Pre-Primary Child Education Game with AI Implementation (Little Leaps)

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This project report has been submitted in fulfillment of the requirements for the Degree of Bachelor of Science in Software Engineering

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APPROVAL

APPROVAL

This project titled on "**Pre-Primary Child Education Game with AI Implementation (Little Leaps)**", submitted by **Md Rabbi Islam (ID: 202-35-3123)** to the Department of Software Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science in Software Engineering and approval as to its style and contents.

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DECLARATION

I hereby state that **Mr. Md Khaled Sohel, Assistant Professor, Department of Software Engineering, Daffodil International University**, has been supervising me on this research. I further declare that no other project has been submitted for a degree elsewhere.

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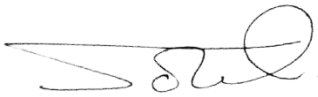

Certified by:
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ACKNOWLEDGEMENT:

Firstly, I would want to give my recognition to the All-Powerful Allah. Nonetheless, I have documented my efforts on this endeavor. Without the generous assistance and support of numerous people, it would not have been possible to achieve. To each and every one of them, I send my deepest gratitude and affection.

I am truly appreciative that I was able to finish my project in the allotted time frame by the Project/Thesis Committee. I also want to express my gratitude to my esteemed supervisor, **Mr. Md. Khaled Sohel**, for his invaluable guidance and support in getting this project done.

In conclusion, I sincerely appreciate every one of my parents, relatives, friends for their tolerance, encouragement, and support during my academic career. I would like to extend my sincere greetings to all of our university's personnel, friends, and lecturers.

ABSTRACT:

This project is an android base mobile Application. This project aims to solve the educational challenges and problem faced by children in rural areas through the development and implementation of a game-based early childhood education program. In rural areas children are not as much as conscious along with their parents. So, there is a big gap in their education till they get admission in the school. The program will utilize interactive games to deliver high-quality educational content as they need in their early phase of life.

DEDICATION:

I dedicate this project specially to the rural area's children along with my beloved father and mother also my respected supervisor and my other's teachers who are always help me. Without them and their unconditional love, affection, patient and help it was really not possible for me to complete this project.

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Chapter 1 - Introduction

This project aims to solve the educational challenges and problem faced by the children in rural areas through development and implementation of a game-based early childhood education application called (**Little Leaps**). Because in rural areas children are not as much as conscious along with their parents. As a result, those children cannot obey the teacher's orders properly and cannot compete with their classmates, due to which at some point they drop out. So, there is a big gap in their education till they get admission in the school. As a result, the program will utilize interactive games to deliver high-quality educational content as they need in their early phase of life.

1.1 Project Overview: I have designed this system to develop an AI based education game. First of all, teacher and child both can logs in to the system, then child's will able to see a beautiful decorated childish Homepage, where child can interact with every feature of it. Such as reading practice, writing practice, learn alphabet with gaming manner, digital ink board to recognizing writing, speech recognition to recognize reading, daily task, lesson wise quiz, track every day's activities, generate monthly and daily progress card and so on. Teacher can also use the interface along with he can add student, add content, track all student activity etc. User can access this application from any types of android device.

1.2 Project Purpose: Main focused aim of this brilliant project will be to make our rural areas child enough capable in early education phase so that they have the proper foundation in pre-primary lesson which can help them to cop up with their classmate, teacher and with their post-primary education lesson. And also, proper utilization of spending lot of time with mobile game.

1.3 Technical Terms: I have used Kotlin, XML, Jetpack compose and Firebase throughout the whole project.

1.4 Benefits: After successful completion of this project:

- Increase productivity in reading, writing, listening, speaking
- Enhance engagement with education
- Reduce dropout rate
- Individualized learning
- Enhance learning outcome

- Reduce educational disparity
- Teacher support and monitoring

1.5 Goals:

- Providing a highly engaging and interactive education environment
- Automated reading and writing detection
- AI model-based content implementation
- Bringing all required content under one system

1.6 Stakeholders: This project stakeholders are:

- Admin
- Teacher
- Child

1.7 Literature Review:

- **Paper name with publication**

Strengthening learning through play in early childhood education program by UNICEF. **Learning through play, Published by UNICEF, Education Section, Program Division**

1.8 Project Schedule: By using Gantt chart and milestone of project schedule is shown below.

1.9 Gantt Chart:

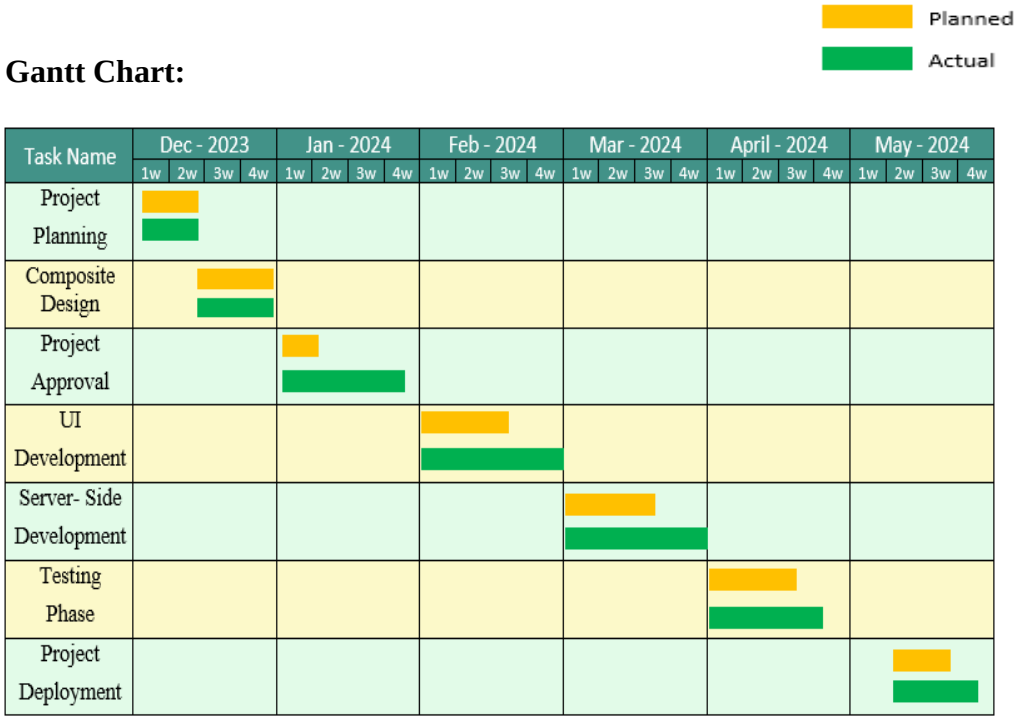

Figure 1: Gantt Chart Diagram

Chapter 2 – Requirement Engineering

Software Requirement Specification (SRS):

By using requirements analysis, it is easy to identifying the user satisfaction from the system more easily. So, this is very important for a system before being developed.

