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Abstract

Jadara Bookshare is an Android application that helps reduce the effort and time in searching for academic aids. The idea of this application appeared under the circumstances of the Corona pandemic, which transformed face-to-face education into e-learning, so we developed the application to provide the opportunity for students to seek academic support. The user enters his personal information such as name, phone number, etc.; In addition, the user selects the college and then selects the department to show him a list containing all the academic aid publications of this college and this particular department; So that for each publication the name of the material attached to the publication appears, in addition to the name of the doctor, the name of the file and a link containing the material uploaded to the server. The user can communicate with the owner of the publication either through direct contact or through WhatsApp or e-mail; He can also download the file to his personal device, or add it to the favorites list to facilitate the process of returning to it later. After reviewing the previous work, we added some features and improved some of them to reach an application that differs in its content from other pre-existing applications and competes with them in this field, as our application contributed to creating a channel that connects users with service providers and advancing social work and academic work at Jadara University. One of the most important additions to the application is the ability to support the largest possible number of students and facilitate the process of linking them to each other. The application will be developed and a version running on the (IOS) system will be released to enable access to the largest segment of users, along with a desktop version, in addition to many important future works.

الملخص

جدارا بوك شير هو تطبيق أندرويد يساعد في تقليل الجهد والوقت في البحث عن المساعدات الأكاديمية. ظهرت فكرة هذا التطبيق في ظل ظروف جائحة كورونا و التي قامت بتحويل التعليم الوجيه إلى تعليم إلكتروني، لذلك قمنا بتطوير التطبيق لإتاحة الفرصة للطلبة للبحث عن الدعم الأكاديمي. يقوم المستخدم بإدخال معلوماته الشخصية مثل الاسم ورقم الهاتف وما إلى ذلك؛ بالإضافة إلى ذلك ، يقوم المستخدم باختيار الكلية ومن ثم باختيار القسم لتظهر له قائمة تحتوي على جميع منشورات المساعدات الأكاديمية التابعة لهذه الكلية وهذا القسم بالتحديد؛ بحيث يظهر لكل منشور اسم المادة المرفقة في المنشور، إضافةً إلى اسم الدكتور، واسم الملف ورابط يحتوي على المادة المُحملة على السيرفر. يمكن للمستخدم أن يقوم بالتواصل مع صاحب المنشور إما عن طريق الإتصال المباشر أو عن طريق الواتساب أو الإيميل؛ ويمكنه أيضاً أن يقوم بتحميل الملف على جهازه الشخصي، أو أن يقوم بإضافاتها إلى قائمة المفضلة ليسهل عملية الرجوع إليها في ما بعد. بعد مراجعة العمل السابق قمنا بإضافة بعض الميزات وتحسين بعضها للوصول إلى تطبيق يختلف في محتواه عن التطبيقات الأخرى الموجودة مسبقاً ويتنافس معها في هذا المجال ، حيث ساهم تطبيقنا في إنشاء قناة تربط المستخدمين بها مقدمو الخدمات والنهوض بالعمل الاجتماعي والعمل الأكاديمي في جامعة جدارا. من أهم الإضافات للتطبيق هو القدرة على دعم أكبر عدد ممكن من الطلبة وتسهيل عملية ربطهم ببعضهم البعض. سيتم تطوير التطبيق وإصدار نسخة تعمل على نظام (IOS) لتمكين الوصول إلى أكبر شريحة من المستخدمين ، إلى جانب إصدار نسخة لسطح المكتب ، بالإضافة إلى العديد من الأعمال المستقبلية المهمة.

Chapter One

Introduction

1.1 Introduction

E-learning systems have been increasingly popular among educators after the World Health Organization designated COVID-19 a global epidemic. Al-Araini Distance education is being accepted at an unprecedented rate in the sphere of higher education throughout the world, bypassing hurdles, issues, and difficulties, according to the report.

A series of scientific and technical advancements have placed new expectations on higher education institutions in recent years. This is although these institutions have limited skills and resources, and they must modernize to meet the rising demand for higher education. [1]

Higher education institutions must make use of technological advances to make their curriculum available to students at any time and from any location. Sabah to keep up with scientific advances, higher education must undergo several transformations. The biggest ones are a shift away from rigidity and toward a more flexible approach, as well as a shift from minimal standards to mastery and excellence. [1]

The idea of exchanging books and academic aid began as an individual activity in universities, and then developed into a service through which the student aims to publish his current academic assistance or obtain it from other students; As this activity helps in increasing social relations between students, and on the other hand, it has contributed to easing the financial burden on most of them.

Interactive activity plays an important role in the social, economic and academic growth of students in universities.

As this academic support contributes to raising the academic and scientific achievement of the students, the educational materials and academic content are transferred to achieve the highest levels of knowledge and understanding.

This traditional activity has turned into electronic work (using social networking sites) as a result of technological progress and the special circumstances that govern it.

Computers or other electronic devices are used to generate, publish, and read electronic books (also known as E-Books). have a printed book that corresponds to it; You can read e-books on mobile phones and laptops if you don't have access to a computer or a device designed to reading e-books called an e-book reader [2].

There are some qualities that e-books share [2]:

- A. It is easy to transfer and upload to other devices.
- B. Computer-based access to its material.
- C. Imagery, video clips, animations, sound effects, and more are all included.
- D. When using a computer or other gadgets, it is easy to read.
- E. When the quotations are linked to the original scientific references, the original reference may be opened, allowing the quotation to be seen as it was written by the author.
- F. View the e-book with pens and comments.
- G. Using an LCD display device or a wall projector, it may be shown to pupils in the classroom.

1.2 Background

Android apps have many components without which the app will not be able to function, such as: [3]

1. **Activities:** Activities are a type of class that is used as a user's entry point and represents a single screen. For example, a messaging application may contain activities that show fresh notifications, another activity that reads messages, and yet another that composes messages.
2. **Services:** In other words, it's an unseen worker for our application. It is constantly updating the data sources and actions that are being tracked. Aside from doing tasks while apps aren't running, it may also broadcast intents. Using the internet or any other application while listening to music is an example of a service.
3. **Content Providers:** Applications can communicate data using the Content Provider component. Because it masks the database's details, it may be used to read and write the application's confidential data. Data from other apps would be impossible to access without content providers.

- 4. Broadcast Receiver:** When another application or system broadcasts a message, the Broadcast Receiver component reacts. Even applications that are not operating can receive broadcasts. Notify the user, for example, that the battery is running low. Android developers may utilize broadcast messages within the application or outside of the usual flow to communicate with other Android developers and users.

1.3 Problem statement

- A.** The difficulty of accepting any email with any domain except "@std.jadara.edu.jo".
- B.** Difficulty finding students who have academic support to share what they have with others.
- C.** Low likelihood of finding a way to connect the students with each other.

1.4 Project Objectives

Our project aims primarily to provide a process of sharing and exchanging academic endeavors among the students of Jadara University in a unique and different way from the previous experiences of the students.

The project objectives can be summarized through the following points:

- A.** Strengthening the spirit of cooperation among university students.
- B.** Promoting the principle and concept of reuse.
- C.** Preserving the largest amount of environmental nutrients by reducing the use of paper.
- D.** Helping students who are unable to pay for books by providing almost new and usable copies.

1.5 Motivation

The inspiration for this project came from the difficulties some university students face in accessing academic aid. As a result, we have built this project so that it is intended for students of Jadara University so that they can obtain the required academic support from other students; which helps in raising the spirit of cooperation and intimacy among students.

1.6 Project Scope

The application has been developed to include students of Jadara University, in order to create a means that allows them to communicate with each other and exchange scientific material and academic support within a specific geographical location (Jadara University).

1.7 Project Goal

To ease the process of exchanging books and academic aids among students at Jadara University, students have access to an application that creates a distinctive place and a unique experience in the realm of digital (electronic) libraries.

1.8 Project Description

When the application is opened for the first time, the application is downloaded through the preparatory screen (splash screen), then the user is transferred to the login screen (log in screen) to log in by registering his email and password. In the event that the user does not have an account, he enters the registration screen (Register Screen) to enter his personal data such as (name, phone number, email, and password) to create his own account on the application and enter the main interface (home screen).

In the event that the user has previously registered and has saved the login process, he will enter the main interface (home screen) to choose the college and then choose the department of this college to show him all the publications of this particular section to add to the favorites list, or contact the author of the publication Via e-mail, WhatsApp, or direct contact.

In the event that the user wants to add a publication, he can press the add button to show him a small screen (Pop Message) to fill in the required data such as (the name of the material, the name of the doctor, and the name of the file); If he wants to display his favorites, he can do so by clicking on the favorites from the side menu (side menu) to show him a list of all the posts he previously added; He can also change his account picture or change the language from English to Arabic or vice versa, and he can also log out of the application!

1.9 Contribution

In this project, we aim to connect Jadara University students with each other in a different and new way to suit the conditions that students are living in at the present time within the Corona pandemic, so that this project encourages students to communicate better and raise the spirit of familiarity and cooperation in order to reach a better academic and scientific status.

1.10 General Constraints

We believe that our project faces a number of obstacles, including a lack of time in the first place, as well as the difficulty of finding a mechanism that preserves college privacy while helping students as much as possible, and the difficulty of creating new and distinct characteristics due to its dwindling size. After completing a bachelor's degree.

1.11 Document Organization

Organize the remaining document of these documents as follows:

Chapter #1, a collection of major ideas and headers are included in this chapter to help understand the basic idea of the project.

Chapter #2, discusses the background and related work, beginning with a discussion of the background information and the work related to it, and finishing with providing a summary table comparing the similarities in the proposed work with existing systems.

Chapter #3, discusses the project methodology, where we discussed in detail the architecture of the proposed application along with project planning and various requirements such as user requirements, system requirements, and domain requirements.

Chapter #4, discussing software design and applications, where we discussed in detail the use cases and activities that can be performed with the proposed system, and we discussed the implementation of the proposed system.

Chapter #5, discuss the results and discussion, we performed various test cases to verify the working of the developed application.

Chapter #6, the conclusion and future directions are presented.

Chapter Two

BACKGROUND AND RELATED WORKS

2.1 Introduction

In this chapter, a description of the application is presented that is similar to the developed application and compares it in terms of features, advantages and disadvantages and differs from the developed application. For every application developed there are specific goals to be achieved, while goals differ between applications and there are similarities between them. The differences and similarities between the application and the developed application are discussed in detail. In this chapter, we have also discussed some of the applications in which books are exchanged and disseminated in many ways between readers.

The participation application was created for students wishing to flexibly and easily access or publish academic aids, which provides students with a unique experience that differs from previous participation processes, so that the application is keen to connect students with each other.

This application consists of several screens interconnected with each other, specifically serving students. It is an application dedicated to Jadara University students that facilitates the search process by selecting the college and department, then selecting the required material, and then communicating with other students to obtain it, in addition to an area that allows students to access some details about the content of the scientific or academic subject.

2.2 Theoretical background

We will face many difficulties while implementing this project until writing it, but we believe that the most difficult thing is finding students to interact within the application away from the traditional model on social media.

2.3 Related Application

We reviewed existing apps and studies that are similar to ours and discussed the most important features that each app has and the country in which each app operates. We have made a comparison table for all the applications we have reviewed and compared them with the proposed features and improvements that serve the target students (Jadara University students).

