9	Finalize the Document	5 days	2/28/20 8:00 AM	3/5/20 5:00 PM	8
10	Approve the Charter from the Sponsor	2 days	3/6/20 8:00 AM	3/9/20 5:00 PM	7
11	Requirement Analysis	42 days	3/10/20 8:00 AM	5/6/20 5:00 PM	1
12	Prepare Personas	4 days	3/10/20 8:00 AM	3/13/20 5:00 PM	1
13	Send Questions to System Users	4 days	3/10/20 8:00 AM	3/13/20 5:00 PM	8
14	Write Functional Requirements As Users Stories	14 days	3/16/20 8:00 AM	4/2/20 5:00 PM	12
15	Conduct Interviews with System Users	5 days	3/16/20 8:00 AM	3/20/20 5:00 PM	13
16	Analyze the Policy and Procedures Documents	5 days	3/23/20 8:00 AM	3/27/20 5:00 PM	15
17	Make Assumptions	3 days	3/30/20 8:00 AM	4/1/20 5:00 PM	16
18	Divide the Functional Requirements According to the Us...	1 day	4/2/20 8:00 AM	4/2/20 5:00 PM	17
19	Write Nonfunctional Requirements	10 days	4/3/20 8:00 AM	4/16/20 5:00 PM	14
20	Conduct Interviews with System Users	5 days	4/3/20 8:00 AM	4/9/20 5:00 PM	15
21	Analyze the Policy and Procedures Documents	1 day	4/10/20 8:00 AM	4/10/20 5:00 PM	20
22	Make Assumptions	3 days	4/13/20 8:00 AM	4/15/20 5:00 PM	21
23	Grouping the Nonfunctional Requirements	1 day	4/16/20 8:00 AM	4/16/20 5:00 PM	22
24	Draw Use Case Diagrams	2 days	4/17/20 8:00 AM	4/20/20 5:00 PM	19
25	Draw Activity Diagrams	2 days	4/21/20 8:00 AM	4/22/20 5:00 PM	24
26	Draw State Diagrams	5 days	4/23/20 8:00 AM	4/29/20 5:00 PM	25
27	Draw Entity-Relationship Diagram	5 days	4/30/20 8:00 AM	5/6/20 5:00 PM	26
28	Project Management	4 days	3/10/20 8:00 AM	3/13/20 5:00 PM	1
29	Communication Management	2 days	3/10/20 8:00 AM	3/11/20 5:00 PM	5
30	Stakeholder Management	2 days	3/10/20 8:00 AM	3/11/20 5:00 PM	8
31	Schedule Management	4 days	3/10/20 8:00 AM	3/13/20 5:00 PM	7
32	Do Activity List	1 day	3/10/20 8:00 AM	3/10/20 5:00 PM	9
33	Draw Gantt Chart	1 day	3/11/20 8:00 AM	3/11/20 5:00 PM	32
34	Draw Network Diagrams	1 day	3/12/20 8:00 AM	3/12/20 5:00 PM	33
35	Prepare the Resources List	1 day	3/13/20 8:00 AM	3/13/20 5:00 PM	34
36	Risk Management	2 days	3/10/20 8:00 AM	3/11/20 5:00 PM	9
37	System Design	6 days	5/7/20 8:00 AM	5/14/20 5:00 PM	11
38	Requirements Verification	5 days	5/7/20 8:00 AM	5/13/20 5:00 PM	11
39	Exchange the Requirements Analysis Documents with ...	1 day	5/7/20 8:00 AM	5/7/20 5:00 PM	11
40	Inspect the Document	1 day	5/8/20 8:00 AM	5/8/20 5:00 PM	39
41	Identify the Defects	1 day	5/11/20 8:00 AM	5/11/20 5:00 PM	40
42	Correct Defects Provided by the Inspector	1 day	5/12/20 8:00 AM	5/12/20 5:00 PM	41
43	Calculate the Metrics	1 day	5/13/20 8:00 AM	5/13/20 5:00 PM	42
44	Logical Data Modeling	6 days	5/7/20 8:00 AM	5/14/20 5:00 PM	27
45	Map the Entity-Relationship Diagram to Relational Sche...	3 days	5/7/20 8:00 AM	5/11/20 5:00 PM	27
46	Normalize the Relations to the Third Normal Form	1 day	5/12/20 8:00 AM	5/12/20 5:00 PM	45
47	Denormalize the Relations	1 day	5/13/20 8:00 AM	5/13/20 5:00 PM	46
48	Specify Information About Each Attribute	1 day	5/14/20 8:00 AM	5/14/20 5:00 PM	47
49	Physical Data Modeling	6 days	5/7/20 8:00 AM	5/14/20 5:00 PM	19
50	System Architecture	2 days	5/7/20 8:00 AM	5/8/20 5:00 PM	23
51	Draw Deployment Diagrams	2 days	5/11/20 8:00 AM	5/12/20 5:00 PM	50
52	Define Hardware and Software Specifications	2 days	5/13/20 8:00 AM	5/14/20 5:00 PM	51
53	Project Closure	6 days	5/15/20 8:00 AM	5/22/20 5:00 PM	37
54	Final Report	4 days	5/15/20 8:00 AM	5/20/20 5:00 PM	37
55	Apply Feedbacks to the Previous Documents	1 day	5/15/20 8:00 AM	5/15/20 5:00 PM	37;28;11;1
56	Prepare Project Stakeholder Engagement Log	1 day	5/18/20 8:00 AM	5/18/20 5:00 PM	55
57	Prepare Project Communication Log	1 day	5/19/20 8:00 AM	5/19/20 5:00 PM	56
58	Prepare Lessons Learned Register	1 day	5/20/20 8:00 AM	5/20/20 5:00 PM	57
59	Prepare Final Presentation	2 days	5/21/20 8:00 AM	5/22/20 5:00 PM	58
60	Submit All Delevarables to The Stakholders	1 day	5/21/20 8:00 AM	5/21/20 5:00 PM	54
61	Field Supervisor Evaluation	1 day	5/15/20 8:00 AM	5/15/20 5:00 PM	

FIMS

Table 30: Information Key for FIMS Gantt chart

3.5.4 Network Diagram

Network Diagrams are the preferred technique for showing activity sequencing. Also, a network diagram is a schematic display of the logical relationships or sequencing of project activities the following diagram shows the network diagram for the FIMS project. The activities show in a rectangular shape. The black one shows the Milestones. While the blue borders mean non-critical paths activities. The red borders are activities that consider critical paths.

The critical path is the longest path through the network diagram. Where the longest path is deriving the completion date for the project. In other words, if one or more of the activities on the critical path takes longer than planned, the whole project schedule will slip unless the project manager takes corrective action. As shown in the diagram, for this project there are more than one critical path. So, the network diagram can have more than one critical path.

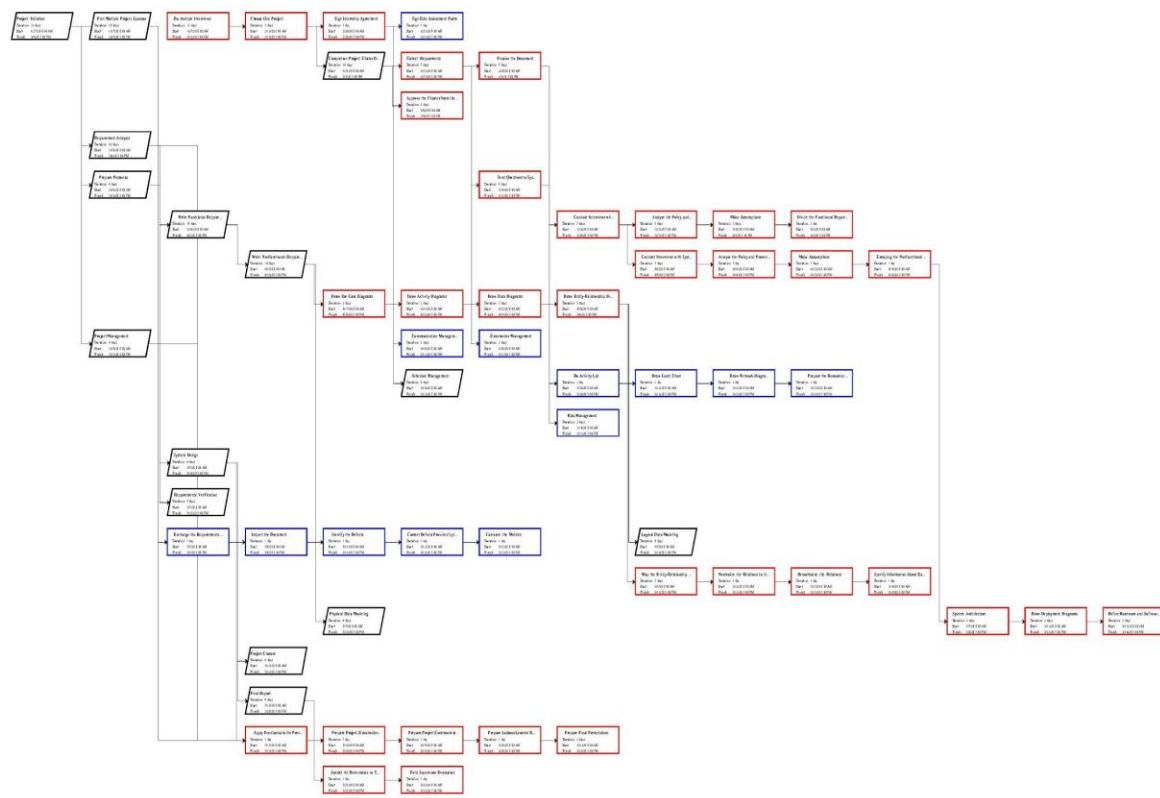


Figure 19: Network Diagram

3.5.5 Resources

The following list show resources that a project team should use to perform project activities