2.1 Functional Requirements

FR01	Registration
Description	Teacher and child need to register into the system to use the system. For that they have to provide name, email, phone number, password etc. for registration.
Stakeholder	Admin, Teacher, Child

FR02	Login
Description	After the registration, they need to login by providing name and password which was given while doing the registration.
Stakeholder	Admin, Teacher, Child

FR03	Dashboard
Description	After being logged in successfully, it redirects teacher to the dashboard where all the system function is being stored for further access.
Stakeholder	Admin, Teacher

FR04	View Profile
Description	Both can able to see all the information including personal info, all children progress, grading procedure, engagement and so on.
Stakeholder	Teacher, Child

FR05	View Home page
Description	In home page, there will be many options to explore for children including daily test, coin, reward, guessing test, AI character, reading-writing practice with AI and so on.
Stakeholder	Teacher, Child

FR06	Add Teacher
Description	From dashboard, admin can add teacher content wise or category wise

Stakeholder	Admin, Teacher

FR07	Add Child
Description	From dashboard, admin and teacher both can add child to the system
Stakeholder	Admin, Teacher, Child

FR08	Complete daily lesson
Description	In home page, from daily task section child has to complete daily task lesson wise
Stakeholder	Child

FR09	Get rewards
Description	After completing every task reward will be added in child account
Stakeholder	Child

FR10	Reading & Writing practice
Description	Student can practice both reading and writing with AI involvement
Stakeholder	Child

FR11	Take/give test
Description	Student will give quiz test after completing a lesson and teacher will track and check that
Stakeholder	Teacher, Child

FR12	Generate/view grade card
Description	Student can view their weekly/monthly grade card generated by the teacher
Stakeholder	Teacher, Child

2.2 Non-Functional Requirements

NFR - 01	UI
Description	User Interface should be kept as simple as possible. As user can easily use the system.
Stakeholder	End User

NFR-02	Performance
Description	Application performance should be enough faster in case of every functionality.
Stakeholder	End User

NFR-03	Availability
Description	Whole system should ready all the time when user need it.
Stakeholder	End User

NFR-04	Security Layer
Description	SSL, Https provide extra layer of security to user
Stakeholder	End User

NFR-05	Efficiency
Description	System should be providing enough quality full content with easy and attractive representation
Stakeholder	End User

Chapter 3 – Requirement Analysis

3.1 Use Case Diagram:

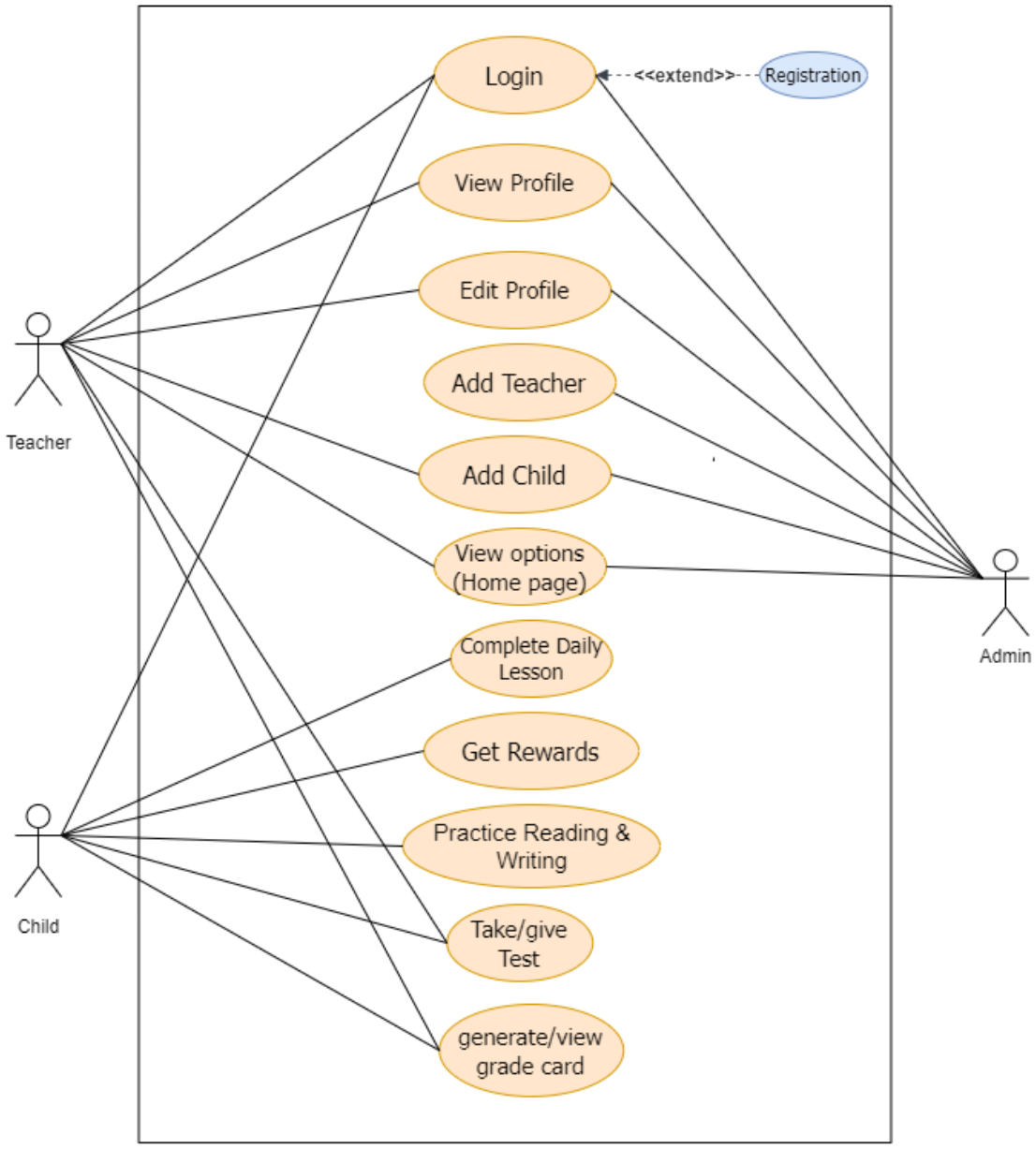

Figure 2: Use case Diagram

3.2 Use case Description:

Table No: 1

Use Case - 01	Registration	
Goal	Providing valid information admin, teacher registered and recorded into the system.	
Preconditions	N/A	
Success End Condition	Successful signup allows to use the application.	
Failed End Condition	Already registered into the system or email in use.	
Primary Actors: **Secondary Actors:**	Admin, Teacher N/A	
Trigger	Signup pop-up fade in.	
Description / Main Success Scenario	**Step**	**Action**
	1	Click on Registration button
	2	Enters name, email and password.
	3	validates the entered name and password
	4	Save the record in database and register into the system.
	5	Show success messages and redirect user to home page
Alternative Flows	**Step**	**Branching Action**
	6	enters an invalid name and/or password, the system displays an error message.
	7	return to the beginning of sign up or cancel the sign up.
Quality Requirements	**Step**	**Requirement**
	8	OTP verification
	9	should get an error message.

