

JU Library

Names	ID
Lara salameh alqaisi (Team Supervisor)	0204879
Saja omar salameh obeidat	0212289
Aman abdul hafiz aloudat	0193677
Yara Sameer Hussain Abu Sammour	0202841
Shadan mohammad ekedat	0207422

Supervisor: Dr. Hamad Alsawalqah

Table of Contents

1.0 Project Initiation	4
1.1 Project Overview.....	4
1.2 Problem Definition.....	4
1.2.1 Issues of The University of Jordan Library	4
1.2.2 Objectives	4
1.2.3 Requirements.....	4
1.2.4 Constraints.....	4
1.3 Solution Alternatives Feasibility Study.....	5
1.3.1 Technical Feasibility	5
1.3.2 Operational Feasibility.....	5
1.3.3 Economic Feasibility.....	5
1.3.4 Schedule Feasibility.....	7
1.3.5 Legal Feasibility	9
1.4 Recommended Solution and Expected Project Deliverables.....	9
1.5 Local and Global Impact of the Proposed Solution.....	10
2.0 Project Management plan	10
2.1 Project Organization	10
2.2 Roles and Responsibilities.....	10
2.3 Software Process Model	11
2.4 Tools and Techniques	11
2.5.Project Tasks	11
2.5.1 Task Description.....	11
2.5.2 Deliverables and Milestones.....	11
2.5.3 Resources needed.....	11
2.5.4 Dependencies and Constraints	11
2.6 Assigning Team Members to Tasks.....	11
2.7 Project Schedule (Gantt chart and PERT diagram)	14
2.8 Monitoring and Controlling Mechanisms (EVM and Schedule Expediting)	15
2.9 Risk Analysis (use Fishbone diagram)	20
4.0 Software Requirements Specifications (SRS).....	20

4.1 System Stakeholders and Requirements Sources.....	20
4.2 Information Gathering Techniques.....	21
4.2.1 Interviews	21
4.2.2 Questionnaires.....	22
4.3 User Requirement Definition (you can draw use case diagrams).....	25
4.4 System Functional Requirement Specifications (you can create use case scenarios)	26
4.5 Non-Functional Requirements	27
4.6 Data Requirements.....	27
5.0 System Analysis and Design.....	28
5.1 Architecture Design	28
5.2 DFDs (at least level 1 DFD).....	29
5.3 Data Dictionaries.....	31
5.4 Process Specification and Structured Decision Analysis.....	33
5.5 ERD analysis	35
5.6 Graphical User Interface Design (input and output design including forms and reports).....	35
.....	36
5.7 Database Design (DB normalization).....	38
6.0 User Manual.....	39
7.0 References:	40

1.0 Project Initiation

1.1 Project Overview

The JU Library application is designed to provide a user-friendly experience for students, enhancing their library experience at the University of Jordan. Our app provides a simple interface through which students can easily search for the book that they want in the library and check its availability. Additionally, it provides library employees with functionalities to manage the library's book in the application by adding, deleting, and updating them. Moreover, students can see important library announcements and report any problem that faces them through the application. The JU Library application aims to improve communication between the library and students.

1.2 Problem Definition

1.2.1 Issues of The University of Jordan Library

- 1) The existing web-based search engine that is not user-friendly.
- 2) University does not have a platform to inform students about library opening and closing times. Students miss many announcements.
- 3) Students face challenges when seeking assistance or report a problem related to the library, leading to time wastage.
- 4) Students often forget the date and time they borrow the books.

1.2.2 Objectives

- 1) Create a user-friendly application where students can search for books easily and check availability.
- 2) Provide announcements section within the application, ensuring that students are informed with the important updates.
- 3) Provide a section where students can report a problem.
- 4) Help students to keep track of their borrowing date and time.

1.2.3 Requirements

- 1) The system should be easy to use.
- 2) The system should be secure and reliable.
- 3) The system should be accessible for all of the users.

1.2.4 Constraints

- 1) System's development should not exceed 3/6/2023, considering the project's deadline.
- 2) Development team with limited expertise.

1.3 Solution Alternatives Feasibility Study

1.3.1 Technical Feasibility

We can use our skills and field of study by getting help from developers and programmers or IT staff in general who is experienced with flutter and dealing with database.

1.3.2 Operational Feasibility

Operational feasibility is a measure of how well a proposed system solves the problems and takes advantage of the opportunities identified during scope definition and how it satisfies the requirements identified in the requirements analysis phase of system development.

JU Library will be feasible because it will be available at all times and accessible form any location. Also, it meets the requirement of the system from ease of searching for books, book availability, receive announcements, and reporting a problem.

1.3.3 Economic Feasibility

The economic feasibility step of business development is that period during which a break-even financial model of the business venture is developed based on all costs associated with taking the product from idea to market and achieving sales sufficient to satisfy debt or investment requirements.

If the system wants to develop features, then it may conduct the feasibility study, which will help it in determining whether a system needs to be developed and updated or not.

Economic Feasibility is an assessment of the case of system model, cost structure, revenue streams, economics on a unit basis, and development and Updated of a system. This process was aimed at determining if there was a system design that could generate a net economic return above program and transaction costs.

Development Cost:

Personal Cost

TABLE 1:PERSONAL COST

<u>Role</u>	<u>Cost per hour</u>	<u>Hours</u>	<u>Total cost per hour</u>
-------------	----------------------	--------------	----------------------------

1 System Analyst	50 JOD	20 Hours	1000 JOD
1 System Administrator	20 JOD	24 Hours	480 JOD
3 Programmer	30 JOD	90 Hours	2700 JOD
1 GUI designer	15 JOD	18 Hours	270 JOD
1 Database Specialist	17 JOD	14 Hours	238 JOD
Total			4,688 JOD

New Hardware and Software cost:

TABLE 2:HARDWARE AND SOFTWARE COST:

<u>Hardware & Software</u>	<u>Cost</u>
1 phone	200 JOD
1 DBMS Software	500 JOD
1 Development Server	800 JOD
Total	1500 JOD

Total Development Cost = $4688 + 1500 = 6188$ JOD (For Development Year).

Operating Cost:

TABLE 3:OPERATING COST

Name	Cost
Hosting server	300 JD
Programmer	2,000 JD
System Update and Enhancements	1,000 JD
Device Maintenance	700 JD

Total = 4,000 JD

Benefits:

TABLE 4:BENEFITS

<u>TANGIBLE BENEFITS WORKSHEET: Year 1 – 5</u>	
1. Error reduction	2,400 JOD
2. Increased flexibility	3,000 JOD
3. Increased speed of activity	1,700 JOD
4. Improvement in management planning or control	4,500 JOD
Total Tangible Benefits	11,600 JOD

➤ **Intangible Benefits:**

- Improve user satisfaction.
- Good reputation and image.
- decreases in the amount of employee time needed to complete specific tasks.

1.3.4 Schedule Feasibility

TABLE 5:SCHEDULE FEASIBILITY

	Task	Start Time	End time	Duration	Dependencies
1	Gather information and initiate project	18/3/2023	21/3/2023	4	-
2	Study the feasibility of the project	23/3/2023	27/3/2023	5	T1
3	Prepare a project management plan	28/3/2023	31/3/2023	4	T1,T2
4	Define requirements specifications	1/4/2023	7/4/2023	7	T3
5	Design system architecture	8/4/2023	11/4/2023	4	T4
6	Prepare context diagram	12/4/2023	17/4/2023	6	T4
7	Drawing diagram 0,1	18/4/2023	22/4/2023	5	T6

8	Define data Dictionaries	23/4/2023	26/4/2023	4	T4
9	Define process specification	27/4/2023	30/4/2023	4	T4
10	Do the structured decision analysis	1/5/2023	2/5/2023	2	T4
11	Draw ERD	3/5/2023	7/5/2023	5	T9
12	Design graphical user interfaces	8/5/2023	17/5/2023	10	T5
13	Normalize Database	18/5/2023	20/5/2023	3	T12
14	Make User Manual	21/5/2023	25/5/2023	4	T13

1.3.5 Legal Feasibility

The legal requirements the study to know if the proposed project confirms the legal and ethical requirement and, in our project, the proposed system is completely ok with the legal and ethical terms it does not take not legal things form any existing copyright, and it is such an ethical system too.