	Name	Group	Cost
1	Lucidchart	Software	\$0.00
2	Draw.io	Software	\$0.00
3	ProjectLibre	Software	\$0.00
4	Google Docs	Software	\$0.00
5	Microsoft Word	Software	\$0.00
6	Adobe Reader XI	Software	\$0.00
7	Balsamic	Software	\$0.00
8	SQL Server Development Edition	Software	\$0.00
9	Microsoft PowerPoint	Software	\$0.00
10	Visual Studio 2019 Community Edition	Software	\$0.00
11	Whatsapp	Software	\$0.00
12	Gmail	Software	\$0.00
14	System Analyst	Labors	\$0.00
15	System Designer	Labors	\$0.00
16	System Devloper	Labors	\$0.00
17	System Aministrator	Labors	\$0.00
18	Project Manager	Labors	\$0.00
19	Project Team	Labors	\$0.00
21	Budget for Laptop Maintenance	Budget	\$0.00
22	Budget for System Maintenance	Budget	\$0.00
23	Budget for System Implementation	Budget	\$0.00
24	Budet for Printing Documents	Budget	\$0.00
26	Laptops	Material	\$0.00
27	High Speed Internet	Material	\$0.00
	FIMS		

Table 31: FIMS Project Resources

3.6 Project Risk Management

Project Manager: Ateqa Bin Mhafod
Project Sponsor: Dar Al-Hekam University

Date Prepared: 04/04/2020

Version	Date	Author	Comment
1.0	04/04/2020	Ateqa	Initial Draft
2.0	04/04/2020	Ateqa	Write Introduction
3.0	12/04/2020	Ateqa	Defined the risks
3.1	13/04/2020	Ateqa	Added risks with IDs R6, R7, R8
4.0	13/04/2020	Ateqa	Defined responses for each risk

Table 32: Risk Plan History

3.6.1 Introduction

Risks are situations that lead to the loss of the value of something. Also, risks can be dangerous situations that again lead to a big loss. In dictionaries, risks are the possibility that something unpleasant or unwelcome will happen. In organizations, these risks will be involved in their projects.

So, to reduce the effect of these risks it needs to be managed. Apart from this, the processes involved in management are identifying, analyzing, and responding to risks throughout the life of a project and in the best interests of meeting project objectives. Moreover, to manage the risks during the execution there are some strategies. Firstly, risk management should be embedded while planning. So, it needs to be planned for and what should the response be. Secondly, the risks can be identified in an early stage using the previous lesson learned of similar projects. Thirdly, once the risk is being identified during the execution it should be assigned to one of the team members to take the accountability of it. By this action, other team members will work on the project and the deliverable will be delivered on the agreed date. So, no delay in work will happen.

To manage these risks there are purposes behind it. One of the purposes is that it helps to prevent undesirable situations from occurring. In addition, it helps to reduce any negative consequences when something undesirable does occur. Lastly, one of the purposes is that it helps to enhance the overall success of projects.

3.6.2 Organization

It matters that if the organization has a risk policy and process or not. Because this policy and process will provide a basis for an organization to analyze how to get from their existing state to a target state. Dar Al-Hekma University has policies and processes for risk management. The Quality Assurance department is responsible for it.

3.6.3 Risk Identification

The following table shows the risks that might occur during the projects and the category of each risk. Also, the table shows the probability of the risk to occur and what will be the impact.

ID	Category	Risk Statement	Probability	Impact
R1	Technical	The laptop device may stop working, causing loss project work	Low	High
R2	External	If a global disease occurs in KSA, a curfew may happen in the country, leading to having fewer options to communicate the stakeholders	High	High
R3	Management	Tightening in schedule causing the low-quality system	High	Medium
R4	Organizational	Unavailability of the stakeholders to conduct interviews causing changes in the requirements during the execution phase	Medium	High
R5	Organizational	IT department may reject the system causing not applying the system in the organization	High	Low
R6	Management	Lack of knowledge in some project phases causing a delay in schedule and deliverables	Low	High
R7	Management	Missing requirements during the collection causing the undesired system	Medium	High
R8	Management	Incomplete system design causing problems while execution	Medium	High

Table 33: Risk Identification

Table Legends

1. Probability:

- **High:** Greater than 70% probability of occurrence
- **Medium:** Between 30% and 70% probability of occurrence
- **Low:** Below 30% probability of occurrence

2. Impact:

- **High:** the risk that has the potential to greatly impact project cost, project schedule or performance
- **Medium:** the risk that has the potential to slightly impact project cost, project schedule or performance
- **Low:** the risk that has relatively little impact on cost, schedule or performance

3.6.4 Risk Responses

This section will identify the approach and response for each risk especially risks that turned red in the previous table. So the following table will show the responses for the risks.

ID	Risk	Approach	Response
R1	The laptop device may stop working, causing loss project work	Avoid	Try to backup once in a week to secure the work
R2	If a global disease occur in KSA, a curfew may happen in the country, leading to having fewer options to communicate the stakeholders	Mitigate	It can reduce its impact by fully using fewer options of communicating and searching for alternative communication ways which should be convenient for both parties.
R3	Tightening in schedule causing the low-quality system	Avoid	This risk might occur if the stakeholders want the deliverable earlier. The risk can be avoided from the beginning while signing the contract and deciding for a delivery date which is convenient for both the team and the stakeholder.
R4	Unavailability of the stakeholders to conduct interviews causing changes in the requirements during the execution phase	Mitigate	Conduct interviews with the available one and get back to the unavailable. Try to vary in requirements gathering technique. Find other ways to reach out with stakeholder according to the communication plan
R5	IT department may reject the system causing to not applying the system in the organization	Transfer	Let the academic affairs interfere in this matter
R6	Lack of knowledge in some project phases causing a delay in schedule and deliverables	Mitigate	To reduce the impact try to allocate time to read about these phases before its execution time or after working hours
R7	Missing requirements during the collection causing the undesired system	Avoid / Mitigate	Conduct many interviews and meetings and find an alternative or similar systems to collect requirements from. Also, collect requirements by reading and analyzing the policy and procedure documents related to the requirements that need to be collected
R8	Incomplete system design phase causing problems while execution	Mitigate	Try to complete the main tasks in designing that will need it during the execution and leave the sub-tasks

Table 34: Risk Responses

Table Legends

Approaches:

- **Avoid:** eliminate the threat by eliminating the cause
- **Mitigate:** identify ways to reduce the probability or the impact of the risk
- **Accept:** nothing will be done
- **Transfer:** make another party responsible for the risk (buy insurance, outsourcing)

3.7 Lesson Learned Register

Project Manager: Ateqa Bin Mahfodh

Project Sponsor: Dar Al-Hekma University

ID	Category	Lesson	Recommendations
1	Requirement	Missing and wrong requirements regarding the process	Should ask the stakeholders for all policy and Procedure document from each department that interact with the system
2	Communication	The chosen communication method was not efficient	Try to choose good time, send reminder and ask for another method which will be more efficient

Table 35: Lesson Learned

Chapter 4: System Design

4.1 Introduction

This chapter will talk about the design phase, which is the third phase in SDLC. During this phase what should happen is the conversion of the description of the recommended solution (FIMS) into logical design and then physical system specifications. But due to the circumstances and time limitation the physical system specifications will be completed in the next semester in Capstone Project, and only logical design will be implemented.

So, the first section of this chapter will talk about requirement verification. Requirement verification is part of the software quality.

The second part will state the logical data modeling and this part will be divided into sub-parts. The sub-parts are three main things in logical design which are, relational schema, normalization, denormalization, and attributes data types.

The third and final part of this chapter is the system architecture. This part will mention the system architecture of the developing system and then how it will be implemented. The implementation or the deployment process will be shown in the deployment diagram. Lastly, this part will talk about the specification of the hardware and the software that will be used to implement this system.

Finally, the purpose from this phase is the physical system specifications in a form ready to be turned over to programmers and other system builders for constructions. [1]

4.2 Requirements Verification

Requirement verification is part of the software quality. It helps in indicating the errors and duplicates in the requirements. So, in this section two verification activates is done. First activity is the review, which is done by the project manager and the second is the inspection activity. This activity done by another system analyst. In the following, are the inspection that done by the system analyst.

4.2.1 Requirements Inspection

The following table, shows the requirements inspections that done by the system analyst.