Table No: 2

Use Case - 02	Login
Goal	Providing valid username and password used in registration, user will login.
Precondition	Have to be registered in database
Success End Condition	Successful sign in allows to use the system
Failed End Condition	Wrong username or password.

Primary Actors: **Secondary Actors:**	Admin, Teacher Child	
Trigger	"Login" button or initiates the login process.	
Description / Main Success Scenario	**Step**	**Action**
	1	Click on login button
	2	Enters email address and password.
	3	Validation and sanitization of provided credential
	4	Show successful login message with home redirection
Alternative Flows	**Step**	**Branching Action**
	5	"Forgot Password" option to reset the password.
	6	System send a password reset link to email, clicks the link and sets a new password.
Quality Requirements	**Step**	**Requirement**
	7	Process should be secure
	8	use encryption for password transmission.
	9	Error messages should be clear and informative

Table No: 3

Use Case - 03	View Item (Dashboard)	
Goal	Admin & Teacher can see personalized overview of relevant information and functionalities within the system	
Preconditions	Should logged into the system.	
Success End Condition	Views and interacts with their personalized dashboard, gaining key insights and performing desired actions.	
Failed End Condition	System error prevents the dashboard from loading	
Primary Actors: **Secondary Actors:**	Admin, Teacher N/A	
Trigger	Navigates to the "Dashboard" section.	
	Step	**Action**

Description / Main Success Scenario	1	Displays relevant information with proper section.
	2	Interact with the dashboard elements
	3	Show or modify information based on his role
	4	Specific roles and permission determine the content displayed on their dashboard.
	5	The system updates the dashboard information dynamically based on changes.
Alternative Flows	**Step**	**Branching Action**
	6	Encounters error while accessing or interacting with the dashboard.
	7	Contact the system administrator for further assistance.
Quality Requirements	**Step**	**Requirement**
	8	Dashboard would be visually appealing, intuitive, and easy to navigate.
	9	Information should be accurate, up-to-date, and relevant to the teacher's role.

Table No: 4

Use Case - 04	Edit Profile	
Goal	Allow teachers to view, edit, and manage their personal info within the system.	
Preconditions	Must be login into the system	
Success End Condition	Views, edits, delete, and manages their profile information.	
Failed End Condition	Required information is missing or invalid. unauthorized or restricted based on the teacher's role or permissions.	
Primary Actors: **Secondary Actors:**	Admin, Teacher N/A	
Trigger	Open "Profile" section	
Description / Main Success Scenario	**Step**	**Action**
	1	displays the teacher's profile information, course, role and so on

	2	Teacher can edit their profile information such as change profile picture, name, email etc.
	3	Click on update, will make update the record into database
	4	Show updated information.
Alternative Flows	**Step**	**Branching Action**
	5	Encounters an error while editing or saving their profile information.
	6	The system provides a secure password change mechanism.
Quality Requirements	**Step**	**Requirement**
	7	Data validation should ensure information accuracy and consistency.
	8	Password change mechanism should be secure and require strong password practices.

Table No: 5

Use Case - 05	Add Teacher	
Goal	Allow admin to easily add a teacher's profile to the system	
Preconditions	N / A	
Success End Condition	New teacher profile is created	
Failed End Condition	User enters invalid information during profile creation System error prevents profile creation.	
Primary Actors: **Secondary Actors:**	Admin Teacher	
Trigger	Select the "Add Teacher" option	
Description / Main Success Scenario	**Step**	**Action**
	1	"Add Teacher" section appear with clear and user-friendly interface
	2	Enters name, age, email and designation
	3	The application validates the entered information.
	4	Upon successful validation

	5	New teacher profile is created
Alternative Flows	**Step**	**Branching Action**
	6	Invalid information
	7	displays an error message
	8	Try again later or contact us.
Quality Requirements	**Step**	**Requirement**
	9	The application should securely store teacher profile information.
	10	Separate option with variety

Table No: 6

Use Case - 06	Add Child	
Goal	Allow teacher to easily add a child's profile to the system	
Preconditions	N / A	
Success End Condition	Child successfully added	
Failed End Condition	Enters invalid information during profile creation. System error prevents profile creation.	
Primary Actors: **Secondary Actors:**	Teacher Child	
Trigger	Select the "Add Child" option within the application	
Description / Main Success Scenario	**Step**	**Action**
	1	"Add Child" section appear with clear and user-friendly interface
	2	Enters name, age, email and preferred language
	3	The application validates the entered information.
	4	Upon successful validation
	5	New child's profile is created
Alternative Flows	**Step**	**Branching Action**
	6	Invalid information
	7	displays an error message

	8	Try again later or contact us.
Quality Requirements	**Step**	**Requirement**
	9	The application should securely store child profile information.
	10	Separate option with variety

Table No: 7

Use Case - 07	View Item (Home page)	
Goal	Provide children with a welcoming and engaging entry point to the educational app, showcasing key features and motivating them to learn	
Preconditions	N / A	
Success End Condition	Child interacts with and navigates through the different elements on the home page, including the education banner, daily lessons, and reward points system.	
Failed End Condition	Error prevents the home page from loading or displaying elements correctly. Child encounters technical issues while interacting with features.	
Primary Actors: **Secondary Actors:**	Child Teacher (optional)	
Trigger	Child opens the app and automatically lands on the home page.	
Description / Main Success Scenario	**Step**	**Action**
	1	The home page displays a visually appealing and age-appropriate design.
	2	All the functionality will be shown here like daily lesson, reading, writing, quiz and so on.
	3	Clicking on banner may navigate the child to relevant content or activities.
	4	Can see reward section and unlock feature using coin
	5	Clicking on a lesson card takes the child directly to the lesson content.
Alternative Flows	**Step**	**Branching Action**

	6	The system displays an error message or attempts to recover gracefully.
	7	The system displays a message encouraging the child to explore other learning activities or wait for new lessons.
Quality Requirements	**Step**	**Requirement**
	8	Content and features should be engaging and aligned with the child's learning goals.
	9	The reward system should be transparent, motivating, and offer meaningful rewards.

