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Marjiei

Graduation Project-1

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STUDENT DECLARATION

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Our completion of this project could not have been accomplished without the support of our families and friends.

ENGLISH ABSTRACT

“Marjiei” is a reference management application that supports Arab researchers, scholars and all members of the academic community in researching, documenting and storing reference documents. Marjie has improved the referencing process that was followed in previous research. In the past, the citation and reference management process took so much time and effort as it was done manually.

In this project, we aim to create an application to serve researchers and scholars by creating a reference management application that supports an Arabic interface. This makes the application unique as most of the available applications in the field do not support the Arabic language. When using “Marjiei”, it will be easy to manage the referencing process, because it provides many services such as: adding, editing and deleting reference documents and references, inserting bibliography and selecting the bibliography style. This allows the user to work efficiently and comfortably.

In this report we explain the first part of “Marjiei” project in terms of analysis and design, considering previous applications similar to It, also explains the analysis process in detail and clarifies all aspects of the application ‘s design and interfaces.

ARABIC ABSTRACT

"مرجعي" هو برنامج لإدارة المراجع يدعم الباحثين والمتخصصين العرب وجميع أفراد المجتمع الأكاديمي في البحث والتوثيق وحفظ المراجع، وقد حسن مرجعى عملية كتابة المراجع التي اتبعت في البحوث السابقة. في السابق كانت عملية كتابة المراجع وإدارتها تستغرق وقتاً طويلاً وجهداً كبيراً لأنها تتم يدوياً.

نحن نهدف في هذا المشروع إلى إنشاء تطبيق "مرجعي" ليخدم الباحثين والمتخصصين بواجهة عربية وهذا ما يجعله مميزاً وفريداً حيث أن الغلب البرامج المتاحة في هذا المجال لا تدعم اللغة العربية. عند استخدام "مرجعي" سيكون من السهل على المستخدم إدارة المراجع، حيث يوفر "مرجعي" خدمات متعددة مثل إضافة وتعديل وإزالة المراجع والوثائق، إدراج فهرس المراجع وتحديد نمط الفهرس مما يتبع للباحث العمل بشكل فعال ومريح.

في هذا التقرير تم توضيح الجزء الأول من المشروع ، الذي يشرح تطبيق "مرجعي" من حيث التحليل والتصميم وشرح أساسيات التطبيق مع ذكر التطبيقات السابقة المشابهة لتطبيقنا الحالي ، كما يشرح عملية التحليل بشكل مفصل مع توضيح جميع جوانب التطبيق، وفي النهاية يقدم عرض مفصل عن عملية التصميم وبناء واجهات التطبيق.

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Chapter 1: Introduction

1.1 INTRODUCTION

Reference Management software supports researchers in searching, storing, and writing references. This is perceived to be tedious and time consuming when it is done manually. In the past, references used to be added and edited manually. The Reference Management software consists of a database that stores references and citations, so it is faster and easier to find a specific search than manual referencing.

In our project, we will create reference management software (Marjiei) that has an Arabic interface, and it supports Arabic documents and bibliography styles. This is what makes this software distinctive, because most of the available software does not support Arabic language. The software will be an easy way for scholars to insert citations, which leads to flexibility and time saving while writing research. The software provides multiple options for the style of the bibliography. Furthermore, the software allows the information of the references to be added manually.

Consequently, we seek to create reliable and user-friendly software for managing Arabic references to aid the researchers to process the references in an easy and effective way.

1.2 THE PROBLEM

Reference management software is usually used for recording and utilizing references. Once a citation has been recorded, it can be used for generating bibliographies, such as lists of references in scholarly books, articles and essays. Nevertheless, the available software does not support Arabic language, which will make it harder to manage references for an essay or research written in Arabic. Hence, this project aims to create reference management software that supports Arabic documents and bibliography styles. This type of software is being highly demanded and indispensable to researchers, scholars, graduate and undergraduate students, and anyone who writes academic papers in Arabic.

1.3 PROJECT GOALS AND OBJECTIVES

1.3.1 GOALS

The main objective of this project is to create reference management software that has an Arabic interface, and thereby supporting Arabic documents and bibliography styles. It should be simple and easy to use by either students or scholars. Also, it is very important to be a reliable and secure program for managing Arabic references.

1.3.2 OBJECTIVES

The following objectives attained in this project:

- Supporting Arabic referencing.
- Creating new references and using them in different files.
- Automatically creating a list of references at the end of the document.
- Create folders that contain their files of references.
- Changing the referencing style automatically.
- Allowing scholars to manually add some information into references such as publication year and author name.

1.4 THE SOLUTION

The solution of this problem would be creating a program which can support Arabic references. This program will automatically create a list of references at the end of the document. Moreover, it will store references that researcher cite in a certain folder for easier allocation. Interestingly, this program will be the first Arabic program that helps Arab researchers and saves their time.

1.5 PROJECT SCOPE

In Marjiei reference management software, we will try to apply an effortless way for Arabic scholars to store their references documents and use them for citation automatically.

It will insert a citation of the reference, which has been uploaded to Marjiei, during the process of writing a research in a word program. In addition, adding automatic bibliography that includes all sources associated with the documents. Moreover, Marjiei will support the option for choosing the style of the bibliography that the user wants from the styles supported; IEEE, APA or MLA.

It allows the scholars to manually add the information of the references such as: the name of the author, publication, year of publication, pages number, date, etc. However, Marjiei is not providing functions like; editing text, printing documents, adding tables or checking spelling and grammar.

1.6 HARDWARE AND SOFTWARE

1.6.1 HARDWARE

Laptops and Printers.

1.6.2 SOFTWARE

Documentation: Microsoft Word, Smartsheets.

Analysis & Design: Microsoft Project, GenMyModel, Creately, Justinmind.

Communication: WhatsApp, Microsoft Outlook, Dropbox.

Programming: NetBeans IDE, MySQL.

1.7 COST

The cost is zero since the software will be free and the hardware is our own computers.

1.8 TIMELINE

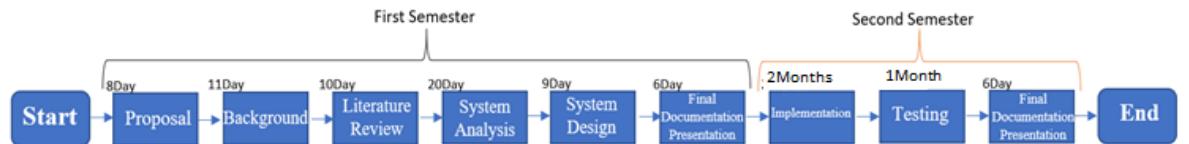


Figure 1: Time line for the two semesters.

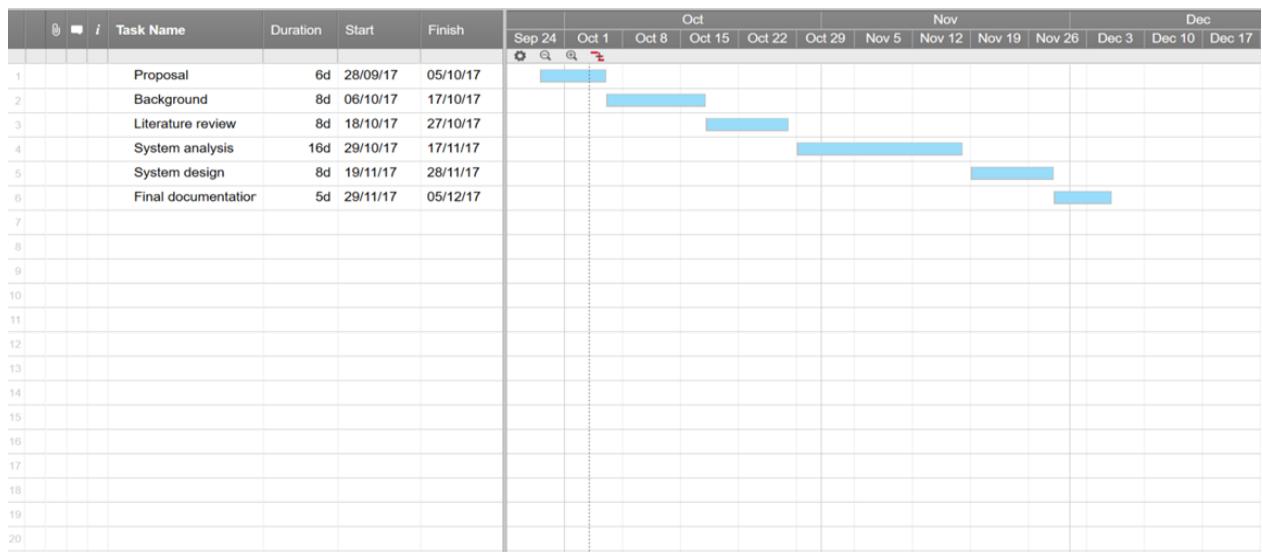


Figure 2: Time line for the first semester.

1.9 ROLES AND RESPONSIBILITIES

Table 1: Roles and responsibilities

Role	Responsibilities	Participant(s)
Project Leader	Project Management	Shatha Al-hatem
Analysis	Defining the Problem, developing a solution, Gathering the Requirements, Documenting.	Shatha Al- hatem Rahaf Al-ghwairy Munira Al-angaree Wejdan Al-jaber Munira Al-ghamdi
Design	Planning, Writing the specifications, Designing the interfaces...	Shatha Al- hatem Rahaf Al-ghwairy Munira Al-angaree Wejdan Al-jaber Munira Al-ghamdi
Implementation	Coding, integrating.	Shatha Al- hatem Rahaf Al-ghwairy Munira Al-angaree Wejdan Al-jaber Munira Al-ghamdi
Testing	Creating the Test Plans, Testing, Evaluate the Results, Documenting.	Shatha Al- hatem Rahaf Al-ghwairy Munira Al-angaree Wejdan Al-jaber Munira Al-ghamdi

Chapter 2: Background and Literature Review

2.1 BACKGROUND

Reference management software (or bibliography management software) is software for recording and utilizing references. These software packages consist of database or local library and a system for generating selective lists of references from the database or the library in style of choice. Modern packages can easily plug into the word processor or browser, so the references lists can be produced automatically as the article is written. These software packages help the researchers and scholars with inserting the references, creating bibliography styles and managing and reformatting the references and bibliography. This will greatly reduce the amount of time the researcher spends on drafting the document, leaving more time for data collection and experimentation.

The emergence of information and communication technologies, such as computers, local and global information networks, and the Internet, has led to the development of technical processes and information services in libraries. The user had become able to navigate the library without having to go to the library, after a while, the reference applications began appearing, such as Easybib in 2008 [10], colwiz in 2009 [11], Bibloscape in 1997 [12] and Mendeley in 2008 [13], and many other applications that made it easier for researchers and readers to do their work without cost and complexity in manual research, organize and modification. There are many advantage of reference management which we will talk about later in detail.

2.1.1 OBSTACLES OF ARABIC SOFTWARE

The Arab developers face many obstacles while developing an Arabic software like, lack of Arabic documentation and financial support, weakness of Arabic fonts, Lack of specialized educational programs, difficulty of keeping up with the latest versions of software systems because few Arab programmers are familiar with different programming languages and techniques and the weakness of group working spirit.

On the other hand, Arab users face also many obstacles like lack of understanding of technical programs and how it works, lack of availability and diversity of Arabic programs, mismatching between the Arabic user needs and Arabic developers and the high cost of Arabic programs.

2.1.2 ARABIC REFERENCING

References are very important for anyone who wants to write research or an article, research or a scientific message. However, there is no Arabic style for references in research or in articles, so most Arabic universities and researchers follow Modern Language Association (MLA) style in writing any articles and American psychological association system (APA) style in research.

2.2 LITERATURE REVIEW

2.2.1 COMPETITORS

MENDELEY

Mendeley has several features to assist users not only with organizing papers but also with the reading process. Articles can be organized into Collections (like folders) and identified further using Tags (keywords). Articles can be filtered using tags, authors or publications, and it is possible to search across PDFs making it easier to track an idea. Individual articles can be marked as read or unread, and as favorites, and the writing tools can highlight text within a PDF or add notes.

There are two main strategies for inserting references into Mendeley, adding PDF files or importing citations from the web. The first method is achieved by dragging PDF files into the Mendeley Desktop window. Mendeley will extract metadata from the PDF itself, and if connected to the Internet, will update the citation using the DOI, PubMed ID, arXiv and Google Scholar. If PDFs are added to Mendeley, some citations will be fixed on the fly. The other could not be found and will be put into a Needs Review folder that can be corrected. One neat feature that Mendeley offers is a Watch folder where any PDFs added to the designated folder will be added automatically to Mendeley.

The second strategy is to import citations from the web using the Import to Mendeley browser plug-in. Some websites work better than others. For example, PLoS One has a Mendeley icon which imports both the citation and PDF albeit one reference at a time. Using BioOne, users could import a citation but not the PDF despite. For ScienceDirect, Mendeley did not detect citation data but when using the first strategy of dragging the PDF into Mendeley Desktop, the citation will be added and corrected itself on the fly. The variety of websites and how they interact with Mendeley pose the greatest challenge to teaching this tool. References can be added manually as well.

Specification/features:

Mendeley is free reference management software that supports both a desktop program and a web-based account that work at the same time. The two versions can be synced in a similar fashion to a music player and iTunes. Cross-platform support is the biggest advantage of Mendeley. It supports Windows, OSx, Linux, iOS and Android. Most of the similar software doesn't support Linux operating systems, but Mendeley does. It keeps user's paper organized. It allows users to classify their own papers in folders for easy access, mark the interesting ones as favorites, and access them from any computer by creating an account in Mendeley. Also, it can search multiple papers and have them all stored in the cloud so that the users can access them anywhere and anytime. The application holds many scientific articles with no added time or size. Mendeley is a huge time saver for writing up any kind of report, publication, thesis, or another research document, and the writing tools can highlight text within a PDF or add notes. Mendeley can detect meta-data of the many documents from SCI, SSCI and ERIC databases which is a big feature to organize documents, Mendeley provides also the choice to create a group inviting whoever the user wants and make it private protected between the members, so

they share documents, comments and more spend less time to think and organize and more time to write.

Disadvantage:

While Mendeley has sophisticated organizational tools, the options for creating bibliographies are limited. At this point, it is not possible to create a stand-alone bibliography, and while there is a plug-in for MS Word and OpenOffice, it has a problematic in the Mac version of MS Word. Mendeley program has limited number of journal writing styles when compared with other programs also different from EndNote, Mendeley does not directly allow entering of electronic libraries. [1][2]

ENDNOTE

EndNote is the commercial referencing software tool obtained by USQ and freely available to all USQ academic and professional staff and students for collecting, organizing, creating and managing bibliographies. It is compatible with both Windows and Mac. [3]

Specifications/Features

Used with word processor software such as Microsoft Word, Apple Pages, OpenOffice, Mathematica and more, to store and organize citation information and to insert citations and create bibliographies in the style of user choice when composing research papers. EndNote provides many ways to add references, such as adding references manually, exporting references from the database to Endnote, exporting references from PubMed, adding references by online search, importing PDFs and creating endnote groups and also importing references from Google Scholar. Also, EndNote provides a special function which is Library Sharing function. With this function, the user can share documents with anyone uses EndNote X7 or X8 (up to 100 people). With this feature, can sharing entire EndNote library, including references, PDFs, and annotations. And every member can add to, annotate and use the library at the same time. Also, the user can review the activity of the changes collaborators are making. There's no charge for sharing, no library size limit and no charge for unlimited cloud storage. [6] Another wonderful feature provided in EndNote is the styles, EndNote styles can be modified, and new styles can be created using the EndNote Style Editor, that's mean the user can Edit existing citation styles or create his own. EndNote offers over 6,000 bibliographic styles. [6] If the user only has access to EndNote online, and he hasn't install EndNote desktop. The feature set is limited compared to those using EndNote online besides the desktop; it's still perfect for the new-to-research and writing student. The user can use citations from any computer even if it doesn't have EndNote desktop installed, also, sharing references with EndNote Online users anywhere in the world. The user can synchronize EndNote X7 & EndNote Online so that an exact match, including file attachments, exists. Endnote X7.2 allows unlimited uploads of file attachments (same as desktop).

Disadvantages:

There is no free version of EndNote available. It is necessary to take the time to learn how to use EndNote, can't use term lists for journal abbreviations, can't edit styles and filters and storage limit of 50, 000 records. [5][7]

PAPERS

Papers is a personal library of research, read, organizes, share and sync research papers anytime, anywhere. Papers Search simultaneously repositories, including PubMed, Google Scholar and ArXiv. When importing papers into a library, Papers organize them in collections, annotate and freehand draw in glorious full screen. Also, import Word, PowerPoint, and other document files to a library and organize them as easy as PDFs. Papers also automatically find and download the PDF for references imported from search engines when the full-text is available. Papers now optionally synchronize a library via a local Wi-Fi network or Dropbox to Mac, PC and iOS devices. Also, create Shared Collections and add content to a Reading List, and it's accessible via web browser. [8]

CITAVI

Citavi is a reference management program for Microsoft Windows. It published by Swiss Academic Software. The first version of Citavi was released in 1995 under the name of LiteRat [9]. In 2003, the developers developed LiteRat into a full-featured and they changed the name into "Citavi". Citavi, can be used in a virtual machine on Linux or OS X. Also, it can export and import the data in different formats to other reference management software. It has many features as reference management, knowledge organization, task planning, etc. And, it can switch between English, French, German, Italian, Polish, Portuguese and Spanish. It is widely used in Germany, Austria, and Switzerland, with site licenses at most universities.

PYBIOGRAPHER

Pybliographer is a high-quality tool for working with bibliographic databases. It provides a general framework to manipulate this database, with a friendly graphical interface. It is also extensible with a scripting language to tailor the application to a user's requirements.

Pybliographer supports BibTeX, Medline, Ovid and Refer files. Use this software for viewing, editing, and searching bibliographic databases, and to convert them into different formats such as HTML.

It is a simple framework that provides easy-to-use python classes and functions. Therefore, it's extended many functions (generating HTML pages according to bibliographic searches, etc.). It includes a lot of features like Gnome interface for editing, searching, inserting citations in OpenOffice.org, LyX, and Kile, search external databases such as PubMed, Citeseer and more, Supports BibTeX, ISI, Medline, Ovid and Refer, also a Powerful API. [14]

2.2.2 COMPARED SYSTEMS FEATURES

Table 2: Compared Systems Analysis.

App Feature \	Marjiei	Mendeley	EndNote	Papers	Citavi	Pybliographer
Cost	Free	Free	US\$299.95	US\$79	US\$70-949	Free
OS Support	Windows	Windows, Linux, iOS and Android	Windows, Mac OS X and iOS	mac OS X and iOS	Windows	Linux
Open Source	-	Yes	No	No	No	Yes
Latest Upbeat	-	2017	2017-09-12	2016-05-11	2017-09-20	2017-10-06
Arabic Interface	Yes	No	No	No	No	No
Citation Styles	APA, MLA and IEEE	APA, Harvard, IEEE and MLA	APA, Harvard, IEEE and MLA	APA, Harvard, IEEE and MLA	APA, Harvard, IEEE and MLA	APA, IEEE and MLA
Plug into MS Word	Yes	Yes	Yes	Yes	Yes	No
Web based	Not supported	supported	supported	Not supported	Not supported	Not supported

2.2.3 CONCLUSION

In this chapter, we have reviewed and analyzed some existing reference management systems and applications, we have found many useful features that we intend to implement in our application. To compete with these systems and applications, our application should provide a new feature that the other systems don't support; it is clear from the table above that this new feature is the Arabic Interface Support. We intend to provide a simple user-friendly Arabic interface, In addition to more other features.

Chapter 3: System Analysis

3.1 INTRODUCTION

In this chapter a detailed analysis is presented to examine each aspect in the system. The goal of this chapter is to describe what the system should do to meet user's functional and non-functional requirements, use case diagram that describes the interactions among the elements of the system, sequence diagrams that provides a dynamic representation of the interactions between objects within the system, and class diagram which is a type of static structure diagram that describes the structure of a system by showing the system classes, their attributes, methods and relationships between objects.

3.2 USER CHARACTERISTICS

The intended users of our application are the Arabic scholars, researchers, students and teachers, anyone how needs to write a paper and reference it. Our users should have a good understanding and brief background in referencing, reference management and styles. We expect our users to have a PC that runs Windows OS, also have e-mail accounts.

3.3 OBJECT ORIENTED ANALYSIS AND DESIGN (OOAD)

Object oriented analysis and design (OOAD) is an approach that uses the object-oriented approach (OO) to analyse the system requirements and break a large system into smaller and simpler components. Object-oriented analysis and design (OOAD) is a popular technical approach for analyzing and designing an application, system, or business by applying object-oriented programming, as well as using visual modeling throughout the development life cycles to foster better stakeholder communication and product quality [15]. We will use object-oriented approach for many reasons. Generally large complex problems are difficult to analyse but the object-oriented approach will break it into objects and classes which make it easier to understand and implement. Moreover, Marjiei is a PC application that will be implemented using the object-oriented programming language JAVA, so the implementation will match the analysis.

3.4 SURVEY ANALYSIS

The survey aimed to obtain the point of view of the users to help build an effective reference managing program. The survey was conducted on google drives. It took two full weeks to perform.

The survey has been carried out on 612 users. 75.5% of them holds bachelor Degree, 15.7% Master's Degree holders and 8.8% PhD holders.

Table 3: Survey Analysis (Scientific Degrees).