1.4 Recommended Solution and Expected Project Deliverables

We expect this application to help JU students by offering them different functionalities in the app that is connected to a database. Student can search for books, report a problem, see announcements and more. Moreover, employee will post the announcements and monitor books in the library. Also, requirements specifications are shown in details. The expected project delivery will be with deadline and the system will be divided into tasks until its done.

1.5 Local and Global Impact of the Proposed Solution

Provide a better experience for JU students and make them more satisfied with the functionalities that the university offers. Also, will help students to save their time.

Developing a system like JU Library will be a technological innovation, and this will help raising JU, and bringing JU more opportunities because JU has many partners.

2.0 Project Management plan

2.1 Project Organization

Project organization refers to the style of coordination, communication, and management the project team uses throughout a project lifecycle.

Project manager uses project organization to align team members before and during a project. The process minimizes disruption to your workflow and conflict among team members, as well as leads to maximum productivity among team members involved in a project.

2.2 Roles and Responsibilities

TABLE 6: ROLES AND RESPONSIBILITIES

Role	Responsibilities
Project Manager	The project planner how is responsible for coordination
Software developers	Developing JU Library app based on the requirements
UX/UI Designers	Design for a user experience that will let students have a great feedback after using it

System Analyst	Understanding requirements and validating them and translating them from business to technical specifications
----------------	--

2.3 Software Process Model

The process model that we will be following is waterfall Plan-Driven (PDD) where we will be planning and developing all the features a user might want or need in the final application and determining how all those features are to be developed. The whole plan is based on the execution of an ordered set of task-specific levels. We have limited requirement that is does not change.

2.4 Tools and Techniques

Laptops

Canva

Microsoft word

2.5 Project Tasks

2.5.1 Task Description

In the table below.

2.5.2 Deliverables and Milestones

We are following waterfall software process so we will have only deliver the project at the end

2.5.3 Resources needed

In the table below.

2.5.4 Dependencies and Constraints

Dependencies

In the table below.

Constraints

1) data management constraint

2) communications constraints like not understanding requirements well

2.6 Assigning Team Members to Tasks

This table will explain 2.5.(1,3,4,6).

TABLE 7:TASKS TABLE

Number	Task Description	Milestones	Needed Resources	Task Assignees
1	This include a hole project overview and defining issues, objectives, requirements, and constraints	-	1)good writing skills. 2)google meet platform	Aman
2	Make technical, operational, economical, legal feasibility and schedule feasibility	M1	a skilled analyst. Spreadsheet like Microsoft excel	Lara, Aman
3	This include controlling the project and showing tasks and assigning team members to tasks	-	Team approval for the plan	all
4	Identify system stakeholders, doing an interview and a questionnaire. User/functional/nonfunctional requirements	M2	Google forms	all
5	Show system components	M3	-	Aman
6	It shows the entire system with the external entities	-	a	Lara

7	Level 0 is an explosion of the context diagram and it has more details, and after that process is exploded at level of diagram 0	M4	a	Lara
8	This include creating dataflow tables and data stores and showing data structures and data elements	M5	-	Yara
9	This includes showing specifications of processes	-	-	Saja
10	Using decision tables	M6	Microsoft word	Saja
11	Show system entities in tables and show the relations between them	-	Smart draw app	Aman
12	High fidelity prototyping for user interfaces	-	Canva platform	Shadan
13	Removing data redundancy and generating 1NF,2NF,3NF	M7	-	Shadan
14	Screenshots that shows how to use JU Library app	M8	-	

2.7 Project Schedule (Gantt chart and PERT diagram)

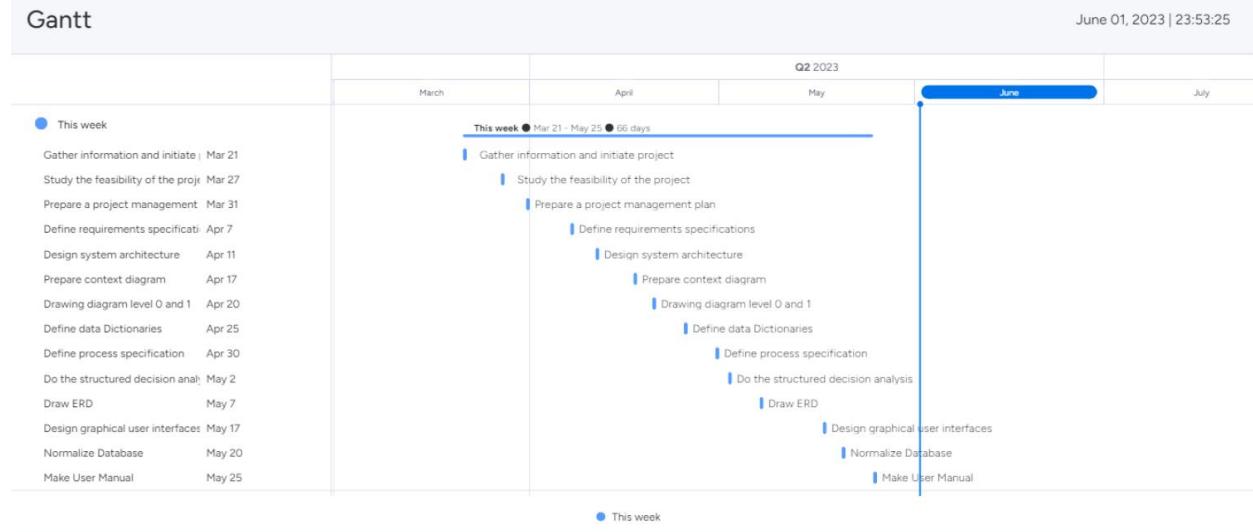


FIGURE 1:GANTT CHART

PERT Diagram

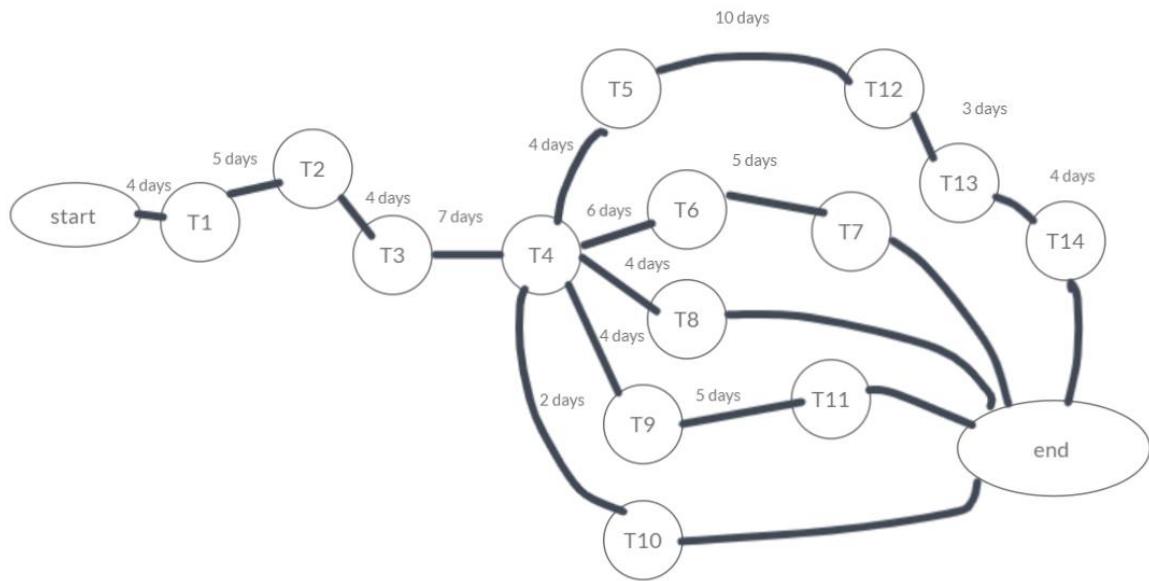


FIGURE 2: PERT DIAGRAM

2.8 Monitoring and Controlling Mechanisms (EVM and Schedule Expediting)

TABLE 8:EVM STUDY TABLE

Task	Estimated cost	Cumulative estimate	Estimated duration	Stage completed	Actual cost of task to date	Actual cost of project to date
Task 1	3000	3000	4 days	100%	3000	3000
Task 2	1000	4000	5 days	100%	3000	4000
Task 3	1000	5000	4 days	100%	1000	5000
Task 4	3000	8000	7 days	100%	3000	8000
Task 5	9000	17000	4 days	100%	9000	17000
Task 6	3000	30000	6 days	100%	3000	30000
Task 7	3000	33000	5 days	18%	3000	33000
Task 8	3000	36000	4 days	0%	Not yet begun	Not yet begun
Task 9	12000	42000	4 days	0%	Not yet begun	Not yet begun
Task 10	15000	57000	2 days	0%	Not yet begun	Not yet begun