Table No: 8

Use Case - 08	Complete Daily Lesson	
Goal	Child will complete their daily lesson task	
Preconditions	N/A	
Success End Condition	Child successfully completed all task	
Failed End Condition	Failed to load the daily lesson content. System error prevents creation of content.	
Primary Actors: **Secondary Actors:**	Child N/A	
Trigger	Select the "Daily Lesson" option within the application	
Description / Main Success Scenario	**Step**	**Action**
	1	"Daily Lesson" section appear with clear and user-friendly interface
	2	Select a task
	3	Open module interface
	4	Upon successful validation
	5	Content will be load
Alternative Flows	**Step**	**Branching Action**
	6	Content creation failed
	7	displays an error message
	8	Try again later or contact us.
Quality Requirements	**Step**	**Requirement**

	9	The application should detect the error
	10	Separate option with variety

Table No: 9

Use Case - 09	Get Rewards	
Goal	Motivate children to complete daily lessons and tasks providing them with access to engaging and age-appropriate reward games.	
Preconditions	complete daily lesson, task or module	
Success End Condition	plays a reward game, enjoying the experience and feeling motivated to continue learning.	
Failed End Condition	System error prevents access to the reward section. Child lacks sufficient points for the desired game.	
Primary Actors: **Secondary Actors:**	Child Teacher (optional)	
Trigger	Child navigates to the "Rewards" section within the app.	
Description / Main Success Scenario	**Step**	**Action**
	1	The "Rewards" section displays a variety of engaging games
		Content categorized by genre, difficulty, or theme.
	2	choose a content according to their interests
	3	receives feedback and rewards
	4	Reward added to coin section
Alternative Flows	**Step**	**Branching Action**
	5	The child tries to access a game they don't have enough points for.
	6	Failed to complete the module
Quality Requirements	**Step**	**Requirement**
	6	Difficulty level should gradually increase
	7	Game mechanics and controls should be intuitive and easy for children to learn.

Table No: 10

Use Case - 10	Practice Reading & Writing	
Goal	Provide children interactive tool to practice reading and writing to improve their alphabet pronunciation and writing in Bangla, English, and Math symbols	
Preconditions	Child has access to the "Reading & Writing Test" section by completing previous practice	
Success End Condition	Completes practicing and receiving feedback from the system	
Failed End Condition	System error prevents access to the test or feedback mechanism.	
Primary Actors: **Secondary Actors:**	Child Teacher (optional)	
Trigger	Child chooses the "Reading & Writing Test" option	
Description / Main Success Scenario	**Step**	**Action**
	1	" Reading & Writing" interface appear visually
	2	Select language
	3	Bangla, English, Math
	4	speak and write the element aloud, clearly into the microphone and whiteboard
	5	Recognize and match using ML Model
	6	Feedback whether correct or not
Alternative Flows	**Step**	**Branching Action**
	7	Encounters a technical issue with speech recognition
	8	Failed to detect or failed to load the model
Quality Requirements	**Step**	**Requirement**
	9	AI model should use clear, friendly, and age-appropriate language.
	10	Offer a variety of language, elements and symbol

Table No: 11

Use Case - 11	Quiz Test

Goal	Provide children with an engaging and interactive way to learn and reinforce their knowledge of alphabets, words, and concepts through diverse guessing tests, receiving feedback and progress.	
Preconditions	N / A	
Success End Condition	Child completes the quiz test	
Failed End Condition	System error prevents access to the test or feedback mechanism.	
Primary Actors: **Secondary Actors:**	Child Teacher (optional)	
Trigger	Child chooses the "Guessing Test" option.	
Description / Main Success Scenario	**Step**	**Action**
	1	"Quiz" interface appears visually
	2	Select language
	3	The child selects the type of guessing
	4	Identifying objects, animals, or concepts
	5	Identifying alphabets (Bangla, English, Math)
	6	Feedback whether correct or not
Alternative Flows	**Step**	**Branching Action**
	7	The child feels stuck or confused by a challenge.
	8	Offers additional hints or clues, without directly revealing the answer.
Quality Requirements	**Step**	**Requirement**
	9	Interface should be visually appealing, engaging, and age-appropriate
	10	Difficulty levels should be adjustable

Table No: 12

Use Case - 12	Generate Grading Card	
Goal	Automatically generated grade card, reflecting achievements, progress, and areas for improvement.	
Preconditions	Teacher has access to the "Generate Grade Card" functionality within the system.	
Success End Condition	Teacher successfully generates a visually appealing and informative grade card for a specific student, accessible for viewing, printing, or sharing electronically.	
Failed End Condition	System error prevents grade card generation or data retrieval.	
Primary Actors: **Secondary Actors:**	Child Teacher	
Trigger	Select "Generate Grade Card" option.	
Description / Main Success Scenario	**Step**	**Action**
	1	The system displays a form or interface for selecting the student
	2	automatically retrieves progress data and marks
	3	analyzes performance data for the chosen period
	4	The generated grade card is presented in a visually appealing and well-organized format.
	5	Share report card
Alternative Flows	**Step**	**Branching Action**
	7	Sharing options should be secure and comply with data privacy regulations
	8	Displays a warning message
Quality Requirements	**Step**	**Requirement**
	9	Grade cards should be visually appealing, well-organized, and easy to read and understand.

