King Abdulaziz University
Faculty of Computing and Information Technology
Department of Computer Science
CPCS 351: Software Engineering
Fall 2023- First semester- 1444

khulasa | خـــلاصة

Book summarization system

Version: 0.4 Group ID: 1

Status: Draft Section: B9A

Date	Version	Description	Authors
11 - 9 - 2022	0.1	Phase 1	All group members
29 - 9 - 2022	0.2	Phase 2	All group members
30 – 10 - 2022	0.3	Phase 3	All group members
13 - 11 - 2022	0.4	Phase 4	All group members

Table of Contents

Phase 1: Project Description 5
1.1 Introduction 5
1.2 Project Description and Objectives 5
1.3 Sources of Domain Analysis Information 5
1.4 Goal and Scope of the System 6
1.5 Project Team 7
Phase 2: Business Requirements Specifications 8
2.1 Techniques for Gathering Data 8
2.1.1 Survey 8
2.1.2 Competing System 8
2.2 Requirements and its type 8
2.2.1 Functional Requirements 8
2.2.2 Non-functional Requirements 11
2.3 Use Case Diagram 12
2.4 Use Case Description 13
2.4.1 Main Use Case 1 13
2.4.2 Main Use Case 2 14
2.4.1 Main Use Case 3 14
2.4.4 Main Use Case 4 15
2.5 Difficulties and Risk Analysis in the Domain 16
Phase 3: Software Design and Structuring 17
3.1 Domain Model 17
3.2 UML Class diagram 18
3.2.1 Association Relationships 18
3.2.2 Composition Relationships 19
3.2.3 Generalization 19
3.3 System Architecture 20
3.3.1 Determine Design Objectives 20
3.3.2 Type of System 20
3.3.3 Architectural Style 20
3.3.4 Specify subsystem functions, interfaces, and interaction behavior 20
3.3.5 Architecture design 20
Phase 4: Modeling, Interaction & Behavior 21
4.1 Sequence Diagrams 21

4.1.1 Download Summary 21
4.1.2 Subscribe 22
4.2 State Diagrams 23
4.2.1 Subscribe use case 23
4.2.2 download summary 23
4.3 Activity Diagrams 24
4.3.1 download summary 24
4.3.2 subscribe 24
4.4 Testing 25
Appendix 29

List of Figures

Figure 1: Use Case Diagram 1 12
Figure 2: Use Case Diagram 2 12
Figure 3: Use Case Diagram 3 13
Figure 4: Domain Model 17
Figure 5: UML class diagram 18
Figure 6: Architecture Design 20
Figure 7: Sequense Digram(Download Summary) 21
Figure 8: Sequense Digram(subscribe) 22
Figure 9: state diagram (subscribe) 23
Figure 10: state diagram (download summary) 23
Figure 11: activity diagram (download summary) 24
Figure 12: activity diagram (subscribe) 24

List of Tables

Table 1: Project team 5
Table 2: Main Use Case 1 11
Table 3: Main Use Case 2 12
Table 4: Main Use Case 3 13
Table 5: Main Use Case 4 14

Phase 1: Project Description

1.1 Introduction

Our world today has come more connected than a few decades ago. Communicating with people from other cultures and countries is almost a part of everyday life. So, understanding each other's culture will be more important over time. Knowing about others' cultures includes their history, language, religion, etc.

There are many ways to learn about other cultures like traveling, visiting museums, watching movies, and following foreign social media pages. One of the most interesting ways is reading books. Books give you the chance to explore new cultures without needing to travel and spend money and time. In your free time, you can read about etiquette, gender roles, festivals, and the religion of other cultures you are interested in.

However, these days many people do not have time to read a book of 200 pages. Because the world is becoming so fast due to technology, our idea is to create an application that introduces summaries of our books in various languages to the world, which will help many people to learn about the culture creatively.

1.2 Project Description and Objectives

Recently, many people do not read books, which affects their knowledge. Some of the common reasons for not reading are busyness, the cost of books, and boredom while reading.

Our application is the solution for everyone who does not have time to read or who cannot complete the book because its pages are many. The system provides textor audio summaries of many different Arabic books, so that the user can know the main ideas without having to read the entire book. Our objective is to increase the level of knowledge and develop people's cultural information easily in the least time and cost. Another objective is to spread Arab culture around the world, so we have provided summaries in different languages.

1.3 Sources of Domain Analysis Information

The source of domain analysis included people who are passionate about books and reading but might not have the time to read a whole book, so they tend to listen and read text and audio summaries of books. In addition to articles that explain the problem of lack of reading in recent times.

1.4 Goal and Scope of the System

This application will help many book lovers to get a summary that includes all the basic book information in the shortest possible time. The e- library aims to provide text and audio summaries of useful Arabic books, in several languages to facilitate obtaining the greatest amount of information effectively and fast.

We strive to:

- Easy reading or listening to summaries everywhere and anytime.
- Quick access to information.
- Saving time and effort of the blinds by providing audio summaries of books.

1.4.1 This system includes:

- Summaries of Arabic books, translated into several languages.
- Text and audio summaries.
- List to save favorite books to get their summaries easily.
- The ability to search for a specific summary by the book name.
- Suggesting summaries of many books to the user based on their interests.
- Subscribing to the application (monthly or annually) and downloading summaries so the user can read it or listen to it offline
- Allowing the user to rate book summaries and see other users' reviews.

1.4.2 This system excludes:

- Non-Arabic books.

1.5 Project Team

WORK DONE	STUDENT
Introduction	Joud Fayez Alahmadi – 2006214
Problem Description	Hanin Mohammed Alharbi- 1905536 (Leader)
Project Objectives	Hanin Mohammed Alharbi- 1905536 (Leader)
Sources of Domain Analysis Information	Maimona Assim Alhakeem – 2006752
Goal and Scope of the System	Jana Faisal Altalhi - 2006359
Include and Exclude Features of the System	Jana Faisal Altalhi - 2006359
Phase 2	All team participated
Domain Diagram	Joud Fayez Alahmadi – 2006214 Maimona Assim Alhakeem - 2006752
UML diagram	Joud Fayez Alahmadi – 2006214 Maimona Assim Alhakeem - 2006752
System Architecture	Hanin Mohammed Alharbi – 1905536 Jana Faisal Altalhi – 2006539
Sequence diagram	Joud Fayez Alahmadi – 2006214
State diagram	Hanin Mohammed Alharbi - 1905536
Activity diagram	Jana Faisal Altalhi – 2006539
Testing	Maimona Assim Alhakeem - 2006752

Table 1: Project team

Phase 2: Business Requirements Specifications

2.1 Techniques for Gathering Data

2.1.1 Survey

We collected data through a survey directed to users of our system. We noticed that many of them do not think that they read enough, and they aspire to read more. Moreover, one of the most reasons for that is not having enough time to read; hence this is where we got the idea of this system. Where concise and interesting summaries are provided to attract readers to get the most important information in the least time. For more detailed information, check Appendix.

2.1.2 Competing System

Akhdar is a system that provides text and audio summaries of different books. Our app has similar services to Akhdar with some improvements. Such as:

- Translate summaries into different languages.
- Provide samples for each summary so anyone can view them.

2.2 Requirements and its type

2.2.1 Functional Requirements

Note: Staff member (publisher, summarizer, translator, and narrator).

1. The system shall allow anyone to use the system as a guest.
    1.1 Unlike the subscribed user, the guest cannot benefit from the application services such as downloading a summary, liking a summary, rating a summary, etc.

2. The system shall allow a new user ,admin and staff member to create an account.
    2.1 The system will ask them to enter information like username, password, email, and phone number.

3. The system will allow the user, the admin and the staff member to log in for those whoalready own an account.
    3.1 The system will prompt them to enter the correct username and password.