ID	User Story / Requirement	Traceable	Feasible	Correct	Consistent	Unambiguous	Comments
FR01.1	As a system supervisor, I want to see the assigned workload for each faculty, so I can review before I approve it.	Yes	Yes	Yes	Yes	Yes	
FR01.2	As a system supervisor, I want to view the assigned teacher assistant for each faculty, so this can help to know the un-assigned TA's.	Yes	Yes	Yes	Yes	Yes	
FR01.3	As a system supervisor, I want to generate the following reports about faculties, so I can use it in the annual meetings as a reference. <ul style="list-style-type: none">• Full-time Faculties• Part-time Faculties• Workload• Assigned TAs• Underload Faculties• Overload Faculties	Yes	Yes	Yes	Yes	Yes	

FR01.4	As a system supervisor, I want to view the faculties' profile, so that I can manage the faculties list and instruct the system admin assistant for changes.	Yes	Yes	Yes	Yes	Yes	
FR01.5	As a system supervisor, I want to view the offices list, so that I can manage the list and instruct the system admin assistant for changes	Yes	Yes	Yes	Yes	Yes	
FR01.6	As a system supervisor, I want to view the available resources in offices, so that I can manage the resources in each office.	Yes	Yes	Yes	Yes	Yes	
FR01.7	As a system supervisor, I want to view attached documents to a candidate profile, so that I can use it for future reference.	Yes	Yes	Yes	Yes	Yes	
FR01.8	As a system supervisor, I want to send notifications to the following users, so that I can notify them if there are any notes to their tasks. <ul style="list-style-type: none"> • System supervisor • System Admin • System admin assistant • CAADU user • HR user • Maintenance coordinator • Information desk coordinator • IT coordinator 	Yes	Yes	Yes	Yes	Yes	
FR01.9	As a system supervisor, I want the following faculties'	Yes	Yes	Yes	Yes	Yes	

	<p>information to be added to the databank automatically so that it can be used for future purpose.</p> <ul style="list-style-type: none"> • Rejected faculties • Canceled faculties • Resigned faculties 						
FR01.10	<p>As a system supervisor, I want the newly hired faculties to add them automatically in the following lists, so I can ensure that new faculties have been added to the lists.</p> <ul style="list-style-type: none"> • Faculty information list • Faculty offices list • Faculty workload list 	Yes	Yes	Yes	Yes	Yes	
FR02.1	<p>As a system admin, I want to record the following data so that I can create a new candidate profile.</p> <ul style="list-style-type: none"> • First name • Last name • Email address • Mobile Number • Type of contract • Part time courses • Total credit hours • Date needed • Recruitment status • Position title • Employment type • Program type (Ex. Undergraduate) • School name (Ex. School of Business and Law) • Department name (Ex. MIS department) • Division 	Yes	Yes	Yes	Yes	Yes	

	<ul style="list-style-type: none"> Temporary office number 						
FR02.2	<p>As a system admin, I want to upload the hiring documents in the following formats in the system, so I can have a backup for the documents.</p> <ul style="list-style-type: none"> .pdf .png .gif .jpg 	Yes	Yes	Yes	Yes	Yes	
FR02.3	<p>As a system admin, I want to perform the following tasks, so I can manage candidate profile</p> <ul style="list-style-type: none"> View candidate profile Edit candidate profile Remove candidate profile List Candidates Search for a candidate 	Yes	Yes	Yes	Yes	Yes	
FR02.4	<p>As a system admin, after creating a candidate's profile I want to update the status with the decision of the approval as it gets from the following committees, so I can continue with the process and keep other departments updated with the decision.</p> <ul style="list-style-type: none"> HR Department Recruitment Panel Department/Program Council School Council Scientific Council President 	Yes	Yes	Yes	Yes	Yes	

FR02.5	As a system admin, I want to submit resource requests about the following resources, so other coordinators can perform according to the request <ul style="list-style-type: none"> • Equipment • Computer • Printer • Door Sign 	Yes	Yes	Yes	Yes	Yes	
FR02.6	As a system admin, I want to submit an electronic devices and computer software request to IT coordinators, so they can act according to the request	Yes	Yes	Yes	Yes	Yes	
FR02.7	As a system admin, I want to specify the following electronic devices and computer software in the request, so the IT coordinator can provide me the exact resource <ul style="list-style-type: none"> • Computer (Windows, MAC) • Printer • Speakers • Projector • Scanner • Paper Shredder • Microphone • Webcam 	Yes	Yes	Yes	Yes	Yes	
FR02.8	As a system admin, I want to submit an equipment request to maintenance coordinators, so they can act according to the request	Yes	Yes	Yes	Yes	Yes	
FR02.9	As a system admin, I want to specify the following equipment in the request, so	Yes	Yes	Yes	Yes	Yes	

	<p>the maintenance coordinator can provide me the exact resource</p> <ul style="list-style-type: none"> • Desk • Chairs • Electricity Extensions • Cabinets • Phones • Phone Extension 						
FR02.10	As a system admin, I want to submit an door sign request to information desk coordinators, so they can act according to the request	Yes	Yes	Yes	Yes	Yes	
FR02.11	<p>As a system admin, I want to perform the following tasks, so that I can manage the resources list</p> <ul style="list-style-type: none"> • View resources list • View request details • List requests • Search request • Edit resource request • Edit resources list 	Yes	Yes	Yes	Yes	Yes	
FR02.12	<p>As a system admin, I want to record the following information, so that I can request resources</p> <ul style="list-style-type: none"> • Office number • Faculty name • Position title • Resource name • Resource quantity • Resource responsible department (Ex. IT) • Note • Request status (Ex. Open, Completed) • Request date and time 	Yes	Yes	Yes	Yes	Yes	

	<ul style="list-style-type: none"> • Delivery date and time 						
FR02.13	As a system admin, I want to search for a specific office to view the available resources in the office, so I can manage the resources	Yes	Yes	Yes	Yes	Yes	
FR02.14	<p>As a system admin, I want to generate reports about the following, so I can analyze data</p> <ul style="list-style-type: none"> • Faculties employment type reports (Full-Time / Part-Time) • Faculties in each school report • Faculties in each department report • Faculties workload report • Teacher Assistant status report (Assigned / Not-Assigned) 	Yes	Yes	Yes	Yes	Yes	similar to the first one in FR01.3
FR02.15	As a system admin, I want to generate a dashboard about faculties employment type so I can use it to check periodically reports	Yes	Yes	Yes	Yes	Yes	
FR02.16	As a system admin, I want the generated reports to be saved in one specific list, so that I can re-use it again in future	Yes	Yes	No	Yes	Yes	You don't need to have a list to save it. As long as the data exists the reports can be generated.
FR02.17	As a system admin, I want to export the generated reports in the following	Yes	Yes	Yes	Yes	Yes	what about .docx

	<p>formats, so that I can use it when needed</p> <ul style="list-style-type: none"> • .pdf • .png • .gif • .jpg • .xlsx • .pptx 						
FR02.18	<p>As a system admin, I want to receive a notification about the following changes on my email so I can be able to follow up:</p> <ul style="list-style-type: none"> • Faculty recruitment status • Completion of each resource request 	Yes	Yes	Yes	Yes	Yes	
FR03.1	<p>As a system admin assistant, I want to assign a temporary office to faculty as they get accepted (hired) so the faculty can have an office</p>	Yes	Yes	Yes	Yes	Yes	
FR03.2	<p>As a system admin assistant, I want to search for the new faculty in the office's list, so I can re-assign a permanent office</p>	Yes	No	No	Yes	No	specify the attributes you may search by
FR03.3	<p>As a system admin assistant, I want to perform the following tasks in the offices list, so that I can manage the offices list</p> <ul style="list-style-type: none"> • View the offices list • Add faculty to the list • Edit the offices list • Remove faculty from the office list • Remove office from the list 	Yes	Yes	Yes	Yes	Yes	

FR03.4	As a system admin assistant, I want to record the following data so that I can add a faculty to the offices list <ul style="list-style-type: none"> • Office number • Area • Person name • Available resource 	Yes	Yes	Yes	Yes	Yes	
FR03.5	As a system admin assistant, I want to search the accepted candidate profile using one of the following, so that I can convert the profile from candidate profile to faculty profile <ul style="list-style-type: none"> • First name • Last name • Mobile Number • Email address • Type of contract • Recruitment status • Position title • Employment type • Program type (Ex. Undergraduate) • School name (Ex. School of Business and Law) • Department name (Ex. MIS department) • Division • Temporary office number 	Yes	Yes	Yes	Yes	Yes	
FR03.6	As a system admin assistant, I want to add the following information to the faculty profile, so I can add the profile to the faculty information list <ul style="list-style-type: none"> • Nationality 	Yes	Yes	Yes	Yes	Yes	

	<ul style="list-style-type: none"> • Highest Education • Institution • Rank • Number Of Credits Taught In Each Course • Course Teaching Type • Total Credits Hours • Total Contact Hours • Required Load • Load Type • Conversion Rate • Status • Hiring Date • Release Date • Application Date • Date Of Birth • Permanent office number • Phone extension 						
FR03.7	<p>As a system admin assistant, I want to perform the following tasks, so that I can manage the faculty information list.</p> <ul style="list-style-type: none"> • List all faculties • Search faculty profile • Edit faculties profiles • Remove faculty from the list 	Yes	Yes	Yes	Yes	Yes	
FR03.8	As a system admin assistant, I want the removed faculty from the faculty list to moved automatically to the databank list, so it can be used in future	Yes	Yes	Yes	Yes	Yes	
FR03.9	As a system admin assistant, I want to receive the following types of notification, so that it	Yes	Yes	Yes	Yes	Yes	

	reminds me for the updating the faculty information list <ul style="list-style-type: none"> • In-app notification • Email notification • Calendar notification 						
FR03.10	As a system admin assistant, I want to search for the faculty in the faculty information list using one of the following, so I can update his/ her profile <ul style="list-style-type: none"> • Name • Employment type (Full-Time / Part-Time) • Position title • Mobile number • Email address • School name • Department name • Office number • Extension number 	Yes	Yes	Yes	Yes	Yes	this one is enough; remove 3.2
FR04.1	As a CAADU user, I want to receive a notification as new faculty get hired, so that I can prepare his/her workload and ensure for them a TA		Yes	Yes	Yes	Yes	
FR04.2	As a CAADU user, I want to record the following information, so that I can assign a workload for a faculty. <ul style="list-style-type: none"> • Faculty ID • Faculty Name • Rank • Position • Course Code • Course Title • Course Type • Course Credits 	Yes	Yes	Yes	Yes	Yes	