For example, we tried some applications, we reviewed their interfaces and how they work, and we monitored the tasks performed by each application, but we encountered some problems in the process of verifying the application and the speed of obtaining the request, because some applications are working on this idea outside Jordan, and examples of these applications:

2.3.1 Book Traders [4]

Book Traders Application allows you to trade books with users around you. How?

Add the books that you have read and don't need anymore.

Start browsing for new books that other users are offering in exchange.

Finally, get busy chatting with them and start trading some books! [4]

This application provides many services to users such as Chatting, Trading Books, and Searching on hard copies and electronic copies.

It works on Android only and can be downloaded from the Google Play Store.

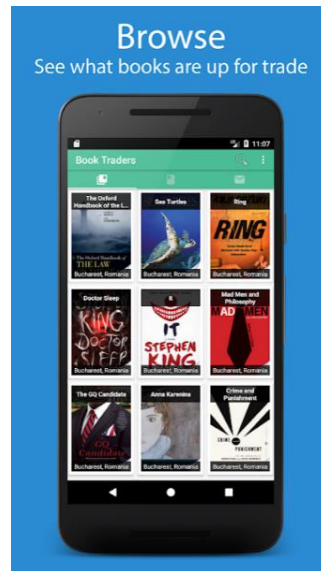


Figure 2.3.1: Book Traders Application.

2.3.2 Trade Books [5]

No need to buy a new book.

Get the same content books at a lower cost.

Advertise books that are no longer needed but are useful for others.

Get the books on rent too. [5]

Where this application provides many services to users such as Buying, Selling, and Renting on hard copies only.

It works on Android only and can be downloaded from the Google Play Store.

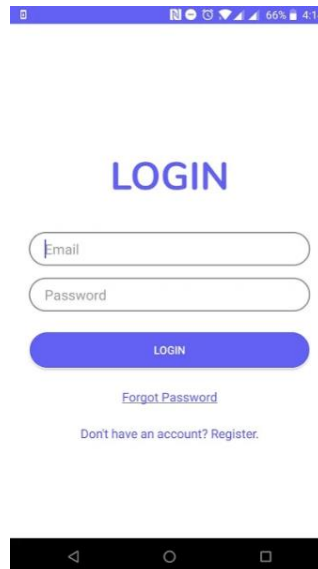


Figure 2.3.2: Trade Books Application.

2.3.3 Forex Trading Binary Books [6]

This Forex book is free of Cost Mostly people Charge Money for Forex Trading Course but in this Forex App, you don't need to pay anything. It's 100% Free Just Download Trading App and starts your Forex Journey. [6]

Where this application provides free courses services on electronic copies only.

It works on Android only and can be downloaded from the Google Play Store.

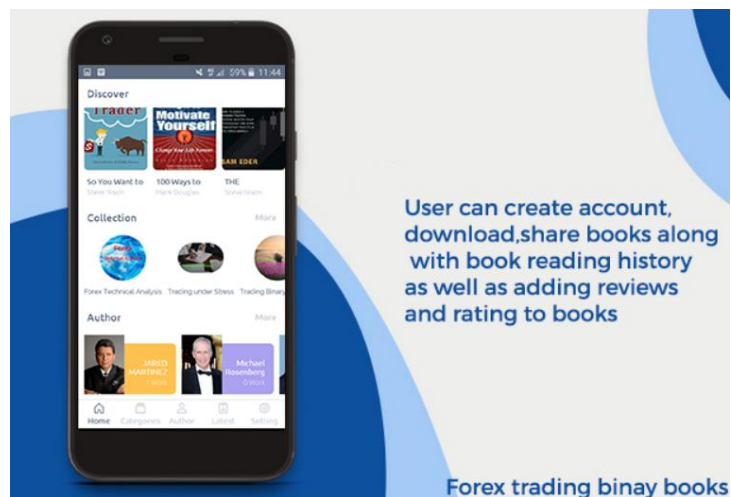


Figure 2.3.3: Forex Trading Binary Books Application.

2.3.4 Trader Ebook Center [7]

Trader Ebook Center is a simple lightweight app that has More than 50+ Forex Ebook Strategy with Malaysian Language.

All of the e-book in this apps are from well-known traders in the forex community. If you are the copyright owner of any of these e-books and do not want me to share them, please contact me and I will gladly remove them. [7]

This application provides many services to users such as Favorites, Searching, and Forecast on electronic copies only.

It works on Android only and can be downloaded from the Google Play Store.

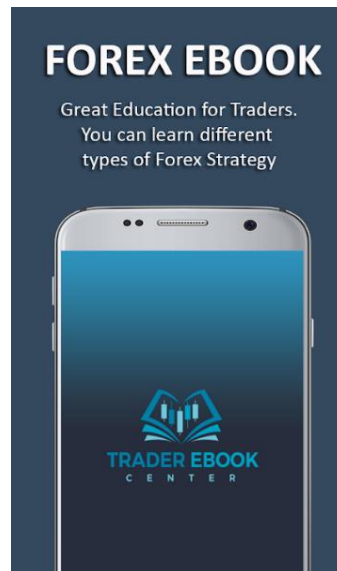


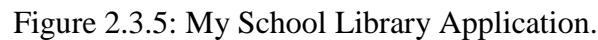
Figure 2.3.4: Trader Ebook Center Application.

2.3.5 My School Library [8]

Just launch the MY SCHOOL LIBRARY App and search for whatever book you want to read. That is it... Your library is now in your palms.

You have searched the app and found a book that you want to read but you need to search for other books immediately, simply add the newly found book to your favorite or simply download it so that you can access it to read offline later from within the app later. [8]

It works on Android only and can be downloaded from the Google Play Store.



Make use of this Book Share app (only in the play store) Your Books could be Shared/Donated/Sold/Lend free for reference. You can ADD or REQUEST books. No need to buy new books if available locally (setting you could give within x km with GPS ON). [9]

It works on Android only and can be downloaded from the Google Play Store.

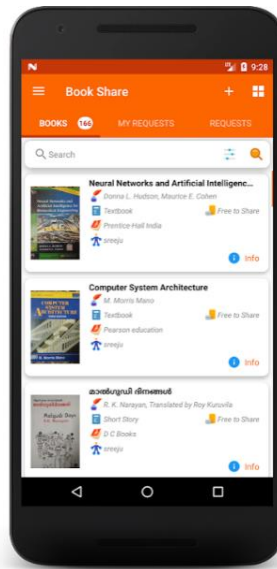


Figure 2.3.6: Book Share Application.

2.3.7 Bookshelf - Your virtual library [10]

Catalog and organize library or book collections on multiple virtual bookshelves.

Track your reading progress and maintain a wish list of books you want to read.

Discover great new reads and share book recommendations.

Bookshelf is a free service with a sleek, functional, and user-friendly interface. [10]

This application provides many services to users such as Adding via Scanner, Searching, Importing, Adding Manual, Writing, Schering, Favorites, Tracking, and Cloud Saving on hard copies.

It works on Android and IOS and can be downloaded from Google Play Store and Apple store.

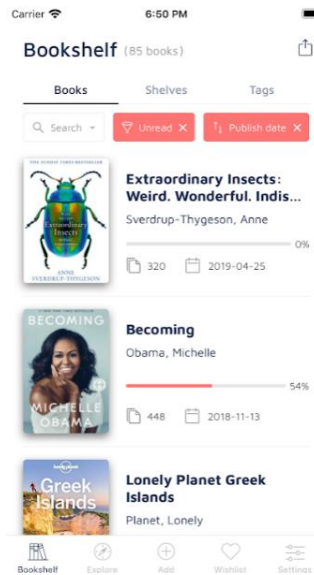


Figure 2.3.7: Bookshelf Application.

2.3.8 Book Sharing [11]

BookSharing is a platform primarily designed to facilitate lending & borrowing of books. Though the facility allows for selling & buying books the focus remains on the former

BookSharing app deals with Sharing Books primarily arose out of a need for users, specifically students, to share books after they were done using them. Consequently, the platform will continue to focus on easy sharing of Books, specifically textbooks. Imagine that you have progressed to the next but don't have enough cash to buy all those expensive new books. Where can you find cheaper alternatives? [11]

This application provides many services to users such as Buying, Selling, and Lending on hard copies only.

It works on Android only and can be downloaded from the Google Play Store.

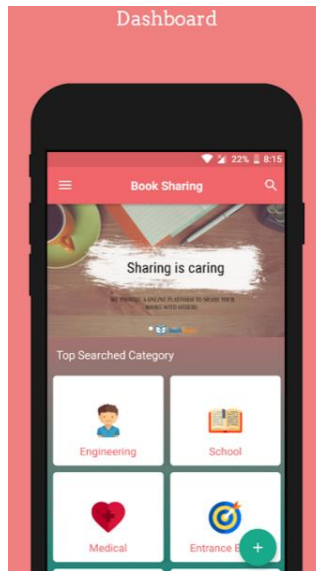


Figure 2.3.8: Book Sharing Application.

2.3.9 Handy Library - Book Organizer [12]

There's no need to own a computer and a barcode scanner to manage books in a small library, the Handy Library app has almost all the features to replace them.

Scan ISBN the first time to get a book's details from the Internet and add it to your library, scan the next time to view the book, write a note, or lend it to someone. [12]

This application provides many services to users such as scanning, sharing, searching, tracking, sorting, and managing hard copies.

It works on Android only and can be downloaded from the Google Play Store.

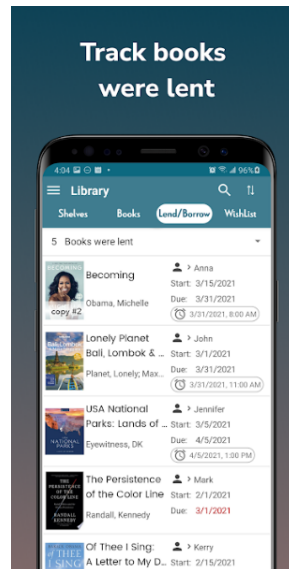


Figure 2.3.9: Handy Library Application.

2.3.10 Inkitt: Books, Novels, Stories [13]

Inkitt in the perfect free app for reading fiction books on your Android phone or tablet, especially for avid readers who love discovering upcoming novels from new and talented authors on the go. All stories published on the Inkitt app are our readers' top picks. Books and novels are our passion and we want to share them with you. Join us on our mission to support rising talent! [13]

This application provides many services to users such as searching and downloading on electronic versions only.

It works on Android and IOS and can be downloaded from Google Play Store and Apple store.

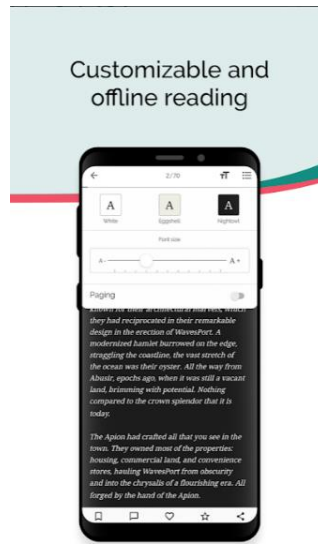


Figure 2.3.10: Inkitt Application.

2.3.11 Kobo Books - eBooks & Audiobooks [14]

The Kobo App allows you to browse our growing collection of the world's best eBooks, audiobooks, graphic novels, and children's books, to enjoy instantly on your smartphone or tablet. Search by author, title, topic, or genre to discover your next great read. [14]

This application provides many services to users such as Searching, Sharing, Rating, Tracking, and Audiobooks on electronic versions only.

It works on Android and IOS and can be downloaded from Google Play Store and Apple store.