4. The system shall allow the user, the admin, and the staff member to choose the application language.

5. The system shall display a profile for each user ,admin and staff member.
    5.1 The system will allow them to edit theirprofile.
        5.1.1 The system shall allow them to changethe username.
        5.1.2 The system shall allow them to change the profile photo.
        5.1.3 The system shall allow them to change the email.
        5.1.4 The system shall allow them to change the password.
        5.1.5 The system shall allow them to change the phone number.

6. The system shall allow the user to subscribe.
    6.1 The system shall allow the user to subscribe monthly or annually.
    6.2 The system shall allow the user to choose the payment method (apple pay, credit card).

7. The system will cooperate with the publishing institution to upload books by the publisher.

8.The system shall allow the user to view the categories of summaries.

9. The system shall allow the user, translator, and narrator, search for a summary, and allow the summarizer, publisher to search for a book.
    9.1 The system shall allow the user, guest, and staff member to search by typing the book's name and showing the book's title , author and publishing institution .
    9.2 The system shall allow the user, guest, and staff member to search by voice and showing the book's title, author and publishing institution.

10. The system shall allow the user to view a summary.
    10.1The system shall view the text summaries of any bookin a language the user chooses.
    10.2The system shall view the audio summaries of any book in a specific language.

11. The system shall provide samples for both guests and users.

12. The system shall allow the user to display a library for each user.

12.1 The system shall allow the user to view a list of downloaded summaries.

12.1.1 The system shall allow the user to download a summary in a specific language.

12.1.1.1 The system shall allow the user to open the downloaded summary offline.

12.1.2 The system shall allow the user to delete any downloaded summary.

12.2 The system shall allow the user to view a list of favorite summaries.

12.2.1 The system shall allow the user to like a summary.

13. The system shall allow the user to rate the summary after reading or listening to it.

14. The system shall allow the user to see other users` reviews of any summary.

15. The system will send notifications to the user.

15.1 The system will send notifications containing suggested summaries.

16. The system should allow the summarizer to view a list of available books.

17. The system shall allow the summarizer to add books to his "My books" list.

17.1The system should not allow the summarizer to add books under processing.

18. The system shall allow the summarizer to upload his summary as a text.

19. The system should allow the translator to view a list of available summaries.

20. The system should allow the translator to add summaries to his "My summaries" list.

20.1The system should not allow the translator to add summaries under processing.

20.2The system should allow the translator to choose the language to be translated into.

21. The system should allow the translator to upload his translated summary text.

22. The system should allow the narrator to view a list of translated summaries.

23. The system should allow the narrator to add summaries to his "My summaries" list.
    23.1 The system should not allow the narrator to choose a summary that is under processing.
    23.2 The system should allow the narrator to choose the language he wants to record the summary.

24. The system should allow the narrator to upload his recorded summary.

25. The system shall allow the admin to manage the accounts.

26. The system shall allow the admin to give authority to the staff members.

27. The system shall allow the admin to approve or reject files.

28. The system shall allow the user, admin and staff member to log out.

2.2.2 Non-functional Requirements

1. The audio summary should not exceed one hour.
2. The length of the text summary should not exceed 30% of the pages of the book.
3. The summary should be available to the user during the term of the subscription.
4. The interface of the system should be easy to use.
5. The quality of the audio should be clear.
6. The audio sample should not exceed 2 minutes.
7. The text sample should not exceed 1 page.
8. If the work extends more than two weeks, it will be deleted fromthe staff member's list.