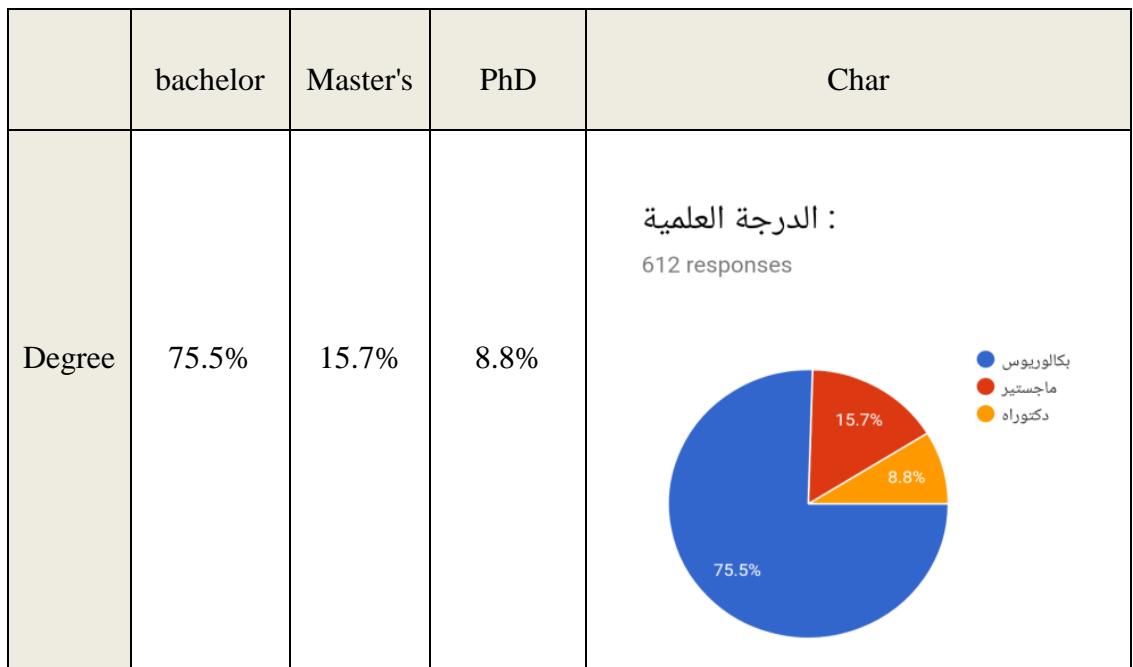
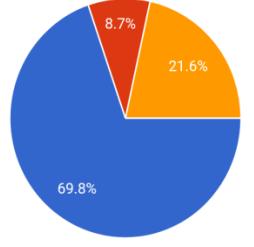
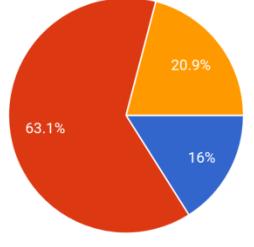
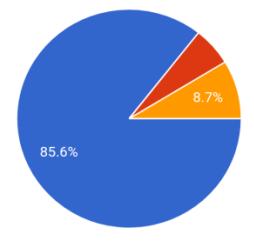


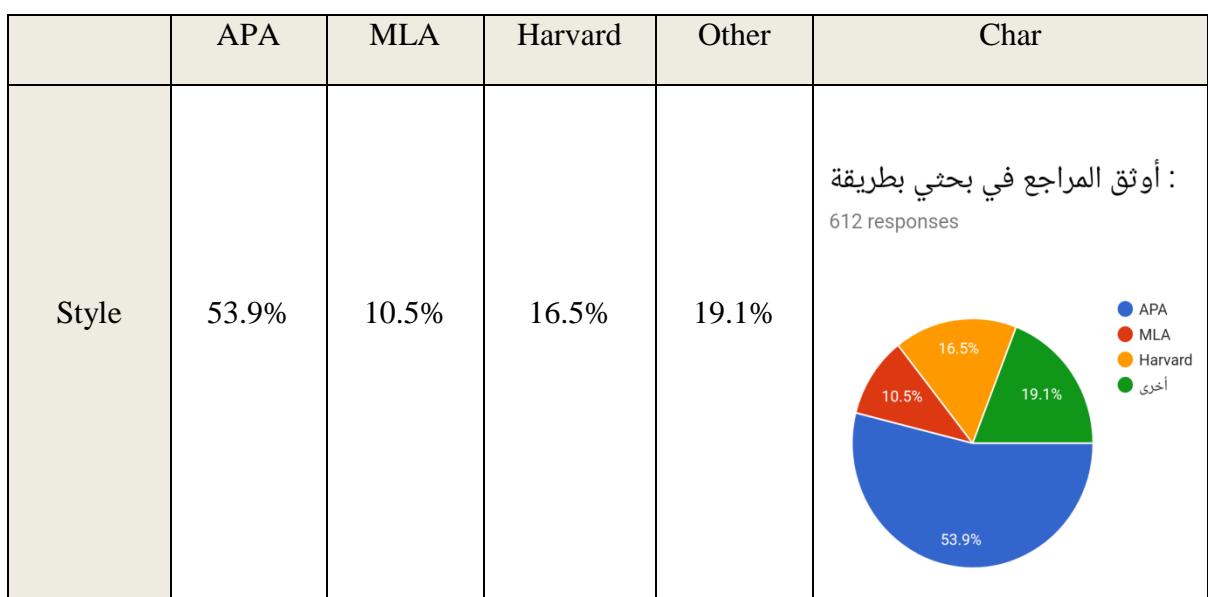
Table 4: Survey Analysis (Software Functionalities).

	Question	Agree	Sometimes	Disagree	Char						
#1	In general, I prefer the software with Arabic interface more than the English one.	56.2%	29.1%	14.7%	<p>بشكل عام أفضل البرامج ذات الواجهة العربية على الواجهة الانجليزية:</p> <p>612 responses</p> <table> <tr> <td>أوافق</td> <td>56.2%</td> </tr> <tr> <td>لا أافق</td> <td>14.7%</td> </tr> <tr> <td>أحياناً</td> <td>29.1%</td> </tr> </table>	أوافق	56.2%	لا أافق	14.7%	أحياناً	29.1%
أوافق	56.2%										
لا أافق	14.7%										
أحياناً	29.1%										
#2	I add my references manually into my researches.	44.1%	34%	21.9%	<p>أوّلئك المراجع في بحثي يدوياً :</p> <p>612 responses</p> <table> <tr> <td>أوافق</td> <td>44.1%</td> </tr> <tr> <td>لا أافق</td> <td>21.9%</td> </tr> <tr> <td>أحياناً</td> <td>34%</td> </tr> </table>	أوافق	44.1%	لا أافق	21.9%	أحياناً	34%
أوافق	44.1%										
لا أافق	21.9%										
أحياناً	34%										
#3	I find it hard to collect and manage my references into a file.	38.6%	38.4%	23%	<p>أجد صعوبة في جمع وترتيب مراجع بحثي في ملف خاص بها :</p> <p>612 responses</p> <table> <tr> <td>أوافق</td> <td>38.6%</td> </tr> <tr> <td>لا أافق</td> <td>23%</td> </tr> <tr> <td>أحياناً</td> <td>38.4%</td> </tr> </table>	أوافق	38.6%	لا أافق	23%	أحياناً	38.4%
أوافق	38.6%										
لا أافق	23%										
أحياناً	38.4%										

#4	I use some books and websites to understand how to reference my researches in a correct way.	69.8%	21.6%	8.7%	<p>أستعين ببعض الكتب والمواقع العلمية لفهم طرق توثيق المراجع بشكل صحيح :</p> <p>612 responses</p>  <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>أوافق</td> <td>69.8%</td> </tr> <tr> <td>لا أوافق</td> <td>8.7%</td> </tr> <tr> <td>أحياناً</td> <td>21.6%</td> </tr> </tbody> </table>	Response	Percentage	أوافق	69.8%	لا أوافق	8.7%	أحياناً	21.6%
Response	Percentage												
أوافق	69.8%												
لا أوافق	8.7%												
أحياناً	21.6%												
#5	I go to experts to manage my references and pay for it.	16%	20.9%	63.1%	<p>أستعين ببعض الخبراء في توثيق المراجع بمقابل مادي :</p> <p>612 responses</p>  <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>أحياناً</td> <td>63.1%</td> </tr> <tr> <td>أحياناً</td> <td>20.9%</td> </tr> <tr> <td>أوافق</td> <td>16%</td> </tr> </tbody> </table>	Response	Percentage	أحياناً	63.1%	أحياناً	20.9%	أوافق	16%
Response	Percentage												
أحياناً	63.1%												
أحياناً	20.9%												
أوافق	16%												
#6	Having a reference management program with an Arabic interface will save a lot of my time and effort.	85.6%	8.7%	5.7%	<p>وجود برنامج بواجهة عربية يهتم بالمراجع وطرق توثيقها يحفظ لنا الكثير من الجهد والوقت :</p> <p>612 responses</p>  <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>أوافق</td> <td>85.6%</td> </tr> <tr> <td>لا أوافق</td> <td>5.7%</td> </tr> <tr> <td>أحياناً</td> <td>8.7%</td> </tr> </tbody> </table>	Response	Percentage	أوافق	85.6%	لا أوافق	5.7%	أحياناً	8.7%
Response	Percentage												
أوافق	85.6%												
لا أوافق	5.7%												
أحياناً	8.7%												

#7	Having a program that manage my references with an Arabic interface serves me a lot	81.9%	10%	8.2%	<p>وجود برنامج لإدارة المراجع : بواجهة عربية يخدمني كثيراً</p> <p>612 responses</p> <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>أوافق</td> <td>81.9%</td> </tr> <tr> <td>لا أافق</td> <td>8.2%</td> </tr> <tr> <td>أحياناً</td> <td>10%</td> </tr> </tbody> </table>	Response	Percentage	أوافق	81.9%	لا أافق	8.2%	أحياناً	10%
Response	Percentage												
أوافق	81.9%												
لا أافق	8.2%												
أحياناً	10%												
#8	I use software to reference my researches.	23.5%	31.5%	44.9%	<p>أستخدم برنامج لتوثيق المراجع في بحثي إلكترونياً</p> <p>612 responses</p> <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>أوافق</td> <td>44.9%</td> </tr> <tr> <td>لا أافق</td> <td>23.5%</td> </tr> <tr> <td>أحياناً</td> <td>31.5%</td> </tr> </tbody> </table>	Response	Percentage	أوافق	44.9%	لا أافق	23.5%	أحياناً	31.5%
Response	Percentage												
أوافق	44.9%												
لا أافق	23.5%												
أحياناً	31.5%												

Table 5: Survey Analysis (Referencing Styles).



According to the survey results we can notice:

- 23.5% of the sample are using program to manage their references.
- 44.1% of the sample are referencing their researches manually, and 69.8% are using websites and books to learn how to make their references in a specific style.
- 53.9% of the sample uses APA style, 16.5% uses HARVARD style and 10.5% uses MLA.
- 56.2% of the sample prefers the Arabic interface rather than English interface.
- 85.6% of the sample like using a program with an Arabic interface so that they can save time and effort when they are discovering the program functions.

From the open-end questions:

- Most of the sample hopes to have a managing reference program with high Accuracy, easy and comprehensive interface.
- Some of the sample wants to have an offline reference management program containing all their references.
- Few of the sample preferred multiple language interface.

Arabic interface:

From the results of questions 1, 6 and 7 we conclude that having a managing reference program with an Arabic interface is highly demanded. Therefore, producing a program with this capability will benefit a lot of users.

3.5 USER AND SYSTEM REQUIREMENTS

In this section, based on the survey results, we are going to describe in detail the requirements that this system application should support. First, we will talk about the functional requirements (User and System requirements in details), then we will talk about the non-functional requirements and properties to measure: Simplicity, Performance, Availability, Accuracy, Language, Reliability, and Learnability.

3.5.1 FUNCTIONAL REQUIREMENTS

1. The User shall be able to register into the system.
 - 1.1 The system shall allow the user to enter his/her information (full name, e-mail, username and password) in the registration page.
 - 1.2 The system shall validate the inputs.
 - 1.3 If one of the inputs was invalid, the system shall indicate there is invalid input.
 - 1.4 The system shall confirm the registration.
2. The user shall be able to log into the system, to be able to utilize its services.
 - 2.1 The system shall allow the user to enter his username and password in the login page, to be authenticated.
 - 2.2 If there is missing or invalid input, the system shall indicate there is missing/invalid input.
 - 2.3 after the authentication is complete, the system shall redirect the user to the home page.
3. The User shall be able to edit his/her profile.
 - 3.1 The system shall show a form that contains the user information (full name and e-mail) and allow him/her to change them.
 - 3.2 The system shall validate the new information.
 - 3.3 If there is missing or invalid input, the system shall indicate there is missing/invalid input.
 - 3.4 The system shall save the changes and indicate that profile updated successfully.

4. The User shall be able to add reference documents into his/her library.

4.1 The system shall allow the user to click on “add reference document” button in the home page.

4.1.1 The system shall open new window contains the computer files and documents.

4.1.2 The system shall allow the user to choose a file from his/her computer and click on “add” button.

4.1.3 The system shall show that the file is added to the library.

5. The user shall be able to add reference document information manually.

5.1 The system shall allow the user to click on “add entry manually” button in the home page.

5.2 The system shall allow the user to select the entry type (Book, Web-page, Journal/Magazine Article or conference proceeding).

5.3 The system shall show a form to enter information depends on the type.

5.4 The system shall validate the inputs.

5.5 If there is missing or invalid input, the system shall indicate there is missing/invalid input.

5.5 The system shall save the information and show that entry was added successfully.

6. The User shall be able to edit the reference document information.

6.1 The system shall allow the user to click on “edit information” button in the home page.

6.2 The system shall show a form that contains the document information and allow the user to change them.

6.3 The system shall validate the inputs.

6.4 If there is missing or invalid input, the system shall indicate there is missing/invalid input.

6.5 The system shall save the changes and show that information changed successfully.

7. The User shall be able to delete reference document from his/her library.
 - 7.1 The system shall allow the user to click on “delete file” button in the home page.
 - 7.2 The system shall show a window that contains the files in the library and allow the user to select from them.
 - 7.3 The system shall ask the user if he/she is sure bout deleting the file.
 - 7.4 The system shall show that the file deleted successfully.
8. The User shall be able to change the bibliography style followed in his/her document.
 - 8.1 The default style in the system shall be “IEEE”.
 - 8.1 The system shall show a menu of the available styles the system and allow the user to select from them in the word plug-in.
 - 8.2 The system shall allow the user to select style from the menu “IEEE, APA or MLA”.
 - 8.3 The system shall show that the selection is saved.
9. The user shall be able to add reference to his/her document.
 - 9.1 The system shall allow the user to place the curser where he/she wants to add the reference.
 - 9.2 The system shall allow the user to click on “add reference” button in the word plug-in.
 - 9.3 The system shall show a window that contains the files in the library.
 - 9.4 The system shall allow the user to choose the file and click “add”.
 - 9.5 The system shall show that the reference is added successfully where the curser was placed.

10. The user shall be able to edit reference in his/her document.

10.1 The system shall allow the user to place the cursor on the reference he/she wants to edit.

10.2 The system shall allow the user to click on “edit reference” button in the word plug-in.

10.3 The system shall show a window that contains the files in the library.

10.4 The system shall allow the user to choose the file and click “edit”.

10.5 The system shall show that the reference updated successfully.

11. The user shall be able to remove reference from his/her document.

11.1 The system shall allow the user to place the cursor on the reference he/she wants to remove.

11.2 The system shall allow the user to click on “remove reference” button in the word plug-in.

11.3 The system shall ask the user if he/she is sure about removing the reference.

11.4 The system shall show that the reference was removed successfully.

12. The user shall be able to Insert bibliography list to his/her document.

12.1 The system shall allow the user to click on “Insert bibliography” button in the word plug-in.

12.2 The system shall list the bibliography at the end of the document.

13. The User shall be able to organize his/her files into folders.

13.1 The system shall allow the user to create folders.

13.2 The system shall allow the user to move his/her files into the folders.

14. The User shall be able to sort his/her files and folders.

14.1 The system shall allow the user to choose the sorting methodology (category, date or title).

14.2 The system shall show the files and folders in the order chosen.

15. The User shall be able to search for files and folder inside the library.

15.1 The system shall show a search field in the home page.

15.2 The system shall allow the user to type the search key and click on “search” button.

15.3 The system shall show the search results in the library or “No results”.

16. The user shall be able to log out from the system.

16.1 The system shall redirect the user to the application main page.

16.2 The system shall prevent the user from accessing of the features until he/she log in again.

3.5.2 NON-FUNCTIONAL REQUIREMENTS

Simplicity: The graphical user interface shall be simple and user friendly.

Performance: Response time should not exceed 5 seconds.

Availability: The system should be available 24 hours.

Language: The system shall provide Arabic and English Interfaces.

Accuracy: The system should perform the functions with correct result.

Reliability: Failures should occur at most twice a week.

Learnability: Standard users should take at most 30 minutes to learn how to use the system.

3.6 USE CASE

3.6.1 USE CASE DIAGRAM

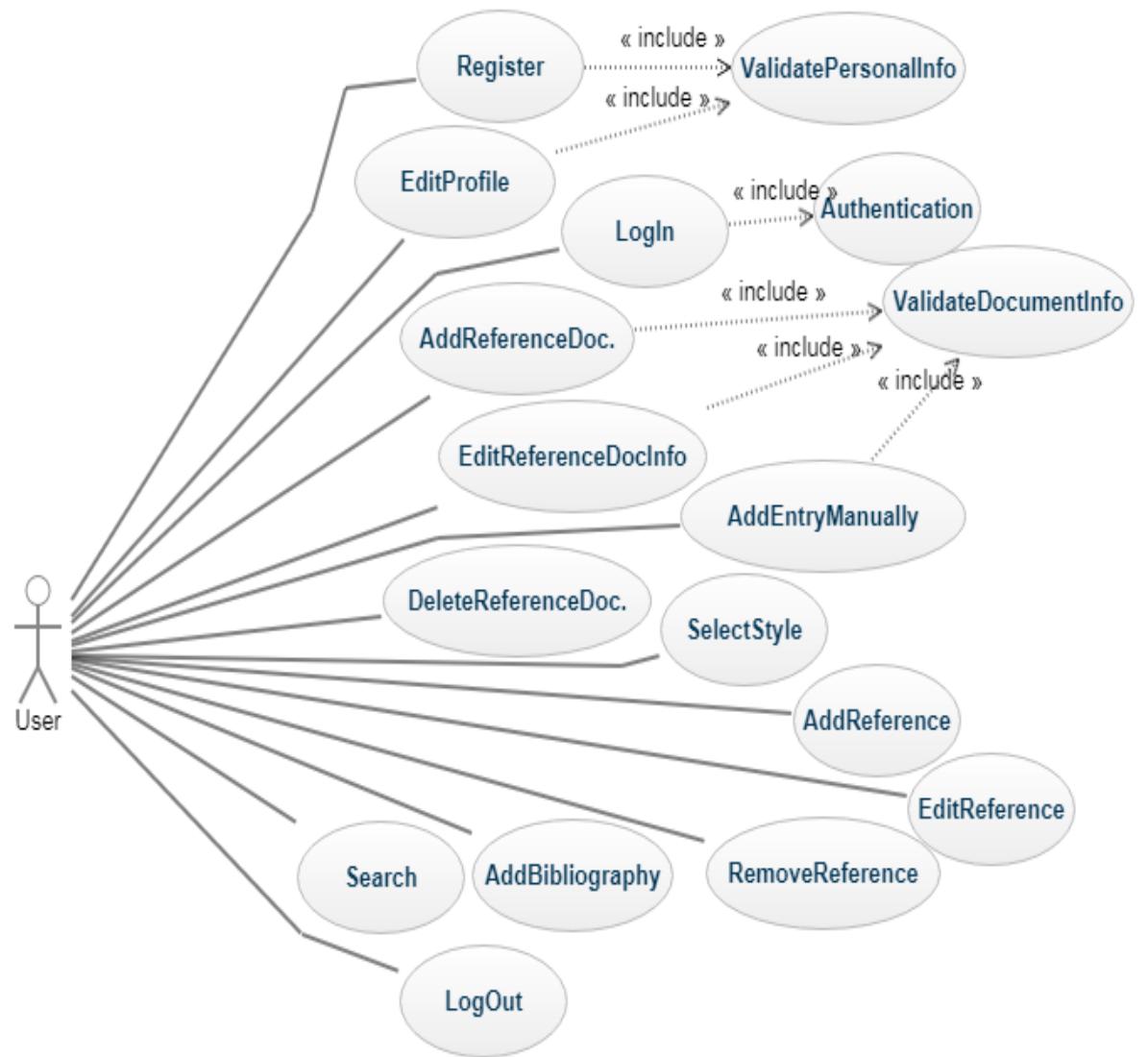


Figure 3: Use Case Diagram.

3.6.2 USE CASE EXPANSION

Table 6 : Use Case Expansion (Register).

1. The User shall be able to register into the system.		
Use Case	Register.	
Actor	User.	
Purpose.	Register at the system and gain benefits from system features.	
Overview (Success Scenario)	The user fills his/her information (name, e-mail, username and password) in registration form. System will create and save user account into data base.	
Type	Primary/Essential	
Cross reference	Null.	
Typical course of events	Actor Action	System Response
	1. This use case begins when user clicks on “Register” button.	
		2. The system displays all required fields to register.
	3. User fills registration form with his/her information.	
		4. The system checks the required fields are filled and inputs are valid.
		5. The system creates and save user account in the database.
		6. The system will show a confirmation message.
	7. At the end, user will move to his/her profile.	
Alternative:		
Line4: Missing filled, display error message and return to Line3.		
Line4: Invalid input, view warning message and returns to Line3.		

Table 7: Use Case Expansion (Log in).

2. The user shall be able to log into the system, to be able to utilize its services.											
Use Case	Log in.										
Actor	User.										
purpose	Access the system and gain benefits from system's features.										
Overview (Success Scenario)	The user fills account information in Login page; The system will authenticate the account. If it is correct, the user will be redirected to the home page.										
Type	Primary/Essential										
Cross reference	Register.										
Typical course of events	<table border="1"> <thead> <tr> <th>Actor Action</th><th>System Response</th></tr> </thead> <tbody> <tr> <td>1. This use case begins when user fills account information (username, password) in the Login page.</td><td></td></tr> <tr> <td>2. The user then clicks on “Login” button.</td><td></td></tr> <tr> <td></td><td>3. The system then authenticates the information.</td></tr> <tr> <td>4. At the end, the user will be redirected to the home page.</td><td></td></tr> </tbody> </table>	Actor Action	System Response	1. This use case begins when user fills account information (username, password) in the Login page.		2. The user then clicks on “Login” button.			3. The system then authenticates the information.	4. At the end, the user will be redirected to the home page.	
Actor Action	System Response										
1. This use case begins when user fills account information (username, password) in the Login page.											
2. The user then clicks on “Login” button.											
	3. The system then authenticates the information.										
4. At the end, the user will be redirected to the home page.											
Alternative:	<p>Line3: Missing information, display an error message then return to Line1.</p> <p>Line3: Invalid information, display a warning message then return to Line1.</p>										

Table 8: Use Case Expansion (Edit Profile).

3. The User shall be able to edit his/her profile.																	
Use Case	Edit Personal Info																
Actor	User																
purpose	Allow the user to edit his/her information (name, email).																
Overview (Success Scenario)	The user chooses edit profile option. The system allows the user to edit his/her profile and enter his/her new information. On completion, the system saves the new information and display conformation message.																
Type	Secondary /Essential.																
Cross reference	Log in.																
Typical course of events	<table border="1"> <thead> <tr> <th>Actor Action</th><th>System Response</th></tr> </thead> <tbody> <tr> <td>1. This use case begins when user clicks on “Edit profile” button.</td><td></td></tr> <tr> <td></td><td>2. The system displays form contains the user information.</td></tr> <tr> <td>3. The user will edit the required fields then clicks on “save” button.</td><td></td></tr> <tr> <td></td><td>4. The system checks the required fields are filled and inputs are valid.</td></tr> <tr> <td></td><td>5. The system will show confirmation message.</td></tr> <tr> <td>6. The user confirms the updates.</td><td></td></tr> <tr> <td></td><td>7. The system will save the new information.</td></tr> </tbody> </table>	Actor Action	System Response	1. This use case begins when user clicks on “Edit profile” button.			2. The system displays form contains the user information.	3. The user will edit the required fields then clicks on “save” button.			4. The system checks the required fields are filled and inputs are valid.		5. The system will show confirmation message.	6. The user confirms the updates.			7. The system will save the new information.
Actor Action	System Response																
1. This use case begins when user clicks on “Edit profile” button.																	
	2. The system displays form contains the user information.																
3. The user will edit the required fields then clicks on “save” button.																	
	4. The system checks the required fields are filled and inputs are valid.																
	5. The system will show confirmation message.																
6. The user confirms the updates.																	
	7. The system will save the new information.																
Alternative: Line4: missing filled, display error message and return to Line3. Line4: Invalid input, view warning message and returns to Line3. Line6: if the user cancels the conformation message, the system will redirect the user to the profile form.																	

Table 9: Use Case Expansion (Add Reference Document).

4. The User shall be able to add documents into his/her library.		
Use Case	Add reference document.	
Actor	User	
purpose	Allow the user to add reference documents to his/her library.	
Overview (Success Scenario)	The user can add his reference document which has been saved in his computer before.	
Type	Primary/Essential	
Cross reference	Log in.	
Typical course of events	Actor Action	System Response
	1. The use case begins when user clicks on “add reference document” button.	
		2. The system should display a window that contains all document and files in the computer.
	3. The user selects the documents then clicks “add”.	
		4. The system will save the reference document in the library.

Table 10: Use Case Expansion (Add Reference Info Manually).

5. The user shall be able to add reference document information manually.		
Use case	add reference info manually	
Actor	User	
Purpose	The user can enter reference document information that does not exist in his/her computer.	
Overview (success scenario)	The user enters just the information of a reference document.	
Type	Primary/Essential	
Cross Reverence	Log in.	
Typical course of events	Actor action	System response
	1. The use case begins when the user clicks on “add entry manually” button.	
		2. The system should display a form for the document type and information.
	3. The user selects the type and enters the information.	
		4. The system validates the inputs.
		5. The system should save the entry info and show it in the library.
Alternatives: Line 4: if there are invalid inputs, the system should display an error message and return to Line3.		

Table 11: Use Case Expansion (Edit Reference Document Info).