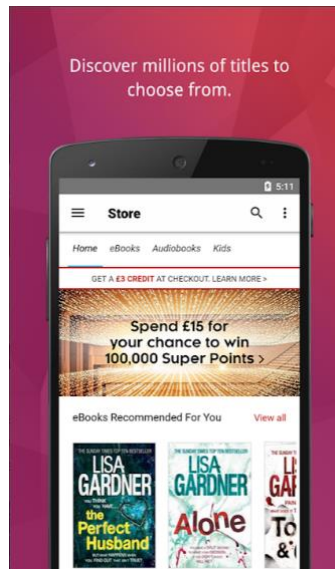


Figure 2.3.11: Kobo Books Application.

2.3.12 Free Books – Novels, Fiction Books, & Audiobooks [15]

Free Books app is a place to discover the best FREE good reads with a fresh, modern app interface and design. Here you can read unlimited ebooks in our ebook reader. We have a huge collection of classic literature including the most well-known romantic novels, fairy tales, epic books, and fantasy books from classic novelists. There are also young adult and science fiction titles that inspire today's dystopia genre. There is also a banned books section! You can also find audiobooks within our app so you can enjoy the classic literature audibly while you are doing something else. [15]

This application provides many services to users such as Searching, Favorites, and Audiobooks on electronic versions only.

It works on Android and IOS and can be downloaded from Google Play Store and Apple store.

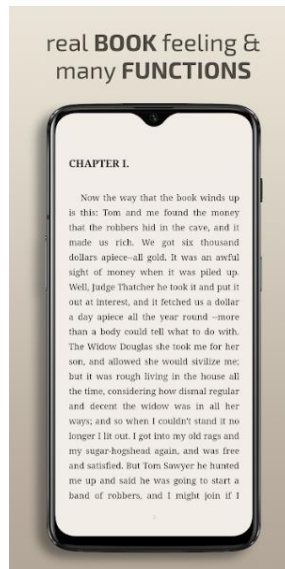


Figure 2.3.12: Free Books Application.

2.3.13 PocketBook reader free reading [16]

PocketBook Reader is a free app for reading any e-content (books, magazines, textbooks, comic books, etc.) and listening to audiobooks! The application supports 26 book and audio formats, including mobile, epub, fb2, cbz, cbr. Read without ads and with total comfort! [16]

This application provides many services to users such as Searching, Scanning, Sorting, and Audiobooks on electronic versions only.

It works on Android and IOS and can be downloaded from Google Play Store and Apple store.

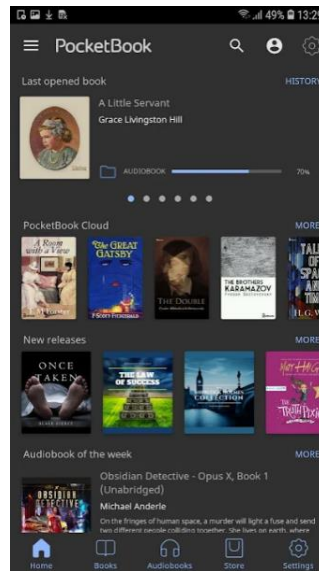


Figure 2.3.13: PocketBook Application.

2.3.14 My Library [17]

This library app is here for you to finally have your books organized - in a library of books that is on your phone and therefore always with you.

Have a list of your books packed in one library:
Scan their barcode and automatically get all of their information (Or add them manually). Rate them, add a description, and much more! [17]

This application provides many services to users such as Searching, Rating, Scanning, and Favorites on electronic versions only.

It works on Android only and can be downloaded from the Google Play Store.

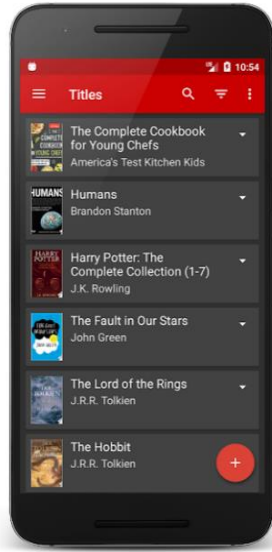


Figure 2.3.14: My Library Application.

2.3.15 Libib [18]

Libib is a small organization and home library cataloging app that allows you to scan in your books, movies, music, and video games.

It works in concert with libib.com, where you can tag, review, rate, import, make notes, and publish your library! [18]

This application provides many services to users such as searching and scanning on electronic copies only.

It works on Android and IOS and can be downloaded from Google Play Store and Apple store.

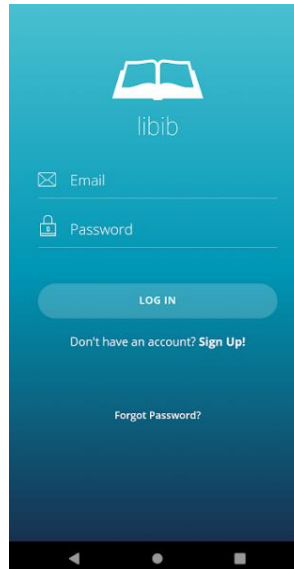


Figure 2.3.15: Libib Application.

2.4 Comprehensives Study

Apps	Android	IOS	Services	Copy Type	Jurisdiction
Book Traders	Exist	Not Exist	Chatting / Trading / Searching	Hard/Soft	Competent
Trade Books	Exist	Not Exist	Buying / Selling / Renting	Hard	unspecialized
Forex Trading Binary Books	Exist	Not Exist	Free Courses	Soft	unspecialized
Trader Ebook Center	Exist	Not Exist	Favourites / Searching / Forecasts	Soft	unspecialized
My School Library	Exist	Not Exist	Favourites / Searching	Soft	unspecialized
Book Share	Exist	Not Exist	Selling / Lending / Donating / Sharing / Requesting	Hard	Competent
Bookshelf	Exist	Exist	Searching / Adding by scanner / Adding Manually/ Importing / Sharing / Rating / Tracking / Wish List / Cloud Saving	Hard	unspecialized

Book Sharing	Exist	Not Exist	Buying / Selling / Lending	Hard	unspecialized
Handy Library	Exist	Not Exist	Searching / Sharing / Scanning / Tracking / Sorting / Managing	Hard	unspecialized
Inkitt	Exist	Exist	Selling / Downloading	Soft	unspecialized
Kobo Books	Exist	Exist	Searching / Sharing / Tracking / Rating / Audiobooks	Soft	unspecialized
Free Books	Exist	Exist	Searching / Favourites / Audiobooks	Soft	unspecialized
PocketBook	Exist	Exist	Searching / Scanning / Sorting / Audiobooks	Soft	unspecialized
My Library	Exist	Not Exist	Searching / Scanning / Rating / Wish List	Soft	unspecialized
Libib	Exist	Exist	Searching / Scanning	Soft	unspecialized

Table 2.4.1: Comprehensives Study.

2.5 Summary

It became clear from the previous table that most of the applications specialized in providing this type of services were rare, as most of the applications were specialized in exchanging cultural books and selling and renting books or were specialized in audio books, unlike what our application will provide, which will provide a different form of services, in addition to many One of the advantages that will make it easier for Jadara University students to have access to the required academic support.

Chapter Three

PROJECT METHODOLOGY

3.1 Introduction

The purpose of this study is to plan and test the Jadara BookShare application. To achieve the previously mentioned goals, this chapter lays out a research approach. Besides, as explained in the first chapter, checking and validating the proposed strategy as well as evaluating the efficiency of the Jadara BookShare application are essential tasks to be accomplished. It takes a clear approach to achieve these goals, and this is the focal point of this chapter. This thesis uses the Architectural Analysis Method (DRM) for this reason and implements its basic stages according to the phenomenon of this research. To present the intent of the chapter.

Obtaining academic supports is one of the most stressful things for university students, hence the need to provide students with an application that helps them facilitate access to these supports to complete the educational process smoothly and save time and effort, in terms of the time required to search for academic supports for semester subjects. Without falling into the usual mistakes that many students face, which is to search for it through the Internet, which may differ in its style from the usual method of teachers in universities.

Through our application, we will meet their needs when searching for an application that provides them with many features, which reduces the burden on them, such as a list that shows them many academic supports that they can access and divided within faculties and departments for these subjects, so that it is easier for students to choose the most appropriate academic supports for them.

3.2 Gantt Chart

Gantt chart, which is commonly used in project management, is a type of bar chart that shows the project schedule; Gantt charts show start and end dates for goals

and summarize project components; To the left of the diagram there is a list of activities and along the top, there is a table corresponding to the list of activities; Each activity is represented by a bar so that the position and length of the bar reflect the beginning, duration, and end of the activity.

This graph helps us remember the following:

- Start and end times for each stage.
- What are the different activities that we want?
- Expected time to complete a specific task; where activities or tasks are mixed with similar tasks.
- Time from start to finish.

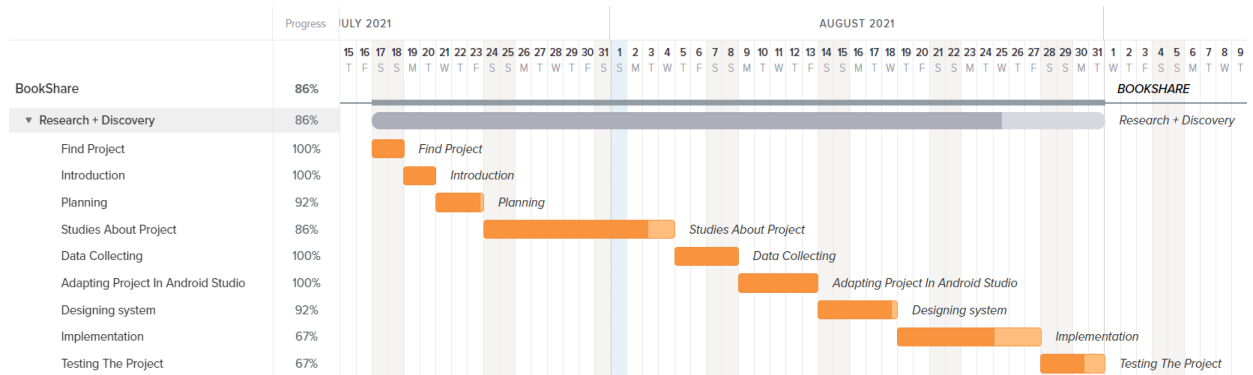


Figure 3.2: Gantt Chart of the System.

3.2.1 Research Approach

The key goal of this research is to establish a Jadara BookShare content positioning and eviction policy to optimize the overall caching efficiency in terms of bandwidth and memory use. While this is a daunting challenge to map the current caching schemes to the new one leading to an effective and optimal solution, these criteria, however, are consistent with the concept of design research as suggested by Blessing [19], where 'design research incorporates the production of understanding and protocol.' These features complement each other to deliver an effective and productive.

According to Blessing [19], to achieve satisfactory findings in both theoretical and functional terms, architecture analysis must be scientific, so it requires a special approach with its unique characteristics. He suggested a strategy called Concept Analysis Methodology for this purpose (DRM). DRM aims to make design analysis more accurate and economical, so it has been embraced for this thesis to be carried out. In the following four steps, DRM can be classified:

- Research Clarification (RC).
- Descriptive Study-I (DS-I).
- Prescriptive Study (PS).
- Descriptive Study-II (DS-II).