2.3 Use Case Diagram

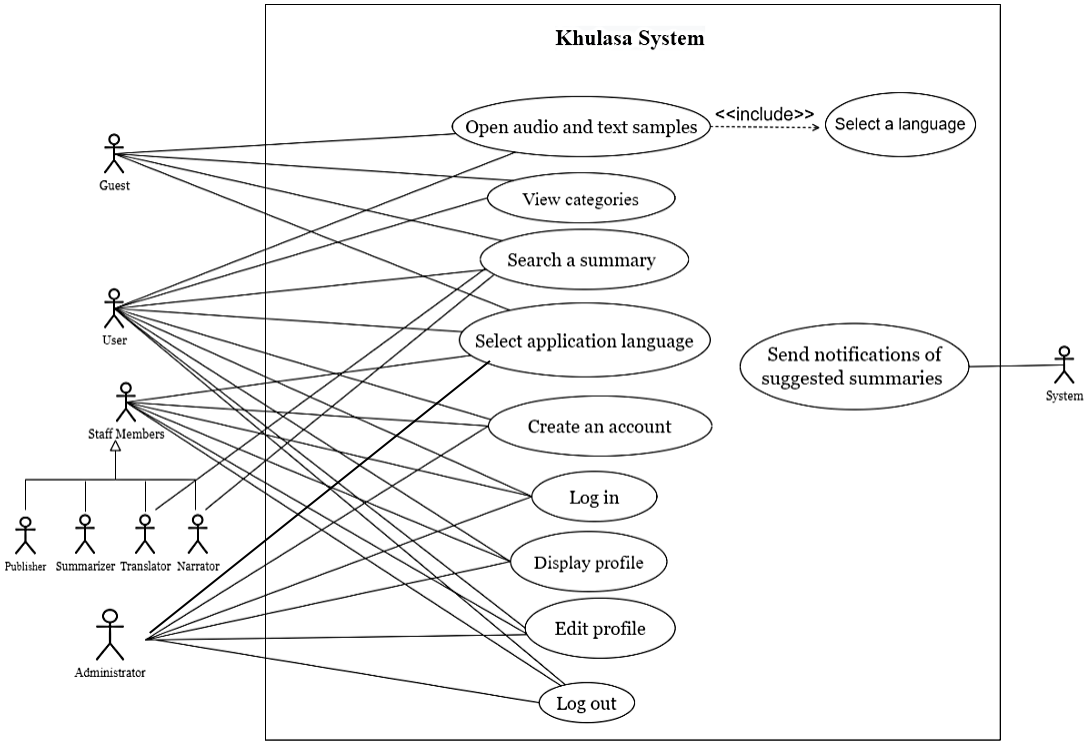


Figure 1: Use Case Diagram 1

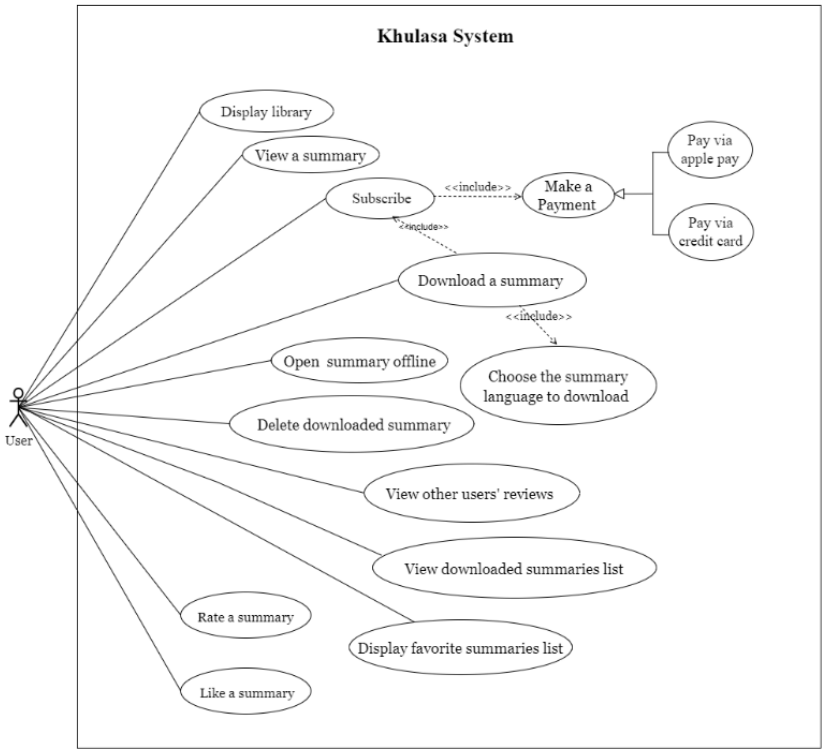


Figure 2: Use Case Diagram 2

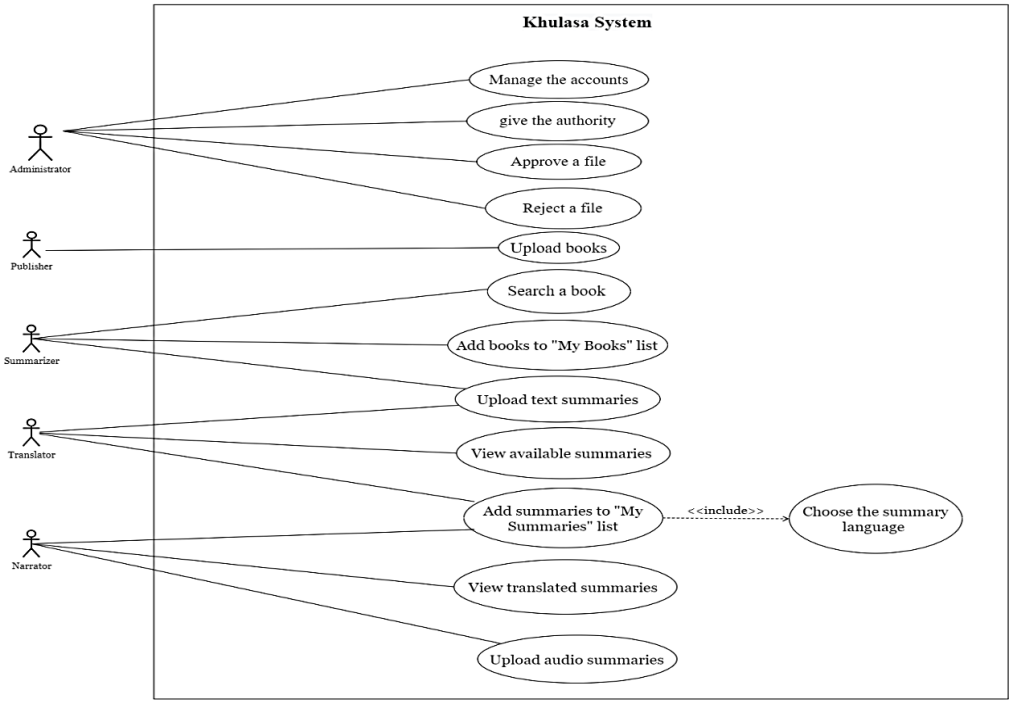


Figure 3: Use Case Diagram 3

2.4 Use Case Description

2.4.1 Main Use Case 1

SUBSCRIBE	
ID	UC001
Description	The system allows the users to subscribe monthly or annually and choose the payment method.
Primary Actor	User.
Preconditions	The user logged into the system.
Postcondition	The user has completed the subscription.
Main Scenario	1. The user should log in to the system. 2. The user clicks the subscribe button. 3. The user selects a subscription plan. 4. The user selects the payment method and process payment. 5. If subscription payment is completed; the system displays a message “Subscription is completed successfully”.
Extensions	If the user’s payment method is declined The system displays the message “Payment was rejected”.
Used Use Cases	Make a payment.

Table 2: Main Use Case 1

2.4.2 Main Use Case 2

SEARCH A SUMMARY	
ID	UC002
Description	The actor can search for any specific summary after they access the system.
Primary Actor	Guest, User, Translator, or Narrator.
Preconditions	The user, translator, and narrator are logged into the system.
Postcondition	The actors may or may not find the summary they look for.
Main Scenario	1. The Guest accesses the system without registering, but the other actors must log in to the system. 2. The actor clicks on the search box. 2.1 The actor types the book's name in the search box. 2.2 The actor uses their voice to search for the book's name. 3. The system searches for a specific summary.
Extensions	If the summary is not found The system displays a message "The summary is not found, make sure you typed the correct name and try again".
Used Use Case	Search a summary.

Table 3: Main Use Case 2

2.4.1 Main Use Case 3

DOWNLOAD A SUMMARY	
ID	UC003
Description	The user downloads any summary they want into their "Downloaded summaries" list.
Primary Actor	User.
Preconditions	The user must be registered in the system. The user must have a valid subscription.
Postcondition	The user successfully downloads a summary. The downloaded summary will be added to the user's "Downloaded summaries" list.
Main Scenario	1. The user logs into the system. 2. The user can access the summaries categories/search for a summary. 3. The user chooses a summary. 4. The system will display the available languages of the chosen summary. 5. The user chooses a language. 6. The user confirms to download the summary with the chosen language. 7. The user will receive a message when the download is

	completed. 8. The system will add the summary to the user's "Downloaded summaries" list.
Extensions	If the user did not choose the language before confirmation - The system will display an error message. If the user already downloaded the summary in the same language - The system will fail to download and display a message that the summary is already downloaded.
Used Use Cases	Choose the summary language to download.

Table 4: Main Use Case 3

2.4.4 Main Use Case 4

	UPLODE AUDIO SUMMARIES
ID	UC004
Description	The narrator uploads the audio summary after recording it.
Primary Actor	Narrator.
Preconditions	The narrator must be registered in the system as an admin. The narrator should be logged into the system.
Postcondition	The audio summary is uploaded, and the system displays a message "The file is successfully uploaded". The recorded summary will be removed from the available summaries list.
Main Scenario	1. The narrator logs into the system. 2. The narrator clicks on the exact summary he wants to upload (from his "My summaries" list). 3. The narrator clicks on "Upload Audio file". 4. The narrator chooses a language in which the summary will be recorded into. 5. The narrator uploads the recorded file. 6. The narrator confirms uploading the file. 7. The system displays a message "The file is successfully uploaded". 8. The narrator exits the uploading page.
Extensions	If the summary was already recorded in the same language that the narrator chose - The system displays an error message "The summary is already recorded in this language! Please choose a different language". If the summary is under processing - The system displays an error message "The summary is under processing. Please choose another summary".

	If the audio exceeds 2 minutes - The file fails to upload, and a message is displayed “The audio exceeds 2 minutes!”. If the summary has lasted in the “My summaries” list for more than two weeks - The summary would be removed from the narrator’s “My summaries” list, and he will be informed about it.
Used Use Cases	Upload audio summaries, Add summaries to the "My Summaries" list.

Table 5: Main Use Case 4

2.5 Difficulties and Risk Analysis in the Domain

- The requirements contained many details, which made it difficult for us to design the use case diagram.
- We modified the idea of the system after we started working, which increased the complexity of the work.
- We faced some difficulties to understand how the system works because we do not have enough experience.