	<ul style="list-style-type: none"> • Contact Hours • Section Number • Semester • Academic Year • Total workload 						
FR04.3	<p>As a CAADU user, I want to perform the following tasks, so that I can manage the workload lists</p> <ul style="list-style-type: none"> • View list • Add faculty to the list • Edit information on the list • Remove faculty from the list • Remove workload from the faculty • Update faculty workload • List faculty workload 	Yes	Yes	Yes	Yes	Yes	
FR04.4	<p>As a CAADU user, I want to be updated if the assigned workload is approved or not, so that I can re-assign if not approved.</p>		Yes	Yes	Yes	Yes	
FR04.5	<p>As a CAADU user, I want to receive a notification about workload and TA/ Course Admin assignments from the following departments, so I can proceed with the next step.</p> <ul style="list-style-type: none"> • Department chair or Program director • Head of CAADU • Dean of school • Provost 		Yes	Yes	Yes	Yes	
FR04.6	<p>As a CAADU user, I want to know the current faculties in the department, so I can add</p>	Yes	Yes	Yes	Yes	Yes	

	new workload for faculty each semester.					
FR04.7	As a CAADU user, I want delete faculty workload for the following cases, so that I can manage the faculty workload list <ul style="list-style-type: none"> • Case of error • Faculty leave • Faculty change position 	Yes	Yes	Yes	Yes	Yes
FR04.8	As a CAADU user, I want to search for faculty by the following data, so that I can manage their workloads. <ul style="list-style-type: none"> • Faculty ID • Faculty name • Department 	Yes	Yes	Yes	Yes	Yes
FR05.1	As a HR user, I want to be notified when a new candidate is approved and added in the system, so that I can proceed with the hiring process.	Yes	Yes	Yes	Yes	Yes
FR05.2	As a HR user, I want to view the hiring documents for specific candidates using one of the following information, so I can take the decision of hiring. <ul style="list-style-type: none"> • First name • Last name • Email address • Mobile Number • Type of contract • Date needed • Recruitment status • Position title • Employment type 	Yes	Yes	Yes	Yes	Yes

	<ul style="list-style-type: none"> • Program type (Ex. Undergraduate) • School name (Ex. School of Business and Law) • Department name (Ex. MIS department) • Division 						
FR05.3	As a HR user, I want to perform the following tasks in the candidates profiles, so I can manage the requests <ul style="list-style-type: none"> • View candidate/faculty profile • Search for faculties by status • List all faculties • Edit recruitment status (Accept, Cancel, Reject) 	Yes	Yes	Yes	Yes	Yes	
FR05.4	As a HR user, I want the rejected and canceled candidates to move automatically to the databank list, so that it can be used in future	Yes	Yes	Yes	Yes	Yes	
FR06.1	As a maintenance coordinator , I want to receive a notification in the following places when the request sent, so I can update my schedule according to the request <ul style="list-style-type: none"> • Email • FIMS application • Calendar 	Yes	Yes	Yes	Yes	Yes	
FR06.2	As a maintenance coordinator , I want to know the following information	Yes	Yes	Yes	Yes	Yes	

	<p>about the request, so I can manage the request easily</p> <ul style="list-style-type: none"> • Equipment name • Equipment quantity • Problem type (If available, Ex. Broken Desk) • Electricity extension type (Ex. 110, 220) • Note • Delivery date and time • Office number 						
FR06.3	<p>As a maintenance coordinator , I want to perform the following changes to the requests that is related to me, so I can manage the resources list</p> <ul style="list-style-type: none"> • View request details • List requests • Search for request • Accept the request • Reject the request • Change delivery date • Change request status (Ex. Complete) 	Yes	Yes	Yes	Yes	Yes	look at 2.11, 6.3, 7.4, and 8.3
FR07.1	<p>As an information desk coordinator, I want to receive a notification in the following places when the request sent, so I can update my schedule according to the request</p> <ul style="list-style-type: none"> • Email • FIMS application • Calendar 	Yes	Yes	Yes	Yes	Yes	
FR07.2	As an information desk coordinator, I want to know the following information	Yes	Yes	Yes	Yes	Yes	

	<p>about the request, so I can manage the request easily</p> <ul style="list-style-type: none"> • Faculty name • Faculty position title • Office number • Delivery date and time 						
FR07.3	<p>As an information desk coordinator, I want to know the faculty name and the position title in the following languages, so I can print the door sign correctly</p> <ul style="list-style-type: none"> • English • Arabic 	Yes	Yes	Yes	Yes	Yes	non-functional
FR07.4	<p>As an information desk coordinator, I want to perform the following changes to the requests that is related to me, so I can manage the resources list</p> <ul style="list-style-type: none"> • View request details • List requests • Search for request • Accept the request • Reject the request • Change delivery date • Change request status (Ex. Complete) 	Yes	Yes	Yes	Yes	Yes	
FR08.1	<p>As a IT coordinator, I want to receive a notification in the following places when the request sent, so I can update my schedule according to the request</p> <ul style="list-style-type: none"> • Email • FIMS application • Calendar 	Yes	Yes	Yes	Yes	Yes	
FR08.2	As a IT coordinator, I want to know the following	Yes	Yes	Yes	Yes	Yes	

	<p>information in the request, so I can manage the request easily</p> <ul style="list-style-type: none"> • Office number • PC type • Printer type (If needed) • Problem type (If available) • Scanner type (If needed) • Paper Shredder(If needed) • Microphone(If needed) • Webcam(If needed) • Speakers 						
FR08.3	<p>As a IT coordinator, I want to perform the following changes to the requests that is related to me, so I can manage the resources list</p> <ul style="list-style-type: none"> • View request details • List requests • Search for request • Accept the request • Reject the request • Change delivery date • Change request status (Ex. Complete) 	Yes	Yes	Yes	Yes	Yes	
NFR01.1	The provost office, HR, CADDU, IT, Information disk, and Maintenance shall have access to the system	Yes	Yes	Yes	Yes	Yes	
NFR01.2	The HR, CADDU, IT, Information disk, and Maintenance shall have limited access in the system	Yes	Yes	Yes	Yes	No	

NFR01.3	The provost office shall have the full access and authorization on the system	Yes	Yes	Yes	Yes	Yes	
NFR01.4	The system shall be accessible by users who do not have a prior experience in systems and computers	Yes	Yes	No	Yes	No	
NFR02.1	The system shall include authentication and authorization features like different username and password for each user.	Yes	Yes	Yes	Yes	Yes	
NFR02.2	The user shall change the initially assigned login password immediately after completion of each semester, and the initial should never be reused.	Yes	Yes	Yes	Yes	Yes	
NFR02.3	The system shall be locked after three incorrect authentication and send a notification to the user email to unlock the account	Yes	Yes	Yes	Yes	Yes	
NFR02.4	The system while generating passwords shall not accept weak specifications. It must have strong specifications like the password should be a combination of upper, lower case letters, numbers, and symbols.	Yes	Yes	Yes	Yes	Yes	Just say follow best practices.
NFR02.5	The system shall encrypt the password during the login stage	Yes	Yes	Yes	Yes	Yes	
NFR03.1	The system shall be capable enough to handle 1000 users without affecting its performance	Yes	Yes	No	Yes	Yes	

NFR03.2	The system shall update all other lists when specific data in one list has been modified within 2 seconds	Yes	Yes	Yes	Yes	Yes	
NFR03.3	The system shall handle 100 requests per second	Yes	Yes	Yes	Yes	Yes	
NFR04.1	The system shall be portable. So opening from one operating system and then from another does not create any problem.	Yes	Yes	Yes	Yes	Yes	
NFR04.2	The system shall be deployed on DAH servers	Yes	Yes	Yes	Yes	Yes	
NFR04.3	The system shall work on both client devices either Windows or MacOS	Yes	Yes	Yes	Yes	Yes	
NFR05.1	The system shall fully backup automatically every week on the weekend days	Yes	Yes	Yes	Yes	Yes	
NFR05.2	The faculties Information shall be fully backed up every month on the weekend days	Yes	Yes	Yes	Yes	Yes	
NFR06.1	The system shall not allow other users rather than provost office to access faculties information list	Yes	Yes	Yes	Yes	Yes	
NFR06.2	The system shall allow the HR user to only view the candidate profile	Yes	Yes	Yes	Yes	Yes	
NFR06.3	The system shall keep the data private	Yes	Yes	Yes	Yes	No	
NFR07.1	The system shall be web-based because it is easy for	Yes	Yes	Yes	Yes	Yes	

	the users in the work environment						
NFR07.2	The system shall be user friendly, that the user can learn how to use it in one week	Yes	Yes	Yes	Yes	Yes	It depends on the time the use the system, Maybe in 7 times?
NFR07.3	The system shall have a maximum of 3 clicks to reach any content	Yes	Yes	Yes	Yes	Yes	
NFR07.4	The system shall have a single login to access all content	Yes	Yes	Yes	Yes	Yes	
NFR07.5	The system shall have a consistent UI (in all the views and dialogs, the UI elements behave and are placed in a similar way)	Yes	Yes	Yes	Yes	Yes	
NFR08.1	The system shall provide an admin manual hard and soft copy for helping the admins in interact with the system	Yes	Yes	Yes	Yes	Yes	
NFR08.2	The system shall provide a user manual hard and soft copy for helping the users in using the system	Yes	Yes	Yes	Yes	Yes	
NFR09.1	The system shall be available 95% - 99% of the time during the year	Yes	Yes	Yes	Yes	Yes	
NFR09.2	The system shall be available during the working days from Sunday 7:30 AM to Thursday 5:30 PM	Yes	Yes	Yes	Yes	Yes	
NFR09.3	The system shall update during the off days from	Yes	Yes	Yes	Yes	Yes	

	Thursday 7:00 PM to Sunday 5:00 AM						
NFR09.4	The system shall have high availability	Yes	Yes	Yes	Yes	No	
NFR09.5	The system shall not have unexpected downtime	Yes	No	Yes	Yes	Yes	
NFR09.6	The system shall have downtime at most 4 hours/month	Yes	Yes	Yes	Yes	Yes	
NFR09.7	The system shall have its expected downtime announced at least 48 hours in advance	Yes	No	Yes	Yes	Yes	
NFR09.8	The system shall have downtime only during scheduled update days	Yes	No	Yes	Yes	Yes	
NFR10.1	The system shall request the resource in 3 steps	Yes	Yes	Yes	Yes	Yes	
NFR10.2	The system shall create the faculty profile in 3 steps	Yes	Yes	Yes	Yes	Yes	
NFR11.1	The system shall be easily maintainable	Yes	Yes	Yes	Yes	No	

Table 36: Requirements Inspection

4.2.2 Diagrams Inspection

The following table shows the diagram inspection by the system analysis.