In the following pages, a short overview of DRM phases from the viewpoint of this research field is provided. Figure 3.2.1 displays the DRM system where the connections between the phases of DRM, the methods used at each stage, and the key deliverables are shown [20]. Light arrows between the phases represent the main flow of the operation, while the bold arrows to/from each step show methods used and deliverables of that individual phase.

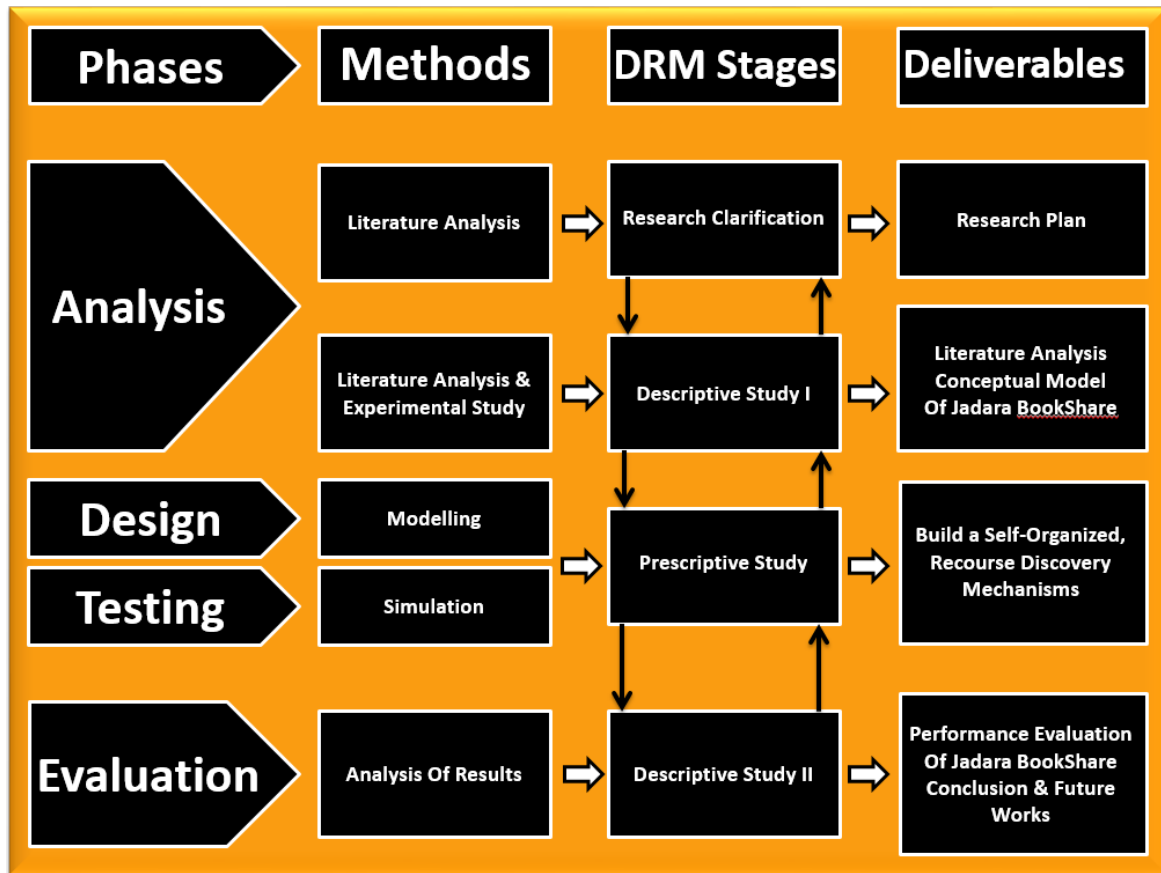


Figure 3.2.1: DRM Framework.

3.2.2 Research Clarification (RC)

The first stage of DRM is Research Clarification (RC), which is used to gain basic information about the overall research program. As seen in Figure 3.2.2, (RC) requires five iterative steps.

In general, the (RC) stage deliverables are the overall study strategy consisting of the following points:

- The basis of research and its motivation.
- Research questions and research problems.
- Important areas to be addressed.
- Research approach.
- Area of contribution and deliverables.

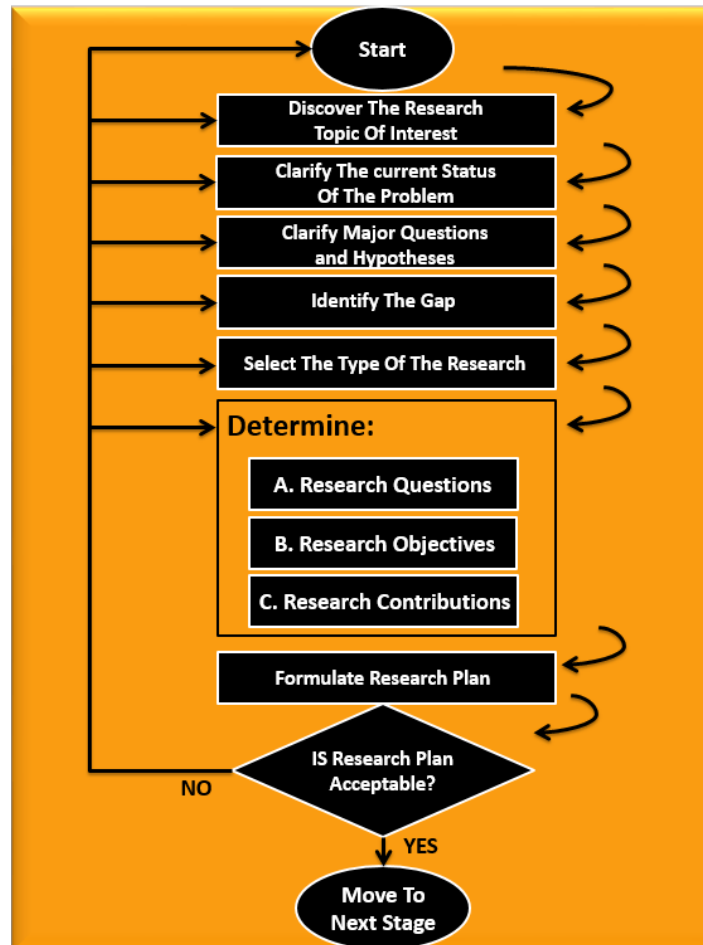


Figure 3.2.2: Research Clarification (RC).

3.2.3 Descriptive Study-I (DS-I)

DS-I is the second level of DRM, which is used to gain a deep understanding of the present situation. This stage entails a critical analysis of the research field's current work as well as observational studies. A thorough analysis of the latest ideas was addressed during the course of this study. To gain a deep understanding of the current systems, several observational experiments were also objectively examined. As shown in Figure 3.2.3, the DS-I involves five steps with several iterations, where each step aims to improve comprehension and can lead to more scientific experiments or

literature reviews that lead to the refinement and upgrading of performance and conceptual models.

The deliverables of the DS-I stage are:

- Conducting a systematic review in Jadara BookShare on cache control approaches.
- In order to understand the power and shortcomings of the system, conduct an inclusive analysis of the system in Jadara BookShare and perform an experimental calculation. Also, to describe the study problems that should be taken into account during the review of the Jadara BookShare project.

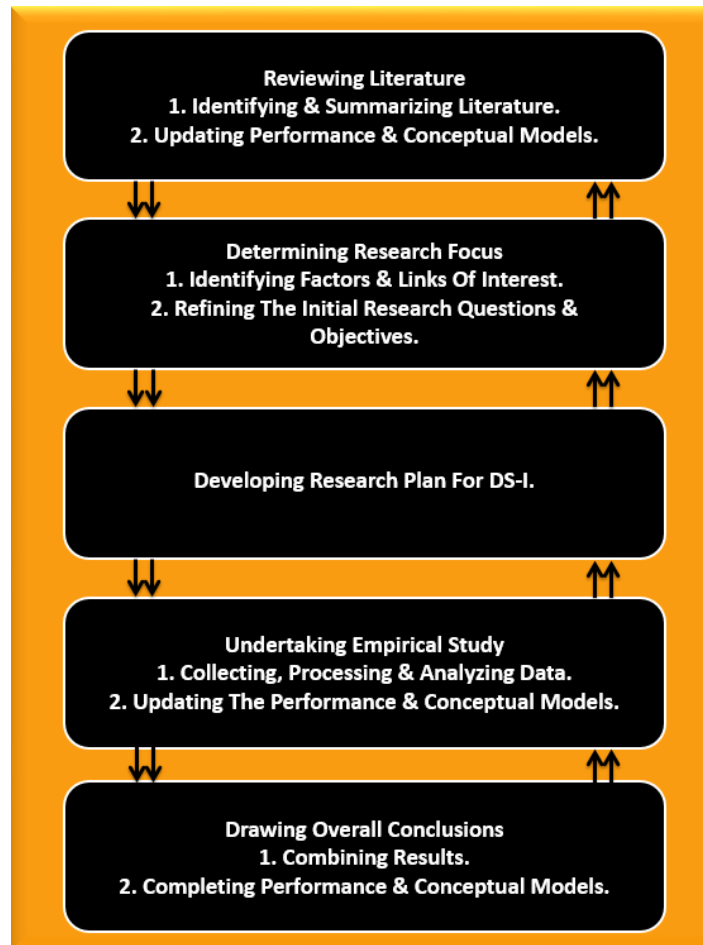


Figure 3.2.3: Descriptive Study-I (DS-I).

3.2.4 Prescriptive Study (PS)

The key stage in DRM is the Prescriptive Study (PS), as it involves the nature of the mechanisms proposed. Network modeling and simulation methods suggested by Guizani et al [21] have been pursued for the purposes of this study.