Phase 3: Software Design and Structuring

3.1 Domain Model

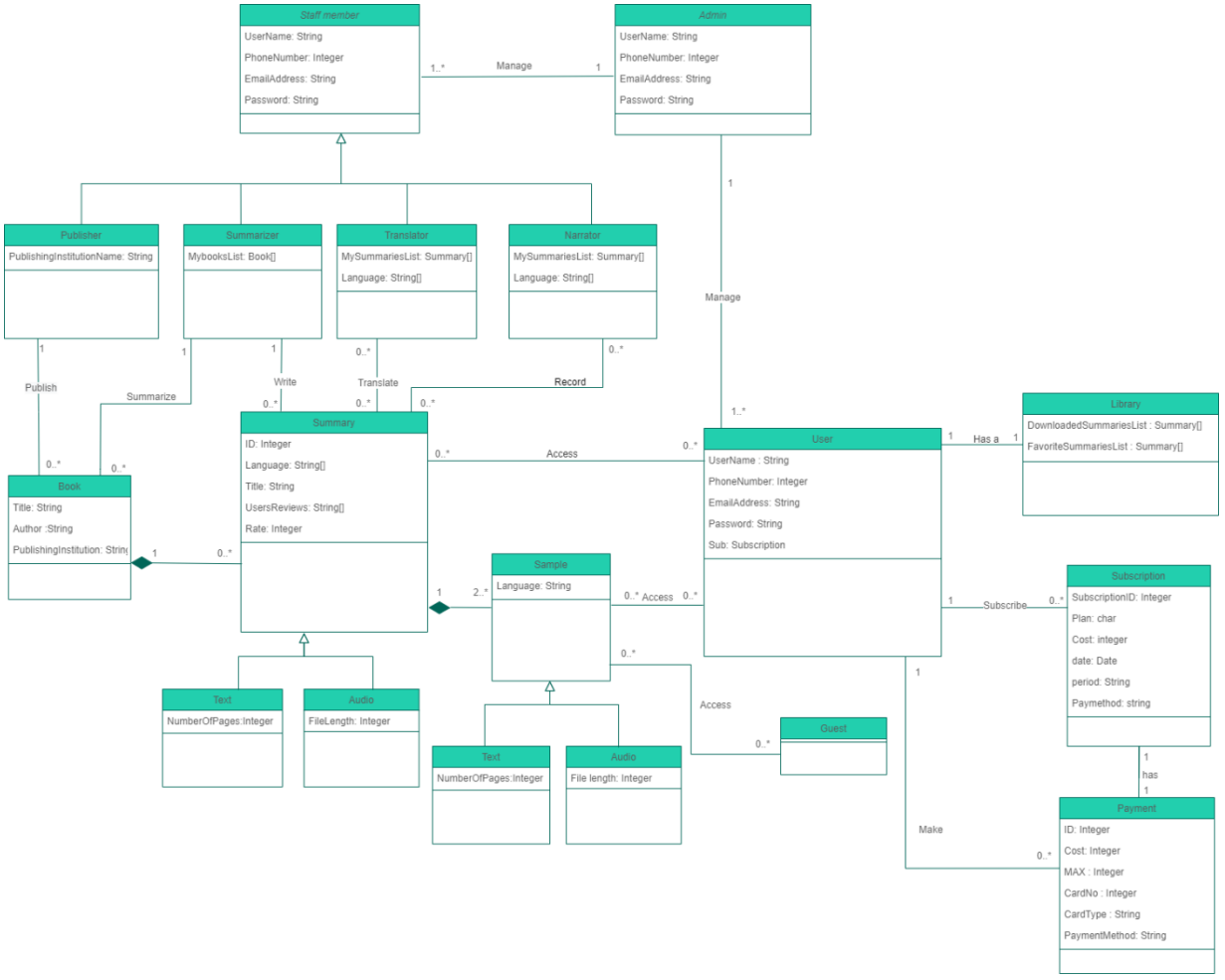


Figure 4: Domain Model

3.2 UML Class diagram

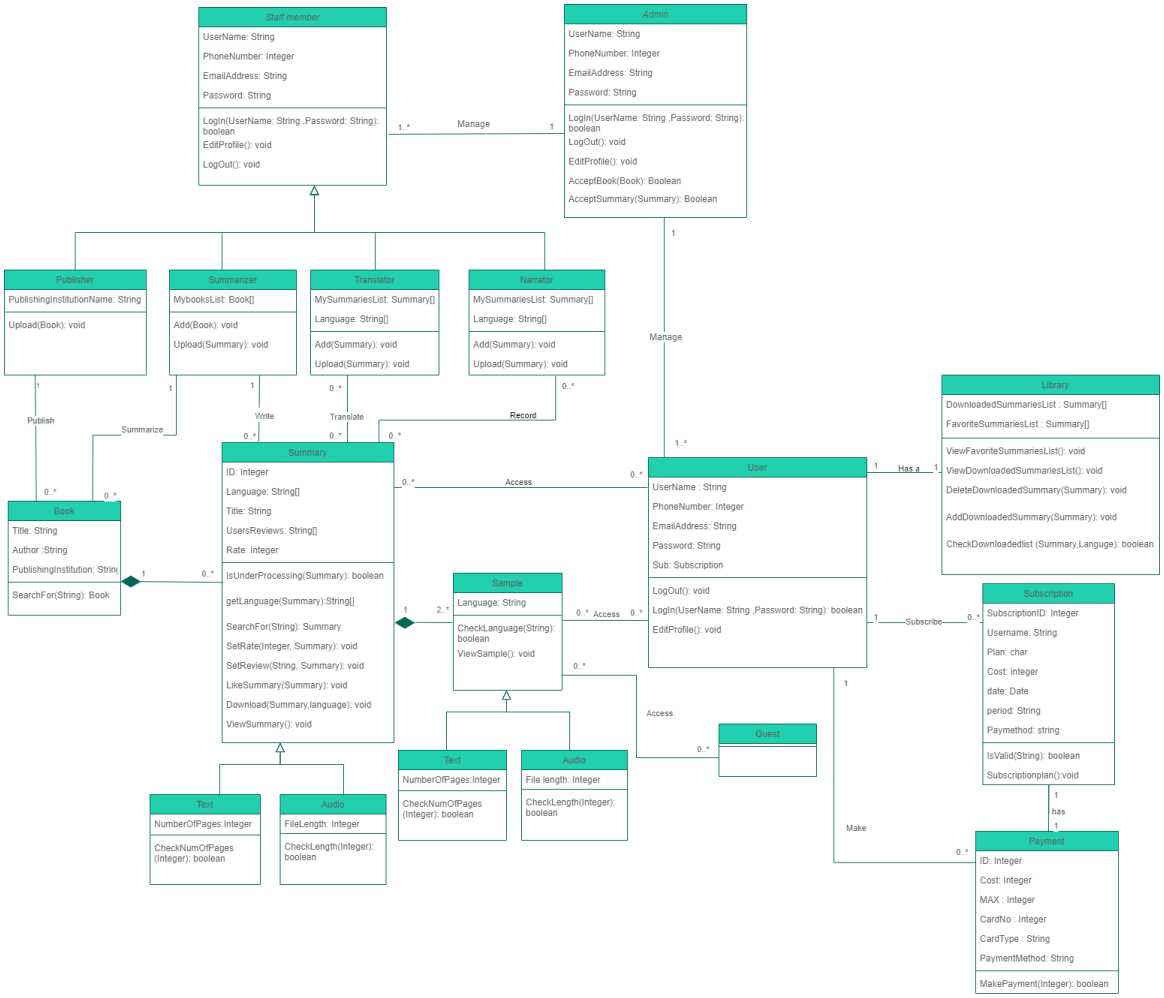


Figure 5: UML class diagram

3.2.1 Association Relationships

1. Between Staff member class and Admin class.
    - An admin Manage to one or more staff members.
    - A staff member is Managed by an admin.

2. Between User class and Library class.
    - A user has a library.
    - A library is provided for each user.

3. Between User class and Subscription class.
    - A user subscribes to a subscription.
    - A subscription is subscribed by a user.

4. Between the Guest class and Sample class.
    - A guest access zero or more samples.
    - A sample is accessed by zero or more guests.

5. Between Publisher class and Book class.
    - A publisher publishes zero or more books.
    - A book is published by one publisher.

6. Between Summarizer class and Book class.
    - A summarizer summarizes zero or more books.
    - A book is summarized by zero or 1 summarizers.
    -

3.2.2 Composition Relationships

1. Between Book class and Summary class.
    - A book has a one or more summaries.
    - A summary is summarized for a one book.

2. Between Summary class and Sample class.
    - A summary has one or more samples.
    - A sample is provided for each summary.

3.2.3 Generalization

1. Staff member class inherited by publisher class, summarizer class, translator class, and narrator class.
2. Sample class inherited by audio class and text class.
3. Summary class inherited by audio class and text class.

3.3 System Architecture

3.3.1 Determine Design Objectives

Khulasa provides a system that interacts with the actor by processing each request and responding quickly and effectively. Moreover, this system is reliable and secure, and offers many services that are easy to use for people interested in books.