Task 11	3000	61000	5 days	0%	Not yet begun	Not yet begun
Task 12	4000	65000	10 days	0%	Not yet begun	Not yet begun
Task 13	5000	70000	3 days	0%	Not yet begun	Not yet begun
Task 14	5000	7500	4 days	0%	Not yet begun	Not yet begun

At the end of task 7:

$$p = (100+100+100+100+100+100+18) / (100+100+100+100+100+100+100)$$

$$= 0.88$$

$$EV = PV * p$$

$$= 33000 * 0.88$$

$$= 29040$$

$$CV = EV - AC$$

$$= 29040 - 33000$$

$$= -3960$$

$$\text{SV} = \text{EV} - \text{PV}$$

$$= 29040 - 33000$$

$$= -3960$$

$$\text{CPI} = \text{EV} / \text{AC}$$

$$= 29040 / 33000$$

$$= 0.88$$

$$\text{SPI} = \text{EV} / \text{PV}$$

$$= 29040 / 33000$$

$$= 0.88$$

$$\text{ETC} = (\text{BAC} - \text{EV}) / \text{CPI}$$

$$= (75,000 - 29040) / 0.88$$

$$= 52227.27$$

$$\text{EAC} = \text{AC} + \text{ETC}$$

$$= 33000 + 52227.27$$

$$= 85227.27$$

Which is significantly more than the 75,000 we originally budgeted for.

Expediting:

Path 1 ➔ T1+T2+T3+T4+T5+T12+T13+T14 ➔ $4+5+4+7+4+10+3+4 = 41$ (CRITICAL PATH)

Path 2 ➔ T1+T2+T3+T4+T6+T7 ➔ $4+5+4+7+6+5 = 31$

Path 3 ➔ T1+T2+T3+T4+T8 ➔ $4+5+4+7+4 = 24$

Path 4 ➔ T1+T2+T3+T4+T9+T11 ➔ $4+5+4+7+4+5 = 29$

Path 5 ➔ T1+T2+T3+T4+T10 ➔ $4+5+4+7+2 = 22$

TABLE 9: TASK SCHEDULE

Activity	Estimated Duration(Days)	Crash Time	Cost/Week
T1	4	3	250
T2	5	3	100
T3	4	2	200
T4	7	5	250
T5	4	4	100
T6	6	5	200
T7	5	4	500
T8	4	2	400
T9	4	3	100

T10	2	2	400
T11	5	4	300
T12	10	10	200
T13	3	3	500
T14	4	4	500

TABLE 10:EXPEDAITE TABLE

Eligible Activities	Activity Chosen	Time For Each Path					Cost	Cumulative Cost
		41	31	24	29	22		
T1,T2,T3,T4	T2	40	31	24	29	22	100	100
T1,T2,T3,T4	T2	39	31	24	29	22	100	200
T1,T3,T4	T3	38	31	24	29	22	200	400
T1,T3,T4	T3	37	31	24	29	22	200	600
T1,T4	T1	36	31	24	29	22	250	850
T4	T4	35	31	24	29	22	250	1100
T4	T4	34	31	24	29	22	250	1350

Expediting the project may take 7 Days and cost 1350

2.9 Risk Analysis (use Fishbone diagram)

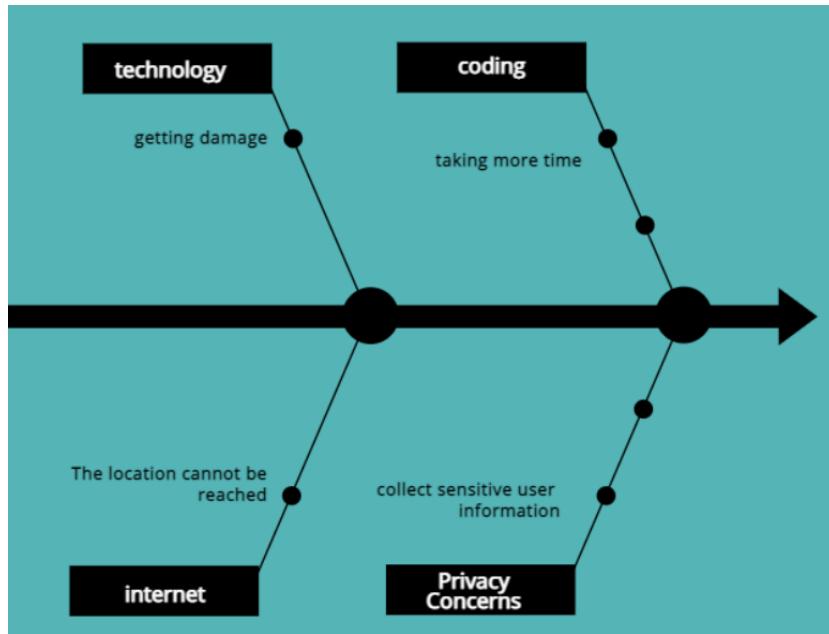


FIGURE 3:FISHBONE DIAGRAM

4.0 Requirements Specifications (SRS)

4.1 System Stakeholders and Requirements Sources

- 1) Students
 - 2) Employee(Library staff)
 - 3) Library administration
 - 4) System analyst
 - 5) System Developers
- Requirement Sources:**

-Gathering feedback through interviews and Questionnaire

-Collaborating with students to understand

Software

4.2 Information Gathering Techniques

4.2.1 Interviews

We have met one of employees in JU library and ask him the following questions and this is what he answered

1. What are the main goals and objectives of the university library?

The main goals are to provide access to a wide range of information resources, support research and learning activities, and facilitate knowledge dissemination among students and faculty.

2. How do you currently manage and organize your library resources?

We use a library management system that includes cataloging, classification, and indexing of materials. We also have physical shelves and sections designated for different subjects or categories.

3. What are the most significant challenges or pain points faced by the library staff and users?

Some challenges include difficulties in locating specific resources, managing overdue materials, ensuring timely returns, and effectively communicating updates and announcements to library users.

4. Can you provide insights into the types of library resources most frequently used by students and faculty?

Commonly used resources include academic journals, textbooks, reference books, research papers, e-books, and multimedia materials such as DVDs or online streaming platforms.

5. How do you handle the process of borrowing and returning books or other materials?

Currently, we use a manual check-out system where users fill out paper forms, and library staff manually stamp the due dates. Returns are processed by staff who verify the condition of the materials and update the records accordingly.

6. Are there any specific features or functionalities you would like to see in a library application?

It would be helpful to have features such as an online catalog with advanced search capabilities, personalized user accounts, automated reminders for due dates, and the ability to reserve or renew materials online.

7. Are there any particular requirements or restrictions related to data privacy and security?

We prioritize data privacy and security to protect our users' personal information and library records. Any library application would need to comply with relevant data protection laws and implement robust security measures, such as encrypted data transmission and secure storage protocols.

8. How do you currently measure and evaluate the effectiveness of library services?

We use a combination of methods, including user surveys, feedback forms, and usage statistics.

We also conduct periodic assessments to measure the impact of library services on student learning outcomes, research productivity, and overall user satisfaction.

9. Are there any integration needs with existing library systems or databases?

We have an existing library management system that handles cataloging, circulation, and resource management. Any new library application should be able to integrate with this system to ensure seamless access to library resources, synchronized user data, and efficient workflow management.