6. The User shall be able to edit the reference document information.		
Use case	Edit reference document info.	
Actor	User	
Purpose	Allow the user to edit reference document information.	
Overview (success scenario)	The user can edit his/ her existed reference documents.	
Type	Secondary/ Essential.	
Cross Reverence	Log in, add reference document.	
Typical course of events	Actor action 1. The use case begins when the user clicks on the “edit file info” button. 3. The user chooses the file. 5. The user can change the information. 6. The user clicks “edit” button. 	System response
		2. The system shall show a window that allows the user to choose which file he/she wants to edit its info.
		4. The system should show a form contains the selected file info.
		7. The system should validate the new inputs.
		8. The system should save the new inputs and show a confirmation message.
Alternatives: Line7: invalid inputs, the system should display an error message and return to Line4.		

Table 12 : Use Case Expansion (Delete Reference Document).

7. The User shall be able to delete reference document from his/her library.		
Use Case	Delete Reference Document.	
Actor	User	
purpose	Allows the user to delete a document from the application.	
Overview (Success Scenario)	The user clicks on delete document option. The system allows the user to select the document from application. On completion, the system deletes selected document from the library.	
Type	Secondary /Essential	
Cross reference	Log in.	
Typical course of events	Actor Action	System Response
	1. This use case will begin when user clicks on "Delete document" button.	
		2. The system displays a window that contains all documents in the library.
	3. The user will select the document and click "Delete" button.	
		4. The system will show a confirmation message before deleting the document.
	5. The user will confirm the operation.	6. The system will delete the document.
Alternatives:		
Line3: if the user clicks on cancel, the system will redirect the user to home page.		
Line5: if the user clicks on cancel, the system will redirect the user to the home page.		

Table 13 : Use Case Expansion (Select Style).

8. The User shall be able to change the bibliography style followed in his/her document.		
Use Case	Select style	
Actor	User	
purpose	Allow the user to change the style of the bibliography.	
Overview (Success Scenario)	The user chooses the bibliography style followed in his/her document from the styles available styles in the system.	
Type	secondary/optional.	
Cross reference	Log in.	
Typical course of events	Actor Action	System Response
	1. This use case begins when user clicks on “Style” menu.	
		2. The system displays list of available bibliography styles.
	3. The user will select the style from the list.	
		4. The system will save the new style and apply it to the references.

Table 14 : Use Case Expansion (Add Reference).

9. The user shall be able to add reference to his/her document.		
Use Case	Add reference.	
Actor	User	
purpose	Allow the user to add references to his/her document.	
Overview (Success Scenario)	The user clicks on add reference button, the system shows a window that contains all files in the library, the user chooses the reference document, and The system will add the reference to the document.	
Type	Primary/Essential.	
Cross reference	Log in.	
Typical course of events	Actor Action	System Response
	1. This use case will begin when user puts the cursor on the place he/she wants to add reference at.	
	2. The user clicks on "add reference" button.	
		3. The system will open a window that contains the files in the library.
	4. The user will choose the file and clicks on “add” button.	
		5. The system will add the reference information.
Alternative:		
Line4: if the user clicks on cancel, the system will redirect the user to his/her document.		

Table 15: Use Case Expansion (Edit Reference).

10. The user shall be able to edit reference in his/her document		
Use Case	Edit reference.	
Actor	User	
purpose	Allow the user to edit his/her references that added to the document	
Overview (Success Scenario)	The user clicks on “edit reference” button. The system shows a window that contains all files in the library. The user will choose the new reference document. The system saves the update on the reference information.	
Type	Secondary/Essential.	
Cross reference	Log in.	
Typical course of events	Actor Action	System Response
	1. This use case will begin when user puts the cursor on the reference he/she wants to edit.	
	2. The user clicks on "edit reference" button.	
		3. The system will open a window that contains all files in the library.
	4. The user will choose the file and clicks on “edit” button.	
		5. The system saves the updates on the references
Alternative: Line4: if the user clicks on cancel, the system will redirect the user to his/her document.		

Table 16 : Use Case Expansion (Remove Reference).

11. The user shall be able to remove reference from his/her document.		
Use Case	Remove reference.	
Actor	User	
purpose	Allow the user to remove references that have been added to his/her document	
Overview (Success Scenario)	The user clicks on “remove reference” button. The system will ask the user if he/she is sure about removing the reference. The system will remove the reference information.	
Type	Secondary/Essential.	
Cross reference	Log in.	
Typical course of events	Actor Action	System Response
	1. This use case will begin when user puts the cursor on the reference he/she wants to remove	
	3. The user clicks on "remove reference" button.	
		3. The system will show a confirmation message before removing the reference.
	4. The user will confirm the operation.	
		5. The system will remove the reference from the file.
Alternative: Line4: if the user clicks on cancel, the system will redirect the user to his/her document.		

Table 17: Use Case Expansion (Add Bibliography).

12. The user shall be able to add bibliography to his document.	
Use Case	Add bibliography
Actor	User
purpose	Allows the user to add a bibliography at the end of the research.
Overview (Success Scenario)	The user clicks on add bibliography option. The system will add the selected bibliography in the end of the research.
Type	Primary / Essential
Cross reference	Log in.
Typical course of events	Actor Action
	1. This use case will begin when user clicks on "Add bibliography" button.
	2. The system displays the bibliography list at the end of the file.

Table 18 : Use Case Expansion (Search).

15. The User shall be able to search for files and folder that inside the library.									
Use Case	Search.								
Actor	User.								
purpose	Allow the user to search his/her library files.								
Overview (Success Scenario)	The user will enter the search key (title or author name) into the search field; The system will return the results from the library.								
Type	Optional.								
Cross reference	Log in.								
Typical course of events	<table border="1"> <thead> <tr> <th>Actor Action</th><th>System Response</th></tr> </thead> <tbody> <tr> <td>1. This use case begins when user enters a text into the search field.</td><td></td></tr> <tr> <td>2. The user then clicks on “search” button.</td><td></td></tr> <tr> <td></td><td>3. The system will then retrieve and show the search results on the screen.</td></tr> </tbody> </table>	Actor Action	System Response	1. This use case begins when user enters a text into the search field.		2. The user then clicks on “search” button.			3. The system will then retrieve and show the search results on the screen.
Actor Action	System Response								
1. This use case begins when user enters a text into the search field.									
2. The user then clicks on “search” button.									
	3. The system will then retrieve and show the search results on the screen.								
Alternative: Line3: if the entered text doesn't match any of the library's files, the system will show “No results”.									

Table 19: Use Case Expansion (Log out).

16. The user shall be able to log out from the system.							
Use Case	Log out.						
Actor	User.						
purpose	Allow the user to leave the system.						
Overview (Success Scenario)	The user clicks on Log out button, On Completion, the system logs the user out and redirects him/her to the application main page.						
Type	Primary/Essential.						
Cross reference	Log in.						
Typical course of events	<table border="1"> <thead> <tr> <th>Actor Action</th><th>System Response</th></tr> </thead> <tbody> <tr> <td>1. This use case begins when user clicks on “Log out” button.</td><td></td></tr> <tr> <td></td><td>2. The system will redirect the user to the login page, and prevent him/her from accessing any of its features.</td></tr> </tbody> </table>	Actor Action	System Response	1. This use case begins when user clicks on “Log out” button.			2. The system will redirect the user to the login page, and prevent him/her from accessing any of its features.
Actor Action	System Response						
1. This use case begins when user clicks on “Log out” button.							
	2. The system will redirect the user to the login page, and prevent him/her from accessing any of its features.						
Alternative: Line2: if the user cancels the confirmation message, the system will redirect him/her to the home page.							

3.7 SEQUENCE DIAGRAMS

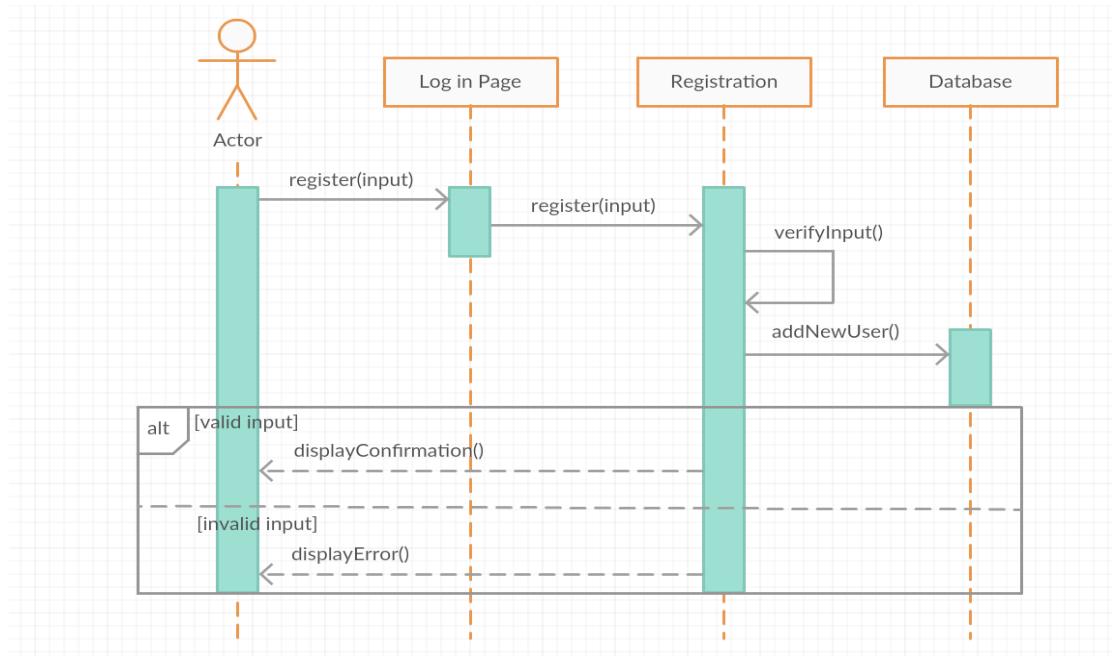


Figure 4: Sequence Diagram (Register).

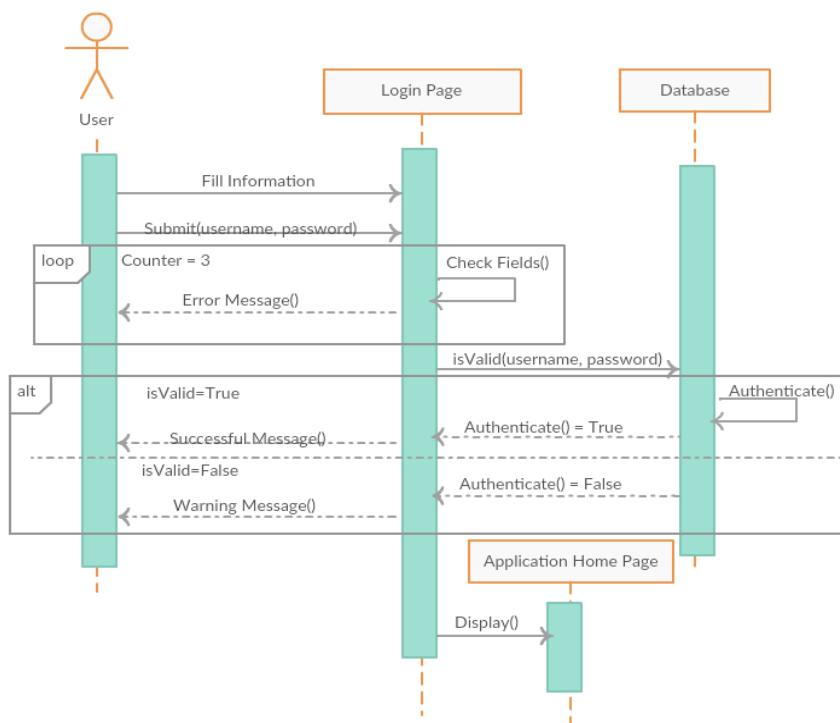


Figure 5: Sequence Diagram (Login).

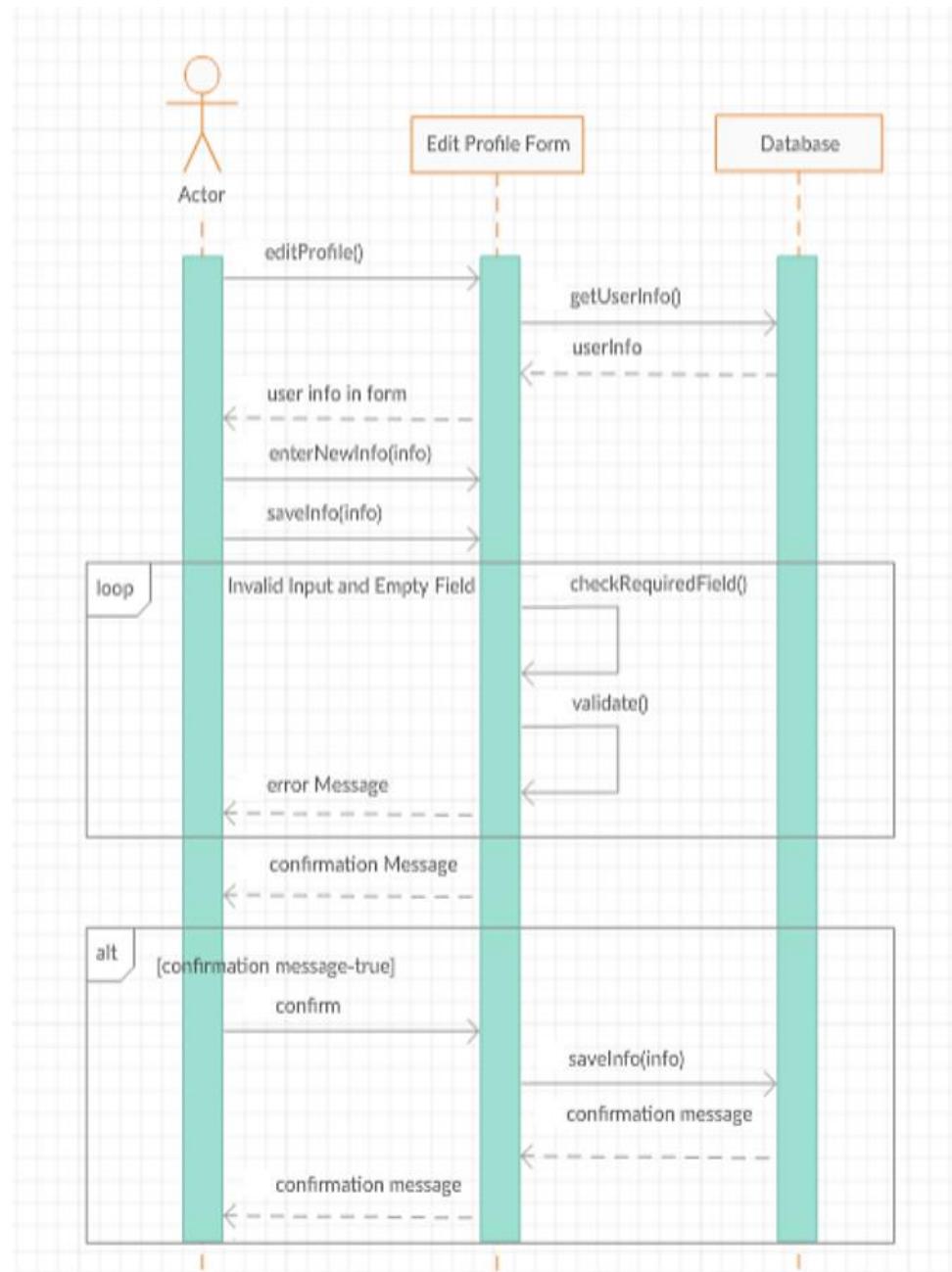


Figure 6: Sequence Diagram (Edit Profile).

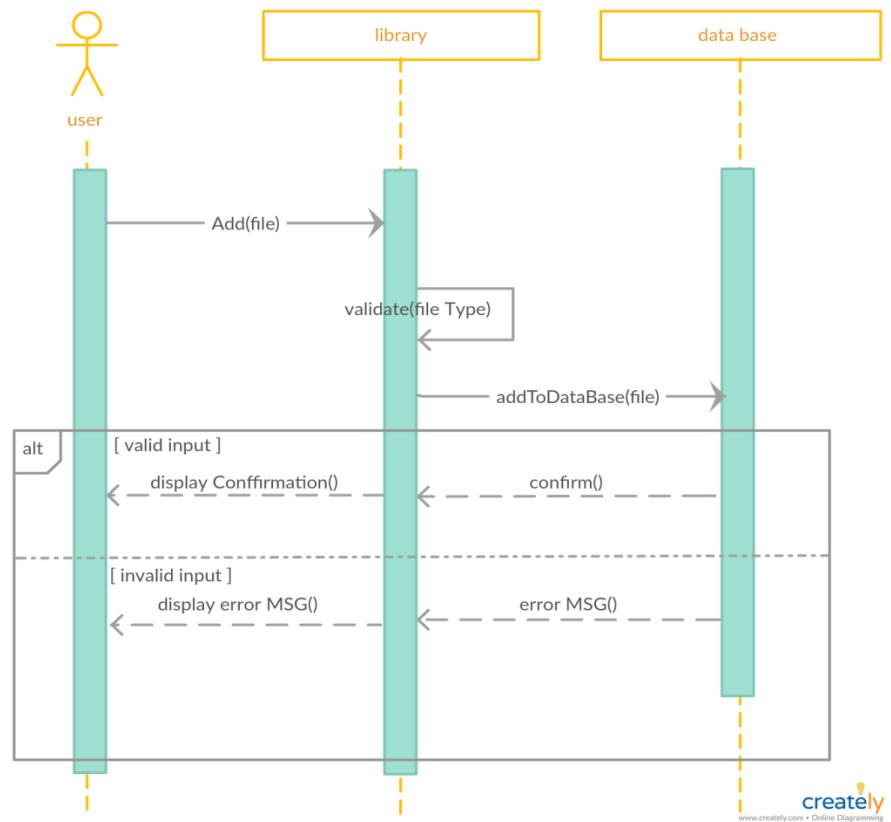


Figure 7: Sequence Diagram (Add Reference Document).

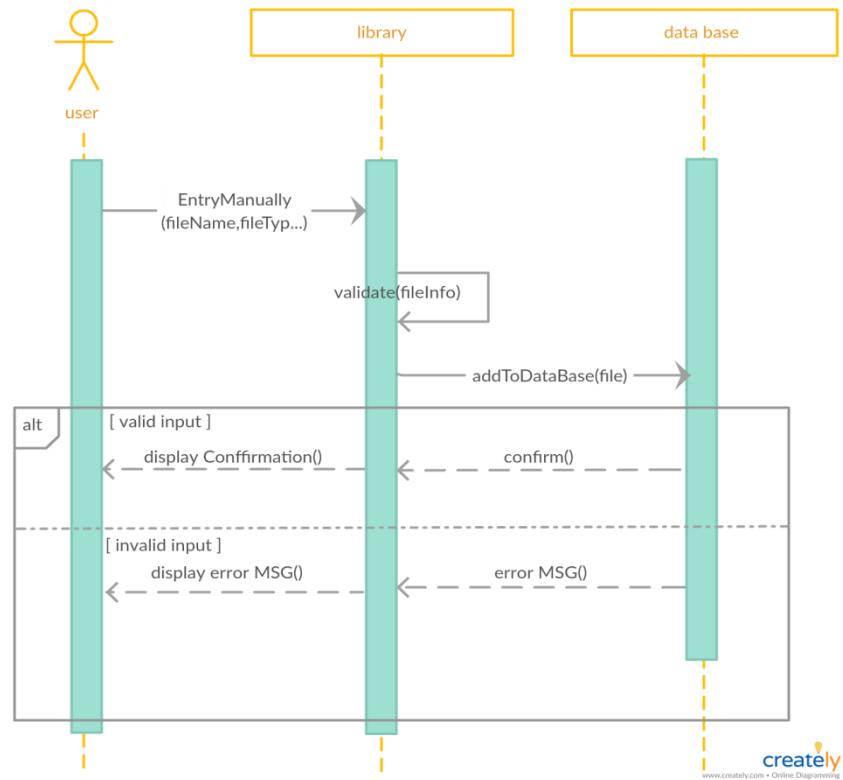


Figure 8: Sequence Diagram (Add Entry Manually).

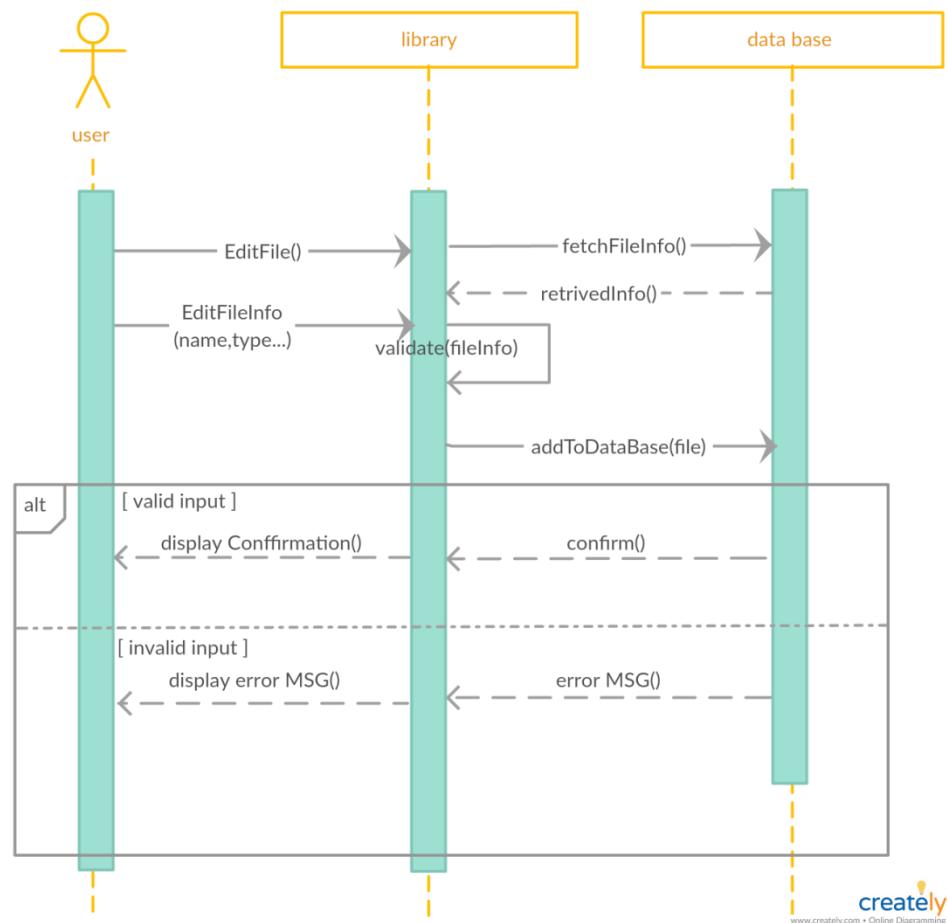


Figure 9: Sequence Diagram (Edit Document Info).

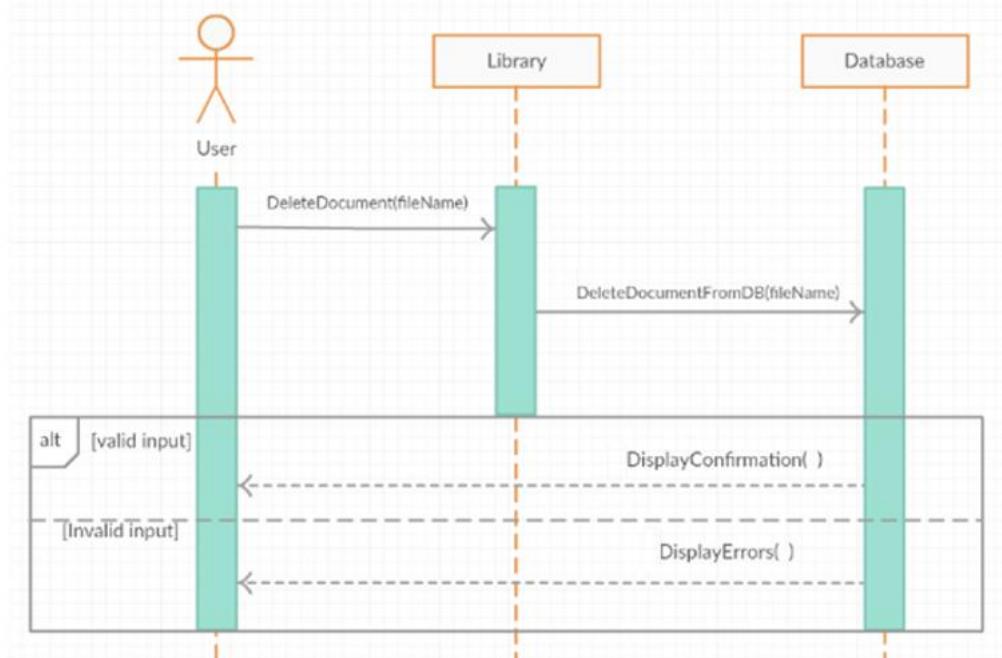


Figure 10: Sequence Diagram (Delete Reference Document).