3.3.2 Type of System

Our system provides users different summaries, allowing them to search, like, rate and download a summary. All these processes occur when the system interacts with the user, so it is considered an interactive system.

3.3.3 Architectural Style

The best way to represent the architecture of an interactive system is N-Tier design.

3.3.4 Specify subsystem functions, interfaces, and interaction behavior

We divide our system into subsystems, then convert it into classes. These classes are book, summary, samples, library, user, guest, staff member and admin. The previous section showed the functions and the interaction between classes in the UML diagram.

3.3.5 Architecture design

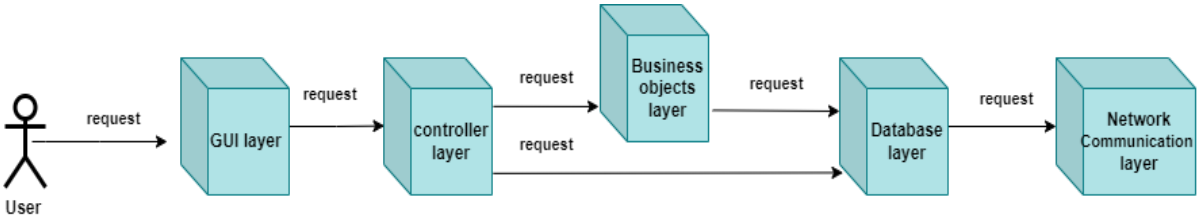


Figure 6: Architecture Design

Phase 4: Modeling, Interaction & Behavior

4.1 Sequence Diagrams

4.1.1 Download Summary

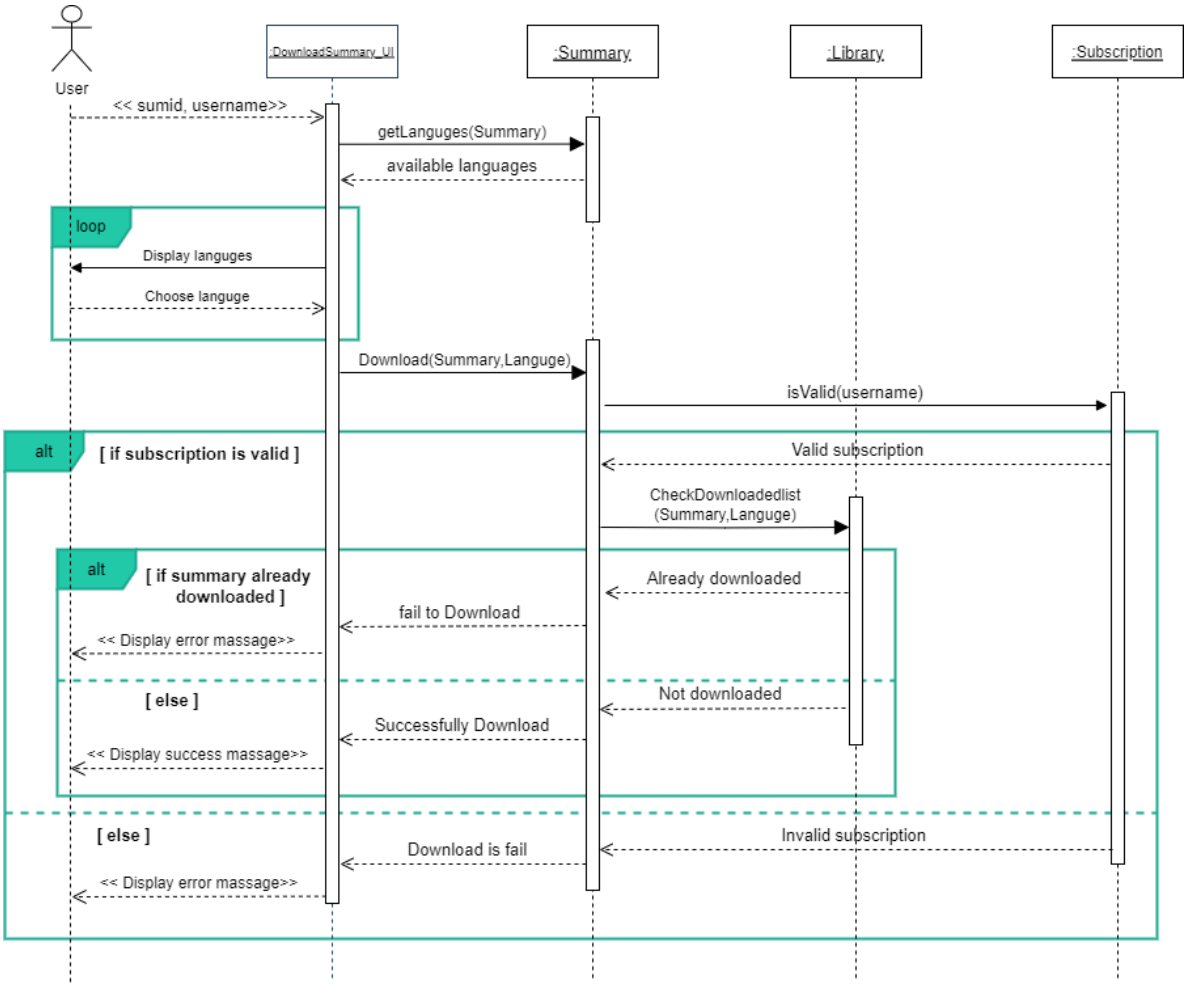


Figure 7: Sequense Digram(Download Summary)