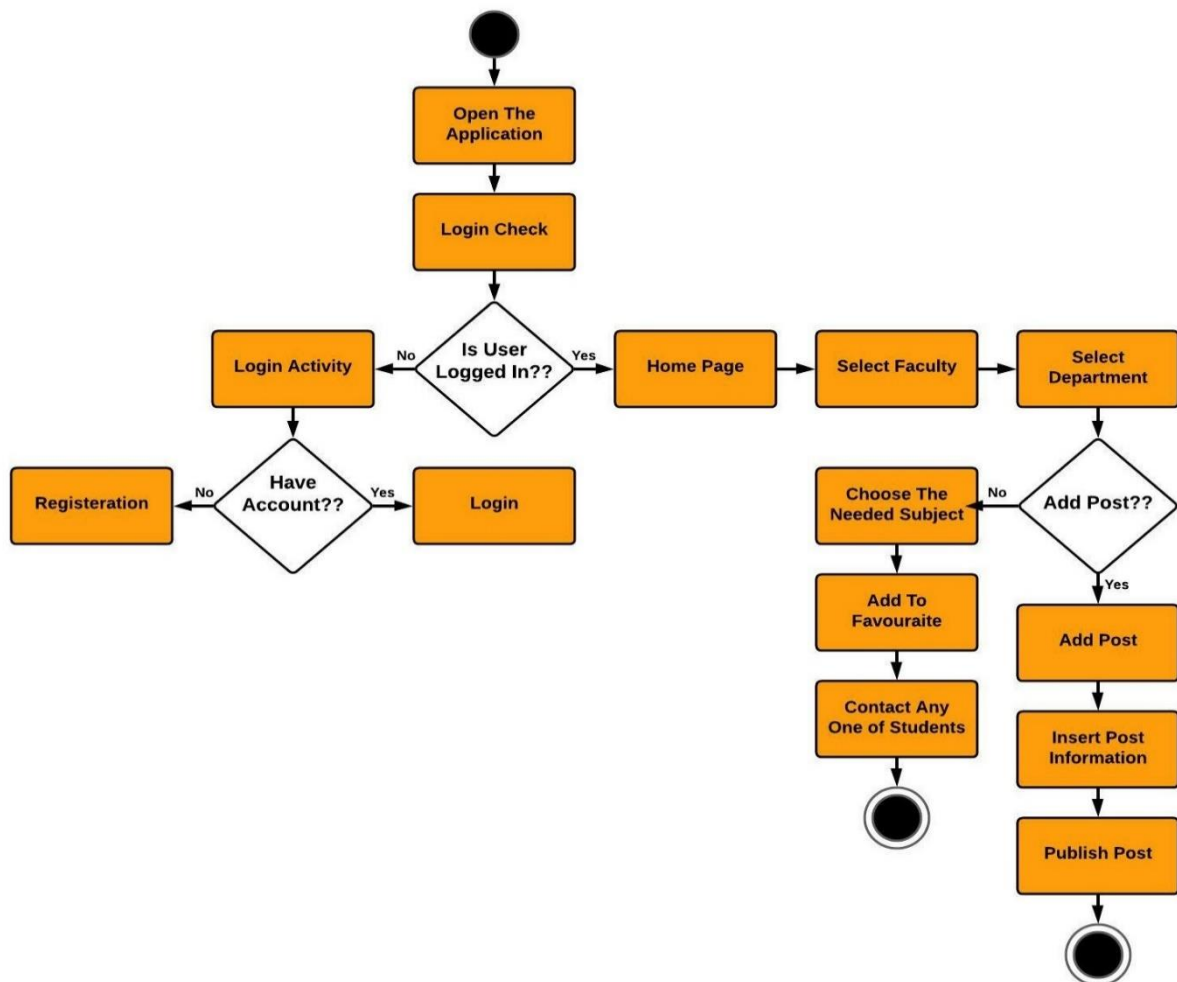


Figure 3.2.4: System Flow Chart.

3.2.5 Descriptive Study-II (DS-II)

This stage focuses on the assessment of the procedures designed. In assessing any analysis, performance assessment is the imperative step.

3.2.6 Verification and Validation

Validation and verification are characterized as a method to validate the data's authenticity and internal integrity and to verify that it embodies real-world entities that are relevant to its intended purpose or number of objectives. Validation is the process, according to the modeling and simulation community, to assess the extent to which a concept, simulation, or mixture of prototype and simulation and its related data correctly reflects the real world from the point of view of its intended application.

While verification is the process of figuring out that a prototype, simulation, or mixture of prototype and simulation and its relevant data correctly represents the conceptual model and its explanation of the creator. Therefore, it is a step to ensure that the model implementations have correct assumptions. To ensure that the computational model is an accurate representation of the operating model, this means testing the simulation software.

3.3 Waterfall Vs. Agile

The waterfall model, as the name itself signifies, is a sequential process of software development. Just like in a waterfall, the water progressively falls from one altitude to the lower, in a similar way, the production cycle progresses sequentially, from one stage to the other. The phases of software development, in this model, are as follows: requirement specification, conception, analysis, design, coding, testing & debugging, installation, and finally, maintenance. [22]

In this sequentially structured approach, the development team goes ahead to the next stage of development, only after the previous stage is fully accomplished. Software development companies, adopting this model, spend a considerable amount of time in each stage of development, till all doubts are cleared and all requirements are met. The belief that drives this kind of software development model is that considerable time spent in the initial design effort corrects bugs in advance. Once the design stage is over, it's implemented exactly in the coding stage,

with no changes later. Often the analysis, design, and coding teams are separated and work on small parts in the whole developmental process. Emphasis is placed on the documentation of every software development stage. [22]

3.4 Analysis of the new system

It is a study to determine the goals and actions effectively. It is also a problem-solving technology that divides the system into parts to examine the success of these parts and interact to achieve the desired goal. System analysis relates to requirements analysis, Figure (3.3).

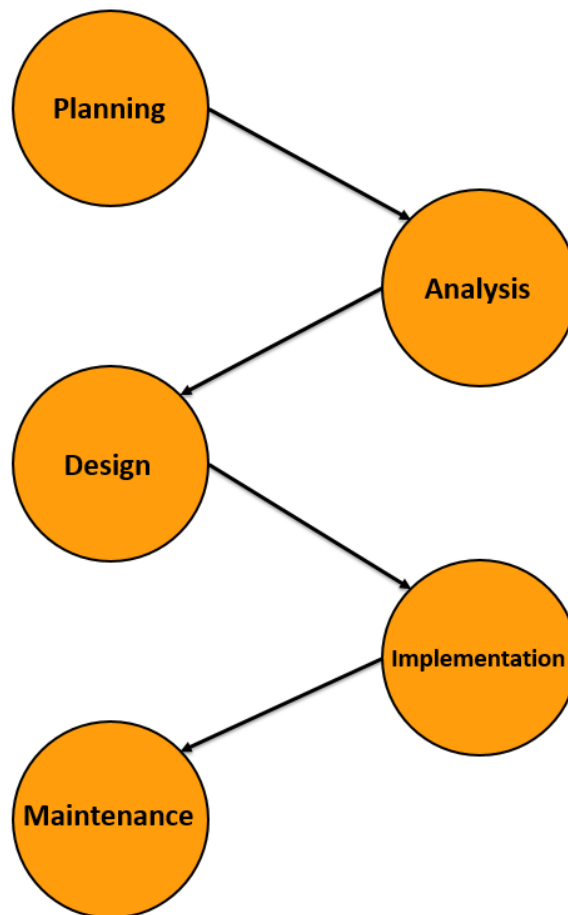


Figure 3.4: System Development Life Cycle (SDLC).

3.4.1 User requirements

3.4.1.1 Functional requirements

Actors in the application of Jadara BookShare:

- **User:**

1. The User shall be able to create an account with his personal information.
2. The User shall be able to login into the application by Email, password.
3. The User can set a profile picture.
4. The User shall be able to insert the information of the post.
5. The User shall be able to contact other users.
6. The User shall be able to select the way he wants to contact other users.
7. The User shall be able to add any post to Favorite.

3.4.1.2 Non-functional requirements

- **Availability:** The application's availability success rate shall be 100%.
The application shall be available 24h/7d.
- **Performance:** The application shall take an advantage of concurrency which makes the application run faster.
- **Security:** The application shall be password protected.
The cloud shall be able to authenticate the clients by using the authentication server.
- **Modifiability:** The application's components shall be able to be changed without breaking the whole application.
- **Usability:** The application's user interface shall be intuitive.
The application's user interface shall use easy-to-read fonts.

- **Scalability:** The application shall be able to enlarge in features and handles an increasing amount of workload.

The application shall be able to enlarge in features in the upcoming future.

3.4.2 System Requirements

System requirements are the configuration that a system must have for a hardware or software application to run smoothly and efficiently. Failure to meet these requirements can result in installation problems or performance problems. The former may prevent a device or application from getting installed, whereas the latter may cause a product to malfunction or perform below expectation or even to hang or crash.

- **Hardware Requirements**

The most common set of requirements defined by any operating system or software application is the physical computer resources, also known as hardware, it's shown in Table (3.4.2.1).

Specification	Recommended Requirements
Computer Type	Dell (Vostro 15 3000)
Computer CPU	Intel Core i5-1135G7, 10 th Generation
Computer RAM	8GB DDR4
Computer Storage	Internal 1TB
User Device	Android OS, Version 5.5 or up

Table 3.4.2.1: Hardware Requirements.

- **Software Requirements**

The software requirements are a description of the features and functionalities of the target system. Requirements convey the expectations of users from the software product. The requirements can be obvious or hidden, known or unknown, expected or unexpected from a user's point of view. Software requirements are defined as follows: The conditions or capabilities the user needs to solve a problem or achieve a specific goal.

Conditions or capabilities of the software to make it compatible with the capabilities of the system to verify the contract and the characteristics agreed upon between the developer and the user, and it's shown in Table (3.4.2.2).

Specification	Recommended Requirements
Operating System	Windows 10
Target Program	Android Studio
Program Language	Java

Table 3.4.2.2: Software Requirements.

3.4.3 Domain Requirements

It is important because we really need a system to help university students search for academic aids, to reduce the effort and time they spend on research, and this system provides users with an integrated environment that includes all colleges, departments, and academic subjects to reach an easy and flexible process that is different from its predecessors.

By:

1. Choosing the student's college and department.
2. Determining the material required by the students or publishing it to help other students using the application interfaces.

Where the application will achieve more accurate and efficient services if the user can deal with the system efficiently.

3.5 Summary

The approach to ensuring the achievement of research goals has been comprehensively clarified in this chapter. Designing Jadara BookShare is the subject of the study. Here, four key research practices were illustrated, in line with DRM. The first activity is the Study Clarification (RC) stage, which provides techniques to support the preliminary stage of this research. The purpose of RC is to categorize and solve a research issue, research questions, and priorities of both academic and realistic interest.

The second phase is the Informative Study-I (DS-I), which addresses measures to gain sufficient awareness of the current condition. This stage entails both developing a reference model and proposing a hypothetical model. The Prescriptive Analysis (PS) is the third stage that focuses on strategies introduced in the design of the cache management strategy proposed. The last stage that addresses the assessment of the planned Jadara BookShare is DS-II.

Chapter Four

Software Design and Implementation

4.1 Introduction:

This chapter will discuss in detail the design and implementation phases of the proposed project, including Android activities, interactions between activities, and database design, in addition to explaining the application life cycle, activity flow, system actors, and their responsibilities.

4.2 Overall System:

System components fall into two categories: hardware components and software components.

The hardware component includes:

- **Backend servers:** They are used to store the databases that will be shared between users, authenticate users, and connect users, and the administration system is built on these servers.
- **Mobile devices:** Users can access the backend of the system through an API and take advantage of its features from their mobile devices, and the mobile device must run on Android OS 5.5 or later.

The program components includes:

- **Database:** The system works on a Firebase database where the entities are not directly related to each other, but rather the structure depends on documents, as the entities can be merged and have different structures without dismantling the system. This can boost system performance because the database requires one query most of the time without joining the tables.

- **Android OS:** Android is the leading operating system in the market due to its popularity, ease of use, and the number of devices running on its basis, which gave the operating system the advantage of targeting the system instead of other operating systems, in addition to that it has a relatively easier learning curve.

The system consists of one user type. Users share many functions of the system, but each user type has its permissions and functions in particular.

These types of users are:

- **Users:** They can choose the faculty and the department then define the needed subject; also, the user can put a detailed explanation of the post that the user wants to publish.

The figure below shows the activities for each user type, the abstract flow of the system, and how the components interact with each other.