3.3 Activity Diagram:

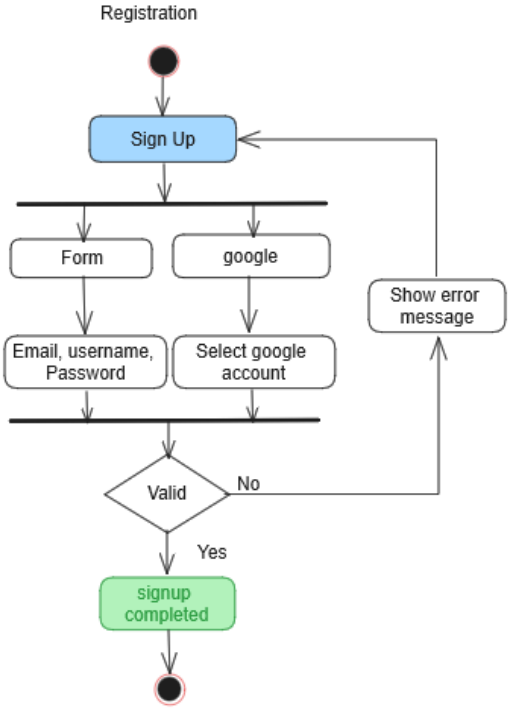

Figure 3: Activity diagram for registration

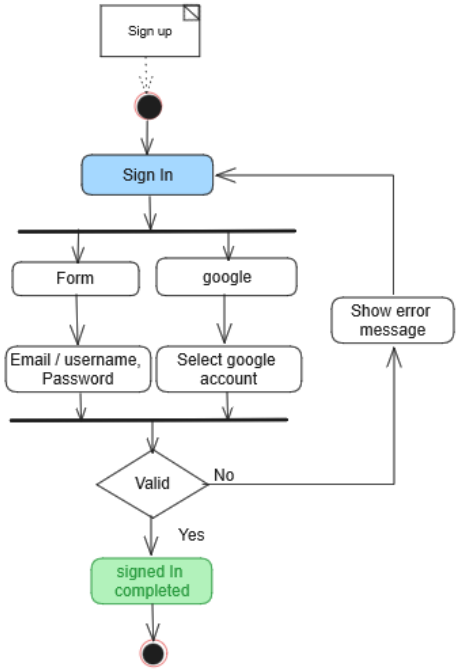

Figure 4: Activity diagram for login

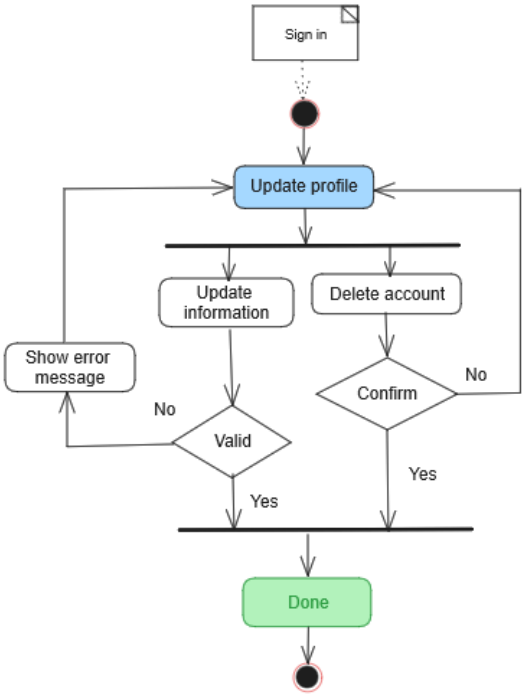

Figure 5: Activity diagram for Edit profile

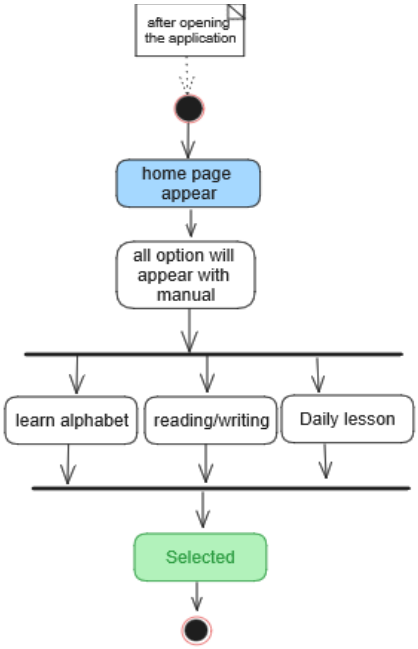

Figure 6: Activity diagram for view home page

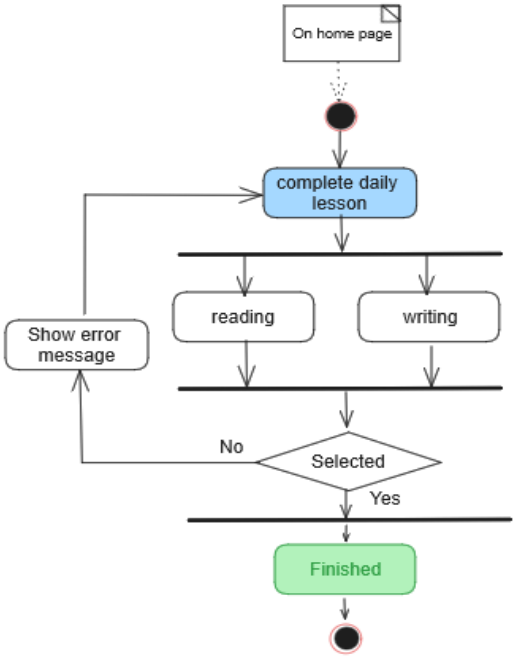

Figure 7: Activity diagram for complete daily lesson

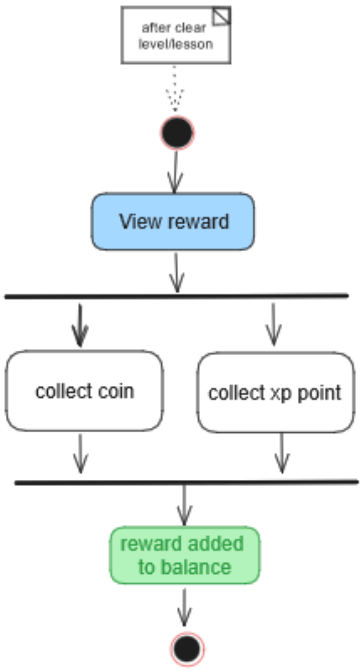

Figure 8: Activity diagram for view reward

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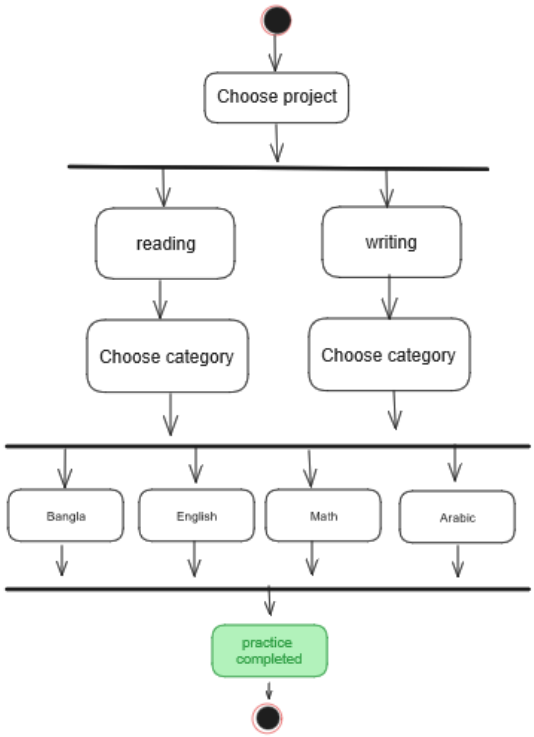