4.1.2 Subscribe

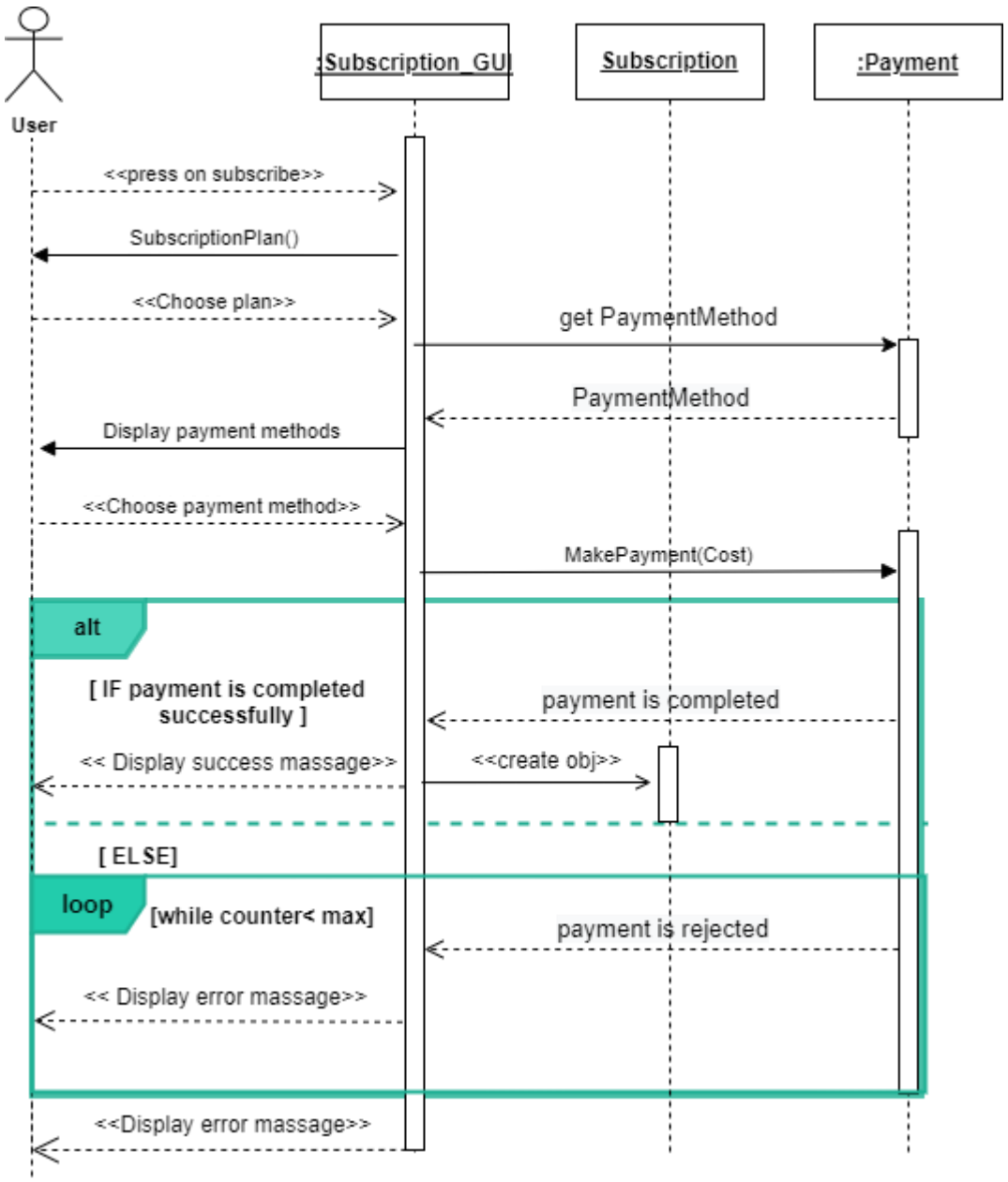


Figure 8: Sequense Digram(subscribe)

4.2 State Diagrams

4.2.1 Subscribe use case

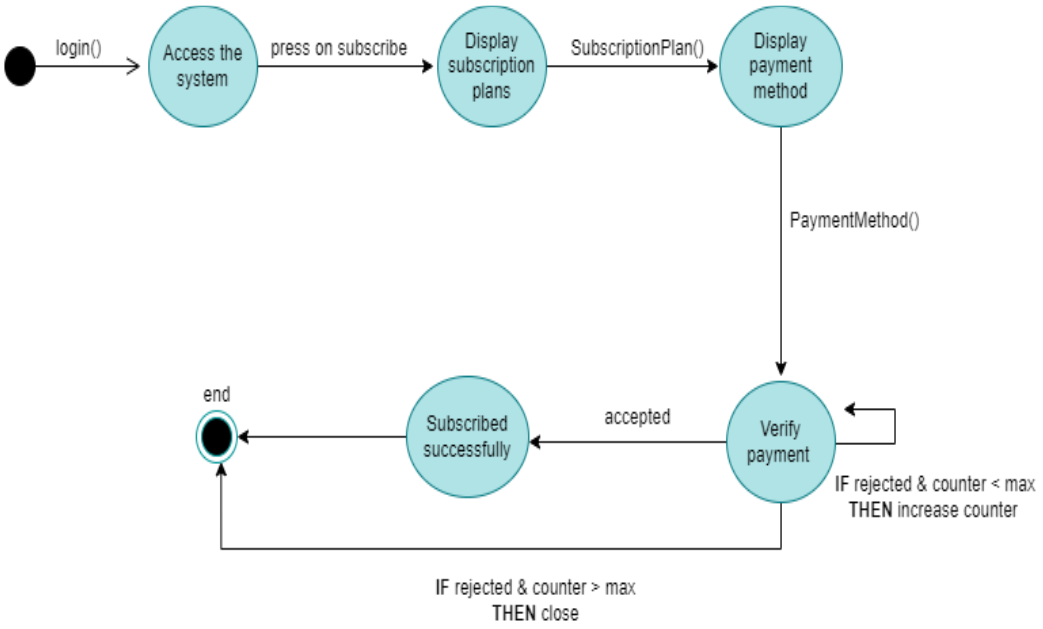


Figure 9: state diagram (subscribe)

4.2.2 download summary

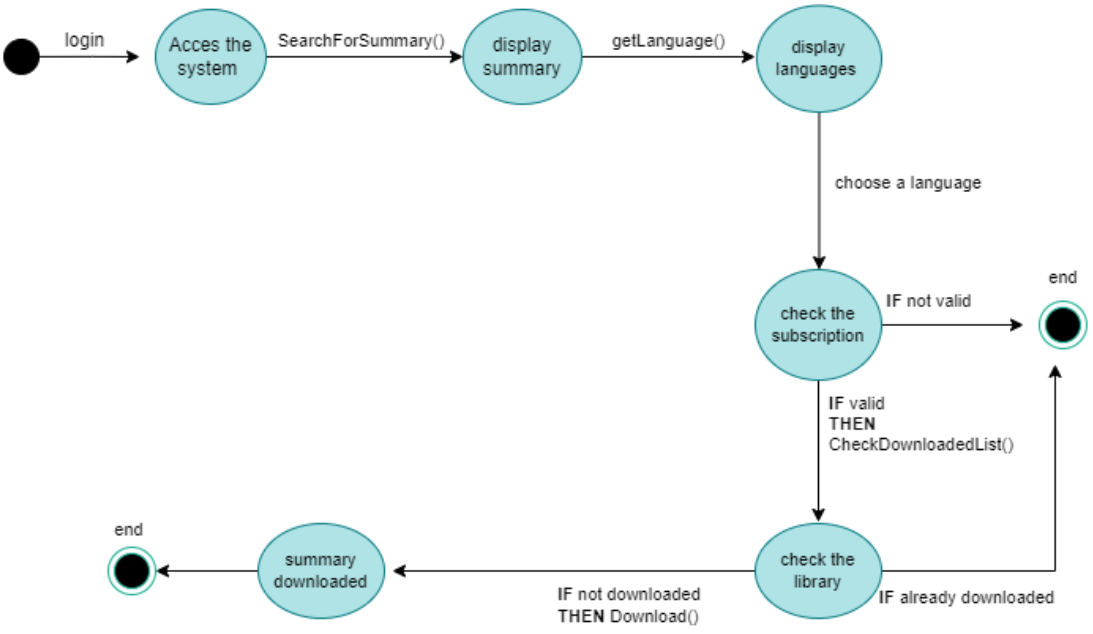


Figure 10: state diagram (download summary)

4.3 Activity Diagrams

4.3.1 download summary

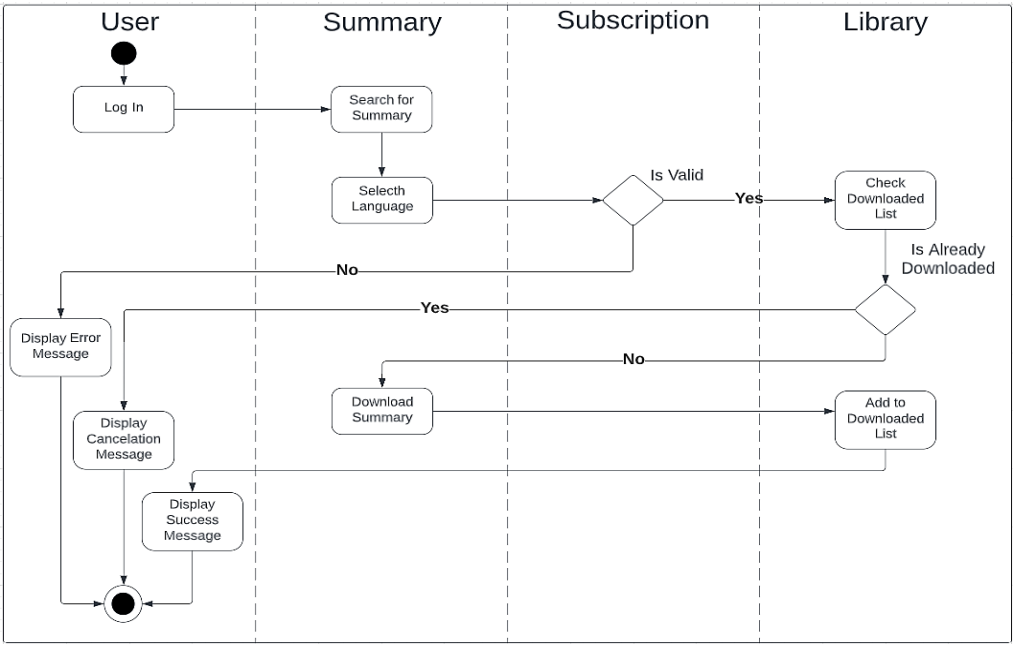


Figure 11: activity diagram (download summary)