4.2.2 Questionnaires

Rate your experience using the library website

 Copy

(قيّم تجربتك لموقع المكتبة الالكتروني)

16 responses

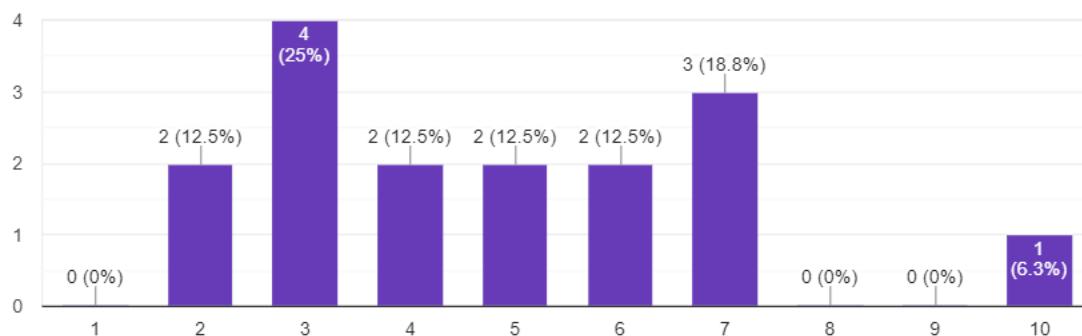


FIGURE 4:QUESTIONNAIRES Q1

Would you prefer if there was a better website for the university library?

 Copy

(هل تفضل لو كان هناك موقع الكتروني أفضل لمكتبة الجامعة)

16 responses

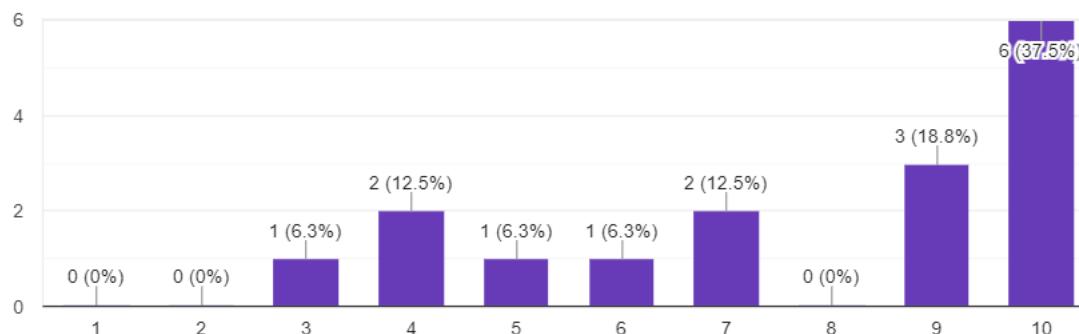


FIGURE 5:QUESTIONNAIRES Q2

Have you ever borrowed a book and forgot when it was due?

(هل سبق لك أن استعمرت كتاباً ونسيت موعد تسليمه؟)

16 responses

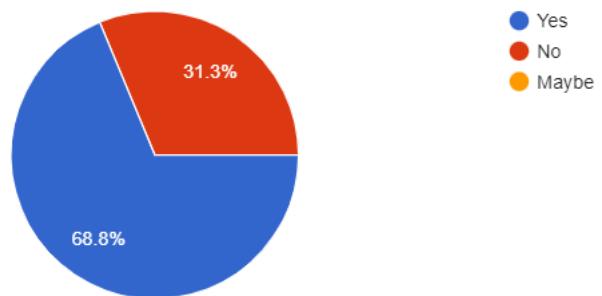


FIGURE 6: QUESTIONNAIRES Q3

What do you think that the application calculates for you when you have to return the book to the library?

(ما رأيك أن يحسب التطبيق متى عليك إعاده الكتاب إلى المكتبة؟)

16 responses

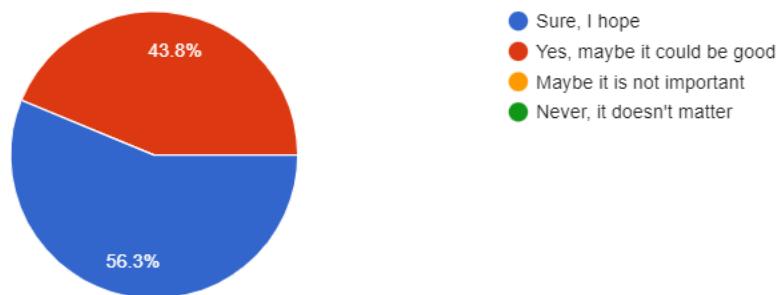


FIGURE 7: QUESTIONNAIRES Q4

Have you encountered a problem in the library and did not know who to file a complaint with?

Copy

(هل واجهت مشكلة في المكتبة ولم تعرف لمن تقدم الشكوى؟)

15 responses

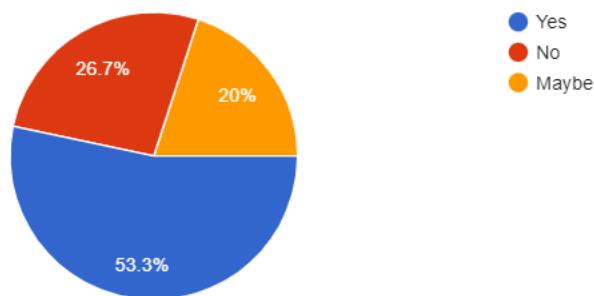


FIGURE 8: QUESTIONNAIRES Q5

Would you like there to be a place for important announcements about the library?

(هل تود أن يكون هناك مكان لاعلانات المهمة عن المكتبة)

16 responses

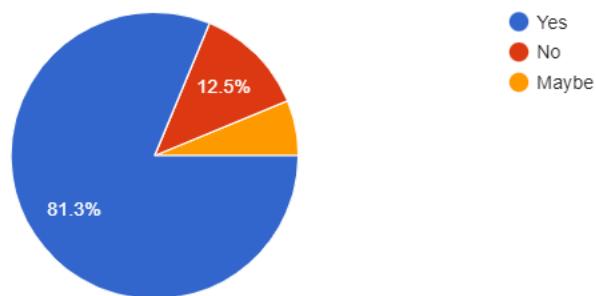


FIGURE 9: QUESTIONNAIRES Q6

What are the most important announcements that you may need to know ?

(ما هي أهم الإعلانات التي قد تحتاج إلى معرفتها؟)

16 responses

type of book

New books

Activities in American corner

Hours the library closed

معرفة ساعات الدوام والاعلانات

أوقات الدوام

الكتب التي تم إضافتها حديثاً

كل شيء

وجود كتب جديدة

المواييد

FIGURE 6:QUESTIONNAIRE Q7

4.3 User Requirement Definition (you can draw use case diagrams)

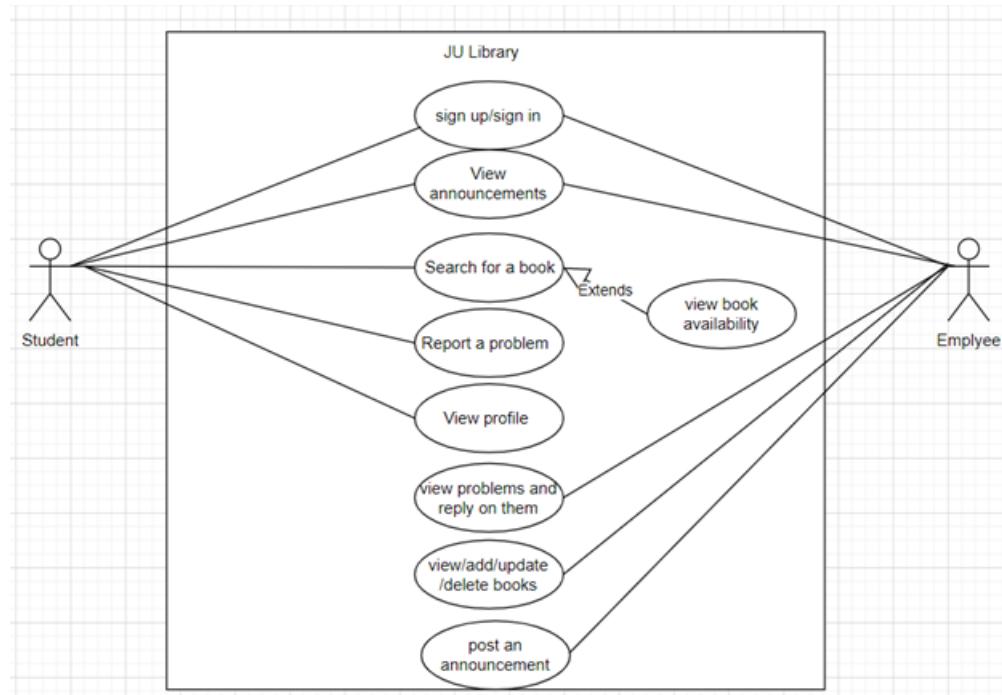


FIGURE 10:USE CASE DIAGRAM

4.4 System Functional Requirement Specifications (you can create use case scenarios)

User requirements:

1. Student
 - Log in: student login into the system using the same username and password that they take from university.
 - Log out: students can log out of the system by pressing the “Sign Up” button to end their session.
 - Search: Students can search for the book through the search box by many keywords
 - Report a problem: Students can report problems they encounter while using the application.
2. Employee
 - Log in: employee login into the system using the same username and password that they take from university.
 - Log out: employees can log out of the system by pressing the “Sign Up” button to end.
 - Add/delete/update book: employee can modify the books.
 - Post announcement: employee can post announcement for student about anything it related to books.

System requirement

1. The application shows the books available in the university in all their classifications.
2. The application allows the student to record the problems.
3. The application shows announcements firsthand so that the student is kept abreast of the latest developments.
4. The application allows the employee to modify books and post announcements to students.

Use case specification:

1. Login: The student can log into the system by entering their full name and password. If the user forgets his password, he must reset it from the university's self-registration website.
2. Search box: The student can search for the book he wants in several ways, such as searching for it through the name of the book, the author, the date, and others.
3. Reporting a problem: The student can report any problem he encounters with the application and send it to the staff responsible for seeing the reports, responding to them and solving the problem.
4. Add/delete/update books: The employee can delete, modify and update the books of the library
5. post announcement: The employee can announce any new updates related to the library and books, and it will appear on the student's interface.

4.5 Non-Functional Requirements

- 1)Security: Secure authentication methods, where only authorized people can access the system securely.
- 2)Performance: system should perform well and fast.
- 3)Usability: a user friendly application and easy to use.
- 4)Reliability: System should be reliable as possible and without error.
- 5)Availability: System must be available any time.
- 6) Portability: easily adapted on different operating systems.

4.6 Data Requirements

Data that must be collected:

- student data
- book data
- employee data
- announcements data
- reported problem data
- data about data

5.0 System Analysis and Design

5.1 Architecture Design

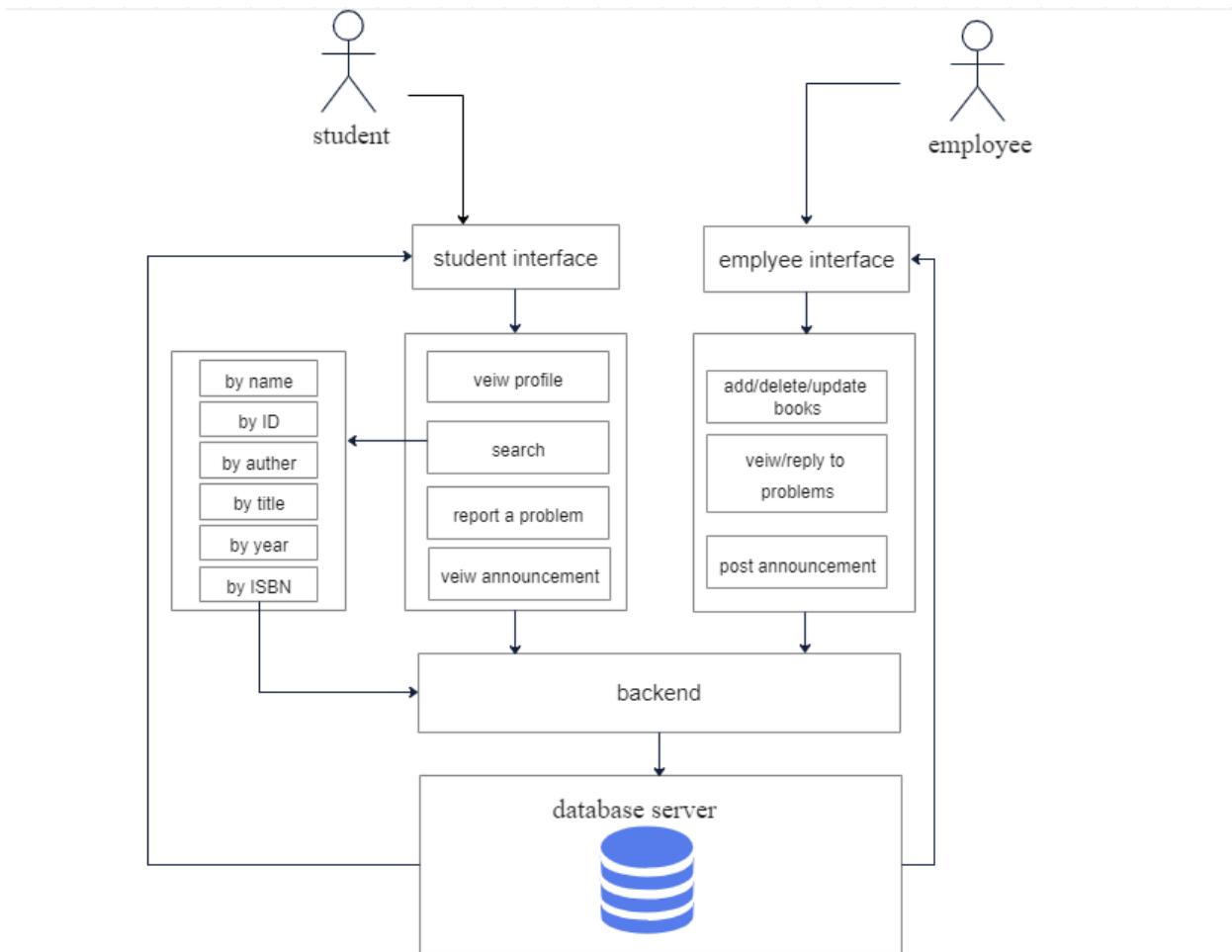


FIGURE 11: ARCHITECTURE DESIGN

5.2 DFDs (at least level 1 DFD)

Context diagram :

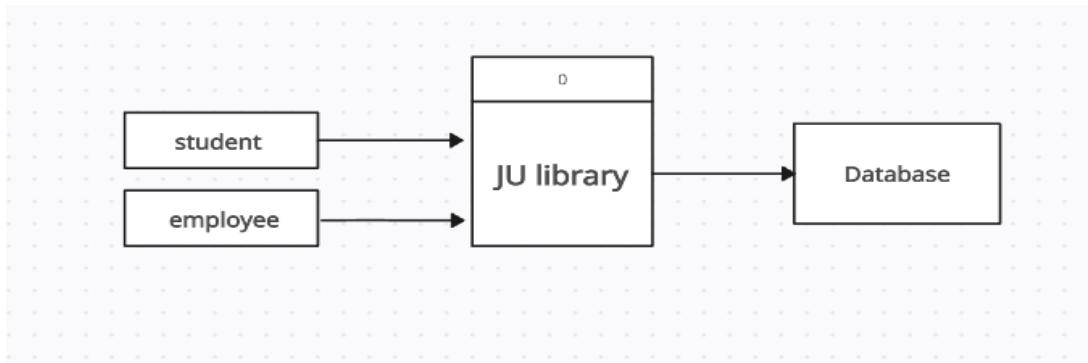


FIGURE 12:CONTEXT DIAGRAM

Data flow diagram:

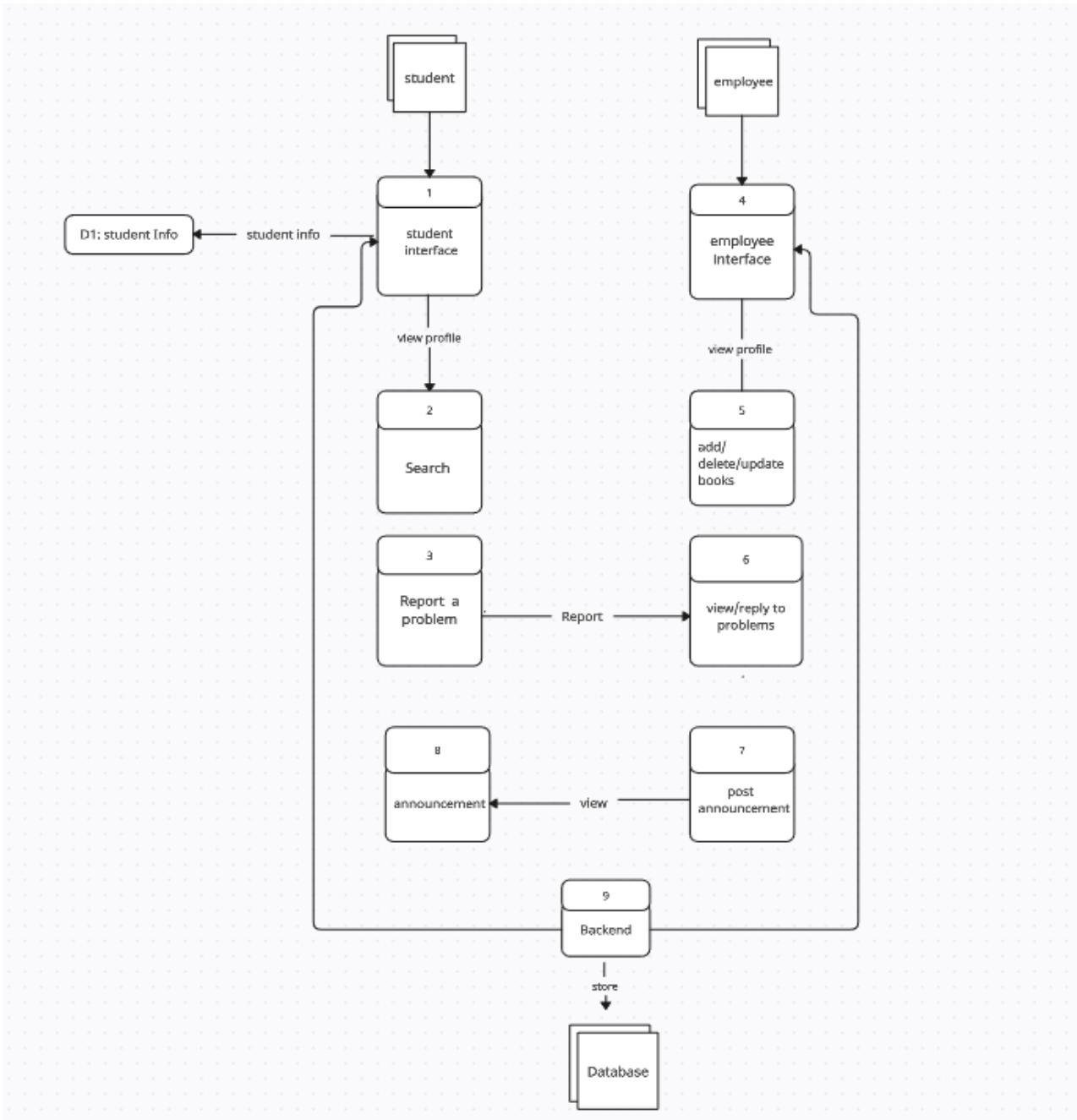


FIGURE 13:DFD DIAGRAM

5.3 Data Dictionaries

1- Data flow:

1.1 Name/Label: student interface

Description: It takes the student's information from log in if its valid this interface load for him

Source: Student external entity

Destination: view profile, search, announcement and report icons

Data structure: Student's information

Volume/Time: 1 Form/ student

Comments: no comment

1.2 Name/Label: search

Description: student can search the availability of books

Source: database of existing books

Destination: student interface

Data structure: book 's information

Volume/Time: 1* Form/ student

Comments: no comment

1.3 Name/Label: Report

Description: Student can send their complaints and issues that they face in JU library

Source: Student external entity

Destination: employee interface

Data structure: Reports

Volume/Time: 1 Form/ student

Comments: no comment

1.4 Name/Label: employee interface

Description: It takes the employee's information from log in if its valid this interface load for him

Source: employee external entity

Destination: view profile ,edit , post and view reports icons .

Data structure: employee's information

Volume/Time: 1 Form/ employee

Comments: no comment

1.5 Name/Label: edit

Description: employee can add books to database , delete or update the number of available books .

Source: employee external entity

Destination: Database

Data structure: books 's information

Volume/Time: 1* Form/ employee

Comments: no comment

1.6 Name/Label: Reply & view

Description: employee can know about students complaints and reply on it

Source: Student reports

Destination: students interface

Data structure: reports

Volume/Time: 1 Form/ employee

Comments: no comment

1.7 Name/Label: Post

Description: Employee can share a post for students for important announcement.

Source: employee external entity

Destination: student interface .

Data structure: Announcement .

Volume/Time: 1 post/ employee

Comments: no comment

1.8 Name/Label: Announcement

Description: Student can know important news and announcement about JU library

Source: 1.7

Destination: student interface

Data structure: post

Volume/Time: 1* post / student

Comments: no comment

5.4 Process Specification and Structured Decision Analysis

User Registration and Login:

Users can create an account by providing their relevant information.

Users can log in to the application using their registered credentials.

Book Search and Availability

Book Checkout and Return:

Users can check the availability status of a book.

If the book is available, users can request to check it out.

The application will update the book's availability status and assign it to the user.

Library Announcements:

Users can view important announcements and updates from the library.

The application will display notifications for new announcements.

Reporting Problems:

Users can report any issues or problems they encounter in the library through the application.

The application will provide a form or interface for users to submit their reports.

Library employees can review and address the reported problems.

Library employees can log in to the application with their own credentials.

Employees can add new books to the library by providing relevant details.

Employees can delete books from the library if necessary.

Structured Decision Analysis:

Book Availability:

Decision: Determine the availability status of a book.

Criteria: Check if the book is currently checked out or available for borrowing.

Alternatives: Available, Checked Out.

Decision Rules: If the book is not checked out by any user, it is available; otherwise, it is checked out.

Book Checkout:

Decision: Add a new book to the library.

Criteria: Validate the book information and check if the book already exists in the library.

Alternatives: Add, Reject.