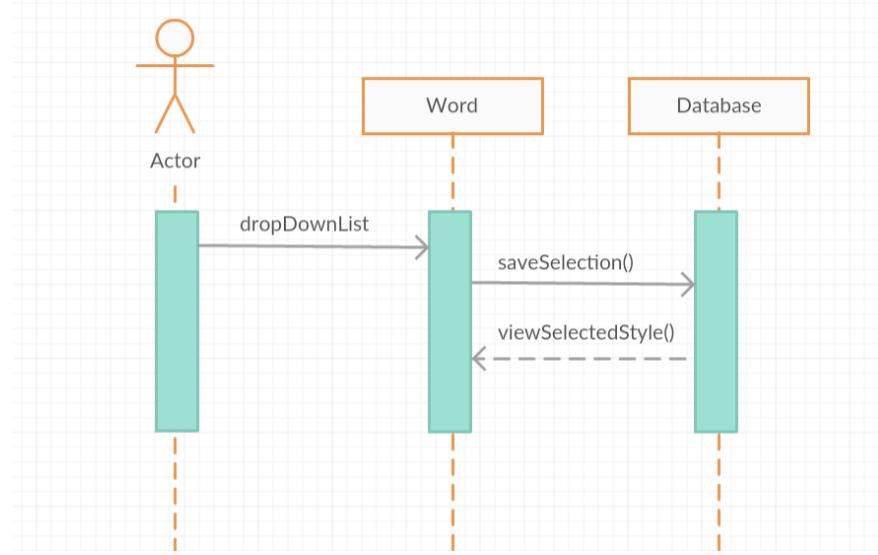


Figure 11: Sequence Diagram (Select Bibliography Style).

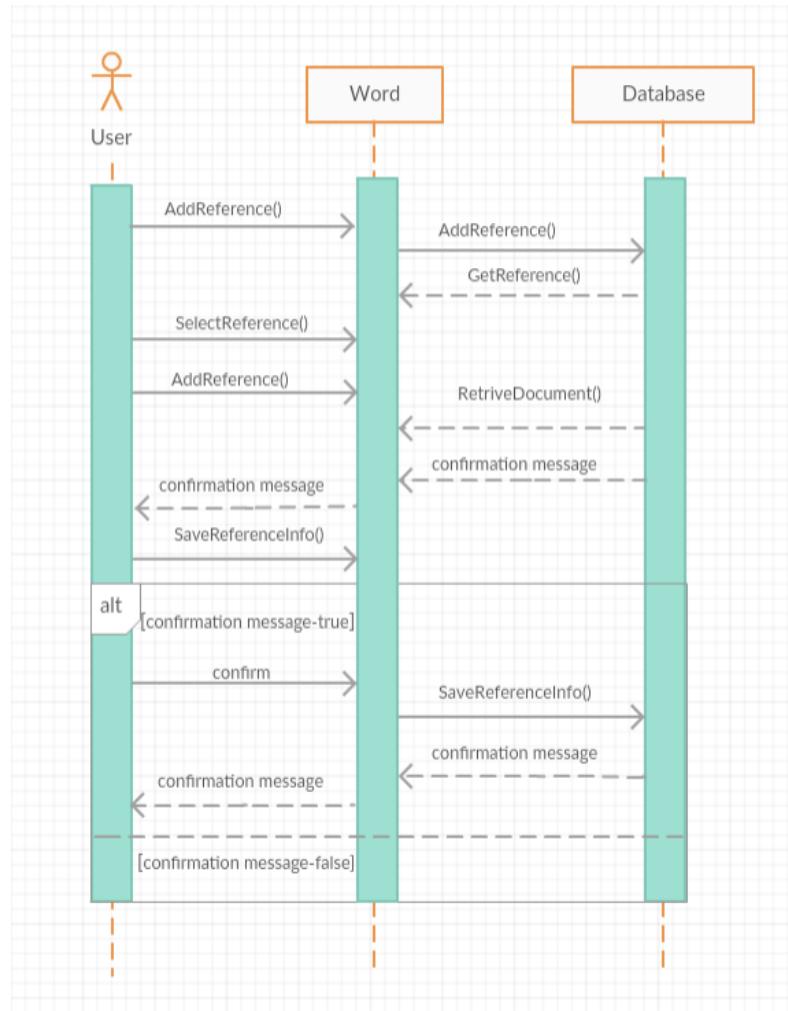


Figure 12: Sequence Diagram (Add Reference).

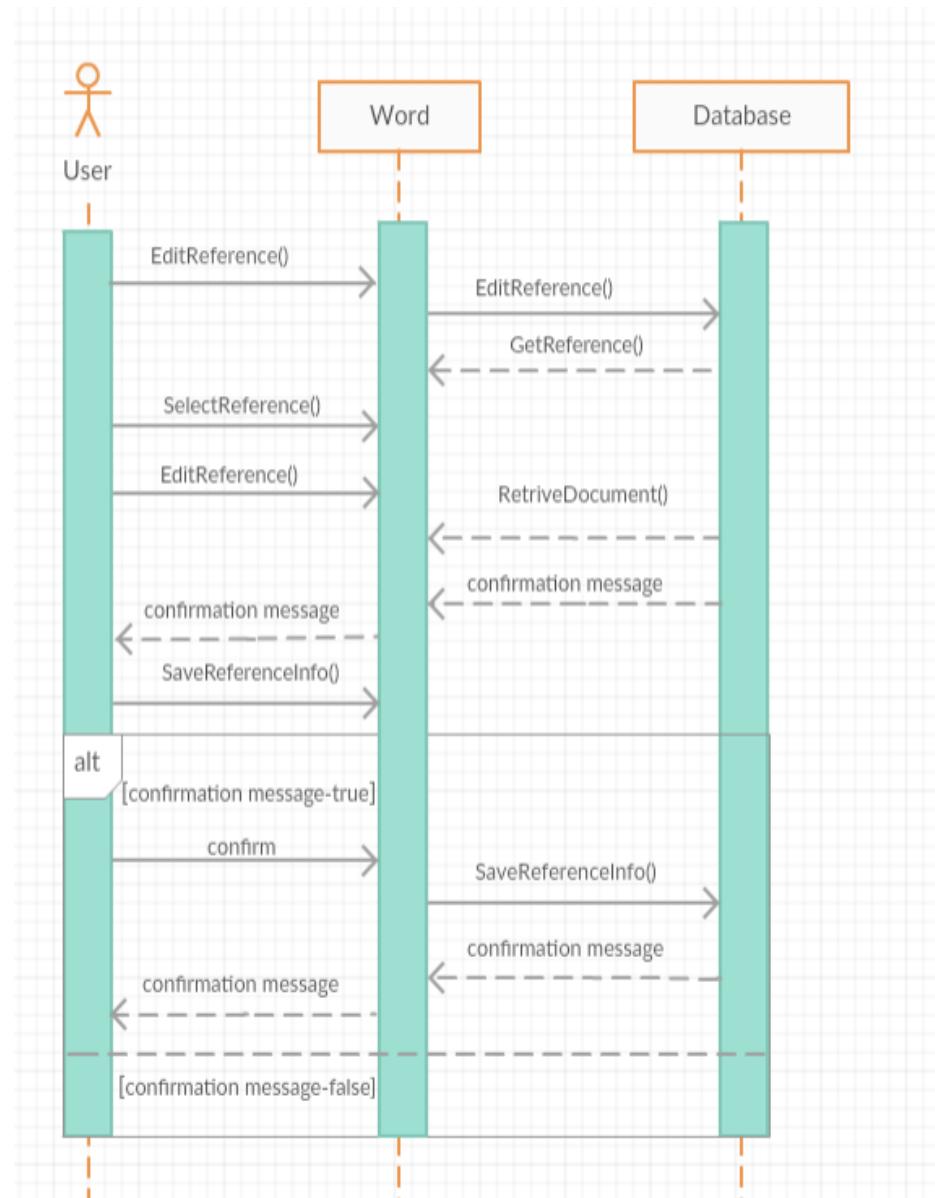


Figure 13: Sequence Diagram (Edit Reference).

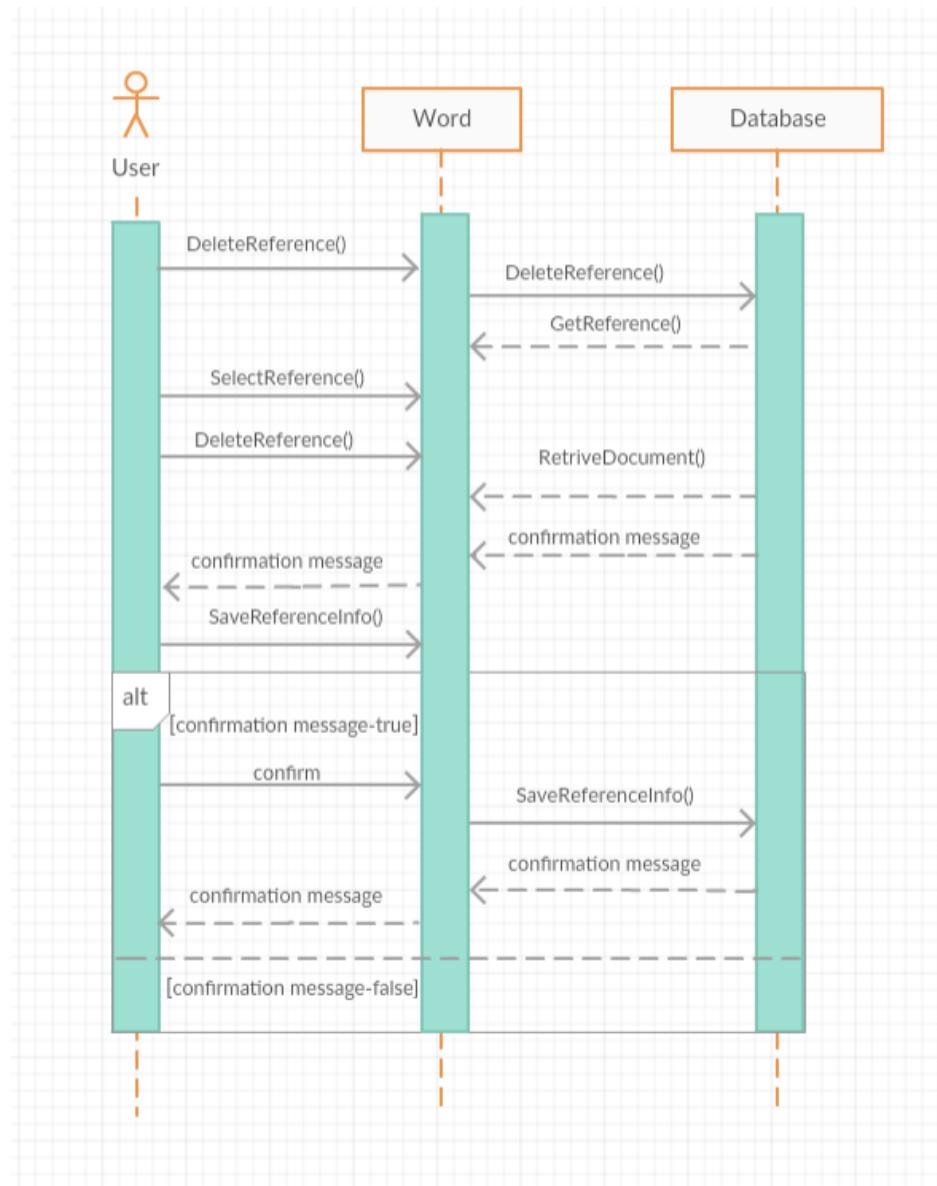


Figure 14: Sequence Diagram (Remove Reference).

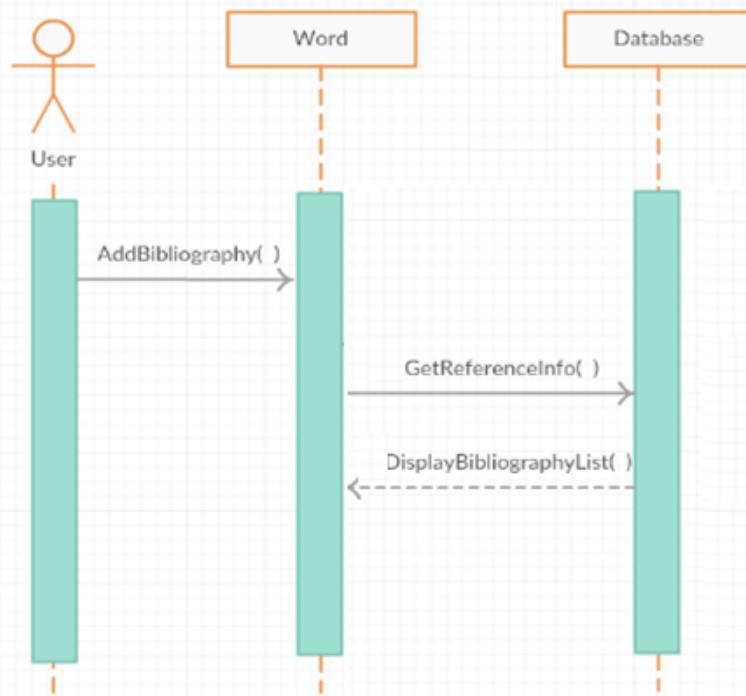


Figure 15: Sequence Diagram (Insert Bibliography).

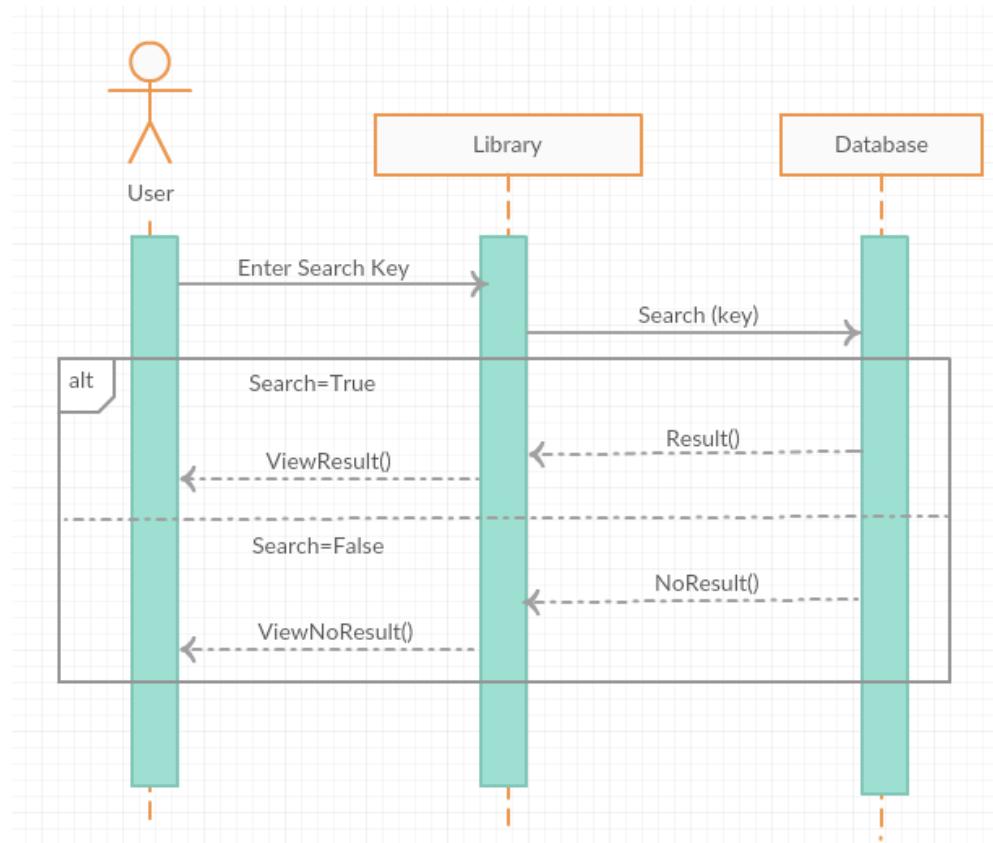


Figure 16: Sequence Diagram (Search).

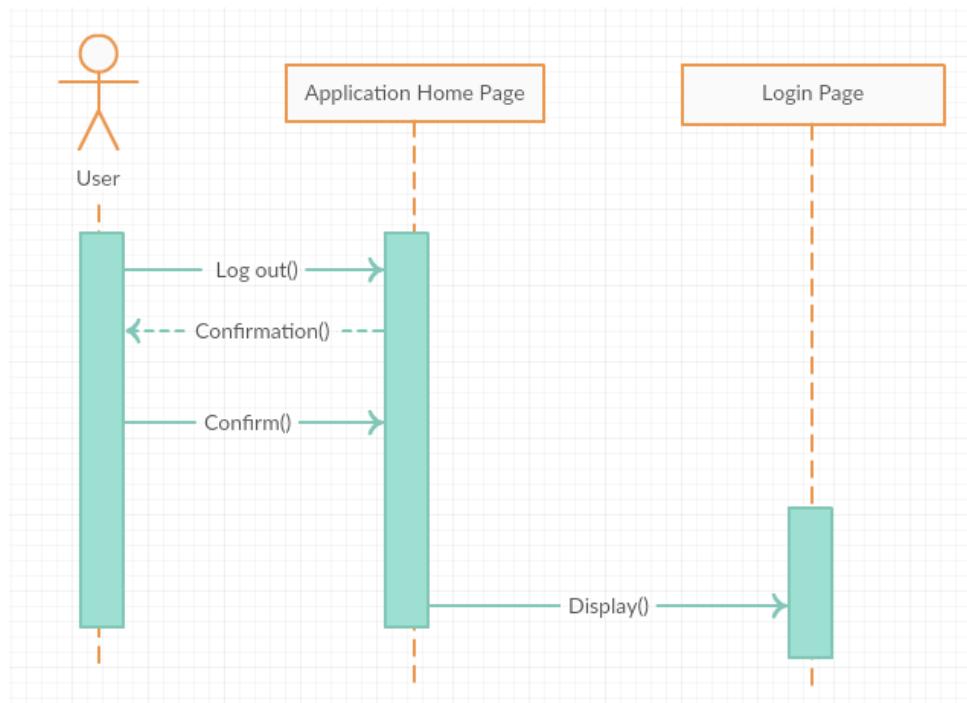


Figure 17: Sequence Diagram (Log out).

3.8 CONCEPTUAL MODEL

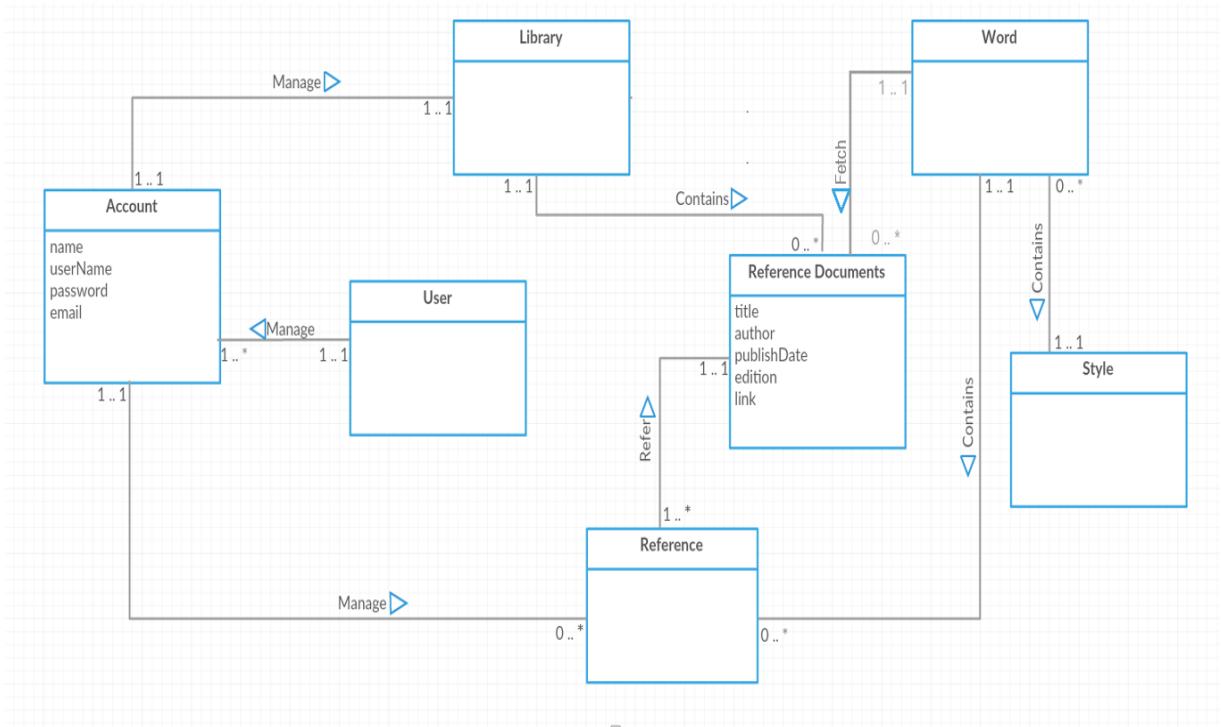


Figure 18: Conceptual Diagram.

3.9 DATABASE

3.9.1 ER DIAGRAM

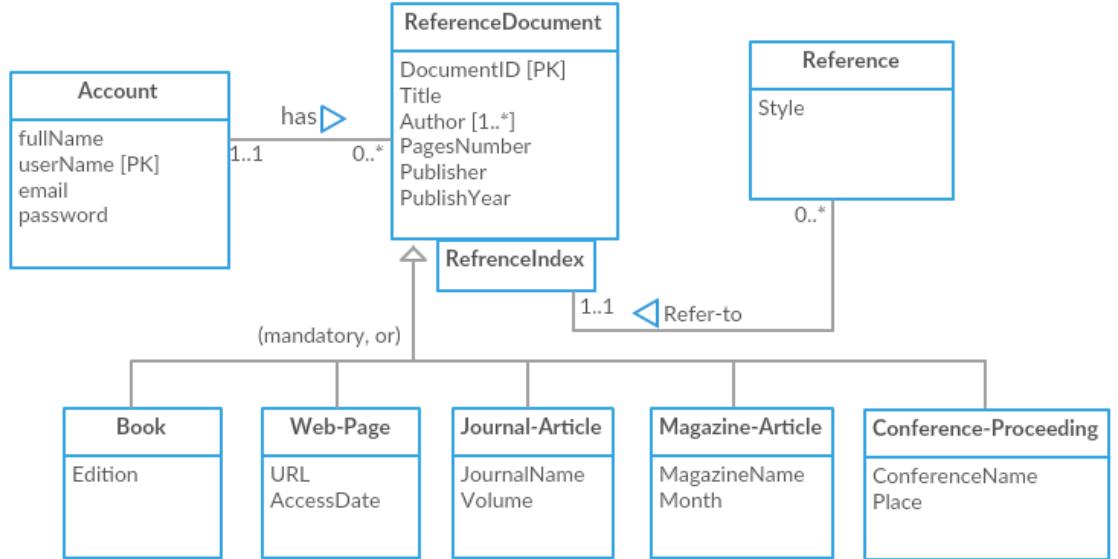


Figure 19: Database (ER Diagram).