Diagram	Comment
Use Case Diagrams	
5.1.1 Manage Faculty Use Case Diagram	<ul style="list-style-type: none"> The diagram is very complicated; it is hard to read. What is CAADU? All abbreviations are not clear to the reader. The diagrams should be understandable by anyone.
5.1.2 Manage Offices Use Case Diagram	
5.1.3 Manage Requests and Resources Use Case Diagram	
5.1.4 Manage Workload Use Case Diagram	
5.1.5 Manage Teacher Assistant Use Case Diagram	
5.1.6 Generate Reports Use Case Diagram	
Activity Diagrams	
5.2.1: Faculty Appointment Activity Diagram	What is AA? To whom does FMIS send the notification? There are some grammatical and spelling mistakes.
5.2.2: Manage Offices Activity Diagram	The second decision node does not have text.
5.2.3: Manage Requests Activity Diagram	-

5.2.4: Manage Workload and Teacher Assistant Activity Diagram	One of the decision nodes needs text to explain it, and there's only one action connected to it which contradicts its purpose.
5.2.5: Manage Faculty Information List Activity Diagram	You don't need the second decision node.
State Diagrams	
6.1.1: Faculty State Diagram	What is after archived? (connect it to end node)
6.1.2: Office State Diagram	-
6.1.3: Request State Diagram	-
6.1.4: Workload State Diagram	-
6.1.5: Teacher Assistant State Diagram	-
Entity Relationship Diagrams	
7.1: FIMS Entity Relationship Diagram	What is the relationship between faculty and candidate? Does an employee have only one position? Can't an office have no requests? Can a section have more than one TA? Department may need no candidate? Can a program belong to more than one school? Is it mandatory for an employee to receive a notification? What is the relationship between a candidate and HR user called?

Table 37: Diagrams Inspection

General comments:

1. Name of use cases within the diagram should be capitalized (i.e. Upload Hiring Documents).
2. There are some grammatical and spelling mistakes.
- 3.

Inspector: Sara Khayat

Date: May 2, 2020

4.2.3 Metrics Calculation

The following section shows the calculation of the verification that is done by the system analysis.

4.2.3.1 Traceable Calculation

Traceable	Count of Traceable
No	3
Yes	95

Table 38: Traceable Calculation

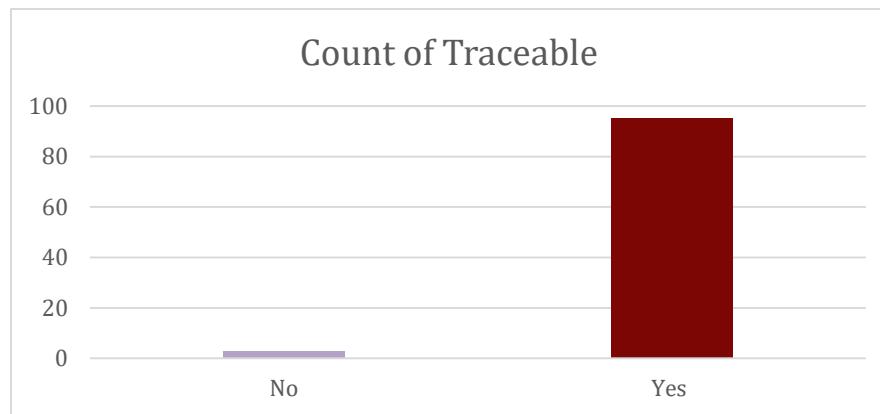


Figure 20 Traceable Calculation Chart

4.2.3.2 Feasible Calculation

Feasible	Count of Feasible
No	4
Yes	94

Table 39: Feasible Calculation

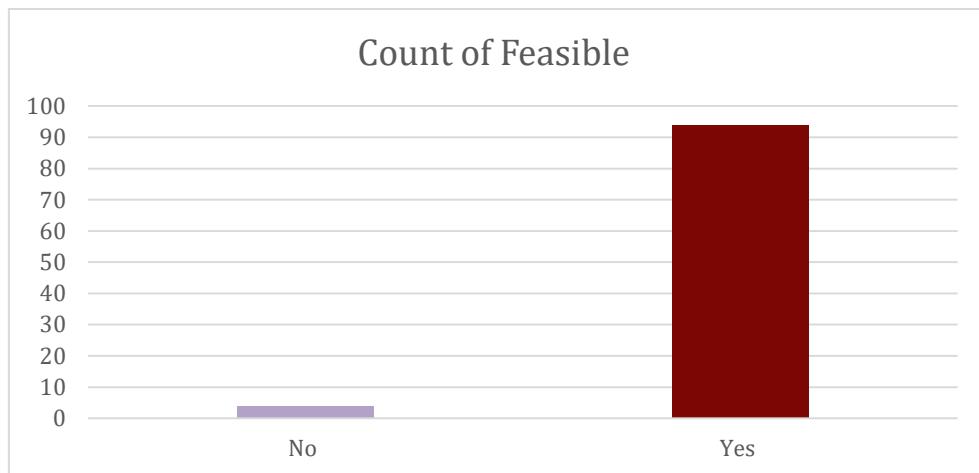


Figure 21: Feasible Calculation Chart

4.2.3.3 Correct Calculation

Correct	Count of Correct
No	4
Yes	94

Table 40: Correct Calculation

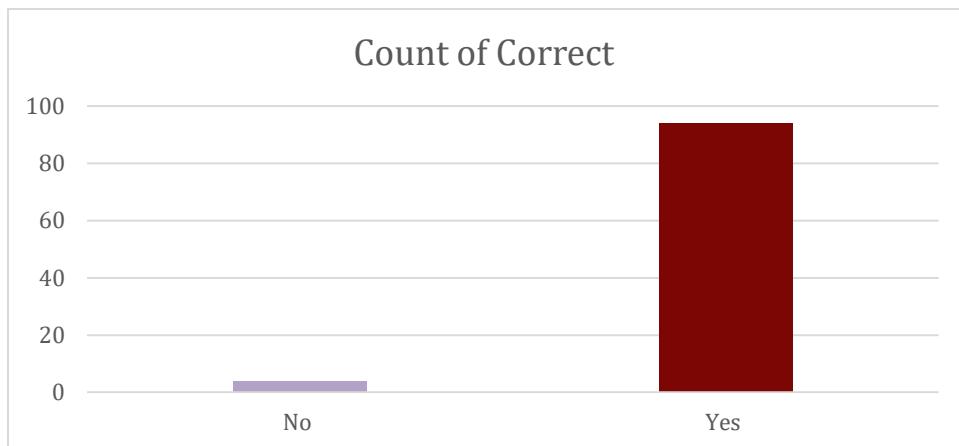


Figure 23: Correct Calculation Chart

4.2.3.4 Consistent Calculation

Consistent	Count of Consistent
No	1
Yes	97

Table 41: Consistent Calculation

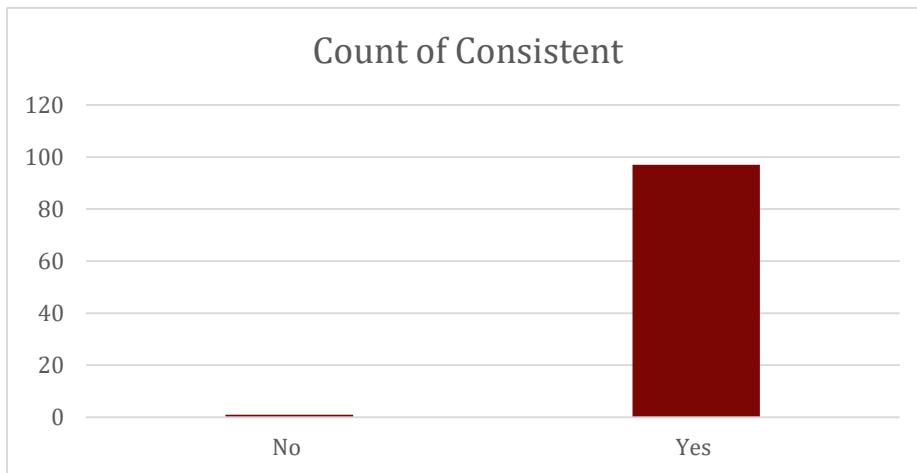


Figure 24: Consistent Calculation Chart

4.2.3.5 Unambiguous Calculation

Unambiguous	Count of Unambiguous
No	6
Yes	92

Table 42: Unambiguous Calculation

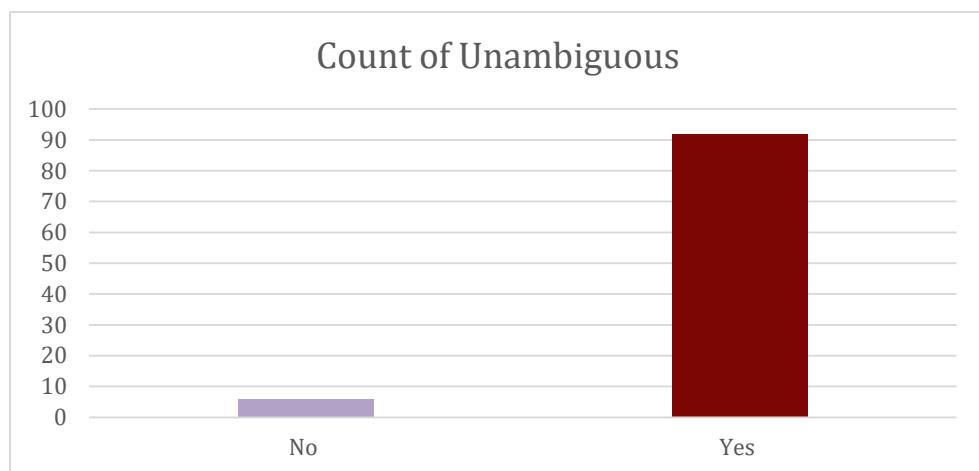


Figure 25: Unambiguous Calculation Chart

4.3 Logical Data Modeling

The logical data describes the data that will be in the system in a much details as possible. Also, the description will include all entities in the system and relationship among them. Moreover, it state all attribute of the entities. So, the following section state the relation schema for the FIMS.