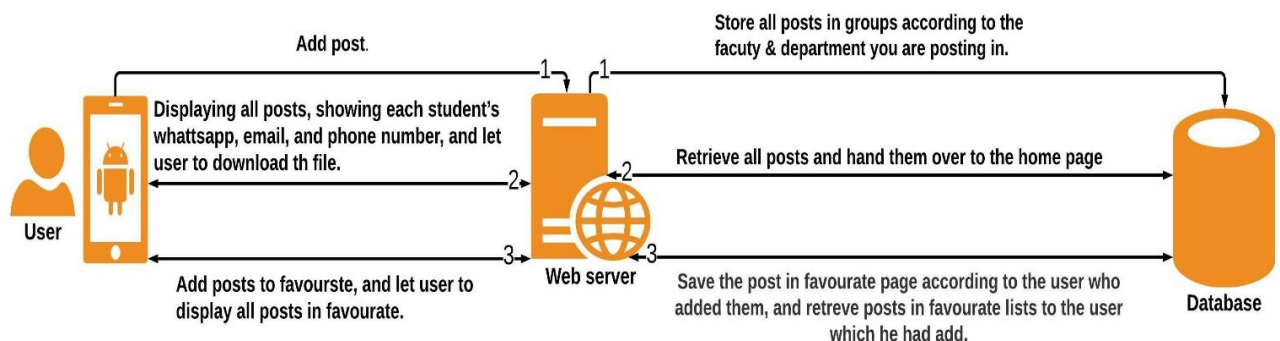


Figure 4.2: Overall System.

This was a summary of the system components, in the following sections, you can find a detailed description of each component and its functions, as well as a diagram that shows the life cycle of the system and the system flow in each step, including the use case diagrams, class diagrams, database design, flow diagram and more.

4.3 Design Of Database

One of our goals was to build a robust and extensible database design to achieve our goal of building a resilient and maintainable project, thus, the database design follows a structure in which the data is normalized to achieve minimal redundancy. Figure 4.2 shows the ERD database:

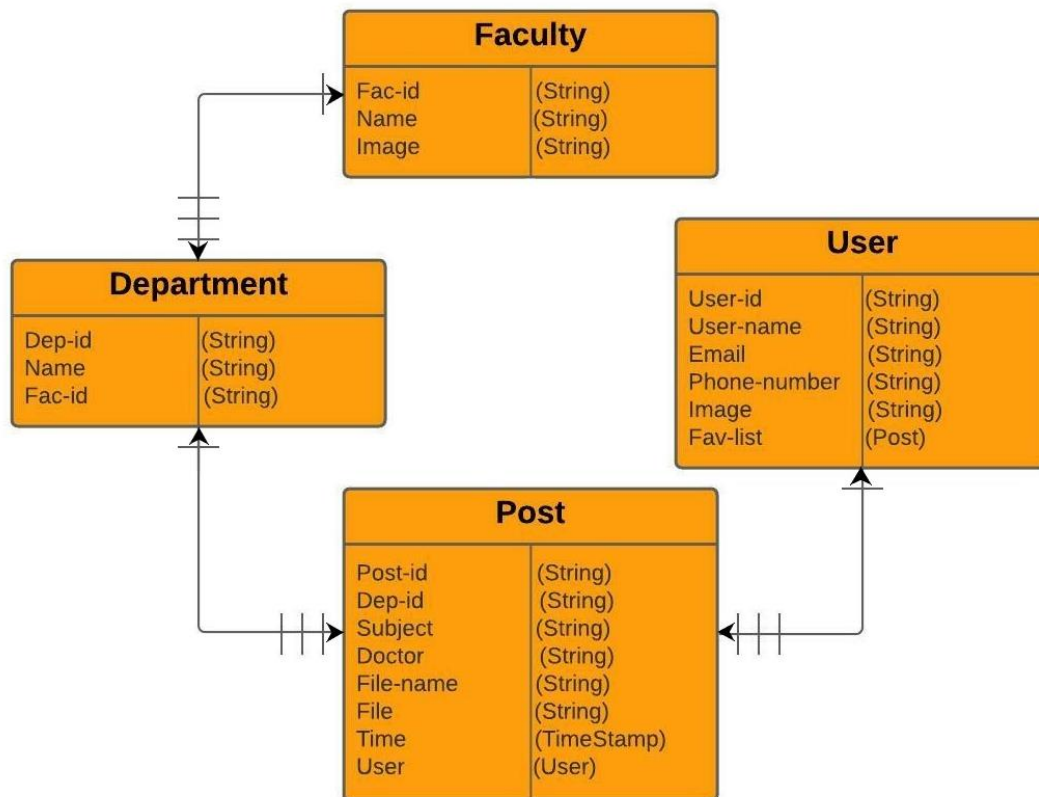


Figure 4.3: ERD database.

4.4 Use Case Diagrams

Use cases are a simple and effective way to express the functional requirements of a system. Describes how actors can use the system and what the system can do for them. The system has one type for end-users (students of Jadara University). The relationships between end users and use cases are illustrated in the figures below:

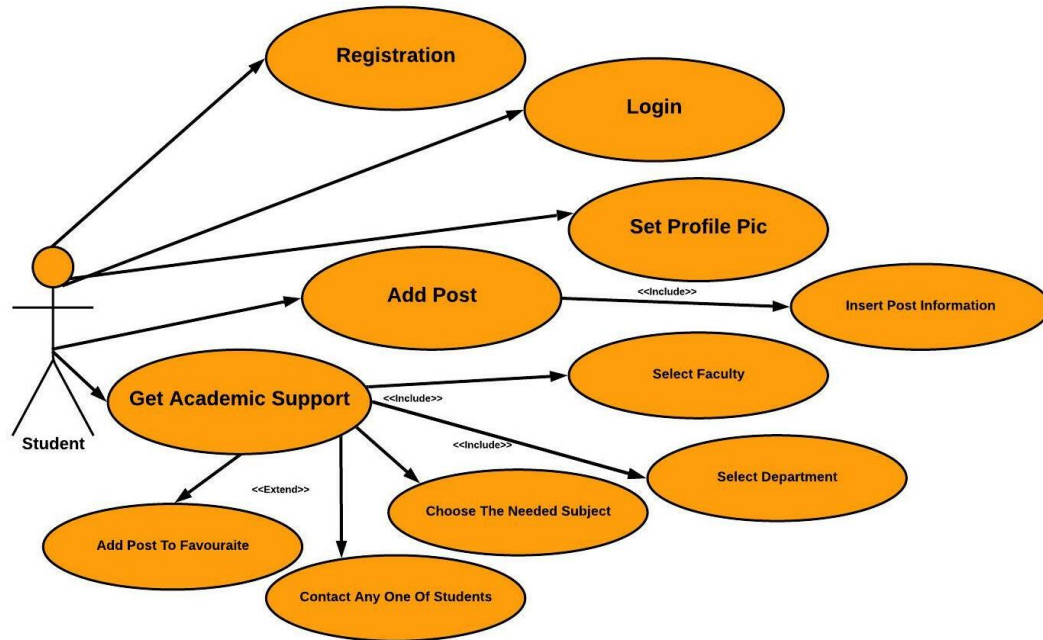


Figure 4.4.1: User Use Case Diagram.

- Use Case Specification :

Use Case:	Create Account.
Actor(s):	Users.
Summary Description:	Allows users to create account on the system.
Pre-condition:	1. The user must have valid and effective mobile phone number. 2. The user must have valid and effective E-mail. 3. The user must have good internet connection.
Post-Conditions:	1. The user already has a registered account. 2. User's data saved in the database.
Alternative Paths:	1. The user leaves at least one field empty. 2. The user typing a non-valid character in one or more fields. 3. The user chooses a password that is less than 6 characters.
Basis Path:	1. The user must enter his personal information. 2. The user should choose a memorable password.

Table 4.4.1: Use Case For Create Account.

Use Case:	Login.
Actor(s):	User.
Summary Description:	Allows users to login the system.
Pre-condition:	1. The user has a registered account. 2. The user must have good internet connection.
Post-Conditions:	The client application will be authorized to send and receive back-end calls.
Alternative Paths:	1. The user leaves at least one field empty. 2. The user enters an incorrect password. 3. The user enters an incorrect username. 4. The user did not submit his inputs by clicking the login button. 5. The application can't communicate with the back-end. 6. The application connection gets interrupted while processing the login request.
Basis Path:	1. The user enters his login credentials. 2. The user submits and attempts to log on by clicking the login button.

Table 4.4.2: Use Case For Login.

Use Case:	Add Post.
Actor(s):	User.
Summary Description:	Users are allowed to add post by pressing on the plus sign.
Pre-condition:	1. The user must be logged into the application. 2. The user must have good internet connection.
Post-Conditions:	A new pop screen will appear to enter all post information.
Alternative Paths:	1. The user didn't fill in the description. 2. The user didn't upload any file. 3. The user didn't click on the button (Add Post).
Basis Path:	The user must insert the post information, and upload the file.

Table 4.4.3: Use Case For Add Post.

Use Case:	Show All posts.
Actor(s):	User.
Summary Description:	Users Are allowed to show all posts, and add them to favorite.
Pre-condition:	1. The user must be logged into the application. 2. The user must have good internet connection.

Post-Conditions:	A list of all posts made will appear.
Alternative Paths:	None.
Basis Path:	The user must have at least one published post or more.

Table 4.4.4: Use Case For Show All Posts.

4.5 Class Diagram

A class diagram is a type of static topology diagram that explains the structure of a system by showing the classes of a system, their properties, their processes, and the relationships between objects. The figure below represents the relationship between the classes and gives an overview of how they work together:

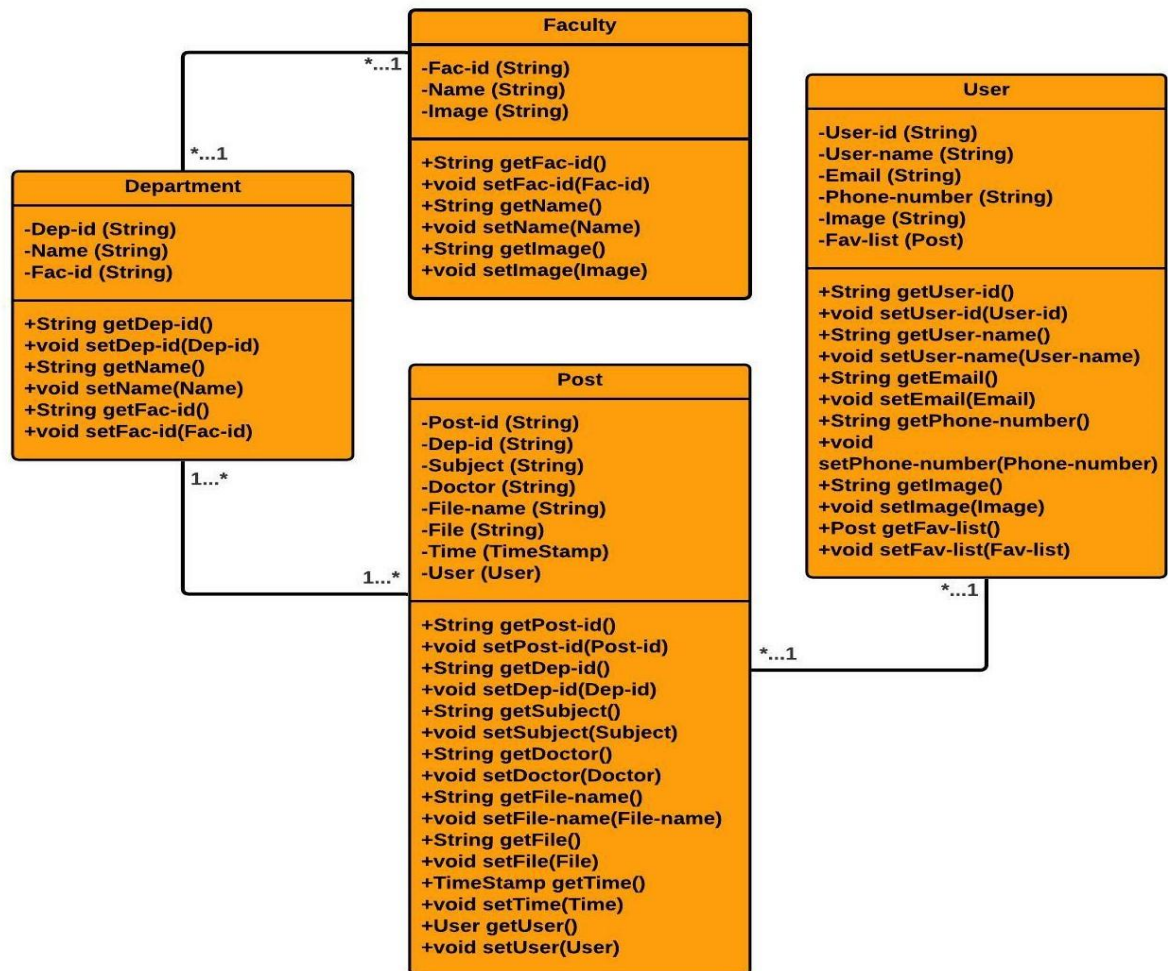


Figure 4.5: Class Diagram.