3.9.2 RELATIONAL SCHEMA

Account (userName, fullName, email, password)

Author (Author, DocumentID)

Book (DocumentID, userName, Title, PagesNumber, Publisher, PublishYear, Edition)

Web-Page (DocumentID, userName, Title, PagesNumber, Publisher, PublishYear, URL, AccessDate)

Journal-Article (DocumentID, userName, Title, PagesNumber, Publisher, PublishYear, JournalName, Volume)

Magazine-Article (DocumentID, userName, Title, PagesNumber, Publisher, PublishYear, MagazineName, Month)

Conference-Proceeding (DocumentID, userName, Title, PagesNumber, Publisher, PublishYear, ConferenceName, Place)

Reference (RefrenceIndex, DocumentID, Style)

3.9.3 DATA DICTIONARY

Table 20: Database (Entities and Relations).

Entity Name	Multiplicity	Relationship	Entity Name	Multiplicity
Account	0.. *	has	ReferenceDocument	1..1
Reference	1..1	Refer-to	ReferenceDocument	0.. *
Book	0.. *	Sub-entity	ReferenceDocument	1..1
Web-Page	0.. *	Sub-entity	ReferenceDocument	1..1
Journal-Article	0.. *	Sub-entity	ReferenceDocument	1..1
Magazine-Article	0.. *	Sub-entity	ReferenceDocument	1..1
Conference-Proceeding	0.. *	Sub-entity	ReferenceDocument	1..1

Table 21: Database (Data Dictionary).

Entity Name	Attribute Name	Description	Data Type	Length	Null	Multi Value	PK	FK
Account	FullName	Full name of the user	Varchar	50	No	No	No	No
	UserName	Unique user name	Varchar	10	No	No	Yes	No
	Email	Email address	Varchar	50	No	No	No	No
	Password	A combination of letters and numbers and symbols used for authentication	Varchar	15	No	No	No	No
Author	Author	Author's Name	Varchar	100	No	Yes	Yes	No
	DocumentID	Unique ID for the document	Integer	5	No	No	Yes	No
Book	DocumentID	Unique ID for the document	Integer	5	No	No	Yes	No
	UserName	Unique user name	Varchar	10	No	No	No	Yes
	Title	Title of the document	Varchar	100	No	No	No	No
	PagesNumber	Range of pages	Varchar	10	No	No	No	No
	Publisher	Publisher of the book	Varchar	100	No	No	No	No
	PublishYear	Year of publication	Integer	5	No	No	No	No
	Edition	Edition of the book	Integer	5	No	No	No	No
	DocumentID	Unique ID for the document	Integer	5	No	No	Yes	No
	UserName	Unique user name	Varchar	10	No	No	No	Yes

Web-Page	Title	Title of the document	Varchar	100	No	No	No	No
	PagesNumber	Range of pages	Varchar	10	No	No	No	No
	Publisher	Publisher of the web page	Varchar	100	No	No	No	No
	PublishYear	Year of publication	Integer	5	No	No	No	No
	URL	Uniform Resource Locator	Varchar	100	No	No	No	No
	AccessDate	Accessing date of the web page	Varchar	10	No	No	No	No
Magazine-Article	DocumentID	Unique ID for the document	Integer	5	No	No	Yes	No
	UserName	Unique user name	Varchar	10	No	No	No	Yes
	Title	Title of the document	Varchar	100	No	No	No	No
	PagesNumber	Range of pages	Varchar	10	No	No	No	No
	Publisher	Publisher of the magazine	Varchar	100	No	No	No	No
	PublishYear	Year of publication	Integer	5	No	No	No	No
	MagazineName	Name of the magazine	Varchar	100	No	No	No	No
	Month	Month magazine was published	Varchar	5	No	No	No	No
Journal-Article	DocumentID	Unique ID for the document	Integer	5	No	No	Yes	No
	UserName	Unique user name	Varchar	10	No	No	No	Yes
	Title	Title of the document	Varchar	100	No	No	No	No
	PagesNumber	Range of pages	Varchar	10	No	No	No	No
	Publisher	Publisher of the journal	Varchar	100	No	No	No	No
	PublishYear	Year of publication	Integer	5	No	No	No	No
	JournalName	Name of the journal	Varchar	100	No	No	No	No
	Volume	Volume of the journal article	Integer	5	No	No	No	No
Conference - Proceeding	DocumentID	Unique ID for the document	Integer	5	No	No	Yes	No
	UserName	Unique user name	Varchar	10	No	No	No	Yes
	Title	Title of the document	Varchar	100	No	No	No	No
	PagesNumber	Range of pages	Varchar	10	No	No	No	No
	Publisher	Publisher of the conference proceeding	Varchar	100	No	No	No	No
	PublishYear	Year of publication	Integer	5	No	No	No	No
	ConferenceName	Name of the conference-proceeding	Varchar	100	No	No	No	No
	Place	Place of the conference-proceeding	Varchar	30	No	No	No	No
Reference	ReferenceIndex	The index of reference	Integer	3	No	No	Yes	No
	DocumentID	Unique ID for the document	Integer	5	No	No	Yes	No
	Style	Style of the reference	Varchar	5	No	No	No	No

3.10 CLASS DIAGRAM

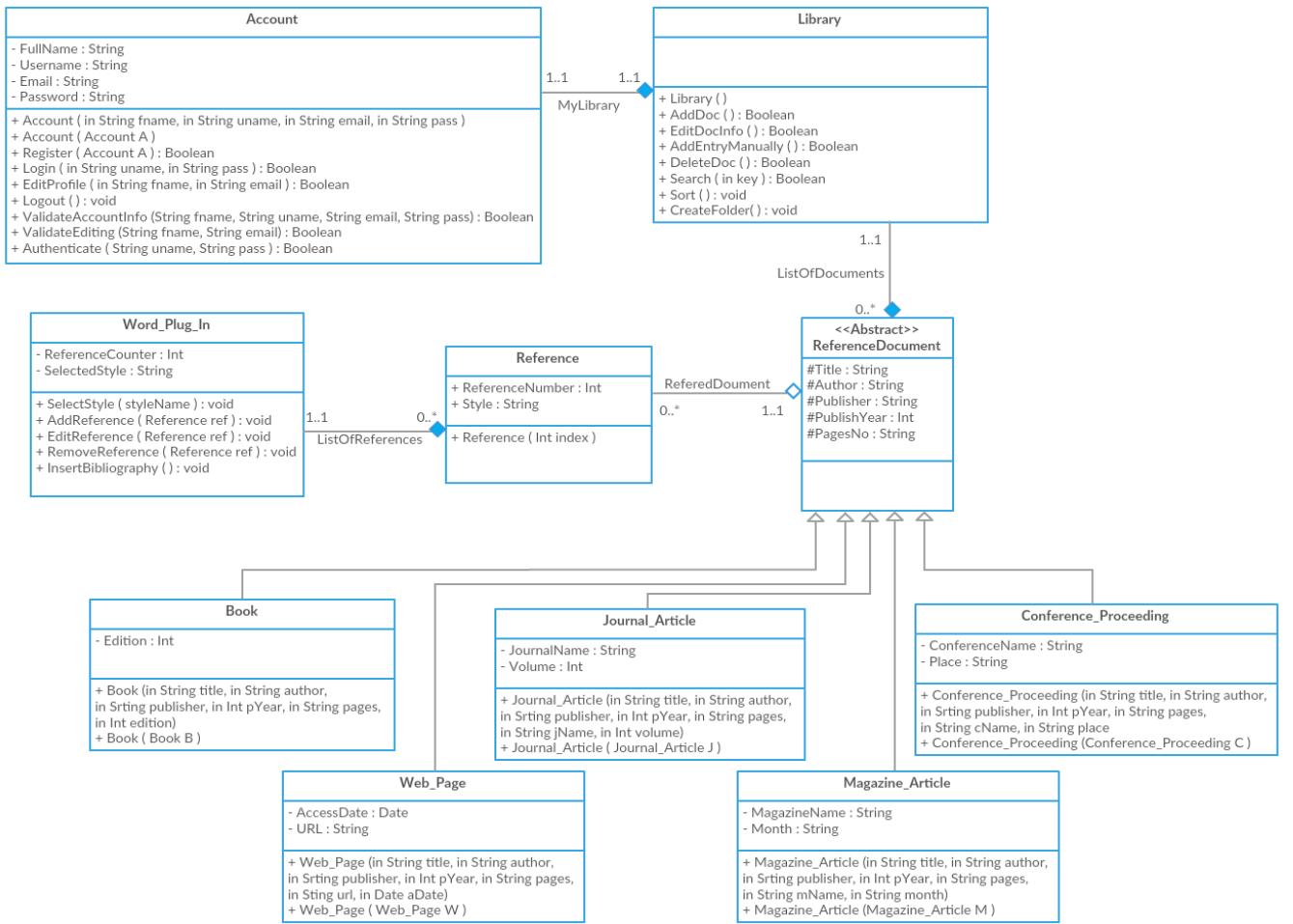


Figure 20: Class Diagram.

Chapter 4: System Design

4.1 INTRODUCTION

In this chapter, we will describe how the system will be when it is built by dividing it into three sections that illustrate system design structure: System Architecture section describes system organization style. Detailed System Design section describes details and implementation of each process. Finally, Interface Design section describes user interfaces and illustrates in detail to show how the system will behave.

4.2 SYSTEM ARCHITECTURE

The figure below shows the system structure; to create reusable and flexible software application we did choose to implement it as a repository architecture model. Repository model is an efficient data sharing mechanism. When large amounts of data that needs to be saved for a long time; then the repository architecture is the needed one. We didn't use MVC architecture model because it would add complexity to the code and because the requirements are well known.

The services that will be provided by this system are the registration, add, edit and delete references and reference documents, add entry manually, search and choose bibliography style.

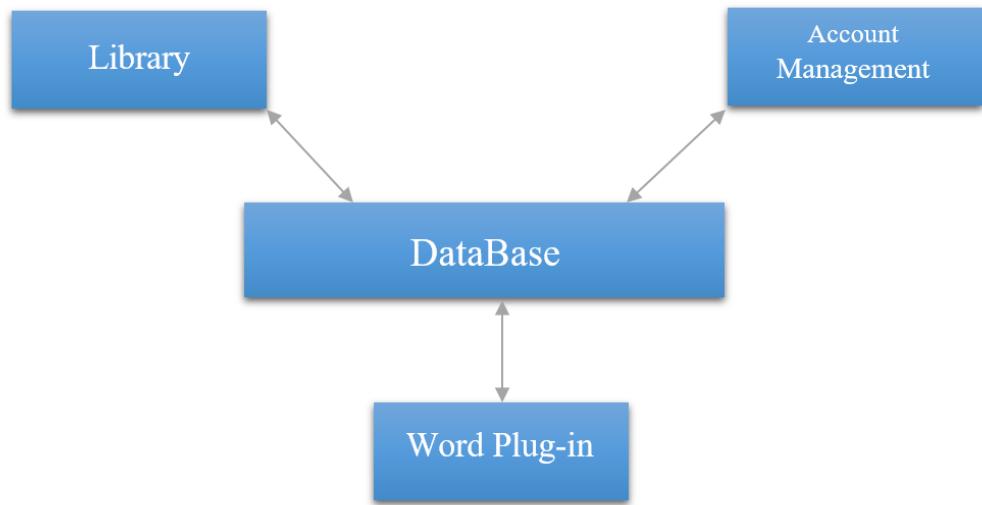


Figure 21: System Architecture.

4.3 DETAILED SYSTEM DESIGN

4.3.1 Register into the system.

- Classification

Function.

- Definition

This function will allow the visitor to have an account and to be one of the system users.

- Responsibilities

Reference Requirement 1

- Constraints

Pre-condition: None.

Post-condition: the user account created.

Post-condition: display the user profile.

Post-condition: user can log in into the system.

- Composition

None.

- Uses/Interactions

None.

- Resources

This function will access the database to add the account information.

- Processing

- ❖ The user will click on sign up button and then enter his/her information in the registration form.
- ❖ The system will create an account for the user and the information saved in the database.
- ❖ The system will show a confirmation message.
- ❖ The system will transfer the user to his/her profile.

- Pseudocode
 1. BEGIN
 2. CLICK sign up button
 3. DISPLAY register form
 4. READ name, email, password
 5. IF name or email or password invalid or empty field
 6. THEN DISPLAY error message and return to register form
 7. ELSE save information and DISPLAY profile
 8. END IF
 9. END

4.3.2 Log into the system.

- Classification

Function

- Definition

The user will have an account, the account will have user's information and functions; the only way to access the account is by logging into the system.

- Responsibilities

Reference Requirement 2

- Constraints

Pre-condition: The user should register in the system before logging in.

Pre-condition: The user should enter a valid username and password to log into the system.

Post-condition: Display the home page.

- Composition

None.

- Uses/Interactions

This function depends on Register function, and all other functions will use this function.

- Resources

This function accesses the database to authenticate the username and password entered by the user.

- Processing

- ❖ User will enter his/her username and password.
- ❖ The process will access the database to check the username and password to allow the user to log into the system.
- ❖ The system will transfer the user to the home page and enable him/her to use the system functions.

- Pseudocode

1. BEGIN
2. READ username and password
3. IF username and password fields are not filled
4. THEN DISPLAY Error message
5. ELSE IF username and password exists in database THEN DISPLAY home page
6. ELSE DISPLAY Warning message to check username/password
7. END IF
8. END

4.3.3 Edit Profile.

- Classification

Function.

- Definition

This function allows the user to edit his/her information (name, email).

- Responsibilities

Reference Requirement 3

- Constraints

Pre-condition: the user must log in to the system.

Post-condition: display the user profile with updated information.

- Composition

None.

- Uses/Interactions

The function depends on log in function.

- Resources

This function will access the Database to update the user information.

- Processing

- ❖ The user will click on edit profile button and then edit information and
- ❖ Then click save button.
- ❖ The user confirms the message.
- ❖ The user information in the database will be updated.
- ❖ The system will show the profile with updated information.

Pseudocode

1. BEGIN
2. CLICK edit profile button
3. DISPLAY edit form
4. READ name, email, password
5. IF name or email or password invalid or empty field THEN
6. DISPLAY error message and return to edit form
7. ELSE update information and DISPLAY profile
8. END IF
9. END

4.3.4 Add Reference Document.

- Classification

Function.

- Definition

This function allows the user to add files whither it is (book, magazine, journals\articles, webpage or conference proceeding) to any folder he/she has in the library.

- Responsibilities

Reference requirement 4.

- Constrains

Per-condition: the user must log in to the system.

Post-condition: display the new file in the selected folder or library.

- Composition

None.

- Uses/interaction

The function depends on log in function.

- Resources

This function will access the Database to add the document information.

- Processing

- ❖ The user will click on add then add document.
- ❖ The system will show a window to choose the desired file.
- ❖ The system will save the selected file in the library
- ❖ The system will show a confirmation message to the user.

- Pseudocode

1. BEGIN
2. CLICK add button
3. SELECT add document
4. DISPLAY windows to the user's computer
5. SELECT the file he wants
6. IF extension != pdf, doc or html
7. THEN DISPLAY "this type of files not allowed"
8. ELSE
10. Add.library(newfile)
11. DISPLAY "your file has been successfully added".
12. END IF
13. END

4.3.5 Add reference document information manually.

- Classification

Function.

- Definition

This function allows the user to add information of a new file without importing the file itself to the library.

- Responsibilities

Reference requirement 5.

- Constrains

Per-condition: the user must log in to the system.

Post-condition: display an empty file with the entered information of the file.

- Composition

None.

- Uses/interaction

The function depends on log in function.

- Resources

This function will access the Database to add the document information.

- Processing

- ❖ The user will click on add then add document manually.
- ❖ The system will show up a form window.
- ❖ The user will write the information needed for the selected type.
- ❖ The system will save the document information in the library
- ❖ The system will show up a confirmation message to the user.

- Pseudocode

1. BEGIN
2. CLICK add button
3. SELECT add entry manually
4. SELECT document type
5. DISPLAY information form depends on the selected type.
6. READ information
7. IF there is invalid or empty field
8. THEN DISPLAY Error message
9. ELSE
10. Add.library(newfile)
11. DISPLAY (your file info has been successfully added).
12. END IF
14. END

4.3.6 Edit the reference document information.

- Classification

Function.

- Definition

This function allows the user to edit information of any files which are in the user's library.

- Responsibilities

Reference requirement 6.

- Constraints

Per-condition: the user must log in to the system

Pre-condition: the selected file to edit exists in the library.

Post-condition: edit the selected file information.

- Composition

None.

- Uses/interaction

The function depends on log in function.

- Resources

This function will access the Database to update the document information.

- Processing

- ❖ The user will click edit document button
- ❖ Then select the file he/she wants to edit
- ❖ The system will show a form with the document information
- ❖ The user will edit the information and click save
- ❖ The system will show a confirmation message to the user.

- Pseudocode

1. BEGIN
2. CLICK edit document button
3. DISPLAY window with documents in the library
4. SELECT document and CLICK edit
5. DISPLAY form with document information.
6. READ new information
7. IF there is invalid or empty field
8. THEN DISPLAY Error message
9. ELSE
10. Edit.library(newInfo)
11. DISPLAY (your file info has been successfully added).
12. END IF
13. END

4.3.7 Delete reference document from the library.

- Classification

Function

- Definition

This function allows the user to delete a document from his/her library.

- Responsibilities

Reference Requirement 7

- Constraints

Per-condition: The user should be logged into the system.

Pre-condition: The document should exist in the library.

- Composition

None.

- Uses/Interactions

The function depends on log in function.

- Resources

This function accesses the database to delete the documents information.

- Processing

- ❖ User will select the document.
- ❖ The process will ask the user if he/she was sure about deleting the document.
- ❖ The process will access the database to delete this document.

- Pseudocode
 1. BEGIN
 2. CLICK delete reference document
 3. THEN
 4. SELECT reference document from the folders
 5. IF the delete button is pressed
 6. DISPLAYS confirmation message
 7. ELSE IF there is no reference document selected
 8. DISPLAYS error message
 9. END IF
 10. END

4.3.8 Change bibliography style.

- Classification

Function.

- Definition

This function allows the user to choose the style of the bibliography.

- Responsibilities

Reference Requirement 8

- Constraints

Pre-condition: the user must log in to the system.

Post-condition: the system saves the new selected style of the bibliography.

- Composition

None.

- Uses/Interactions

The function depends on log in function.

- Resources

None.

- Processing
 - ❖ The user will click on style button
 - ❖ The user will select the style from the list of available styles.
 - ❖ The system will save the new style.

- Pseudocode
 1. BEGIN
 2. CLICK style button
 3. DISPLAY list of bibliography styles
 4. SELECT style from the list
 5. END

4.3.9 Add reference to the document.

- Classification

Function

- Definition

This function will allow user to add reference to his/her document.

- Responsibilities

Reference Requirement 9

- Constraints

Pre-condition: The user should login in the system before add reference to the document.

Pre-condition: The reference document exist.

Post-condition: Display the reference inside the document.

- Composition

None.

- Uses/Interactions

This function depends on login function.

- Resources

This function will access the Database to add the new reference.

- Processing

- ❖ The user will click on “add Reference” button.
- ❖ Then select the reference document and click “add” button.
- ❖ The process will add the reference in the database.
- ❖ The system will show reference inside the document.

- Pseudocode

1. BEGIN
2. CLICK “add Reference” button
3. DISPLAYS window with the reference documents in the library.
4. SELECT reference document
5. CLICK “add” button
6. END

4.3.10 Edit reference in the document.

- Classification

Function

- Definition

This function will allow user to edit reference in his/her document.

- Responsibilities

Reference Requirement 10

- Constraints

Pre-condition: The user should login in the system.

Pre-condition: The Reference exists inside the document.

Post-condition: Display the reference inside the document.

- Composition

None.

- Uses/Interactions

This function depends on login function.

- Resources

This function will access the Database to update the reference.

- Processing

- ❖ The user will click on “edit Reference” button.
- ❖ Then select the reference document and click “edit” button.
- ❖ The process will edit the reference in the database.
- ❖ The system will show reference inside the document.

- Pseudocode

1. BEGIN
2. CLICK “edit Reference” button
3. DISPLAYS window with the reference documents in the library.
4. SELECT reference document
5. CLICK “edit” button
6. END

4.3.11 Remove reference from the document.

- Classification

Function

- Definition

This function will allow user to remove reference from his/her document.

- Responsibilities

Reference Requirement 11

- Constraints

Pre-condition: The user should login in the system.

Pre-condition: The Reference exists inside the document.

Post-condition: Remove the reference from the document.

- Composition

None.

- Uses/Interactions

This function depends on login function.

- Resources

This function will access the database to remove the reference.

- Processing

- ❖ The user will click on “remove Reference” button.
- ❖ The process will remove reference in the database.
- ❖ The system will remove the reference from the document.

- Pseudocode

1. BEGIN
2. CLICK “remove Reference” button
3. DISPLAY confirmation message
4. IF SELECT Yes
5. THEN REMOVE the reference from the document
6. END IF
7. END

4.3.12 Insert bibliography to the document.

- Classification

Function

- Definition

This function allows the user to insert bibliography at the end of the file.

- Responsibilities

Reference Requirement 12

- Constraints

Pre-condition: The user should login in the system.

Post-condition: Bibliography inserted at the end of the document.

- Composition

None.

- Uses/Interactions

This function depends on log in function.

- Resources

This function accesses the database to retrieve the references information.

- Processing

- ❖ User will click “Insert bibliography” button.
- ❖ The process will access the database to get the references information.
- ❖ The process will insert the bibliography according to the selected style.

- Pseudocode

1. BEGIN
2. CLICK Insert Bibliography
3. THEN
4. DISPLAYS the bibliography list at the end of the document
5. END

4.3.13 Create folders.

- Classification

Function

- Definition

This function will allow user to create folders to organize his/her document.

- Responsibilities

Reference Requirement 13

- Constraints

Pre-condition: The user should be logged into the system.

Post-condition: Display the new folder in user's library.

- Composition

None.

- Uses/Interactions

This function depends on login function.

- Resources

This function will access the library to create the folder.

- Processing

- ❖ User will click on “create folder” button.
- ❖ User will type the folder name.
- ❖ The process will access the library and create the folder.

- Pseudocode

1. BEGIN
2. CLICK create folder
3. DISPLAY the new folder AND allow the user to type the folder name
4. END

4.3.14 Sort the files and folders.

- Classification

Function

- Definition

This function allows the user to sort his/her files and documents depends on given sorting methodology.

- Responsibilities

Reference Requirement 14

- Constraints

Pre-condition: The user should login in the system.

Pre-condition: The library should contain some files and folders.

Post-condition: The system displays the sorted file and folders.

- Composition

None.

- Uses/Interactions

This function depends on login function.

- Resources

This function accesses the library to sort the files and folders.

- Processing

- ❖ User will select the sorting methodology.
- ❖ The process will access the library to apply the sorting on files and folders.

- Pseudocode
5. BEGIN
 6. CLICK sort
 7. DISPLAY the sorting methodology (category, date or alphabetical order)
 8. THEN
 9. SELECT sorting methodology
 10. THEN DISPLAYS the file and folder by selected sort
 11. END

4.3.15 Search for files and folder inside the library.

- Classification

Function

- Definition

Search the library for files and folders with a search key.

- Responsibilities

Reference Requirement 15

- Constraints

Pre-condition: The user should be logged into the system.

Post-condition: The system displays the search results.

- Composition

None.

- Uses/Interactions

This function depends on login function.

- Resources

This function will access the Database to retrieve the files and folders.

- Processing
 - ❖ User will type the search key in the search field.
 - ❖ The process will access the database to search for results.
 - ❖ Depends on the search returns; the system will show the results “files and folders” OR show “No Results” message.
- Pseudocode
 1. BEGIN
 2. READ search key
 3. IF results found in the library
 4. THEN DISPLAY Results
 5. ELSE “No Results”
 6. END IF
 7. END

4.3.16 Log out from the system.

- Classification

Function

- Definition

Terminate the session and stop accessing the system functions.