4.3.1 Relational Schemas:

Relational schemas are the representation of a relation without its data. It includes the relation name and the list of its attributes. A schema is part of the logical designing processing. It converts the designed ERD to a more in detail schema that will allow the model to be translated into a database with ease and efficiency. In the following, all entities and relationships introduced in the ERD, have been converted into a relational schema for the FIMS.

RS01:

EMPLOYEE (EmployeeID, FirstName, LastName, EmailAdress, PhoneExtension, AcceptEmailNotification, PositionID, EmploymentTypeID, DepartmentID)

RS02:

FACULTY (EmployeeID, FacultyID, DateOfBirth, Nationality, Status, MobileNumber, HighestEducation, Institution, Division, TypeOfContract, DateNeeded, PartTimeCourses, RecruitmentStatus, ApplicationDate, HiringDate, Rank, RequiredLoad, ConversionRate, NumberOfCreditsTaughInEachClass, CoursesTeachingType, TotalCreditsHours, TotalContactHours, LoadType, ReleaseDate)

RS03:

TEACHER_ASSISTANT (EmployeeID, TeacherAssistantID, TotalCredits, TotalContactHours, LoadType)

RS04:

SYSTEM_SUPERVISOR (EmployeeID, SystemSupervisorID)

RS05:

SYSTEM_ADMIN (EmployeeID, SystemAdminID)

RS06:

SYSTEM_ADMIN_ASSISTANT (EmployeeID, SystemAdminAssistantID)

RS07:

CAADU_USER (EmployeeID, CAADUID)

RS08:

HR_USER (EmployeeID, HRID)

RS09:

IT_USER (EmployeeID, ITID)

RS10:

INFO_DESK_USER (EmployeeID, InfoDeskID)

RS11:

MAINTANANCE_USER (EmployeeID, MaintenanceID)

RS12:

POSITION (PositionID, PositionTitle)

RS13:

EMPLOYMENT_TYPE (EmploymentTypeID, EmploymentTypeName)

RS14:

DEPARTMENT (DepartmentID, DepartmentName, SchoolID)

RS15:

SCHOOL (SchoolID, SchoolName)

RS16:

NOTIFICATION (NotificationID, NotificationDateTime, MessageID)

RS17:

MESSAGE (MessageID, Language, Content)

RS18:

RECEIVE_NOTIFICATION (EmployeeID, NotificationID)

RS19:

TA_GENERATE_NOTIFICATION (TAAssignmentID, NotificationID)

RS20:

TA_ASSIGNMENT (TAAssignmentID, EmployeeID, SectionNumber)

RS21:

WORKLOAD_GENERATE_NOTIFICATION (WorkloadID, NotificationID)

RS22:

WORKLOAD (WorkloadID, Semester, AcademicYear, EmployeeID)

RS23:

REQUEST_GENERATE_NOTIFICATION (RequestID, NotificationID)

RS24:

REQUEST (RequestID, ResourceType, ResourceQuantity, Note, RequestDateTime, DeliveryDateTime, EmployeeID, OfficeNumber)

RS25:

REQUEST_RESOURCE (RequestID, ResourceID)

RS26:

RESOURCE (ResourceID, resourceName, OfficeNumber)

RS27:

OFFICE (OfficeNumber, OfficeArea, AvailableResources)

RS28:

SECTION (SectionNumber, SectionDetails, WorkloadID, CourseCode)

RS29:

COURSE (CourseCode, CourseTitle, CourseType, CourseDetails, CourseCredits,
RequiredContactHours, DepartmentID)

RS30:

HIRING_DOCUMENT (DocumentID, DocumentName, DocumentType, DocumentDate,
DocumentFormat, EmployeeID)

4.3.2 Normalization:

When the Entity Relationship Diagram conceptually modeled as relational schema, it was recognized that all entities for this system (FIMS) were normalized to the third normal form. Apart from this, normalization will not be needed to it more, as it is already a good design and since the requirement is to normalize it to third normal form and not the sixth. According to this, no further normalization will be performed.

4.3.3 Denormalization:

According to the previous part, the denormalization will also be skipped. Since a good design for the database has already been developed and achieved.

4.3.3 Attribute Data Types:

The following tables shows the attribute data types, which will be used to build the database. The data type that is being used is T-SQL types.

EMPLOYEE			
Attribute	Data Type	Required	Default
EmployeeID	INT	Yes	
FirstName	NVARCHAR (20)	Yes	
LastName	NVARCHAR (50)	Yes	
EmailAddress	NVARCHAR (50)	Yes	
PhoneExtension	NVARCHAR(20)	Yes	
AcceptEmailNotification	INT	Yes	
PositionID	NVARCHAR(20)	Yes	
EmploymentTypeID	NVARCHAR(20)	Yes	
DepartmentID	INT	Yes	

Table 43: Employee Data Type

FACULTY			
Attribute	Data Type	Required	Default
EmployeeID	INT	Yes	
FacultyID	INT	Yes	
DateOfBirth	DATE	Yes	
Nationality	NVARCHAR (MAX)	Yes	
Status	NVARCHAR (MAX)	Yes	
MobileNumber	NVARCHAR (20)	Yes	
HighestEducation	NVARCHAR (MAX)	Yes	
Institution	NVARCHAR (MAX)	Yes	
Division	NVARCHAR (MAX)	Yes	
TypeOfContract	NVARCHAR (MAX)	Yes	
DateNeeded	DATE	Yes	
PartTimeCourses	NVARCHAR (MAX)	No	
NumberOfCreditsThoughtInEachClass	NVARCHAR (MAX)	No	
CoursesTeachingType	NVARCHAR (MAX)	Yes	
TotalCreditsHours	INT	Yes	
TotalContactHours	INT	Yes	
LoadType	NVARCHAR (MAX)	Yes	
ReleaseDate	DATE	No	

Table 44: Faculty Data Type

TEACHER_ASSISTANT			
Attribute	Data Type	Required	Default
EmployeeID	INT	Yes	
TeacherAssistanID	INT	Yes	
TotalCredit	INT	Yes	
TotalContactHours	INT	Yes	
LoadType	NVARCHAR (MAX)	Yes	

Table 45: Teacher Assistant Data Type

SYSTEM_SUPERVISOR			
Attribute	Data Type	Required	Default
EmployeeID	INT	Yes	
SystemSupervisorID	INT	Yes	

Table 46: System Supervisor Data Type

SYSTEM_ADMIN			
Attribute	Data Type	Required	Default
EmployeeID	INT	Yes	
SystemAdminID	INT	Yes	

Table 47: System Admin Data Type

SYSTEM_ADMIN_ASSISTANT

Attribute	Data Type	Required	Default
EmployeeID	INT	Yes	
SystemAdminAssistantID	INT	Yes	

Table 48: System Admin Assistant Data Type

CAADU_USER			
Attribute	Data Type	Required	Default
EmployeeID	INT	Yes	
CAADUID	INT	Yes	

Table 49: CAADU User Data Type

HR_USER			
Attribute	Data Type	Required	Default
EmployeeID	INT	Yes	
HRID	INT	Yes	

Table 50: HR User Data Type

IT_USER			
Attribute	Data Type	Required	Default
EmployeeID	INT	Yes	
ITID	INT	Yes	

Table 51: IT User Data Type

INFO_DESK_USER			
Attribute	Data Type	Required	Default
EmployeeID	INT	Yes	
InfoDeskID	INT	Yes	

Table 52: Information Desk User Data Type

MAINTENANCE _USER			
Attribute	Data Type	Required	Default
EmployeeID	INT	Yes	
MaintanacelD	INT	Yes	

Table 53: Maintenance User Data Type

POSITION			
Attribute	Data Type	Required	Default
PositionID	NVARCHAR (MAX)	Yes	
PositionTitle	NVARCHAR (MAX)	Yes	

Table 54: Position Data Type

EMPLOYMENT_TYPE

Attribute	Data Type	Required	Default
EmploymentTypeID	NVARCHAR (MAX)	Yes	
EmploymentTypeName	NVARCHAR (MAX)	Yes	

Table 55: Employment Type Data Type

DEPARTMENT			
Attribute	Data Type	Required	Default
DepartmentID	NVARCHAR (MAX)	Yes	
DepartmentName	NVARCHAR (MAX)	Yes	
SchoolID	NVARCHAR (MAX)	Yes	

Table 56: Department Data Type

SCHOOL			
Attribute	Data Type	Required	Default
School ID	NVARCHAR (MAX)	Yes	
SchoolName	NVARCHAR (MAX)	Yes	

Table 57: School Data Type

NOTIFICATION			
Attribute	Data Type	Required	Default
NotificationID	NVARCHAR (MAX)	Yes	
NotificationDateTime	DATETIME2	Yes	
MessageID	NVARCHAR (MAX)	Yes	