Figure 9: Activity diagram for daily reading & writing

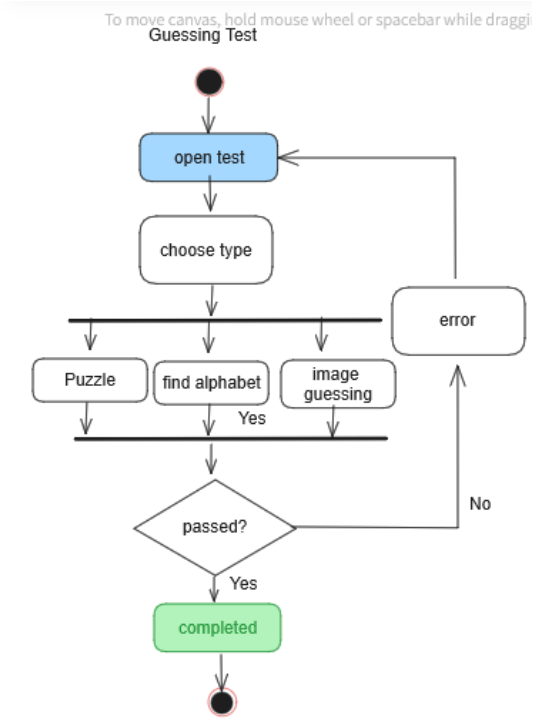

Figure 10: Activity diagram for quiz test

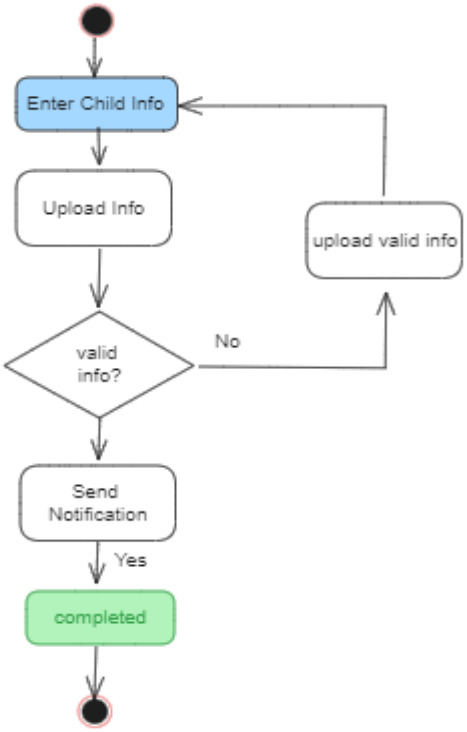

Figure 11: Activity diagram for add child

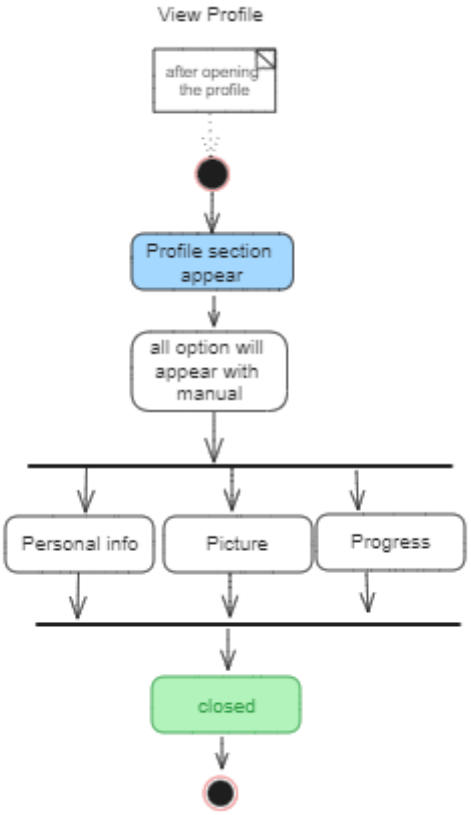

Figure 12: Activity diagram for view profile

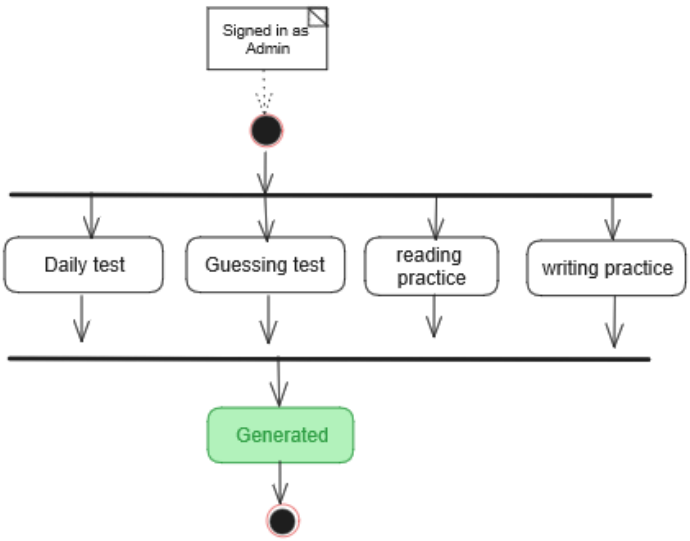