4.6 Flow Chart Diagram

An activity diagram is used to show overall system behavior, and to describe the flow from one activity to another. This section will discuss in detail how activities interact with each other during the application life cycle.

4.6.1 Splash Screen Flow Chart Diagram

This is the login screen for the application, this screen is non-interactive and does not provide any data for the user, we use it to retrieve the necessary data in advance and download the user's status from the database to check whether he has logged in or not. When everything has loaded, the app automatically moves to the next screen.

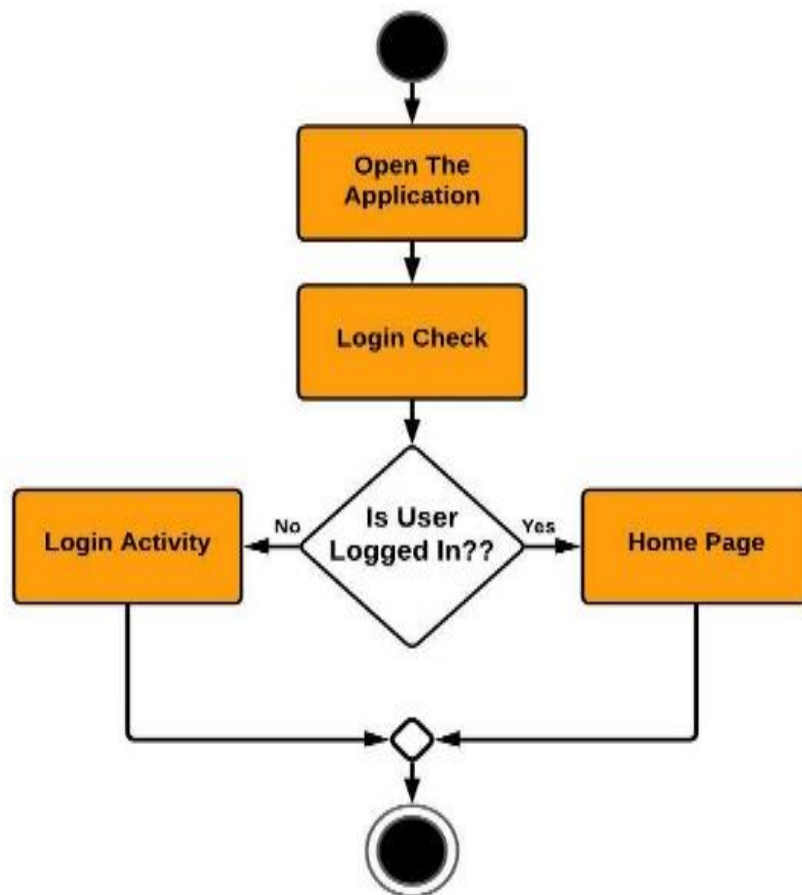


Figure 4.6.1: Splash Screen Flow Chart Diagram.

4.6.2 Create Account Flow Chart Diagram

When the user launches the application for the first time, he must create an account and provide his personal information which includes the full name, password, mobile phone number, and other details. If this data is acceptable and not identical to an account that was previously created, the account will be successfully created and its data saved in the database, but if there is an error, the user will be returned to the account creation page after showing an error message when entering the data.

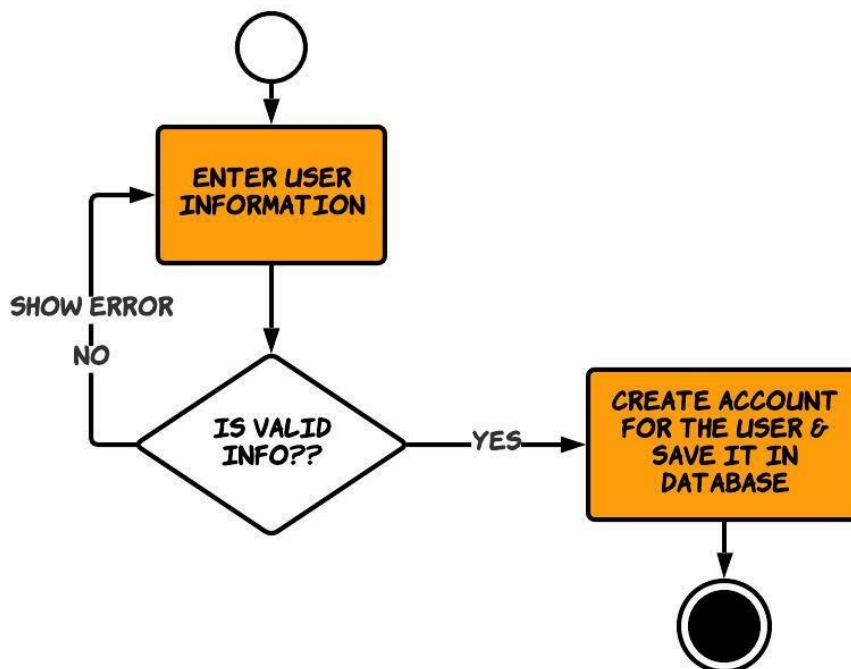


Figure 4.6.2: Create Account Flow Chart Diagram.

4.6.3 Login Flow Chart Diagram

This activity is responsible for authorizing application users by entering their credentials and sending them securely to our backend to match it against the saved credentials, if the user does not already have an account, they can create a new one.

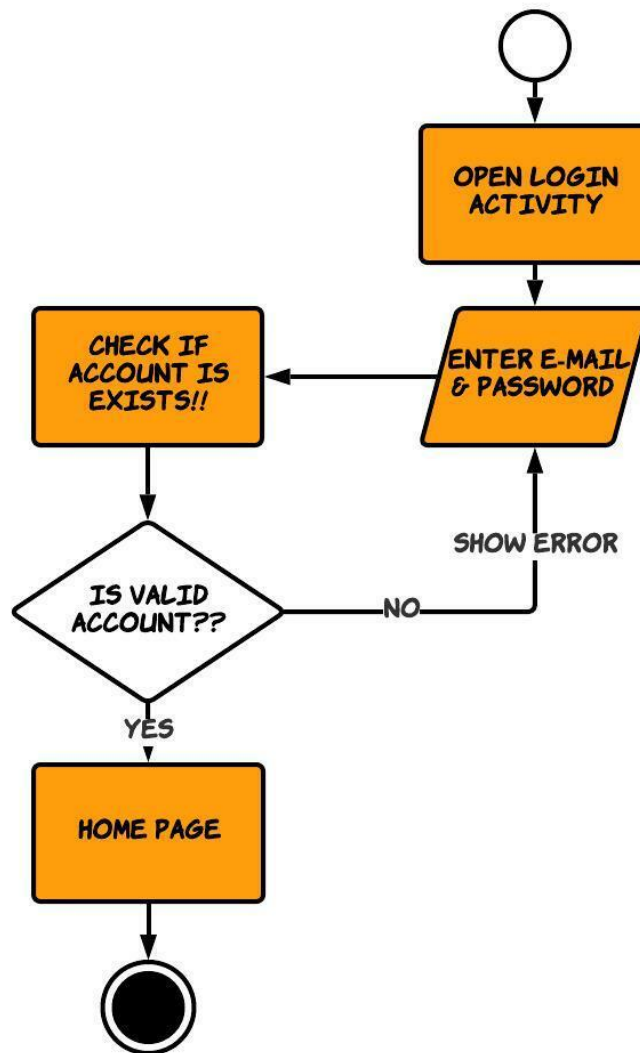


Figure 4.6.3: Login Flow Chart Diagram.

4.6.4 Home Page User(Add Post) Flow Chart Diagram

This activity is responsible for allowing users of the application to create publications by selecting the college and department and then pressing the Add Post button and then the user will be taken to a pop message to fill in the publication information to be published after pressing the publish button, and save the data in the database, otherwise the application will appear error to the user.

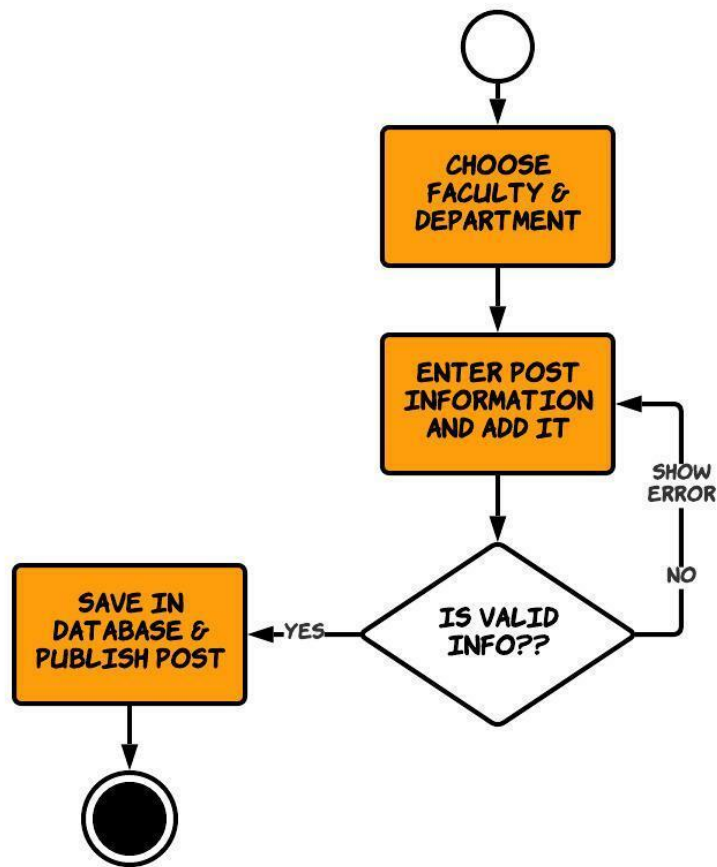


Figure 4.6.4: Home Page User Flow Chart Diagram.

4.7 Implementation

In this phase, we'll explain how the project will take shape, including building the actual project outcome, and how we participate programmatically in coding, and in developing graphic materials visually.

At the end of the implementation stage, the result is evaluated according to the list of requirements created in the definition stage.

The components used to implement the application:

The prototype of the tool is an Android app implemented with programmatic commands using Android Studio, which is Google's official integrated development environment (IDE) for Android.

This program is designed to develop android applications using the used Java programming language. Implementation includes the use of our code and interfaces.