Table 58: Notification Data Type

MESSAGE			
Attribute	Data Type	Required	Default
MessageID	NVARCHAR (MAX)	Yes	
Language	NVARCHAR (MAX)	Yes	
Content	NVARCHAR (MAX)	Yes	

Table 59: Message Data Type

RECEIVE_NOTIFICATION			
Attribute	Data Type	Required	Default
EmployeeID	INT	Yes	
NotificationID	NVARCHAR (MAX)	Yes	

Table 60: Receive Notification Data Type

TA_GENERATE_NOTIFICATION			
Attribute	Data Type	Required	Default
TAAssignmentID	NVARCHAR (MAX)	Yes	
NotificationID	NVARCHAR (MAX)	Yes	

Table 61: TA Assignment Generate Notification Data Type

TA_ASSIGNMENT			
Attribute	Data Type	Required	Default
TAAssignmentID	NVARCHAR (MAX)	Yes	
EmployeeID	INT	Yes	
SectionNumber	INT	Yes	

Table 62: TA Assignment Data Type

WORKLOAD_GENERATE_NOTIFICATION			
Attribute	Data Type	Required	Default
WorkloadID	NVARCHAR (MAX)	Yes	
NotificationID	NVARCHAR (MAX)	Yes	

Table 63: Workload Generate Notification Data Type

WORKLOAD			
Attribute	Data Type	Required	Default
WorkloadID	NVARCHAR (MAX)	Yes	
Semester	NVARCHAR (MAX)	Yes	
AcademicYear	NVARCHAR (MAX)	Yes	
EmployeeID	INT	Yes	

Table 64: Workload Data Type

REQUEST_GENERATE_NOTIFICATION			
Attribute	Data Type	Required	Default
RequestID	NVARCHAR (MAX)	Yes	
NotificationID	NVARCHAR (MAX)	Yes	

Table 65: Request Generate Notification Data Type

REQUEST

Attribute	Data Type	Required	Default
RequestID	NVARCHAR (MAX)	Yes	
ResourceType	NVARCHAR (MAX)	Yes	
ResourceQuantity	INT	Yes	
Note	NVARCHAR (MAX)	Yes	
RequestDateTime	DATETIME2	Yes	
DeliveryDateTime	DATETIME2	Yes	
EmployeeID	INT	Yes	
OfficeNumber	NVARCHAR (MAX)	Yes	

Table 66: Request Data Type

REQUEST_RESOURCE			
Attribute	Data Type	Required	Default
RequestID	NVARCHAR (MAX)	Yes	
Resourceld	NVARCHAR (MAX)	Yes	

Table 67: Request Data Type

RESOURCE			
Attribute	Data Type	Required	Default
Resourceld	NVARCHAR (MAX)	Yes	
ResourceName	NVARCHAR (MAX)	Yes	
OfficeNumber	NVARCHAR (MAX)	Yes	

Table 68: Resource Data Type

OFFICE

Attribute	Data Type	Required	Default
OfficeNumber	NVARCHAR (MAX)	Yes	
OfficeArea	NVARCHAR (MAX)	Yes	
AvailableResources	NVARCHAR (MAX)	Yes	

Table 69: Office Data Type

SECTION			
Attribute	Data Type	Required	Default
SectionNumber	INT	Yes	
SectionDetails	NVARCHAR (MAX)	Yes	
WorkloadID	NVARCHAR (MAX)	Yes	
CourseCode	NVARCHAR (MAX)	Yes	

Table 70: Section Data Type

COURSE			
Attribute	Data Type	Required	Default
CourseCode	NVARCHAR (MAX)	Yes	
CourseTitle	NVARCHAR (MAX)	Yes	
CourseType	NVARCHAR (MAX)	Yes	
CourseDetails	NVARCHAR (MAX)	Yes	
CourseCredits	INT	Yes	
RequiredContactHours	INT	Yes	
DepartmentID	NVARCHAR (MAX)	Yes	

Table 71: Course Data Type

HIRING_DOCUMENTS			
Attribute	Data Type	Required	Default
DocumentID	NVARCHAR (MAX)	Yes	
DocumentName	NVARCHAR (MAX)	Yes	
DocumentType	NVARCHAR (MAX)	Yes	
DocumentDate	DATE	Yes	
DocumentFormat	NVARCHAR (MAX)	Yes	
EmployeeID	INT	Yes	

Table 72: Hiring Documents Data Type

4.4. System Architecture Design

System architecture design is a conceptual representation of the components and the subcomponents that reflects the behavior, structure, and more views of the system. Also, it is a representation of a system including mapping the functionality of the hardware and the software components. [2]

4.4.1. System Architecture

In networking, system architecture is the way in which the functions of the application layer software are spread among the clients and servers in the network. Also, it clarifies how the client computer and the server computer work together to provide application software to the users. Where the client is a user device to access the network and receive data from the server. While the server is a device that stores and transmits data to a client. Currently, there are five fundamental system architectures in use. For the FIMS, the architecture that will be used is the three-tiered client-server architecture.

The client-server architecture means that the work is shared between the server and clients. Moreover, most applications and systems written today use client-server architectures, because it attempts to balance the processing between the client and the server by having both do some of the logic. The logic is the four general functions which is the division of the work that is done by any application program. These four functions are the basic building blocks of any functions. The first function is data storage. Most application programs require data to be stored and retrieved. The second function is the data access logic, the processing required to access data. The third function is the application logic, sometimes called business logic. The fourth function is the presentation logic, the presentation of information to the user and the acceptance of the user's commands. Apart from the functions, in the client-server architecture the client is responsible for the presentation logic, whereas the server is responsible for the data access logic and data storage. The application logic may either reside on the client, reside on the server, or be split between both.

In addition, there are many ways in which the application logic can be partitioned between the client and the server. One of the ways is the three-tiered architecture. It means that it uses three sets of computers. As shown in the following figure 1, the software on the client computer is responsible for presentation logic, an application server is responsible for the application logic, and a separate database server is responsible for the data access logic and data storage. [2]

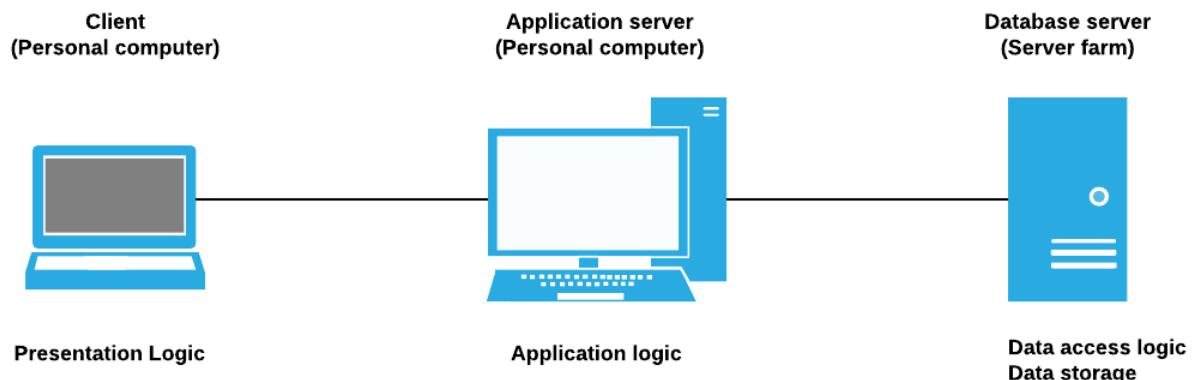


Figure26: Three-tier client-server architecture

Using client-server architecture has many benefits, one of the benefits is that they enable software and hardware from different vendors to be used together. But this benefit is also considered one of the limitations, because it can be difficult to get software from different vendors to work together. One solution to this problem is middleware. Middleware is a software that sits between the application software on the client and the application software on the server. It provides a standard way of communicating that can translate between software from different vendors. Also, one of the benefits is that it separates the processing that occurs to better balance the load on the different servers, and it is more scalable. Moreover there are two more limitations of the three-tier according to the non-functional requirements and compared to other architecture types, first is that it puts a greater load on the network, because it will require more communication among the servers. It generates more traffic so higher capacity networks are needed or the FIMS will perform slowly. Second, it is much more difficult to program and test software in three-tier architectures than in two-tier because more devices have to communicate to complete a user's transactions. Also, one of the benefits of the client-server architecture is that it provide the best scalability, the ability to increase (or decrease) the capacity of the servers to meet changing needs. Moreover it is more reliable. Finally client-server architecture is usually the cheapest. It has many alternative tools exits to develop it, and lots of client-server software exists for specific parts of application. [2]

4.4.2. Deployment Diagram

Deployment diagram is an UML diagram that shows the connection between the system hardware and the components of the system as an overall. Also, the system designer use development diagram to visualize the hardware devices of the system, and the links of the communication between them. The following figure, shows the deployment diagram if the FIMS and how the hardware's are linked. [3][4]