- Responsibilities

Reference Requirement 19

- Constraints

Pre-condition: The user should be logged into the system.

Post-condition: The system should prevent the user from accessing any of the system functions.

Post-condition: Display the login page.

- Composition

None.

- Uses/Interactions

This function will affect all other functions that require an access to the system.

- Resources

None

- Processing

- ❖ User will click on log out button.
- ❖ The process will display a confirmation message to the user.
- ❖ Depends on the user selection; the system will terminate the session and transfer the user to the log in page or transfer him/her to the home page.

- Pseudocode

1. BEGIN
2. IF Log out button was clicked
3. THEN DISPLAY Confirmation message
4. IF Confirmation = TRUE
5. THEN Terminate the session AND DISPLAY Login page
6. ELSE DISPLAY Home page
7. END IF
8. END

4.4 INTERFACE DESIGN

Our system will be completely windows-based. We imagine our system to look like this prototype.

4.4.1 REGISTER

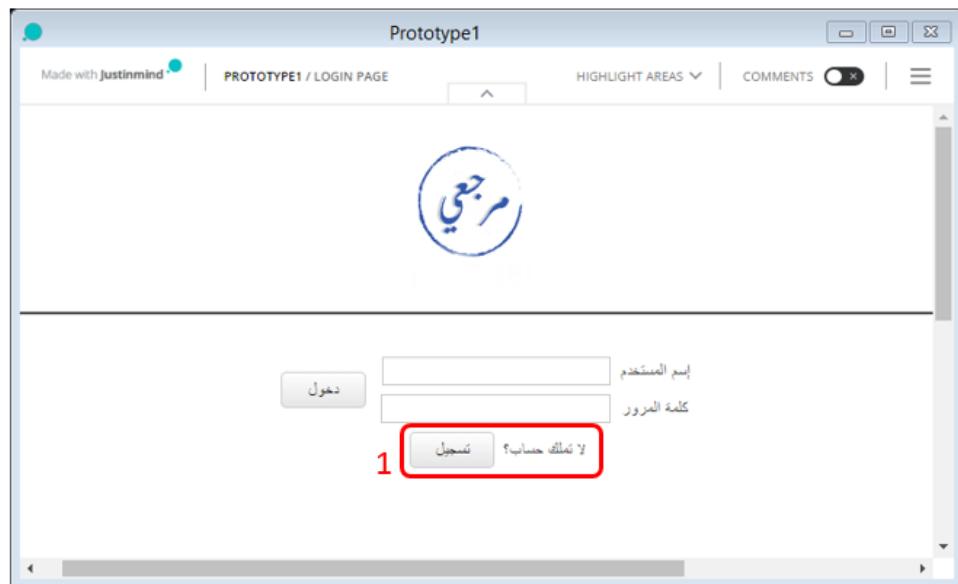


Figure 22: Register Scenario (Step1).

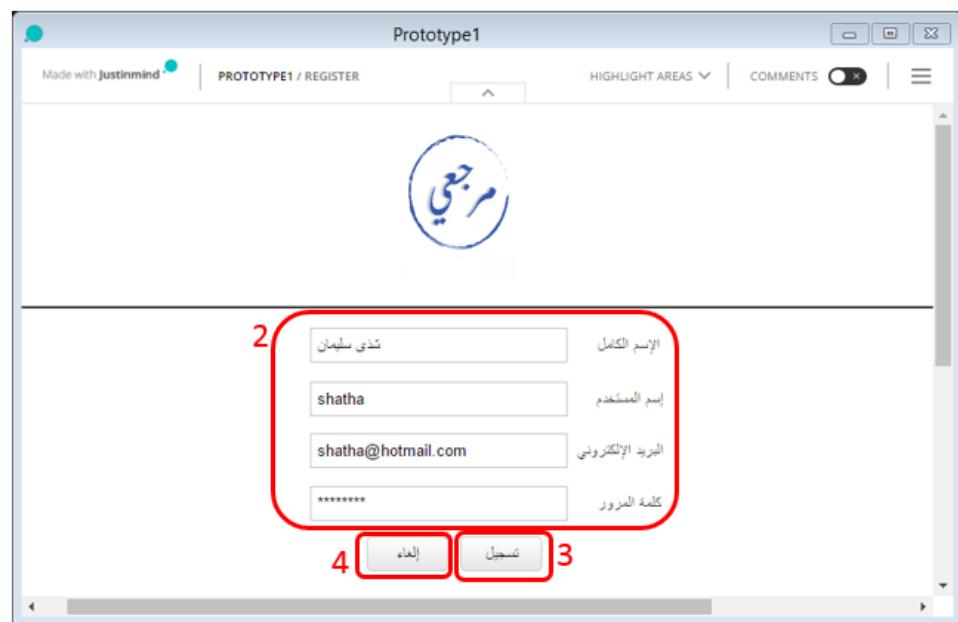


Figure 23: Register Scenario (Form).



Figure 24: Register Scenario (Confirmation Message).



Figure 25: Register Scenario (Last Step).

Table 22: Interface Description (Register).

#	Description
1	The button that will redirect the user to the registration page.
2	The form where the user will enter his/her information.
3	The button that allows the user to register in the system.
4	The button that allows the user to cancel the registration operation.
5	Confirmation message.
6	After the operation is done, user redirected to his/her profile page.

4.4.2 LOGIN

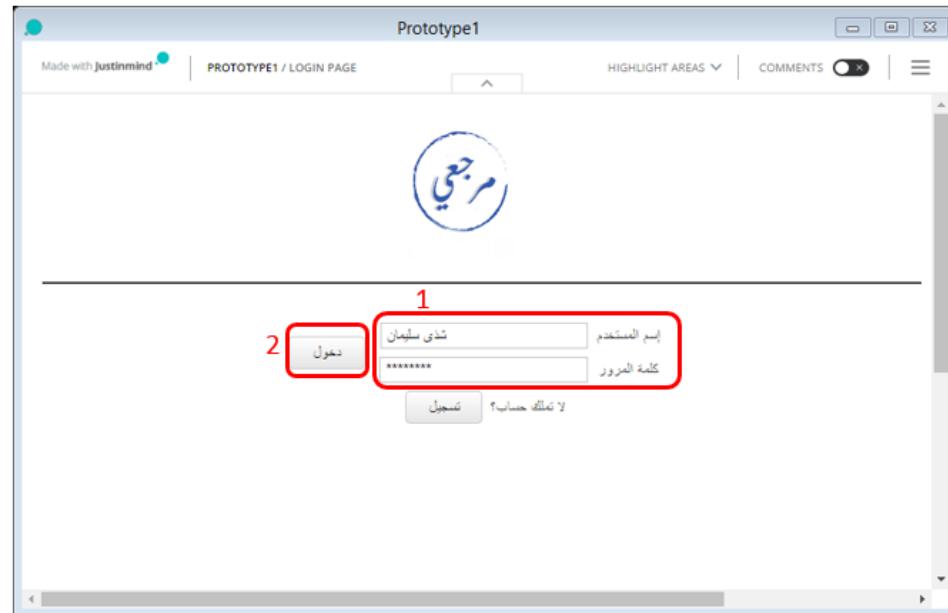


Figure 26: Login Scenario (Form).

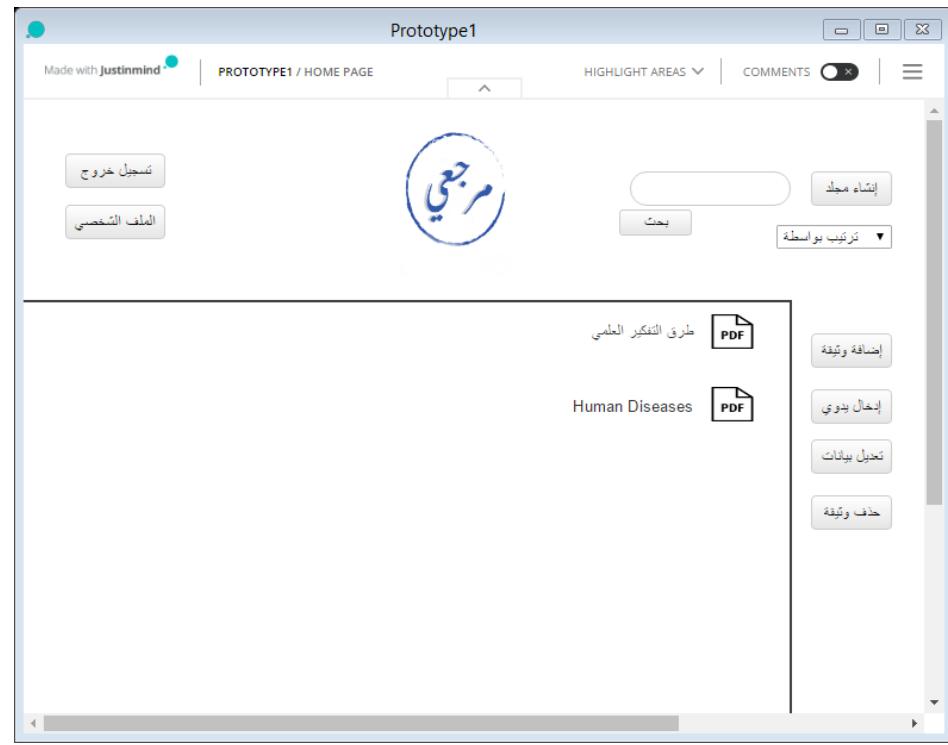


Figure 27: Login Scenario (Last Step).

Table 23: Interface Description (Login).

#	Description
1	The form where the user will enter his/her information
2	The button that will log the user into the system and redirect him/her to the home page

4.4.3 EDIT PROFILE

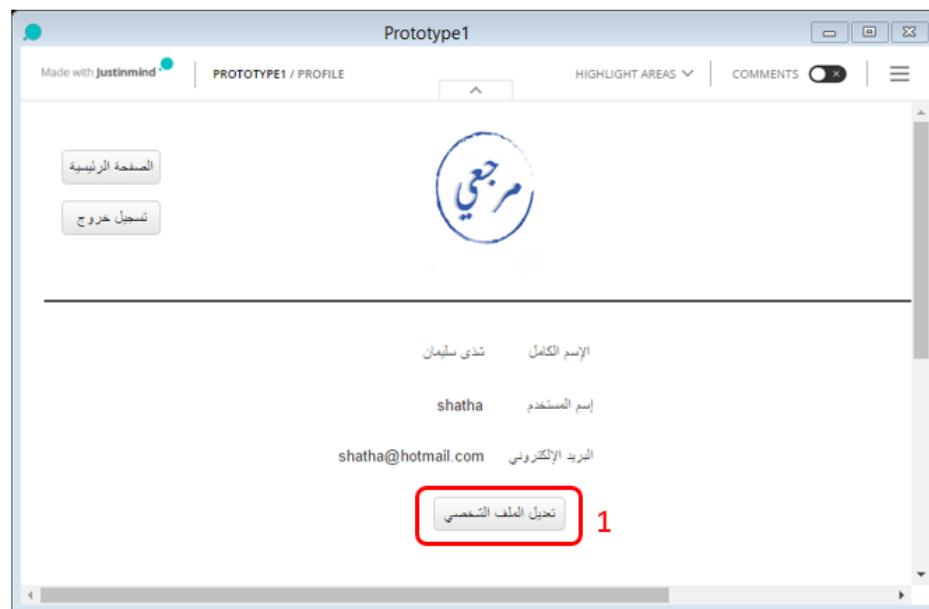


Figure 28: Edit Profile Scenario (Step1).

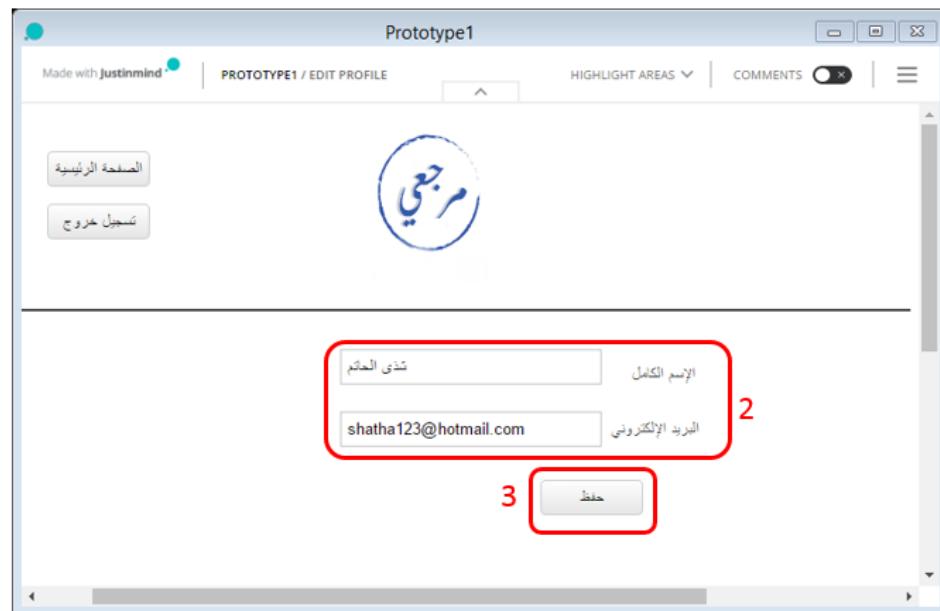


Figure 29: Edit Profile Scenario (Form).

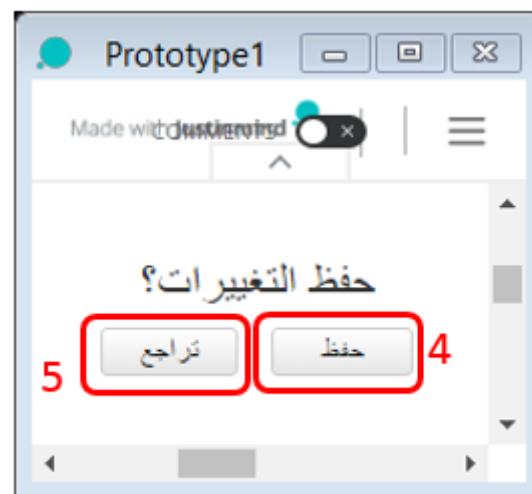


Figure 30: Edit Profile Scenario (Confirmation Message).



Figure 31: Edit Profile Scenario (Last Step).

Table 24: Interface Description (Edit Profile).

#	Description
1	The button that allow the user to edit his/her profile.
2	The form that contain the user information.
3	The button that will save the updates.
4	The button that confirms the updates.
5	The button that cancels the updates.
6	After the operation is done, the user will be redirected to the profile page.

4.4.4 ADD REFERENCE DOCUMENT

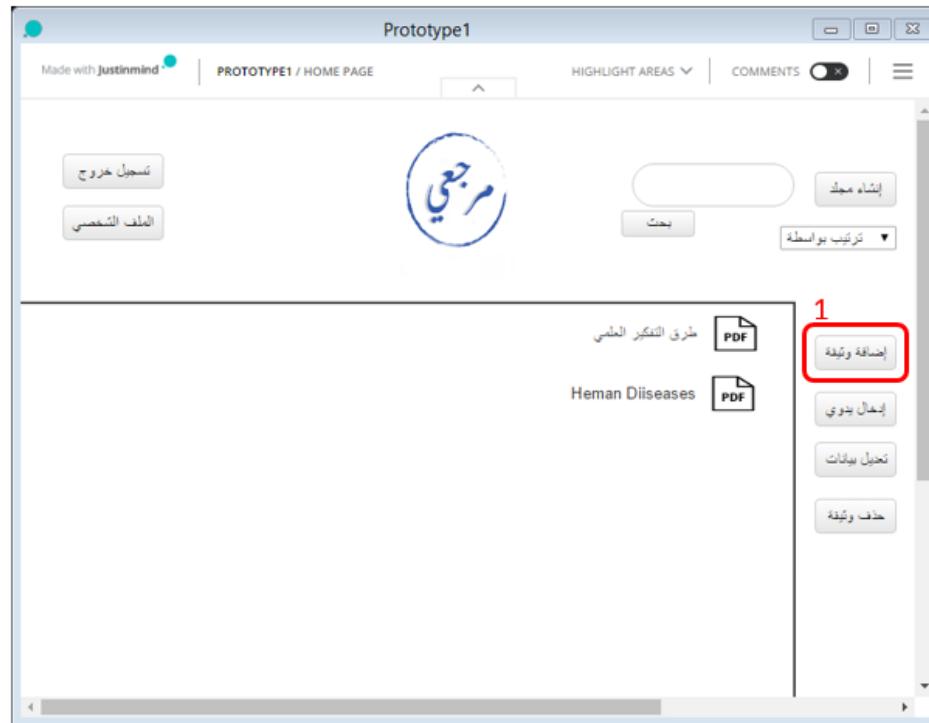


Figure 32: Add Reference Document Scenario (Step1).

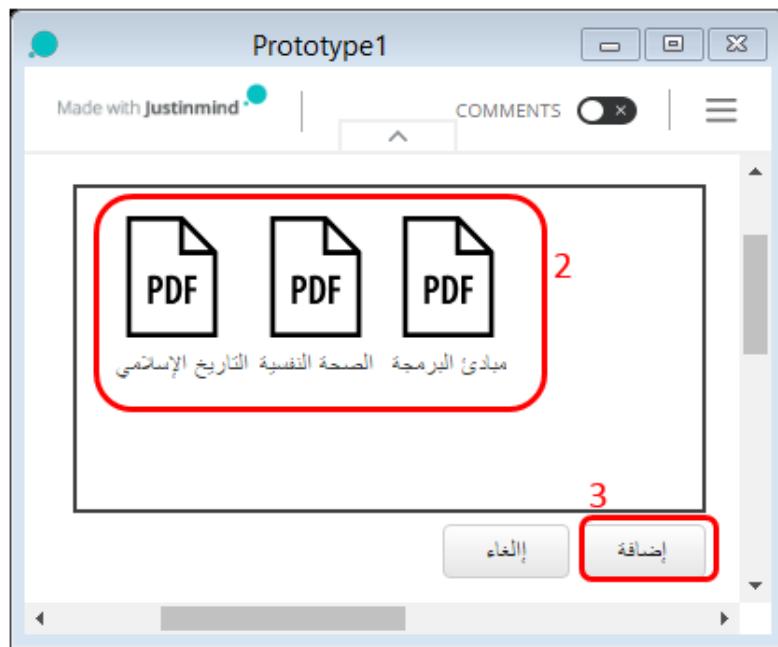


Figure 33: Add Reference Document Scenario (Documents Window).

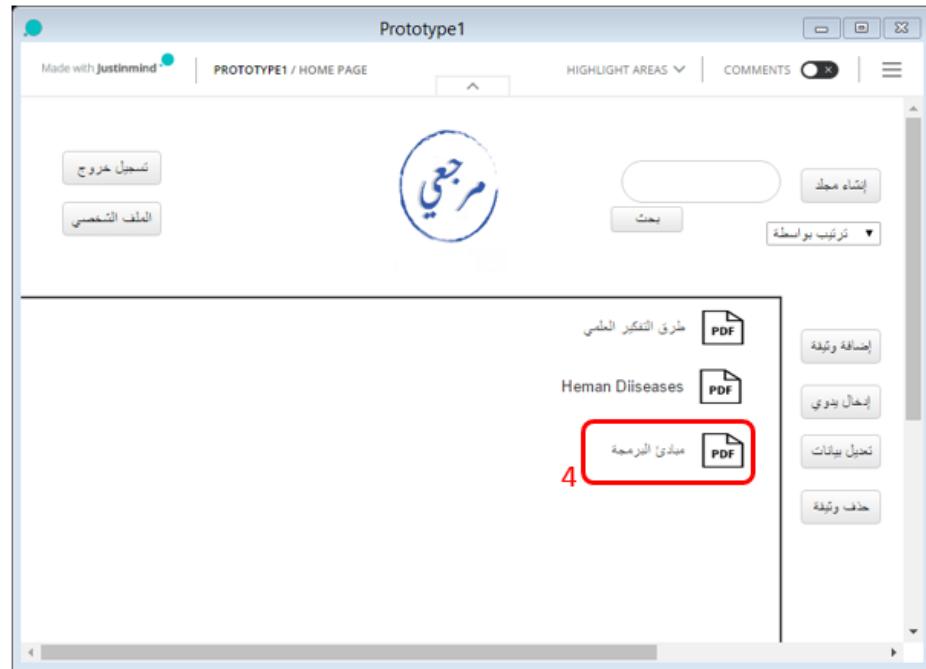


Figure 34: Add Reference Document Scenario (Last Step).

Table 25: Interface Description (Add Reference Document).

#	Description
1	The button that allows the user to add reference document.
2	In this window, the reference document will be selected.
3	The button that adds the reference document to the library.
4	The reference document after it has been added.

4.4.5 ADD ENTRY MANUALLY

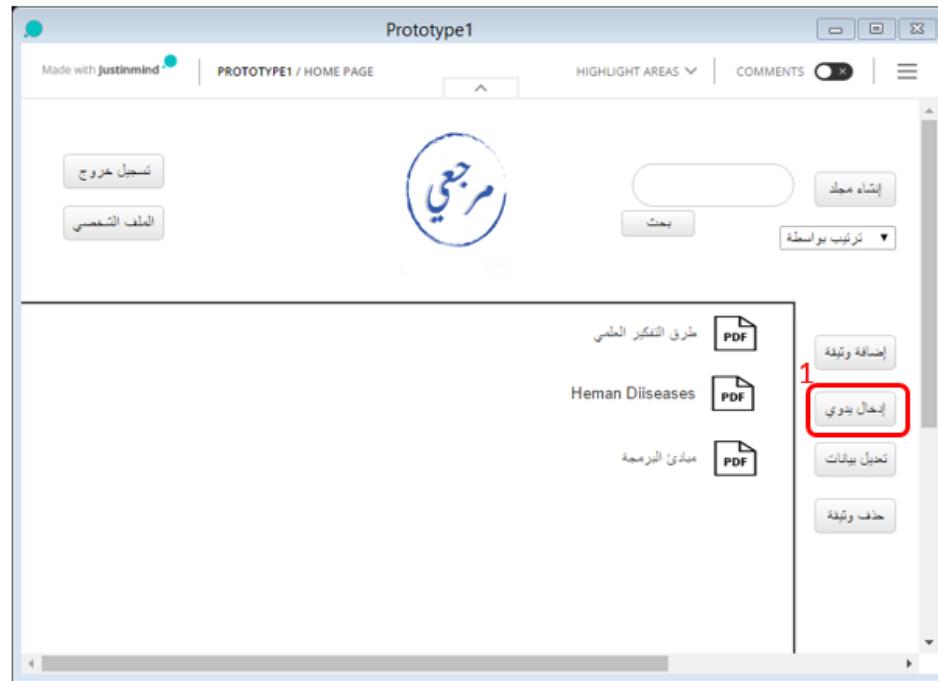


Figure 35: Add Entry Manually Scenario (Step1).

The screenshot shows the 'Prototype1' application interface with the title 'PROTOTYPE1 / MANUALLY'. The main area contains a form for adding a new entry. The form consists of four rows of input fields, each with a label in Arabic: 'العنوان' (Address) with a dropdown menu labeled 'كتاب' (Book) above it, 'المؤلف' (Author) with a dropdown menu labeled 'كتاب' (Book) above it, 'الناشر' (Publisher) with a dropdown menu labeled 'كتاب' (Book) above it, and 'سنة النشر' (Year of Publication) with a dropdown menu labeled 'كتاب' (Book) above it. The entire form area is highlighted with a large red box. Below the form are two buttons: 'إلغاء' (Cancel) and 'إضافة' (Add), with the 'إضافة' button highlighted with a red box and labeled '4'. A red box labeled '3' is also present near the right edge of the form area.

Figure 36: Add Entry Manually Scenario (Form).