Figure 13: diagram for report card generation

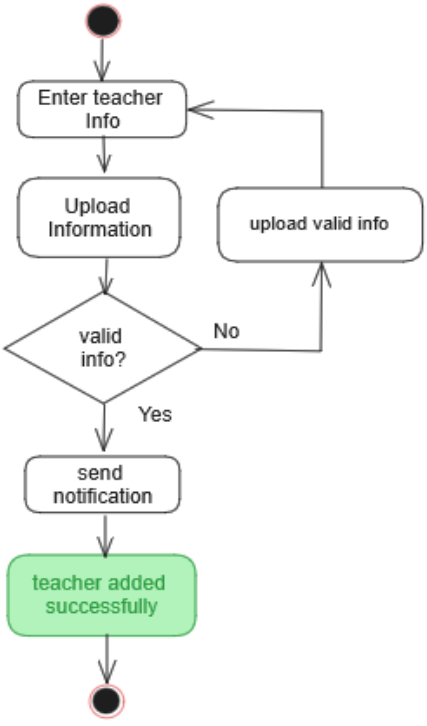

Figure 14: Activity diagram for add teacher

3.4 Sequence Diagram:

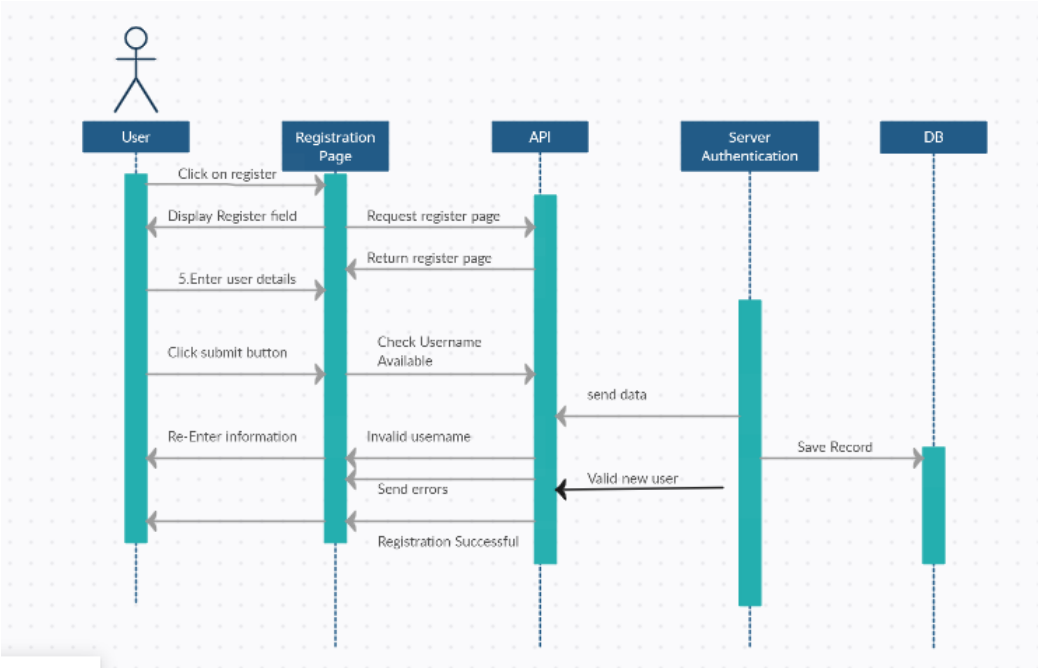

Figure 15: Sequence diagram for registration

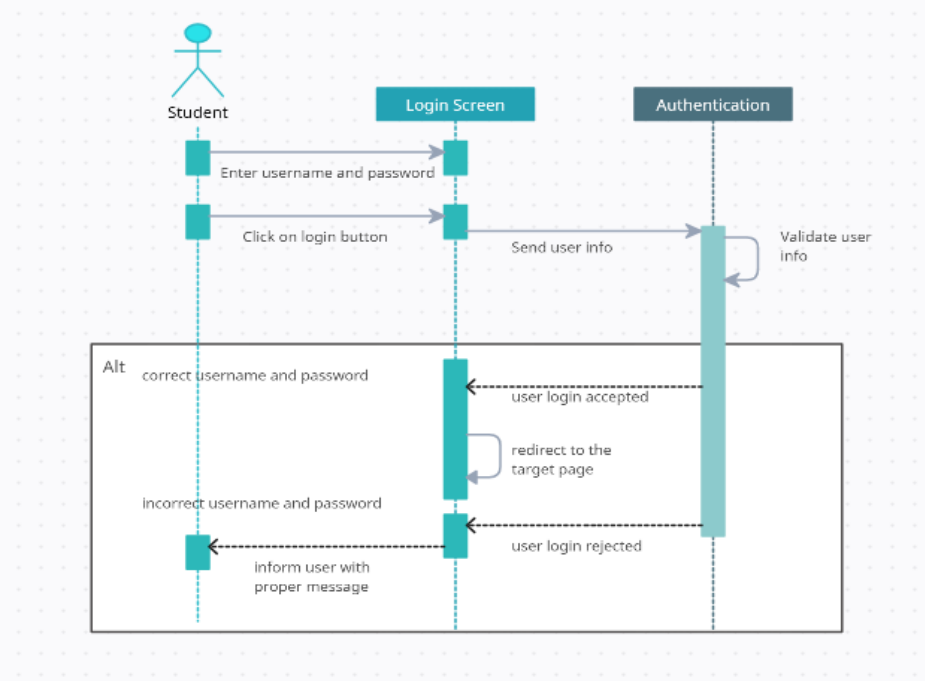

Figure 16: Sequence diagram for login

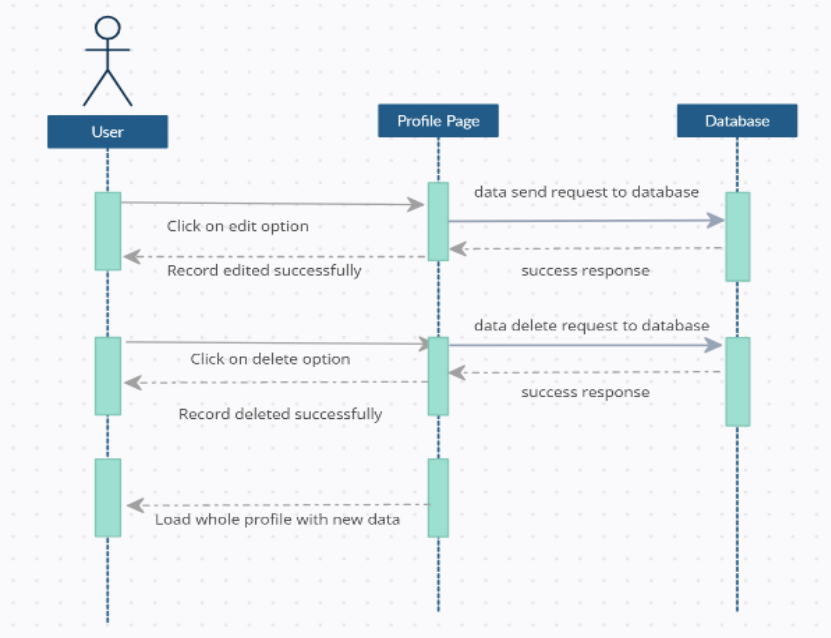

Figure 17: Sequence diagram for edit profile