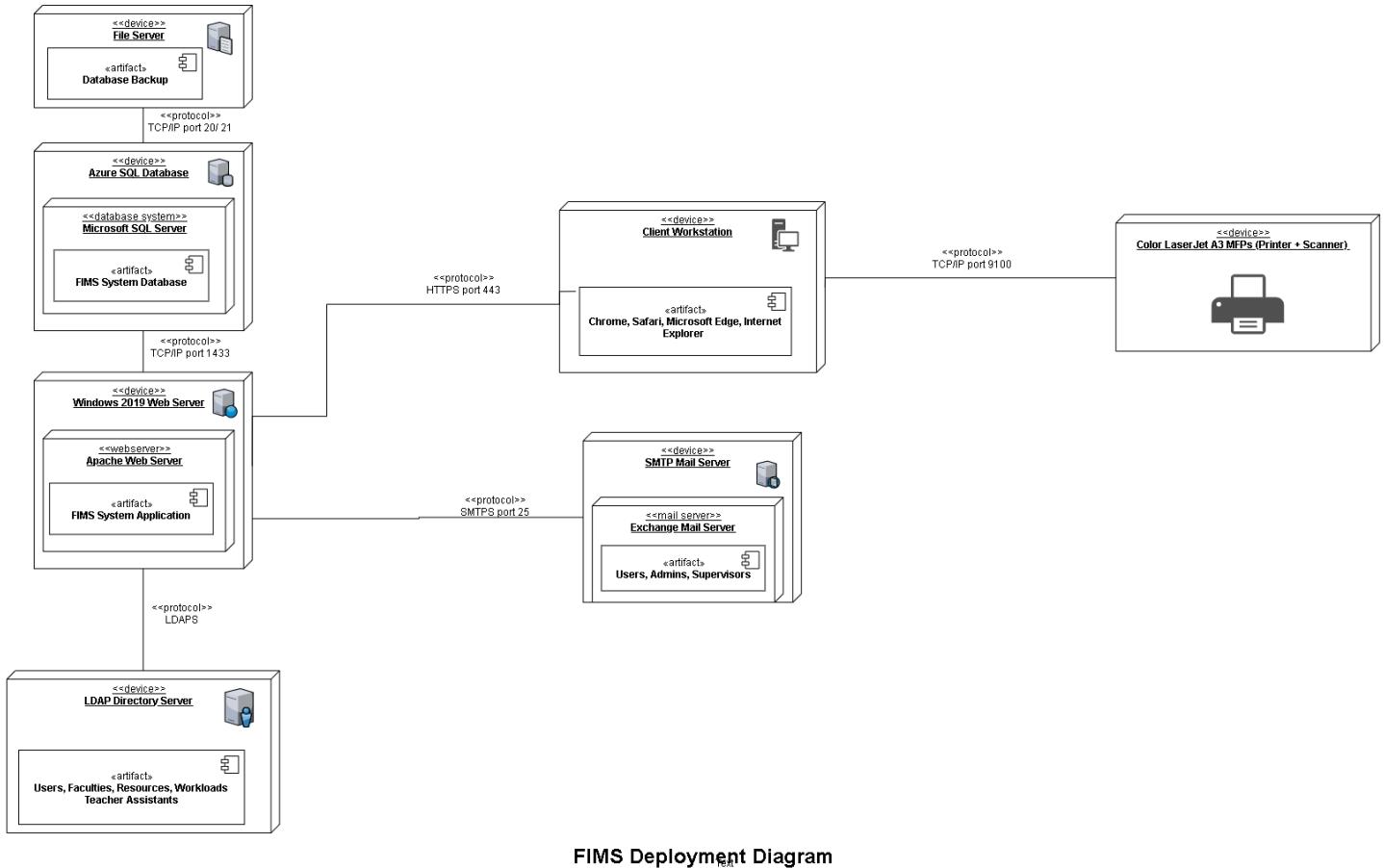


Figure 27: FIMS Deployment Diagram

4.4.3. Hardware and Software Specifications

The following table, shows the specification of the hardware and software for the system that will be developed (FIMS). The table will help the IT department to install. [5] [6] [7] [8] [9]

Category	Client	Web Server	Database Server
Medium: Support up to 1,000 concurrent users			
Operating System	<ul style="list-style-type: none"> - Windows: 7 or newer - Mac: OS X v10.7 or higher 	Windows Server 2019	
Software	Supported Browsers: Chrome, Microsoft Edge, Internet Explorer, Safari	<ul style="list-style-type: none"> - Internet Information Services (IIS) 6, 7.0, 7.5 or 8 - Windows PowerShell 2.0, 3.0 or 4.0 	<ul style="list-style-type: none"> - Microsoft SQL Management Studio 2012
Hardware	Complete PC set, which Include: Processor: Minimum Pentium 4 or higher Hard Drive: 100 or higher MB free space Memory (RAM): Minimum 128 MB or above Monitor Size: 19 to 34 inches Speed: 1 Minimum MG	<ul style="list-style-type: none"> - 500 GB of disk space for cache - 12 CPU cores - 32 GB RAM 	<ul style="list-style-type: none"> - 4 x 1,6 GHz CPU - 7 GB RAM
Network	Ethernet connection (LAN)	-	-
Input Devices	Keyboarded Mouse Scanner	-	-
Output Device	Monitor Printer	-	-

Table 73: Hardware and Software Specifications

Chapter 5: Project Closure

Before closing any project, there are certain activates that must be done by the project manager. One of the activates is releasing all the resources. Since in this project the organization did not provide with any equipment like laptops, cellphones, or any supplies. So, releasing resources for this project will be skipped.

Also, for this project all documents were archives in a workbook. So, that it can be used in the second phase of the project, or use it as a reference.

Moreover, the stakeholder (Ms. Nouf) has been informed that the first part of project has reached to the end. Also, she aware about the activates that is being done through this part. In addition to this, the stakeholders have been informed about the phases that will be done in this part and in the Capstone part.

Finally, all the documents that is being agreed at the beginning of the project has been delivered to the stakeholder except the design document. (Cheek Appendix B)

Chapter 6: Conclusion

In conclusion, it can be said building a system alone without a team is a tough job. So, this project is developed to help the Provost Office at Dar Al-Hekam University in managing the faculties in an efficient way. Also, to reduce the paper based system and the consequences that will occur from this way.

While doing this project, I gained so many skills, but the main one is management skill. Also, I have learned a new fact finding techniques which is document analysis. This project gave me an opportunity to conduct interviews, and I learned how to do it and what to ask. In addition to this, now I am aware about many UML diagram and how to do it. Also, I have background how to describe a system to an IT person, and what it will need to implemented.

In other hand, I faced few challenges like communication challenges. I was not able to meet the stakeholders every day due to the COVID19. So, I had to build system based on assumptions. Finally, there were some new topics that I need to search for it then apply it to the project, such as modeling a deployment diagram.

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Appendix A. Lessons Learned Register

ID	Category	Lesson	Recommendations
1	Requirement	Missing and wrong requirements regarding the process	From the beginning should ask the stakeholders for all policy and Procedure document from each department that interact with the system
2	Communication	The chosen communication method was not efficient	Try to choose good time, send reminder and ask for another method which will be more efficient
3	Schedule	The tasks are not complete on time	First thing to do before start working, plan your schedule
4	Schedule	Did not had enough time to read about new topics such as deployment diagram	In planning the schedule, specify time for reading about new topics related to the system

Table 73: Updated Lesson Learned

Appendix B. Deliverables

The following picture, show the confirmation of the deliverables to the stakeholder.

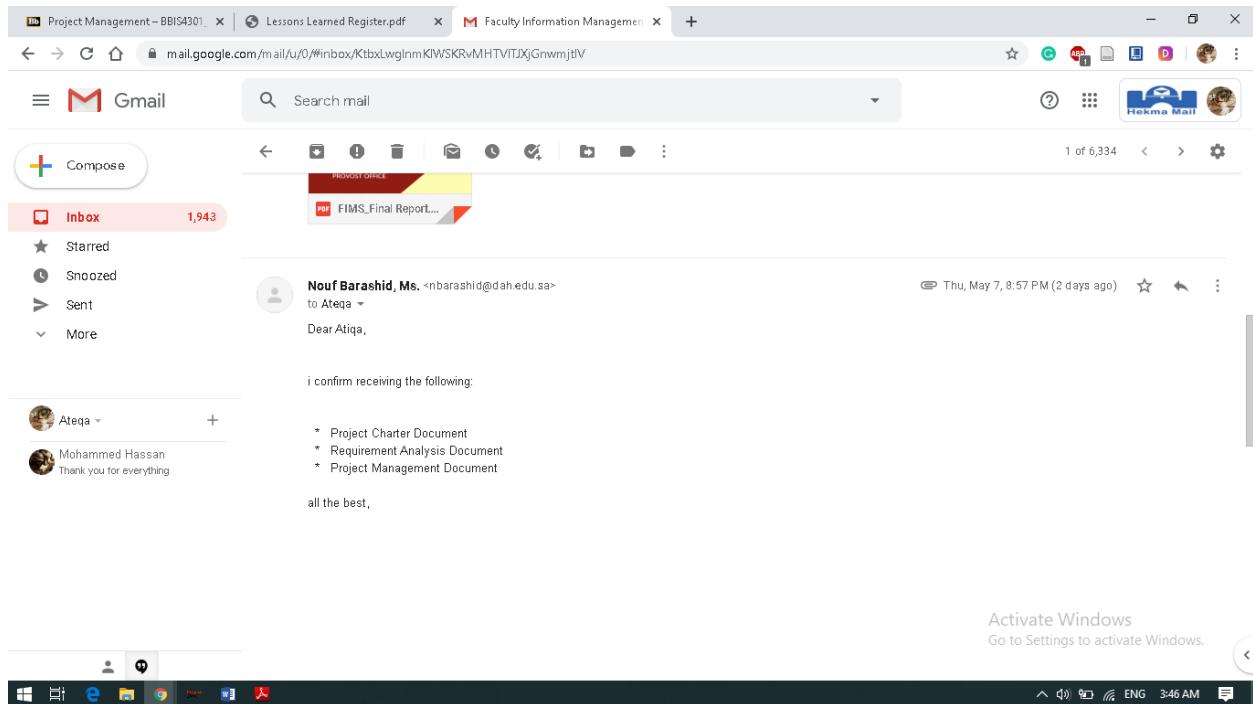


Figure 28: Confirmation Email