5.5 ERD analysis

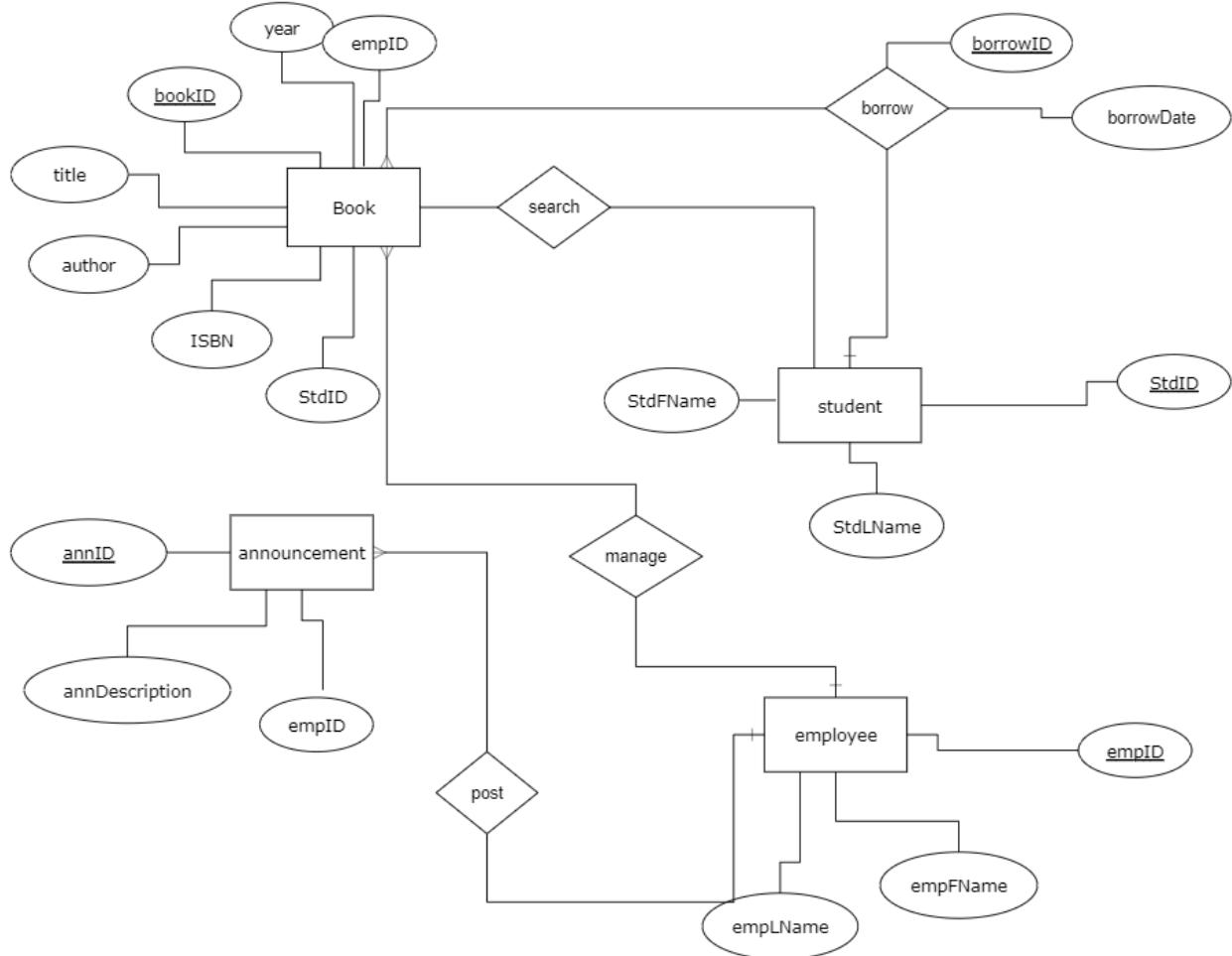
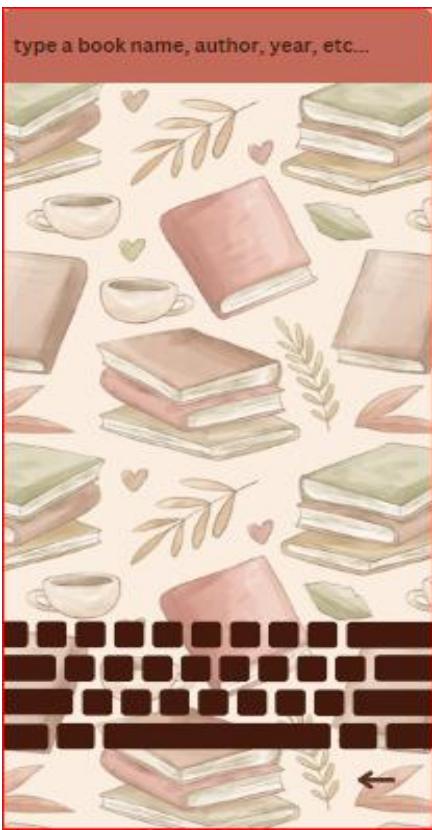
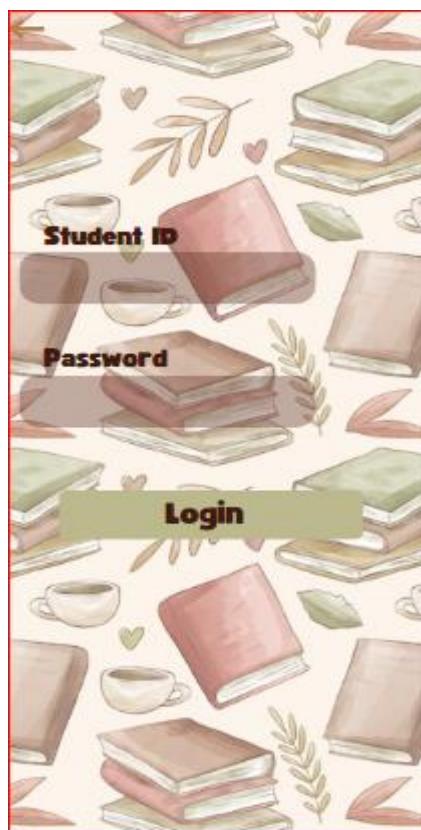
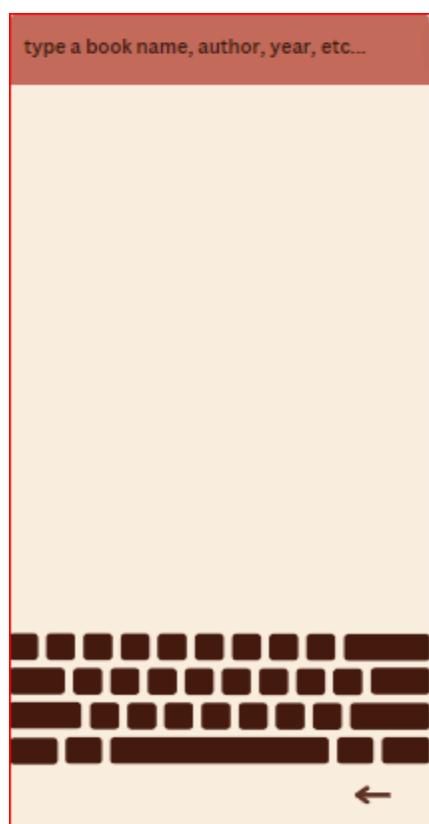
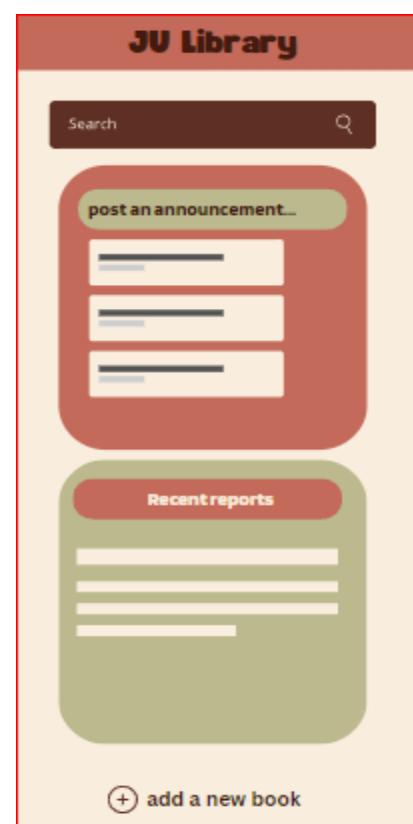
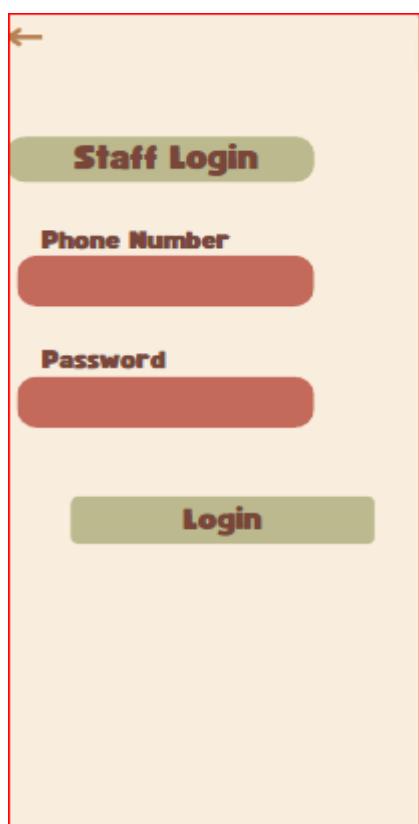
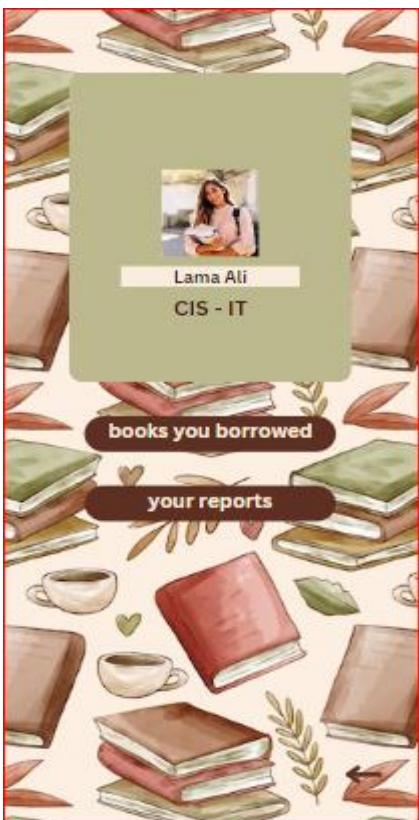
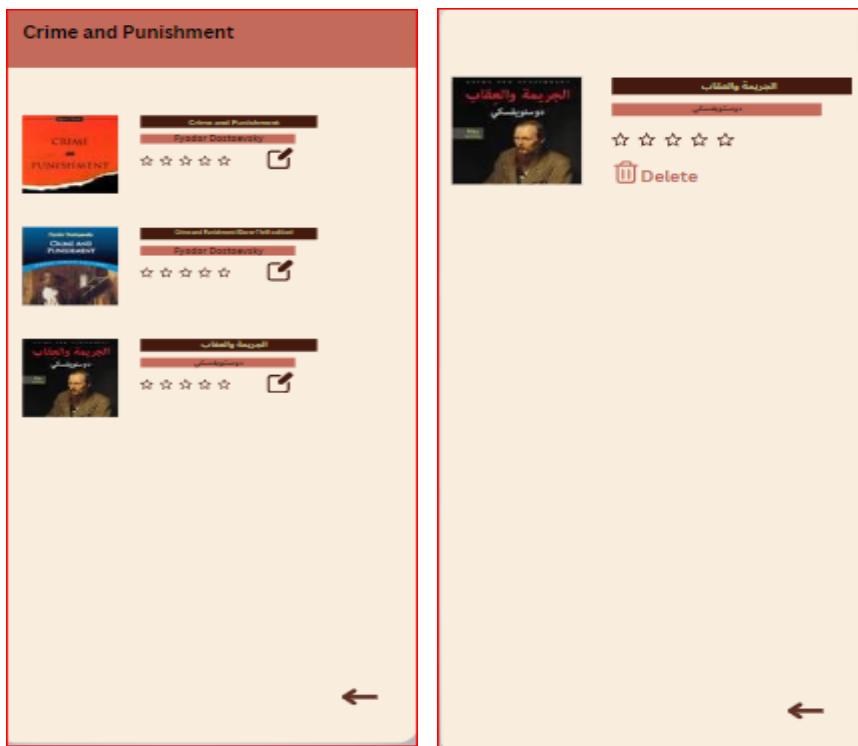