When a new user enters the application, the user becomes inside the application and is authorized to use it. The portable user interface (MUI) is the graphic screen and is usually touch-sensitive on a mobile device, such as a smartphone or tablet, which allows the user to interact with the device's applications, features, contents, and functions.

The application is installed on the phone from the Google Store for all students of Jadara University so that it saves time and effort for each user of the application.

Chapter Five

Results and Discussion

5.1 Introduction

This chapter illustrates the results of the system developed and proposed by pictures from the actual application, Along with a comparison with the related applications.

5.2 Results

5.2.1 Expected Results

In this application, we were interested in developing an Android application that makes searching for academic aids easier and faster. The main idea was to develop an application that is easy to use, efficient and can be used at any time and without restrictions.

5.2.2 Actual Results

We created a database and tested the app to show actual results with users. We found that through the application, students can find academic aids in the application and communicate with the owners of these aids.

5.2.2.1 Splash Screen

The splash screen is the first screen that appears when you open the application and it loads the data previously stored in the application.

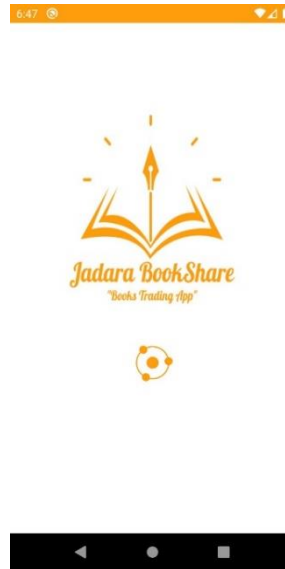


Figure 5.2.2.1: Splash Screen.

5.2.2.2 Login Screen

The login screen and its purpose is to allow users who have pre-existing accounts to enter the application by entering their email and password.

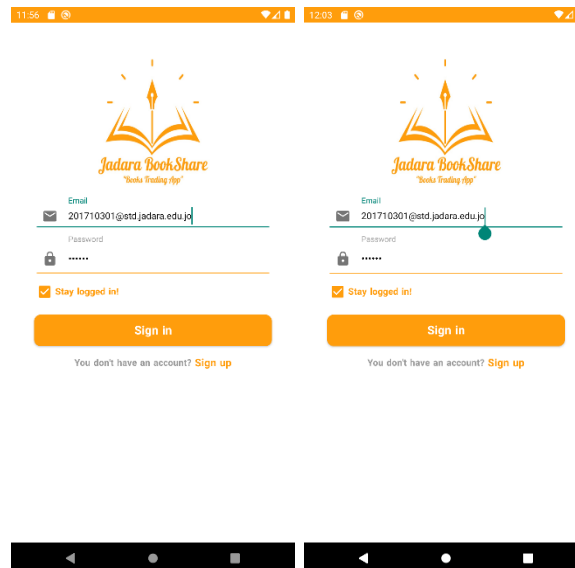


Figure 5.2.2.2: Login Screen.

5.2.2.3 Create Account Screen

The account creation process depends on entering your name, email, and password and phone number. After automatic verification of the entered information, the record button is pressed to complete the process.

The image displays two side-by-side screenshots of the 'Jadara BookShare' app's 'Create Account' screen. Both screens feature the app's logo at the top, which consists of an open book icon with a quill pen above it, and the text 'Jadara BookShare' and 'Books Trading App' below. The form fields are as follows: 'Full Name' (Nourhan Obiedat), 'Phone Number' (077903232), 'Email' (201810810@std.jadara.edu.jo), and 'Password' (masked with dots). A checkbox for 'Agree to the terms and conditions' is checked. An orange 'Sign up' button is located below the form. Underneath the button, a link reads 'You already have an account? Sign in'. At the bottom of each screen is a grey button that says 'Enter the information correctly'. The left screenshot shows a validation error for the phone number: 'The phone number must contain 10 digits'. The right screenshot shows a validation error for the password: 'the password should be from 6 to 20 character!'.

Figure 5.2.2.3: Create Account Screen.

5.2.2.4 Faculty Page Screen

On this screen, the user can choose one of the colleges that appear in front of him, according to the colleges in the university.

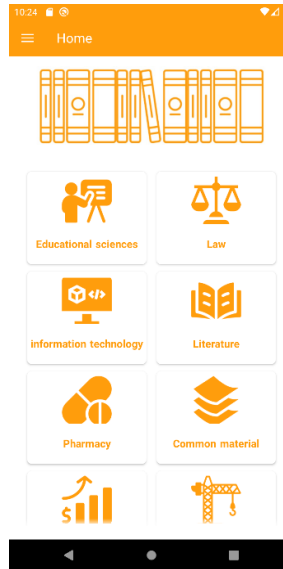


Figure 5.2.2.4: Faculty Page Screen.

5.2.2.5 Department Page Screen

On this screen, the user can choose one of the departments that appear in front of him, according to the departments in the collage he chooses.

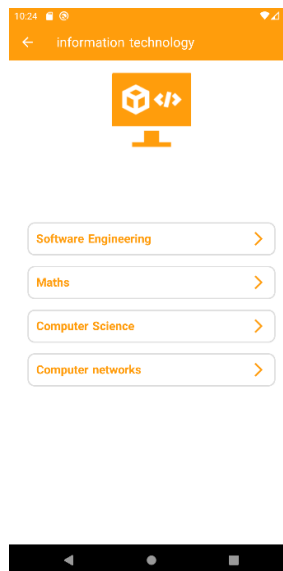


Figure 5.2.2.5: Department Page Screen.

5.2.2.6 Posts Page Screen

The users can choose the needed subject, also, the users can add posts by pressing the add button to share what they have.

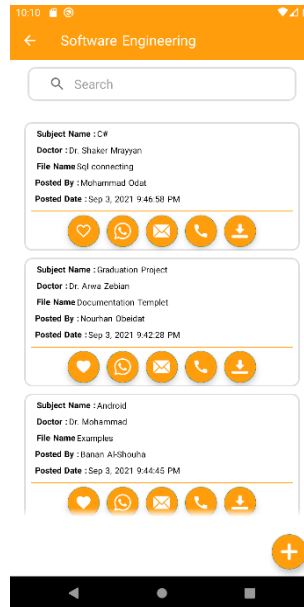


Figure 5.2.2.6: Posts Page Screen.

5.2.2.7 Add Post Screen (Pop Message)

When the user presses the add button, a pop message will appear allowing the user to insert the subject's information which he has. After automatic verification of the entered information, press the "Add" button to complete the process.

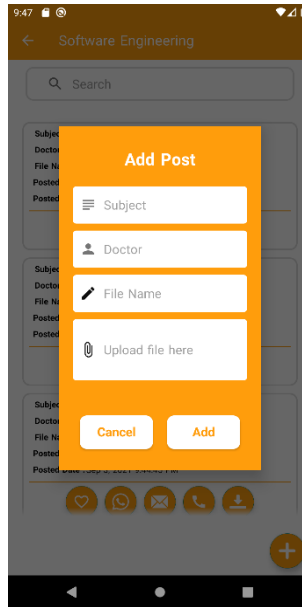


Figure 5.2.2.7: Add Post Screen (Pop Message).

5.2.2.8 Side Menu Screen

It is a screen that gives the user many buttons, allowing him to get several services such as favourites, changing languages, changing the image of his profile, & etc.

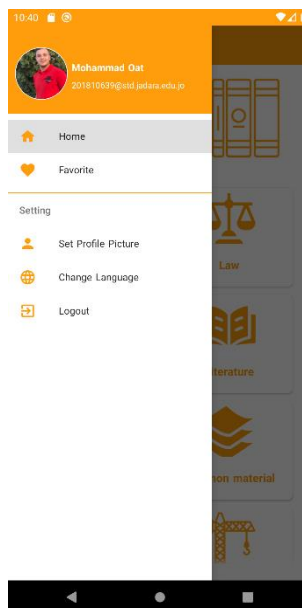


Figure 5.2.2.8: Side Menu Screen.

5.2.2.9 Favourites Page screen

A screen that allows users to see the posts they've made favourites together in one screen, to make it easier to find them instead of searching for them individually.

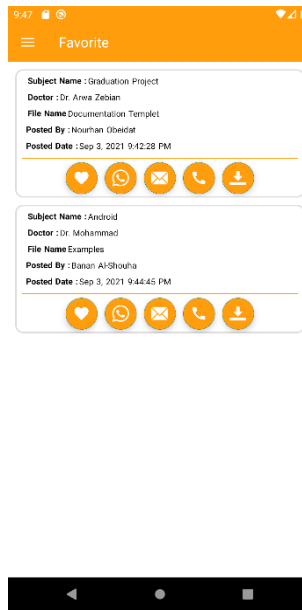


Figure 5.2.2.9: Favourites Page screen.

5.3 Discussion

Apps	Android	IOS	Services	Copy Type	Jurisdiction
Book Traders	Exist	Not Exist	Chatting / Trading / Searching	Hard/Soft	Competent
Trade Books	Exist	Not Exist	Buying / Selling / Renting	Hard	unspecialized
Forex Trading Binary Books	Exist	Not Exist	Free Courses	Soft	unspecialized
Trader Ebook Center	Exist	Not Exist	Favourites / Searching / Forecasts	Soft	unspecialized

My School Library	Exist	Not Exist	Favourites / Searching	Soft	unspecialized
Book Share	Exist	Not Exist	Selling / Lending / Donating / Sharing / Requesting	Hard	Competent
Bookshelf	Exist	Exist	Searching / Adding by scanner / Adding Manually/ Importing / Sharing / Rating / Tracking / Wish List / Cloud Saving	Hard	unspecialized
Book Sharing	Exist	Not Exist	Buying / Selling / Lending	Hard	unspecialized
Handy Library	Exist	Not Exist	Searching / Sharing / Scanning / Tracking / Sorting / Managing	Hard	unspecialized
Inkitt	Exist	Exist	Selling / Downloading	Soft	unspecialized
Kobo Books	Exist	Exist	Searching / Sharing / Tracking / Rating / Audiobooks	Soft	unspecialized
Free Books	Exist	Exist	Searching / Favourites / Audiobooks	Soft	unspecialized
PocketBook	Exist	Exist	Searching / Scanning / Sorting / Audiobooks	Soft	unspecialized
My Library	Exist	Not Exist	Searching / Scanning / Rating / Wish List	Soft	unspecialized
Libib	Exist	Exist	Searching / Scanning	Soft	unspecialized
Jadara BookShare	Exist	Not Exist	Searching / Chatting by WhatsApp & E-mail / Calling / Favourites	Soft	Competent

Table 5.3: Discussion.

Chapter Six

Conclusion & Future Works

6.1 Conclusion

Based on what was discussed in the first chapter of incentives that contributed to supporting the idea of the project, an application was created and developed that works on:

1. Contribute to providing a portal to reach the target audience (students of Jadara University) by reducing time and effort.
2. Giving students the opportunity to access the required academic supports in a way that is different from the previous traditional processes.
3. Limiting all academic aids in one application.
4. Enhancing social work and enhancing the role that academic supports of all kinds play in education.

6.2 Future Works

Based on the above, the researchers recommend the following:

1. Develop an improved version of the application to be able to send notifications to users.
2. Development of another version of the application to serve other operating systems such as (IOS).
3. Developing a website version to allow the largest number of users to benefit from the application's services.
4. Developing a special software version of the application for desktop computers.
5. Update the application so that the user is able to change his personal information, and delete old posts.

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