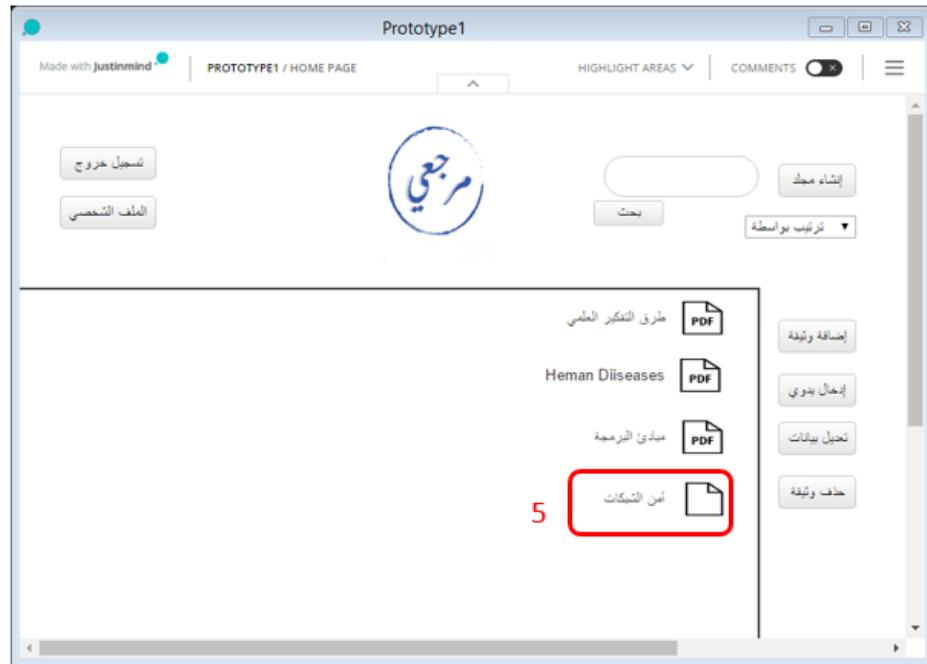


Figure 37: Add Entry Manually (Last Step).

Table 26: Interface Description (Add Entry Manually).

#	Description
1	The button that allows the user to add entry manually.
2	The drop-down menu where the user selects the entry type ‘book’ in this case’
3	The form where the user will enter the reference document information.
4	The button that will save the entry in the library.
5	The entry after it has been added.

4.4.6 EDIT DOCUMENT INFO

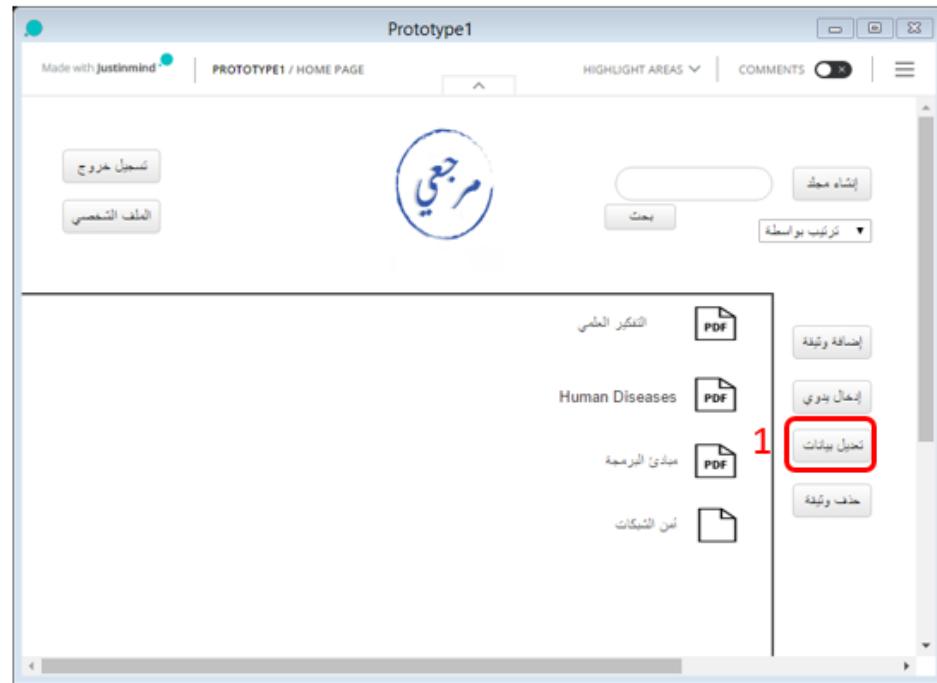


Figure 38 : Edit Document Info Scenario (Step1).



Figure 39: Edit Document Info Scenario (Documents Window).

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Figure 40: Edit Document Info Scenario (Form).



Figure 41: Edit Document Info Scenario (Confirmation Message).

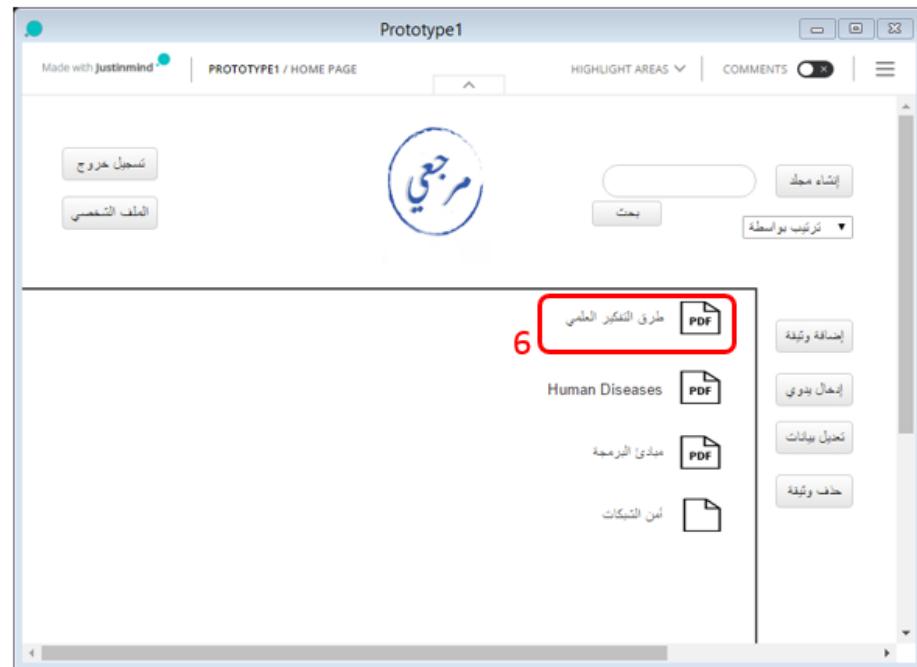


Figure 42: Edit Document Info Scenario (Last step).

Table 27: Interface Description (Edit Document Info).

#	Description
1	The button that allows the user to edit a reference document information.
2	The window that contains the reference documents in the library.
3	The form that contains the selected reference document information
4	The button that will save the updates.
5	Confirmation message.
6	The reference document after it has been updated.

4.4.7 DELETE REFERENCE DOCUMENT

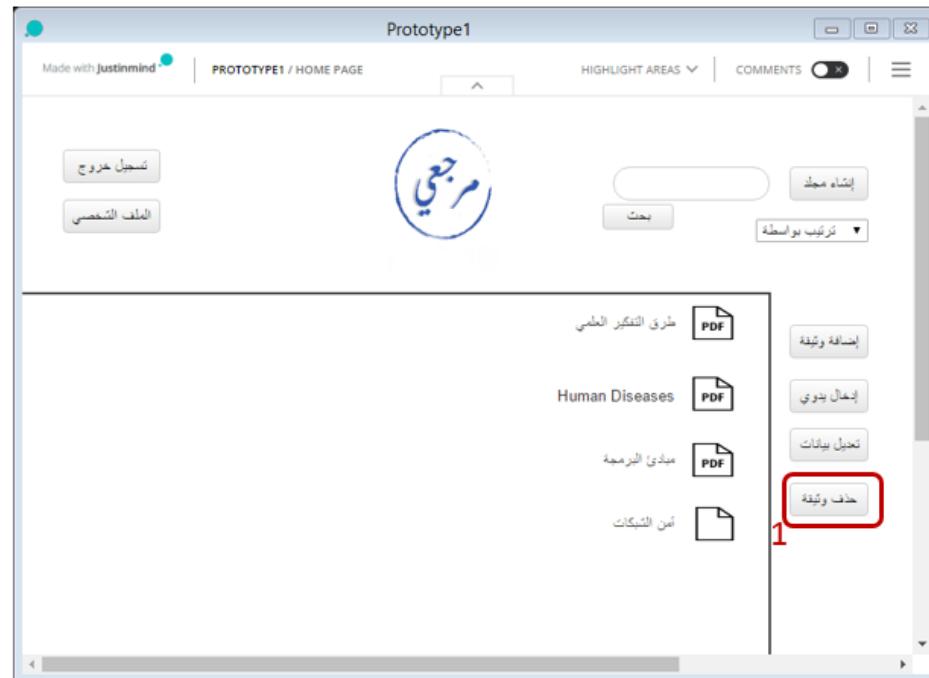


Figure 43: Delete Reference Document Scenario (Step1).

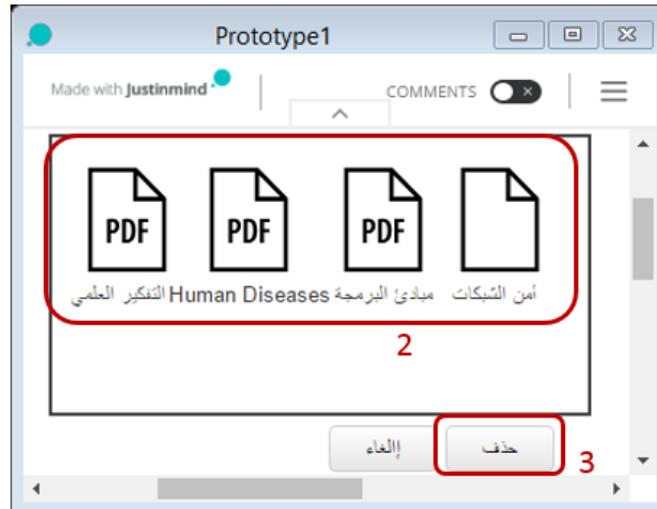


Figure 44: Delete Reference Document Scenario (Documents Window).

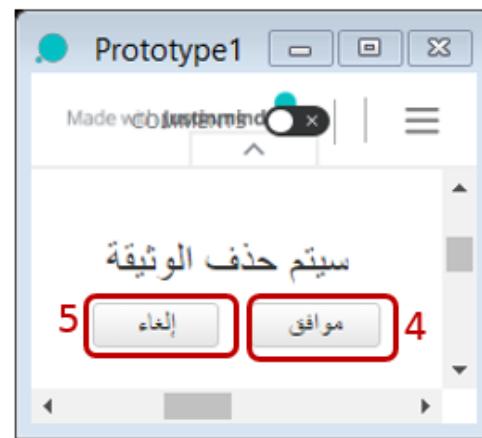


Figure 45: Delete Reference Document Scenario (Confirmation Message).

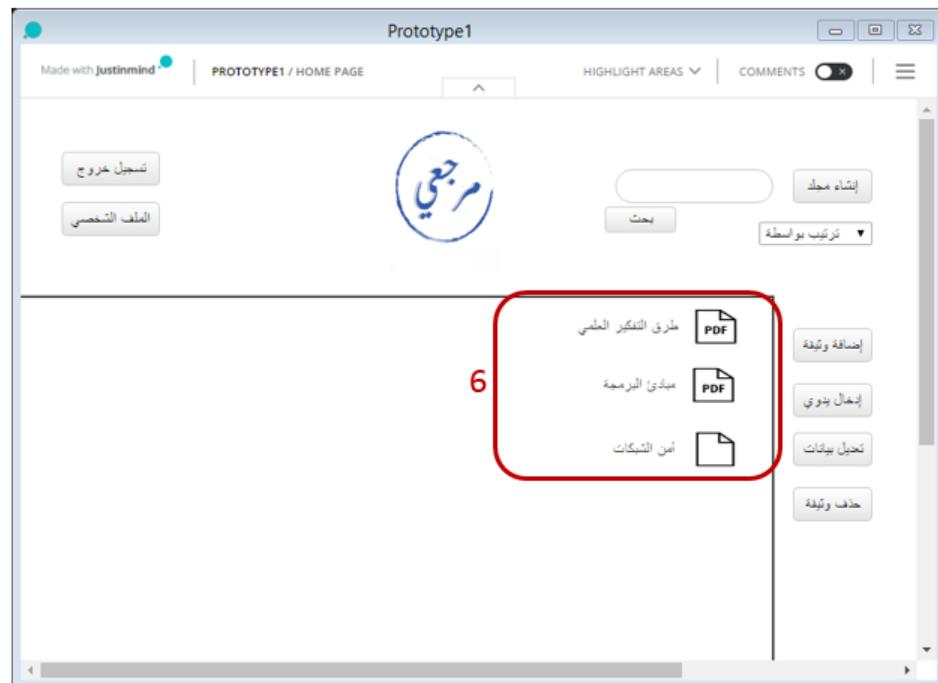


Figure 46: Delete Reference Document Scenario (Last step).

Table 28: Interface Description (Delete Reference Document).

#	Description
1	The button that allows the user to delete reference document.
2	The window that contains the documents in the library.
3	This button when clicked, it will show a confirmation message.
4	This button when clicked, it will delete the document.
5	This button when clicked, it will cancel the operation.
6	When confirmed; the system shows that the reference document is deleted from the library.

4.4.8 SELECT BIBLIOGRAPHY STYLE

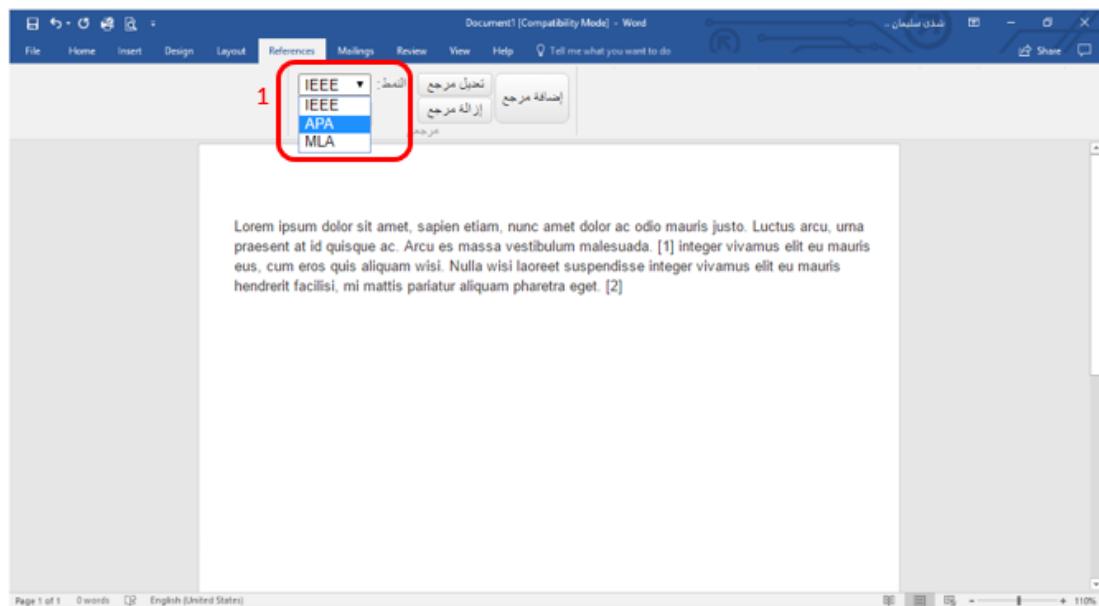


Figure 47: Select Style Scenario (Step1).

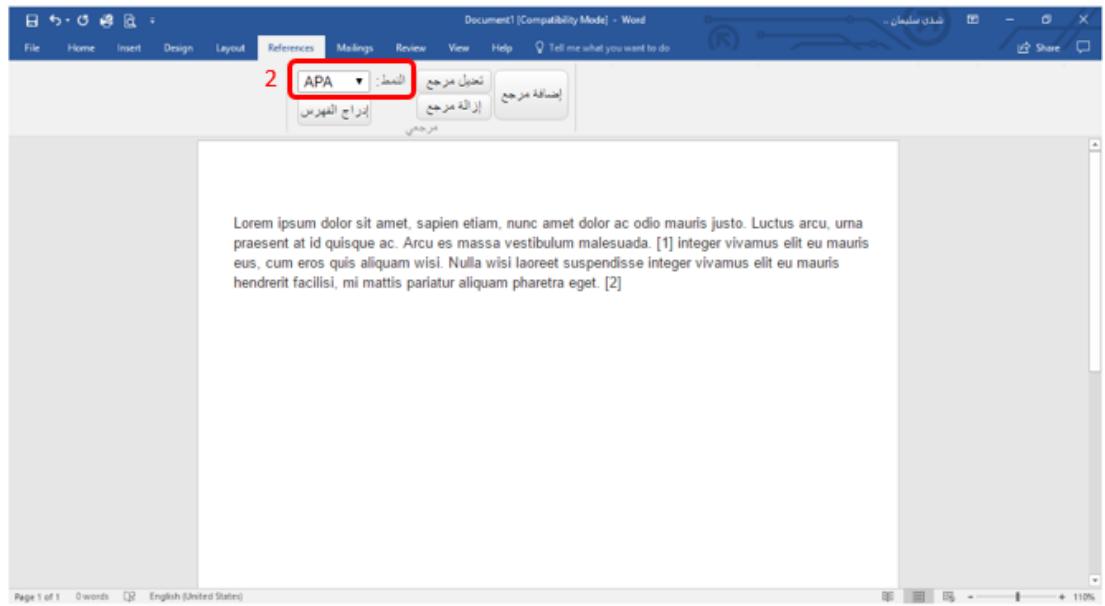


Figure 48: Change Style Scenario (Step2).

Table 29: Interface Description (Select Bibliography Style).

#	Description
1	The drop-down menu to select a style
2	the selected style will be saved.

4.4.9 ADD REFERENCE

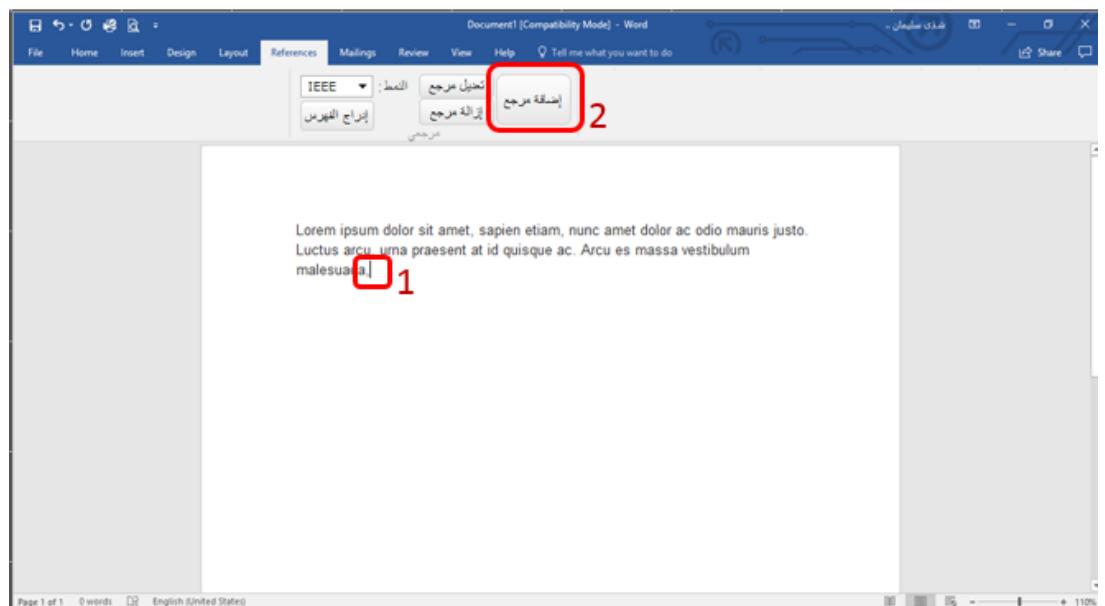


Figure 49: Add Reference Scenario (Step1).



Figure 50: Add Reference Scenario (Documents Window).

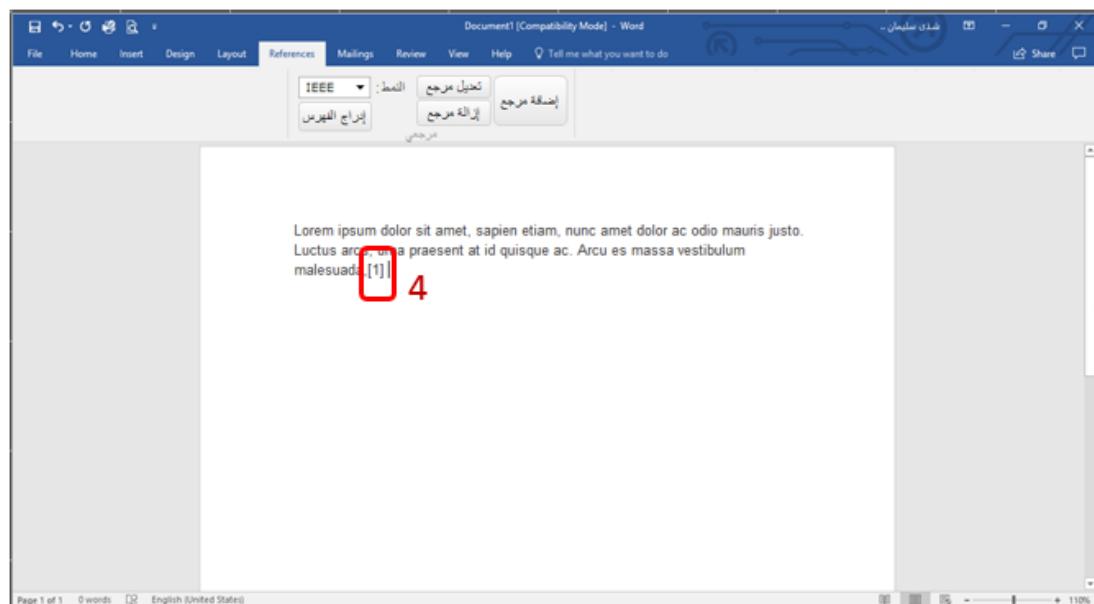


Figure 51: Add Reference Scenario (Last step).

Table 30: Interface Description (Add Reference).

#	Description
1	The user will set the cursor where he/she wants to add reference
2	The button that allows the user to add the reference
3	The window that shows the reference document in the library to be select from
4	The reference is added.

4.4.10 EDIT REFERENCE

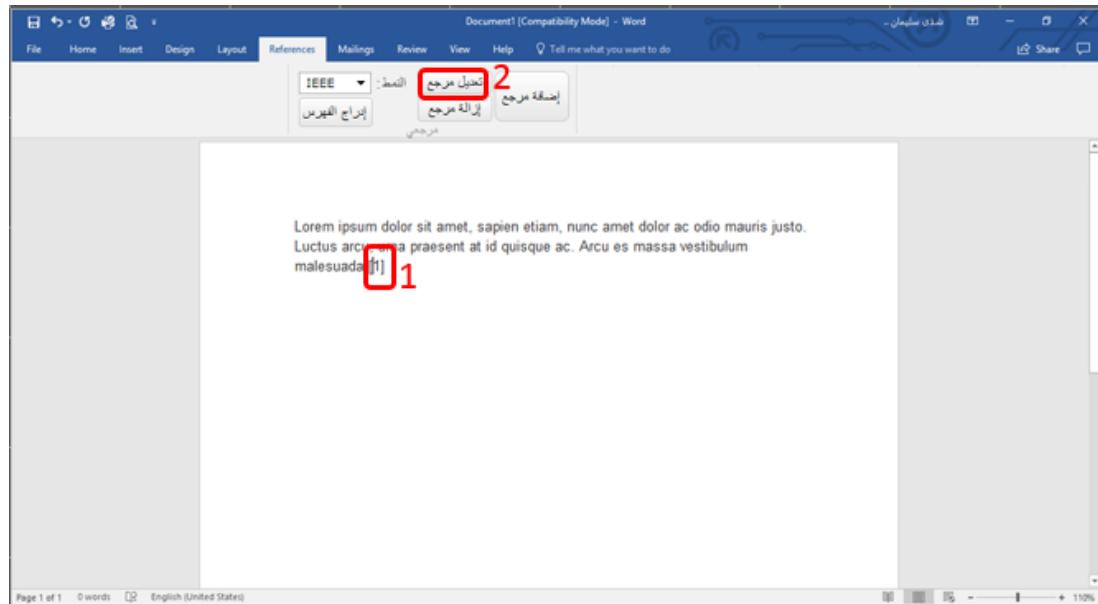


Figure 52: Edit Reference Scenario (Step1).