FIGURE 13:ERD

5.6 Graphical User Interface Design (input and output design including forms and reports)







5.7 Database Design (DB normalization)

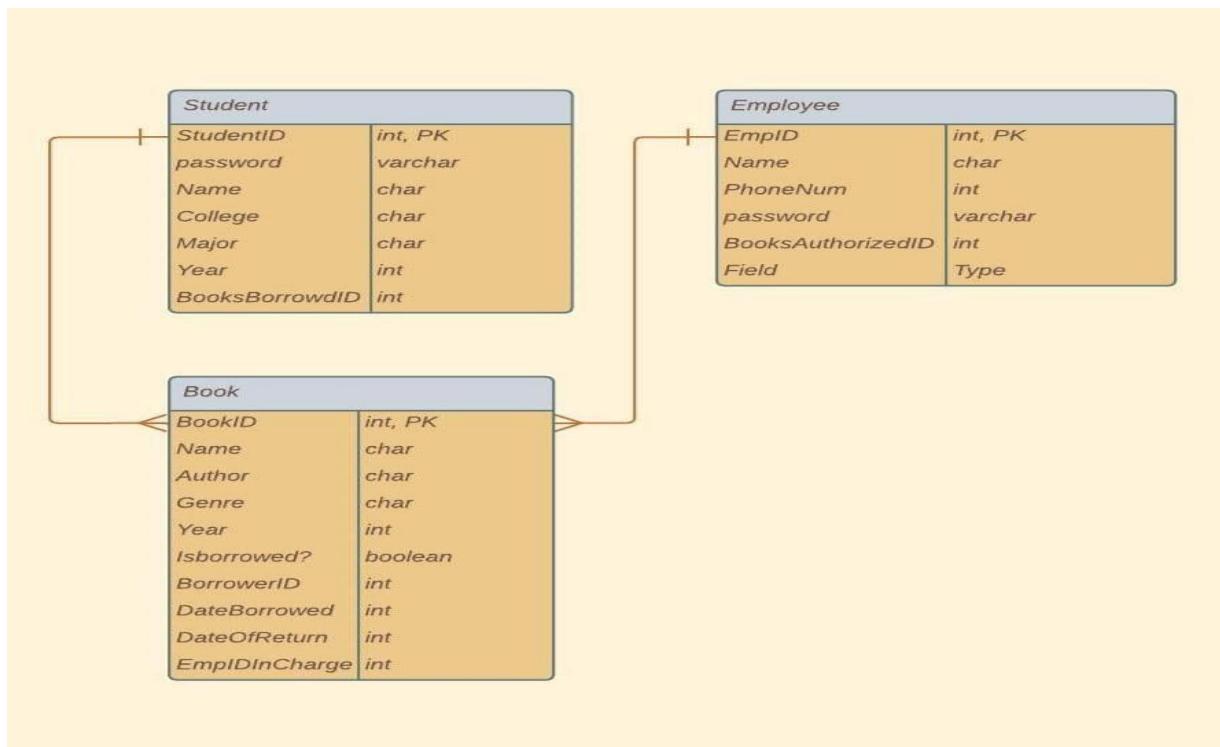


FIGURE 14:DATABASE DESIGN

6.0 User Manual

A. Student Login:

Start the app by clicking on the 'start' button that will take you to the login page. type in your student ID and password that matches the university website, then click on 'Login'.

B. Home Page:

Here you'll get the latest announcements, and you can go to your profile by clicking the profile icon on the right below or report a problem to the staff by clicking on the specified button on the left. You can search for any book/author you want by clicking on the search bar.

C. Search Engine:

After typing in the name of the book you want, a list of the books that the library have that match your search will appear, showing their cover, name, author name and ratings. It will also show you the availability of the book, so if someone else has borrowed it already, it will say that the book is unavailable at the moment.

D. Report a Problem:

If you have a problem or a suggestion you would like to report, or simply a book you would like to request, type it in the box below, and then click on the 'report your problem' button.

E. Profile Page:

Here, you get to see your personal information, like your name, major, and profile picture. You also get to see a list of all the books you borrowed, and a list of the reports you sent in the past.

F. books you borrowed.

after clicking on the 'books you borrowed' button, you'll be referred to a list of these books with all the information you'll need about each book, including the date when you borrowed it, when it should be returned, and the remaining days.

G. your reports

after clicking on the 'your reports' button, you'll be referred to a list of all the reports you've ever sent in the past along with the date.

2. A. Staff Login:

if you're an employee, you can log in by entering your phone number and password and then clicking the 'Login' button.

B. Home Page:

Here, you can post an announcement yourself and view the previous ones shared by you or other staff. Below that, you get to see recent reports that got sent by students. Staff members have the ability to add new books to the application's library, and they can also search for any book/author they want by clicking on the search bar.

C. Search Engine:

after typing in the name of the book you want, a list of the books that the library have that match your search will appear, showing their cover, name, author name, and ratings. It will also show you the availability of the book, so if a student has borrowed it already, it will say that the book is unavailable at the moment.

D. Edit a Book:

you can edit any book by clicking the pen icon next to that book's cover, and then it will refer you to a page where you get to change the book's information, like its name, availability, etc. You can also delete the book completely by clicking the trash can icon.

7.0 References:

- 1. books and tools**
- 2. Untitled diagram tool to draw the use case.**
- 3. monday.com for Gantt chart**
- 4. Creately**
- 5. Canva**