4.3.2 subscribe

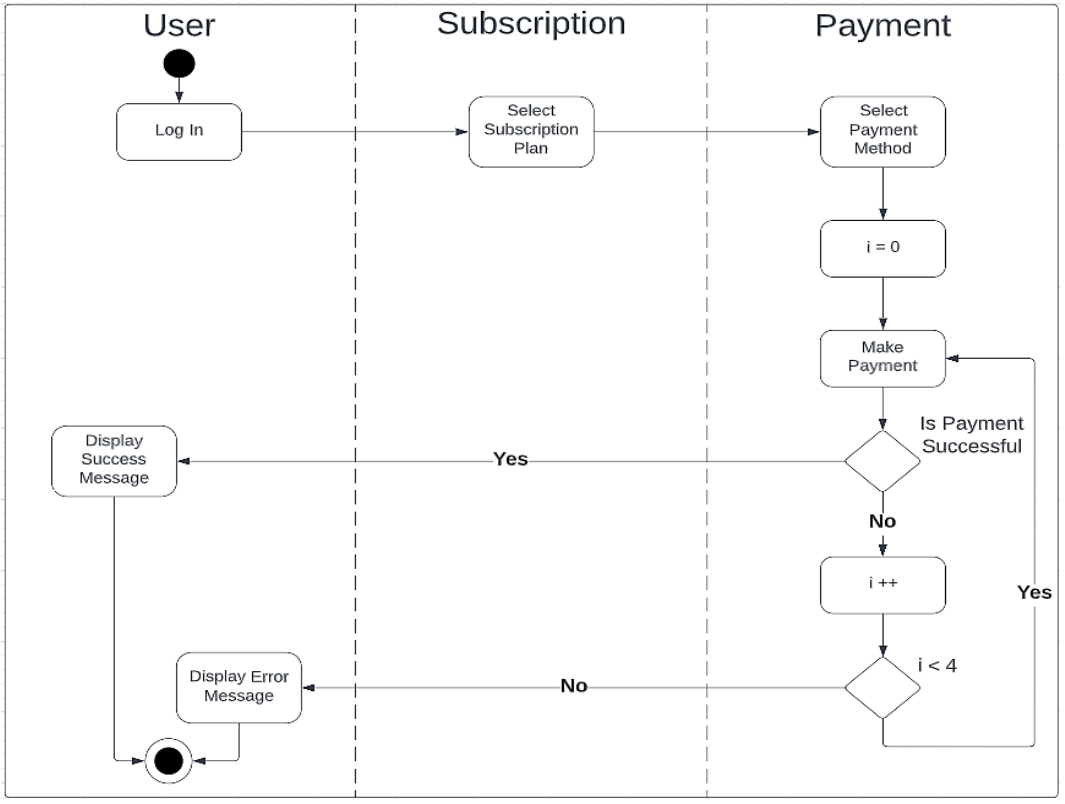


Figure 12: activity diagram (subscribe)

4.4 Testing

4.4.1. Objectives

Testing is performed to detect errors in the system, prevent system bugs, ensure the system is working properly while meeting the requirements. Also, it is performed to test the system's usability to the users.

4.4.2. Approach

The testing approach we used in this report is the black box testing approach, we favored this method because we want to focus on testing the interact and behavior of the system's interfaces by providing inputs and testing the outputs.

4.4.3 Test Plan 1

System: Khulasa iOS App.

Test case name: Subscribe

Description: Testing user's ability to subscribe.

Test Scenario: Check the system's response when the user wants to subscribe.

Preconditions:

- Installed the application.
- Logged in to the system as a user.

Test Case ID	Test Scenario	Test Steps	Test Data	Expected Results	Actual Results	Pass / Fail
1	Check the system's behavior when the user wants to subscribe with all the needed information.	1- Log in. 2- Click on "Subscribe" button.	Subscription plan: monthly. Payment method: Apple pay.	The system should display a message that subscription is completed successfully.		
2	Check the system's behavior when the user wants to subscribe with wrong payment information.	1- Log in. 2- Click on "Subscribe" button.	Subscription plan: monthly. Payment method: Credit card. Card Number: A2345557890111	The system should display a message that the card number entered are not valid, please try again.		

Table 5 : test plan1

4.4.4 Test Plan 2

System: Khulasa iOS / Android App.

Test case name: Search a summary.

Description: Testing user's ability to search a summary.

Test Scenario: Check the system's response when the user searches for a summary.

Preconditions: Installed the application.

Test Case ID	Test Scenario	Test Steps	Test Data	Expected Results	Actual Results	Pass / Fail
1	Check the system's behavior when the user searches for an existed summary.	1- Click on the search icon. 2- Type the summary name in the search box.	Summary name: "الرحيق المختوم".	The system should display show the summary with text and audio forms and available languages.		
2	Check the system's behavior when the user searches for summary that does not exist.	1- Click on the search icon. 2- Type the summary name in the search box.	Summary name: "Atomic Habits".	The system should display a message that the summary with this name does not exist on our application, please search for a different summary.		

Table 6 : test plan 2

4.4.5 Test Plan 3

System: Khulasa iOS / Android App.

Test case name: Upload an audio summary.

Description: Testing staff member (narrator)'s ability to upload an audio summary.

Test Scenario: Check the system's response when the narrator uploads an audio summary.

Preconditions:

- Installed the application.
- Signed in as a staff member (Narrator).

Test Case ID	Test Scenario	Test Steps	Test Data	Expected Results	Actual Results	Pass / Fail
1	Check the system's behavior when the narrator uploads a summary that satisfies all conditions.	1- Log in. 2- Click on "My Summaries" list. 3- Choose a summary to upload. Click on "Upload summary". 3- Click on "Audio summary". 4- Upload the audio file. 5- Choose the narrating language.	Summary language: Japanese.	The system should upload the summary and display a message that summary is uploaded successfully.		
2	Check the system's behavior when the narrator uploads a summary that was already uploaded in the same language.	1- Log in. 2- Click on "My Summaries" list. 3- Choose a summary to upload. Click on "Upload summary". 3- Click on "Audio summary". 4- Upload the audio file. 5- Choose the narrating language.	Summary language: Arabic.	The system should display a message that the summary is already uploaded in thins language, please upload it in a different language.		

Table 7: test plan 3

4.4.5 Applying testing techniques on the test cases

In using testing techniques, the functionality to be tested is Subscribe, where we will focus on payment with credit card, and the cases where the system passes this test.

1) equivalent partitioning

In valid partition	Valid partition	Invalid partition
• 0 characters. • 1 character. … • 5 characters.	• 6 characters. • 7 characters. … • 12 characters.	• 13 characters. • 14 characters. … • 100 characters.

card password range (6-12) characters long.

2) boundary value analysis

card password range (6-12) characters long.

Invalid partition – Valid partition lower boundary		Invalid partition – Valid partition upper boundary	
Boundary value just below the boundary	Boundary value just above the boundary	Boundary value just below the boundary	Boundary value just above the boundary
5	6	12	13

3) decisions table testing

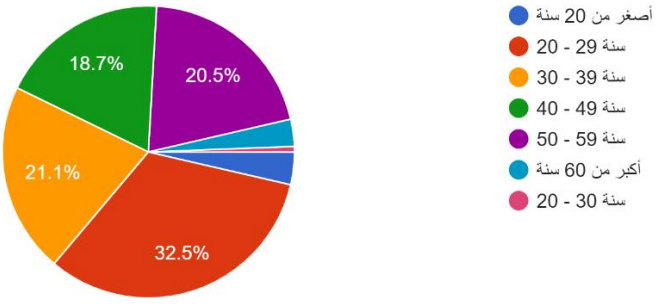
card password range (6-12) characters long.