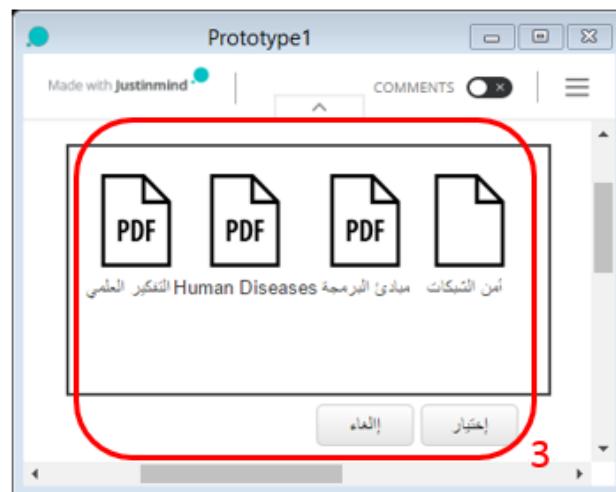


Figure 53: Edit Reference Scenario (Document Window).



Figure 54: Edit Reference Scenario (Confirmation Message).

Table 31: Interface Description (Edit Reference).

#	Description
1	The user puts the cursor on the reference that he/she wants to edit.
2	The button that allows the user to edit the reference.
3	The window that shows the reference document in the library to be select from.
4	Confirmation message.

4.4.11 REMOVE REFERENCE

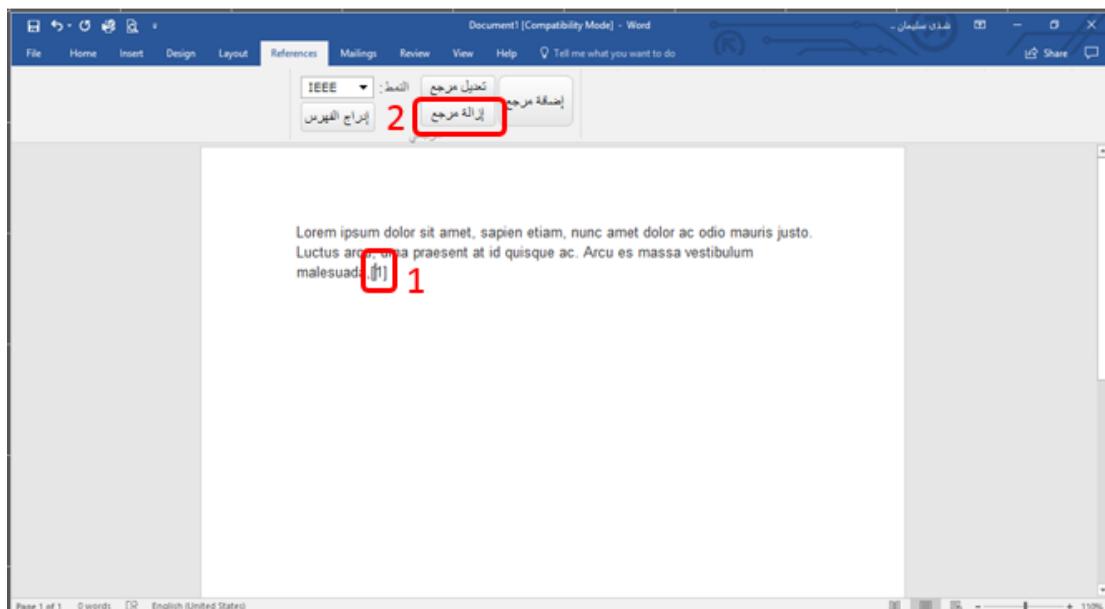


Figure 55: Remove Reference Scenario (Step1).

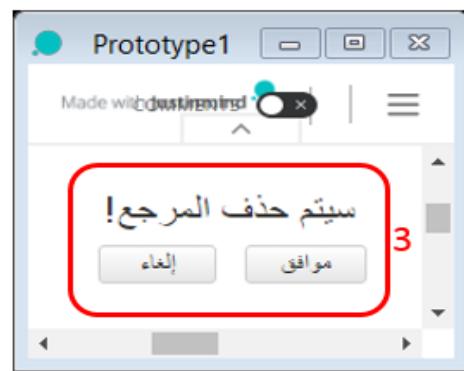


Figure 56: Remove Reference Scenario (Confirmation Message).

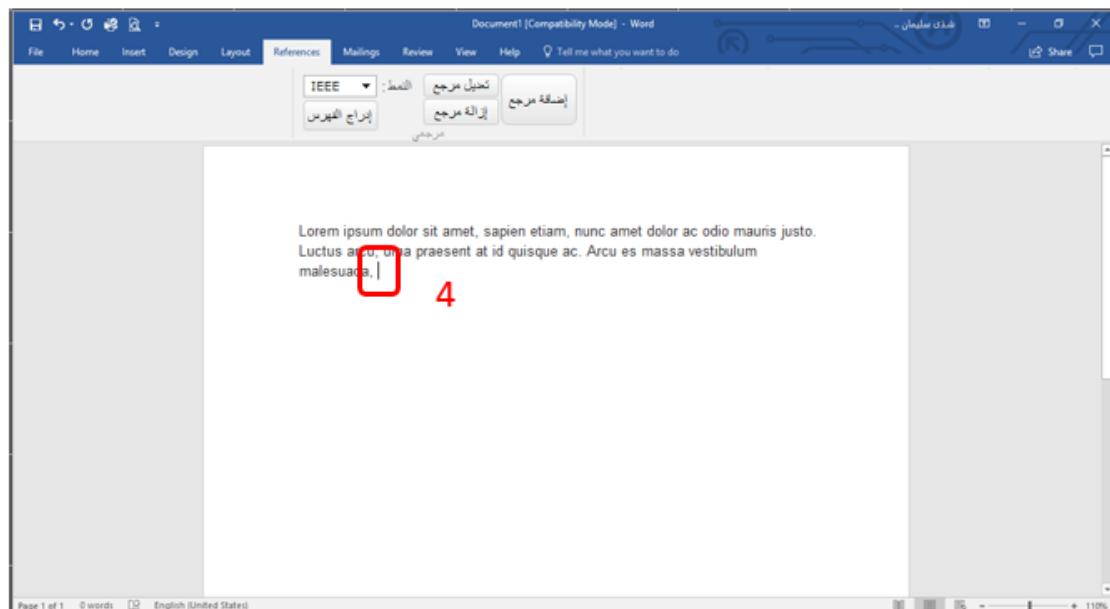


Figure 57: Remove Reference Scenario (Last Step).

Table 32: Interface Description (Remove Reference).

#	Description
1	The user puts the cursor on the reference that he wants to remove.
2	The user clicks on “remove reference”
3	Confirmation message
4	When confirmed; the reference will be removed.

4.4.12 INSERT BIBLIOGRAPHY

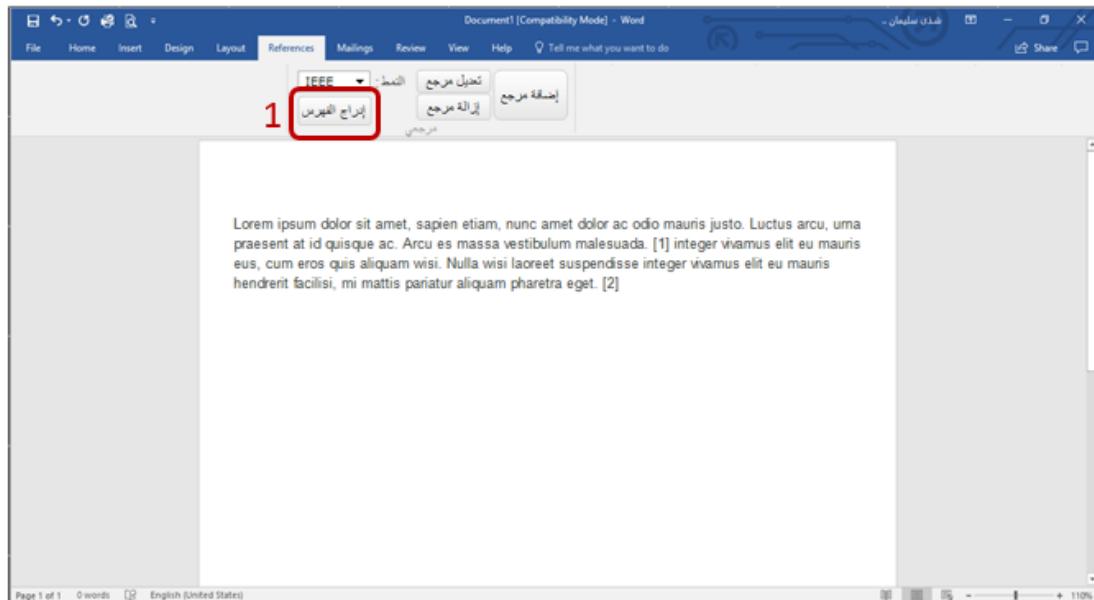


Figure 58: Insert Bibliography Scenario (Step1).

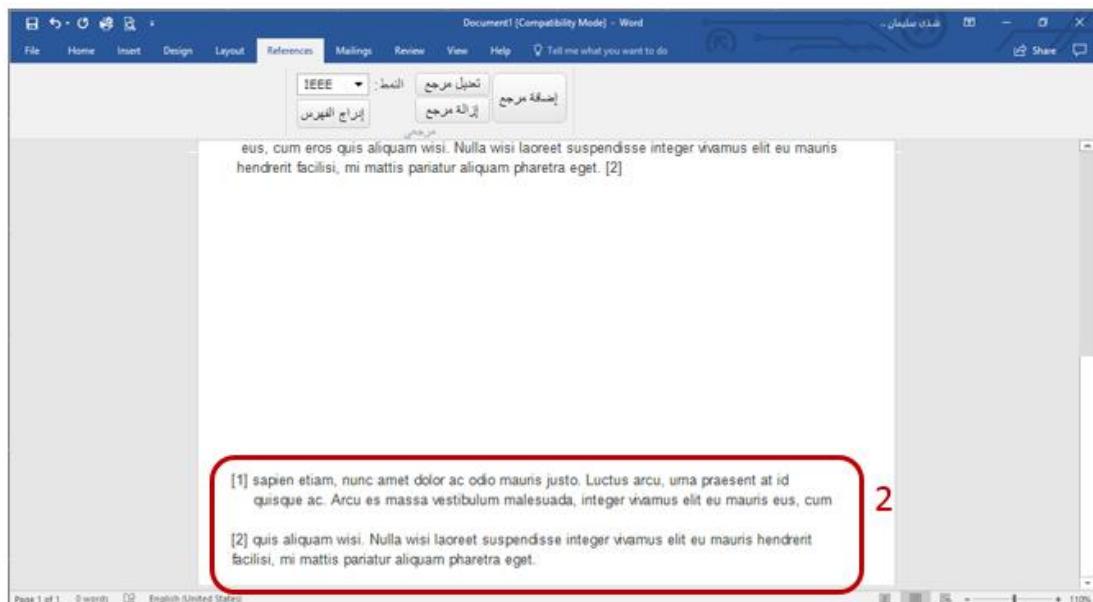


Figure 59: Insert Bibliography Scenario (Last step).

Table 33: Interface Description (Inset Bibliography).

#	Description
1	This button when clicked, it will display the bibliography list at the end of the file.
2	This section that contains the bibliography list.

4.4.13 SEARCH

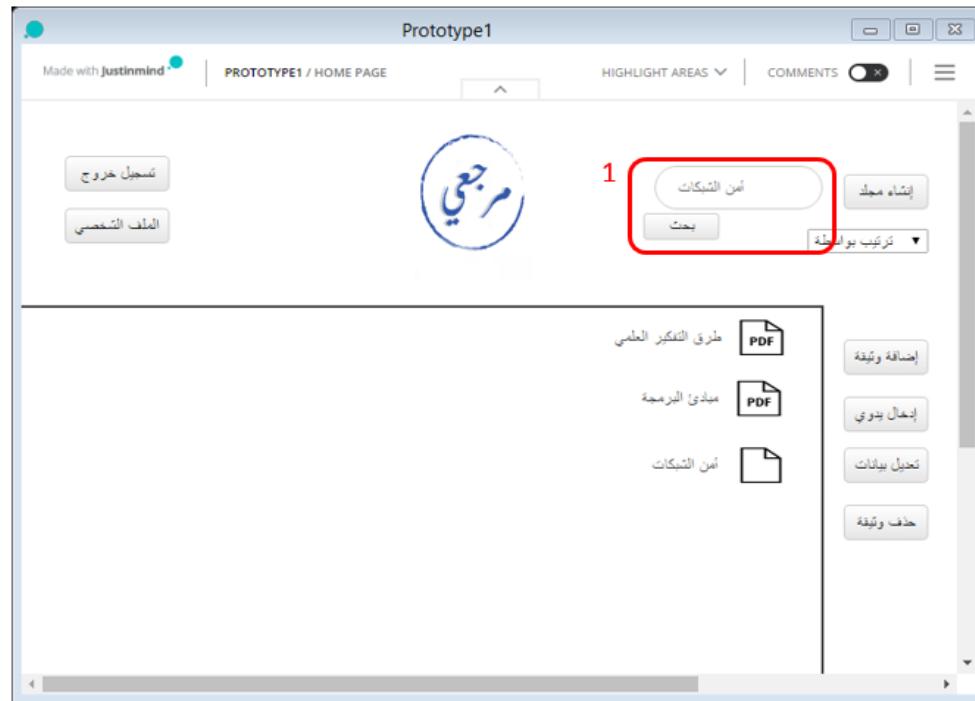


Figure 60: Search Scenario (Step1).

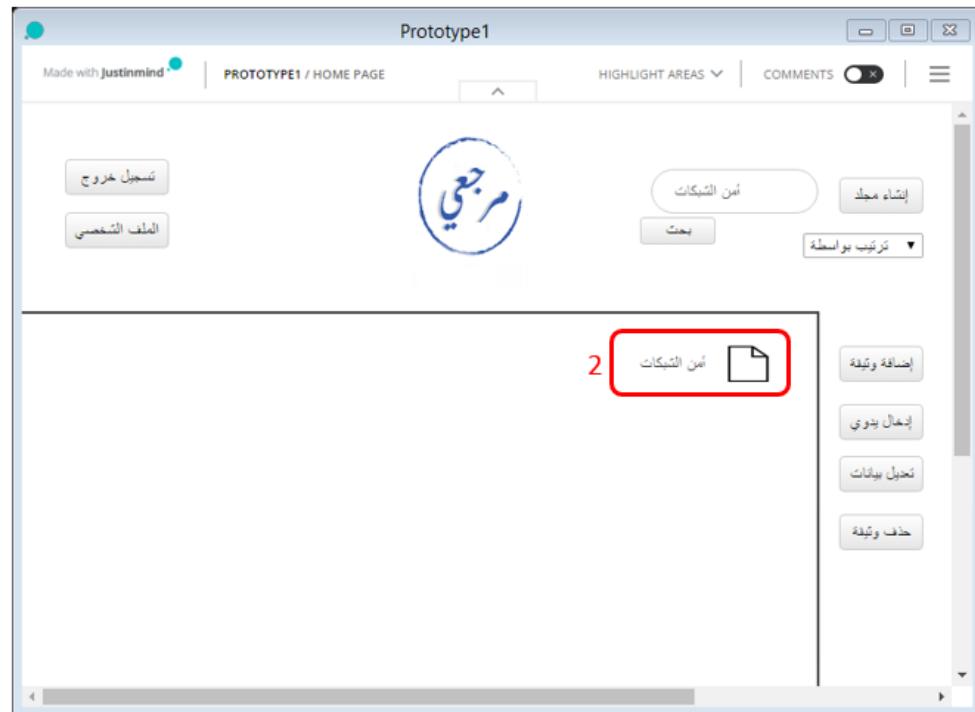


Figure 61: Search Scenario (Results).

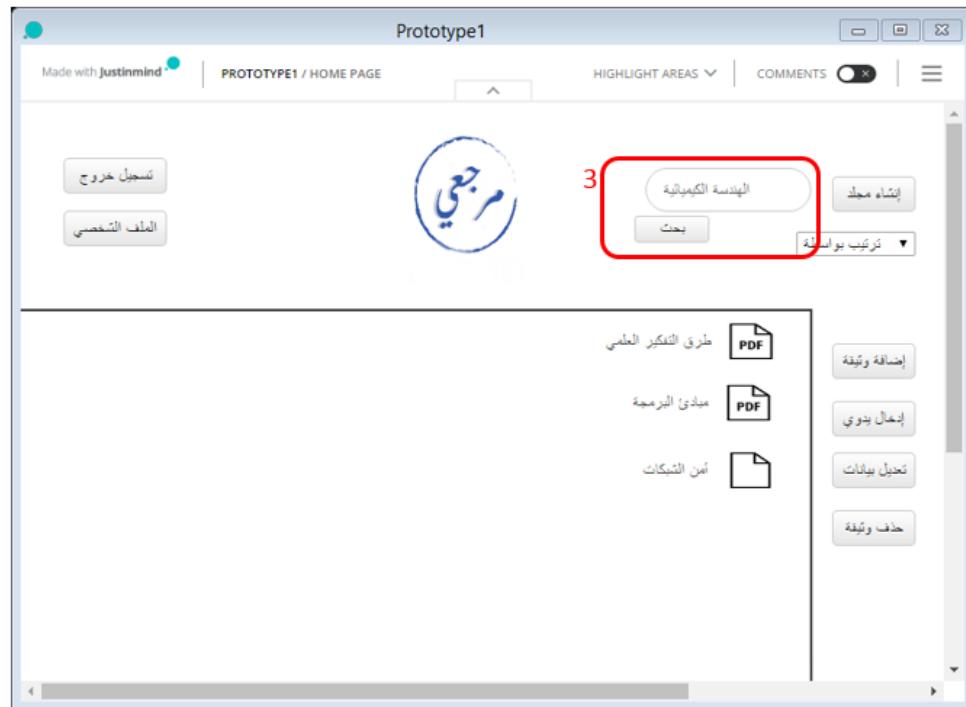


Figure 62: Search Scenario (invalid key).



Figure 63: Search Scenario (No Results).

Table 34: Interface Description (Search).

#	Description
1	The field that the user will enter the search key then click “search”.
2	The system will show results in the home page.
3	Here the user types a key that doesn’t exist in the library.
4	The system shows “No Results”.

4.4.14 LOG OUT

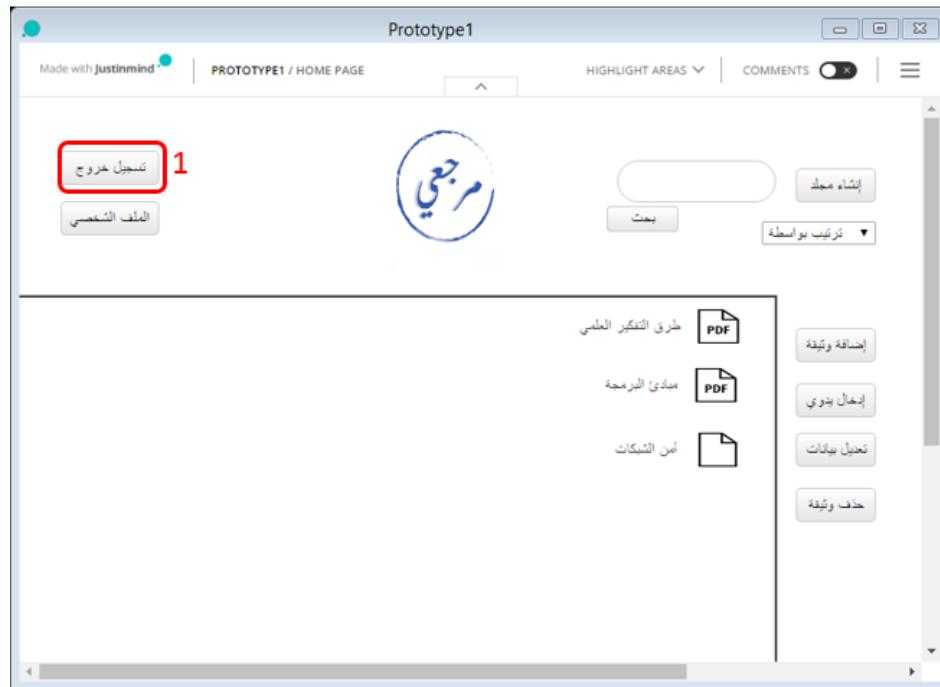


Figure 64: Log out Scenario (Step1).

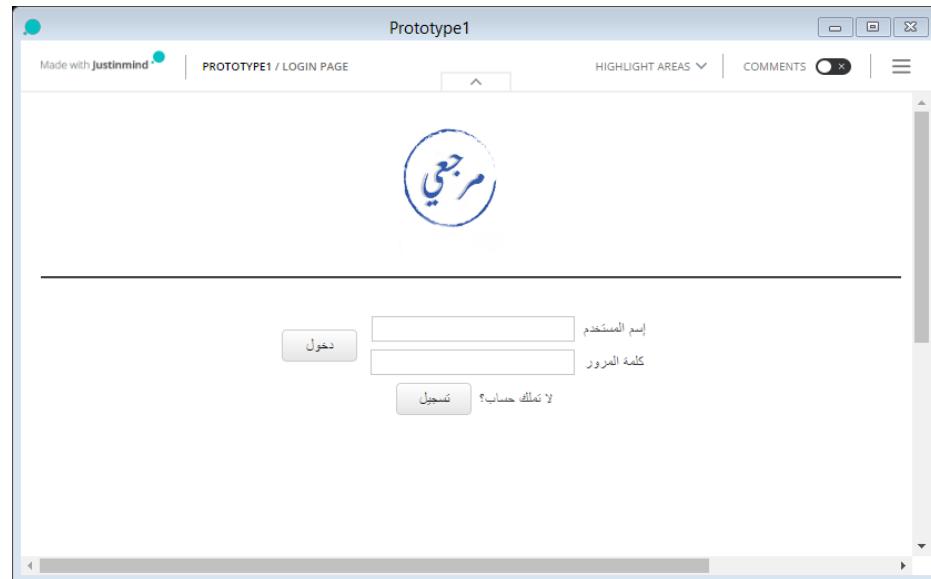


Figure 65: Log out Scenario (Last step).

Table 35: Interface Description (Log out).

#	Description
1	The button that allows the user to log out from the system and redirect him/her to the log in page.

Chapter 5: Conclusion

5.1 CONCLUSION

Marjiei is an offline standalone program for managing references. Usually the users of Marjiei will be bachelor, Master and PhD holders or even ordinary students. Marjiei keeps user's references in one managed place. It provides several services to the users as well.

One of its advantages is the Arabic interface, which is the most wanted feature in the market. In Marjiei users can create accounts and edit their profiles. Users will have an electronic library, which will save their documents. User could also organize the documents in the library by creating folders and sorting files inside them. User can add, edit and remove references from Word files. User can choose certain referencing style and apply it to their documents.

During the analysis of the system, Object Oriented Analysis and Design approach was adopted. We first identify the different aspects of the system and understand their functionalities in depth. Then, we considered the similar applications and identified the differences that make our system unique. After that, we illustrated the functionalities that will be offered by Marjiei and draw the system models that shows the interactions between the user and the different objects within the system.

In the next semester, we will start the implementation and testing phases inshaAllah.

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