Card Number	**F**	**T**	**F**	**T**
password	**F**	**F**	**T**	**T**
Expected result	Error: please enter a valid card number.	Error: Please enter your password again.	Error: Please enter a valid card number.	Login successfully processed.

Appendix

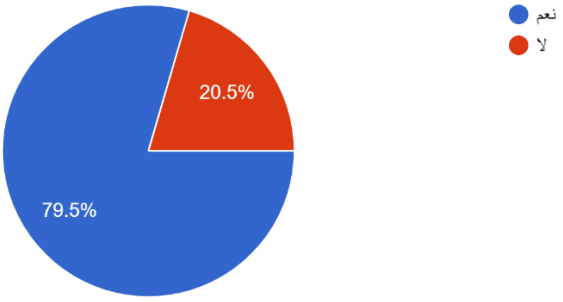
ما هي فئتك العمرية؟

166 responses



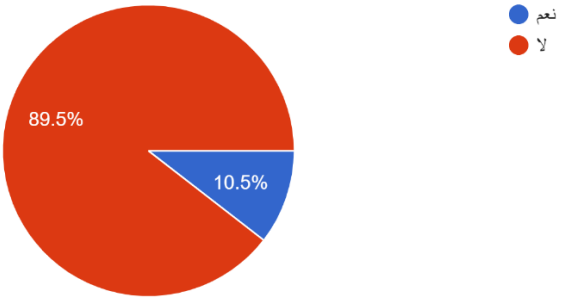
هل تحب القراءة؟

166 responses



إذا كانت إجابتك بـنعم، فهل تشعر أنك تقرأ بشكلٍ كافي؟

143 responses

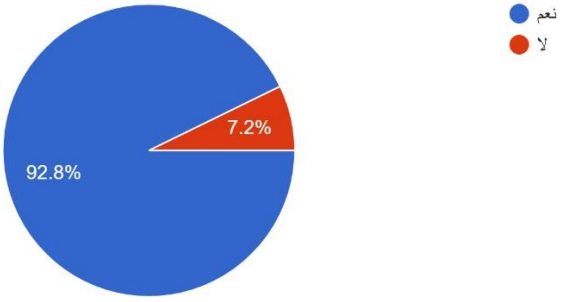


إذا كانت إجابتك بـلا، فما هو السبب برأيك؟

142 responses

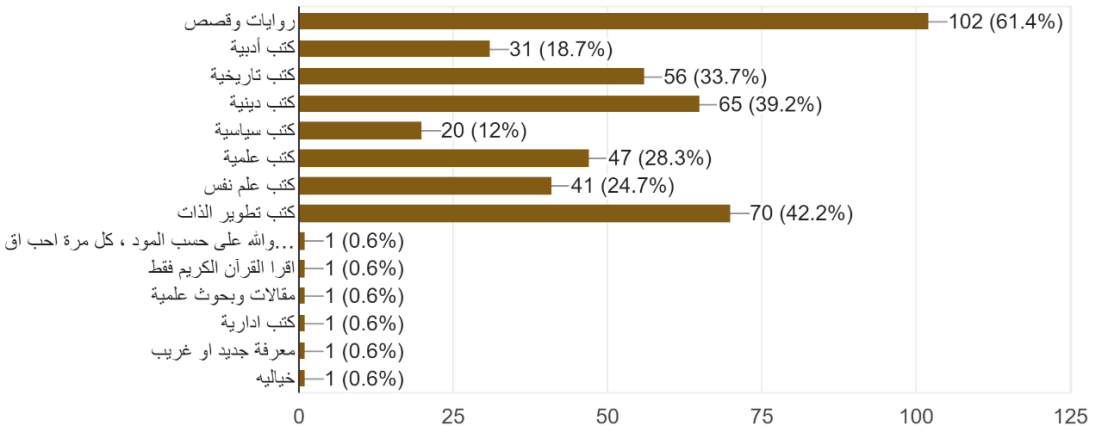
هل تطمح لزيادة معدل قراءتك؟

166 responses



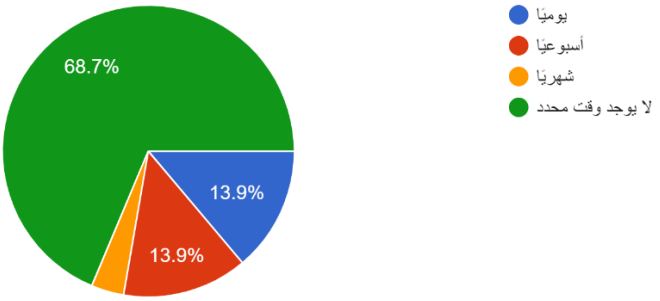
ما نوع الكتب التي تفضل قراءتها؟

166 responses



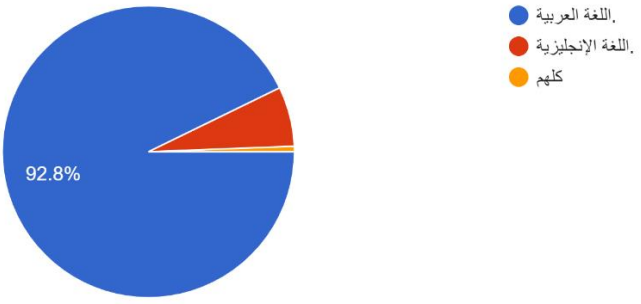
هل تحب قراءة الكتب:

166 responses



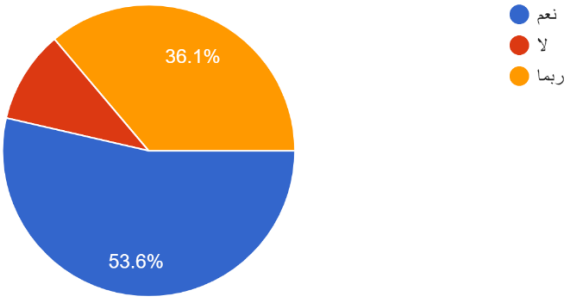
ما اللغة التي تقرأ بها غالبًا؟

166 responses



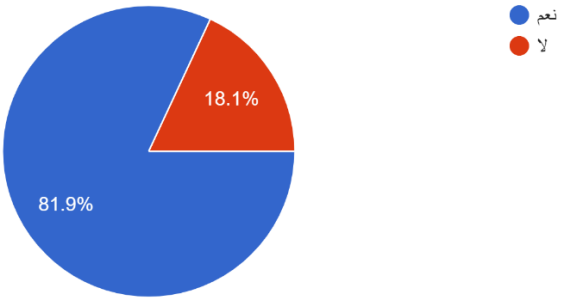
إذا كان هناك تطبيق يوفر ملخصات نصية وصوتية لعدد من الكتب العربية، فهل ستقوم باستخدامه؟

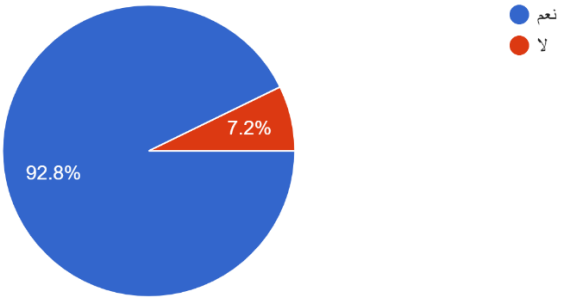
166 responses



هل ستفضّل أن تتلقى إشعارًا عند وجود ملخصات لكتب مطابقة لاهتماماتك؟

166 responses



إذا أُعجبت بقراءة أو سماع ملخص لكتاب، فهل ستتشجّع لقراءة الكتاب كاملًا؟

166 responses