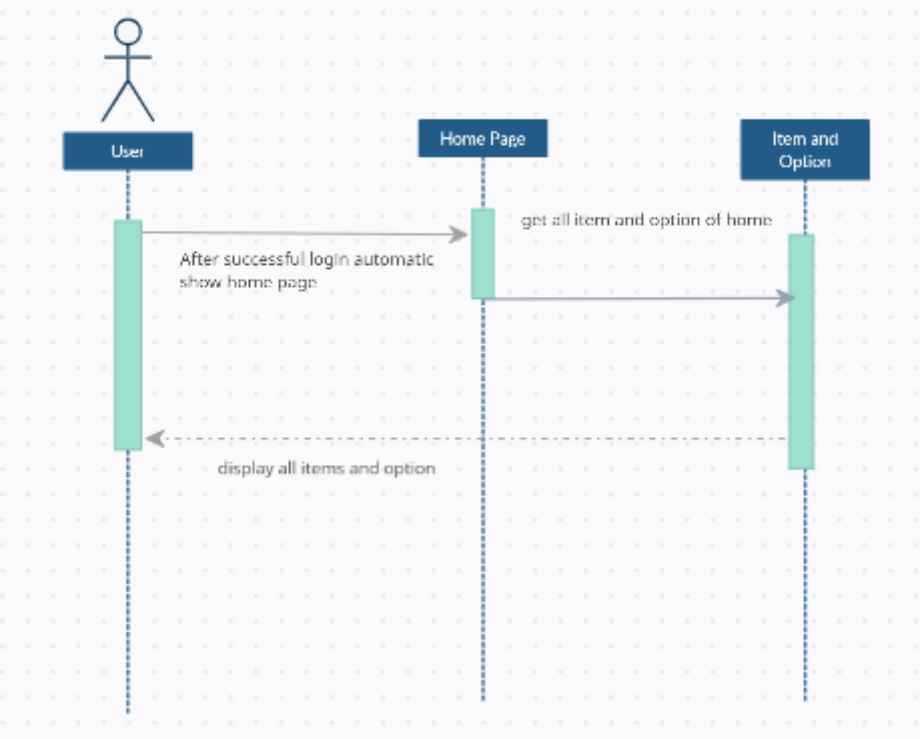

Figure 18: Sequence diagram for view home page

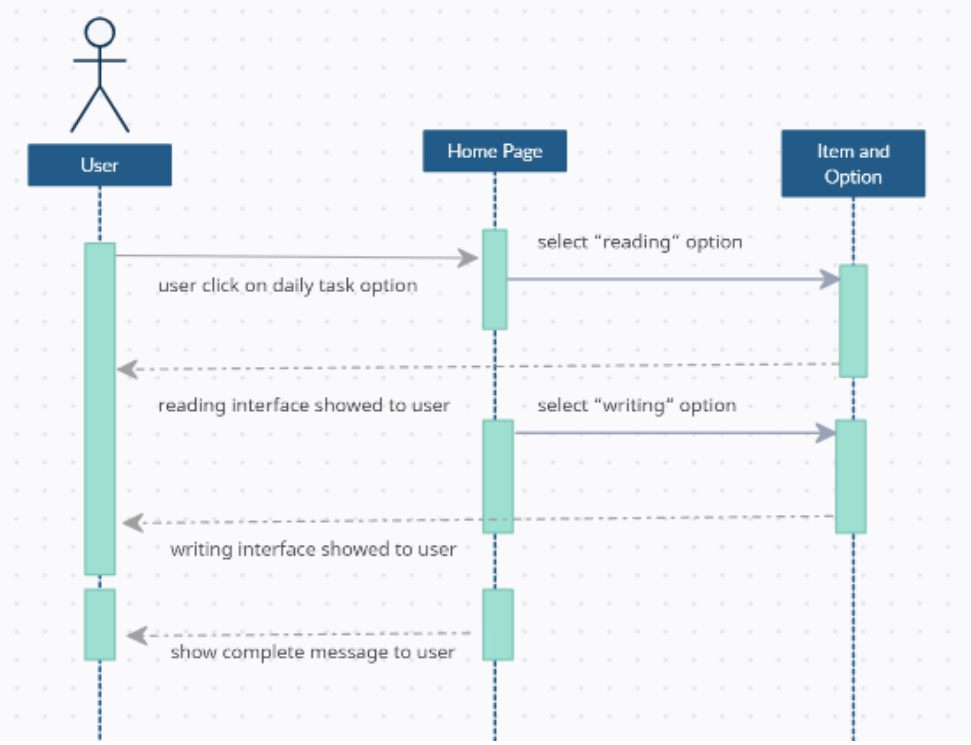

Figure 19:Sequence diagram for daily lesson

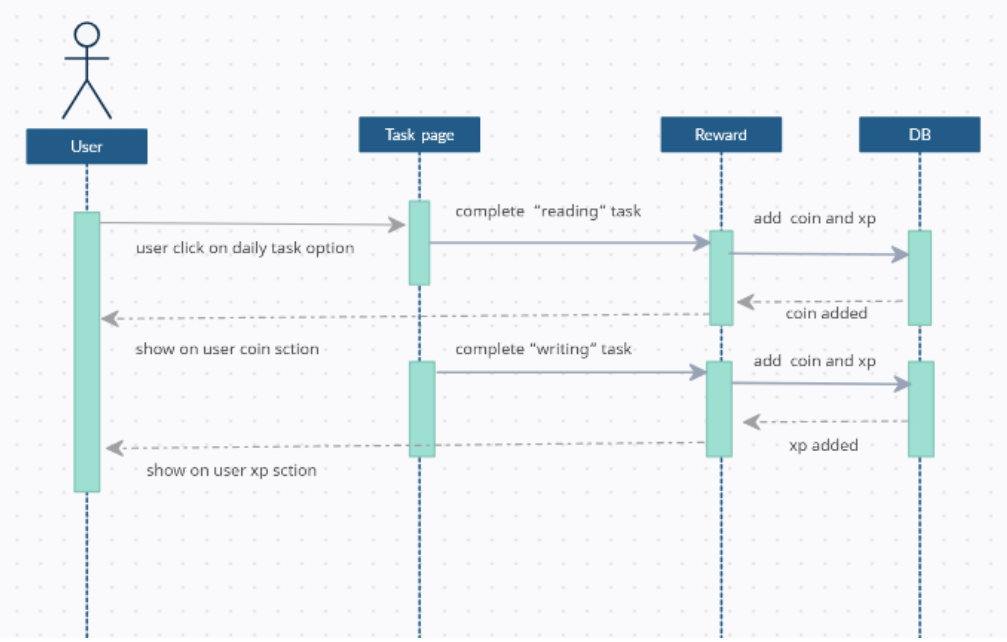

Figure 20: Sequence diagram for reward

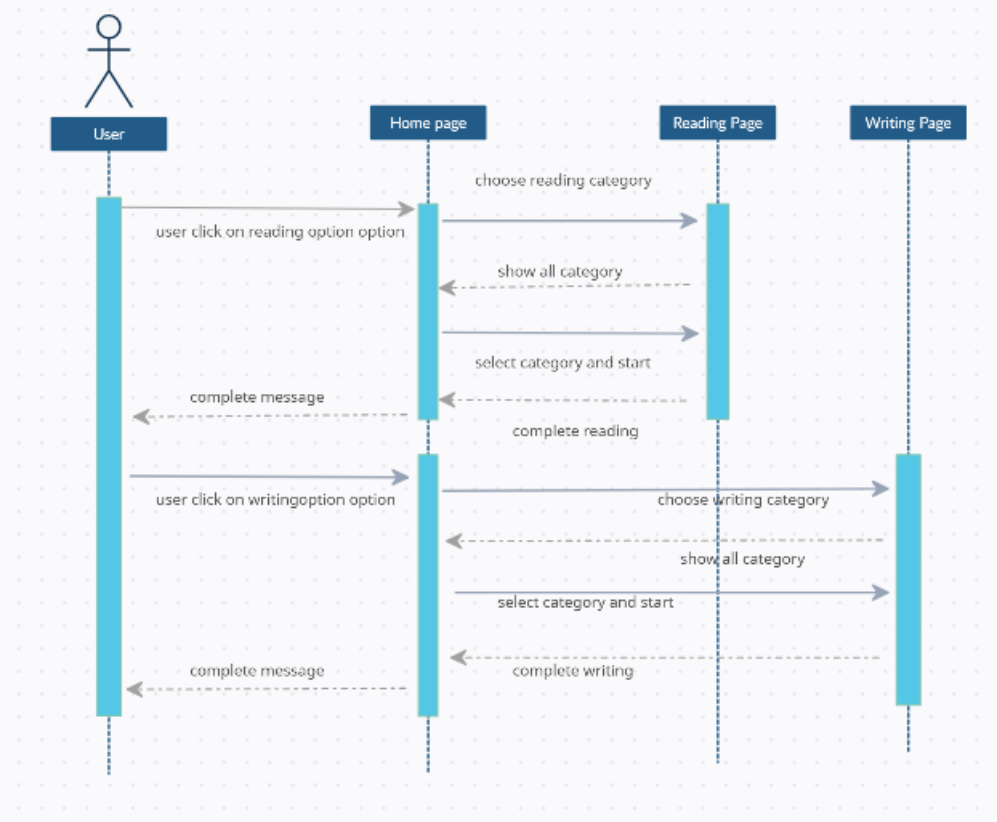

Figure 21:diagram for reading & writing practice

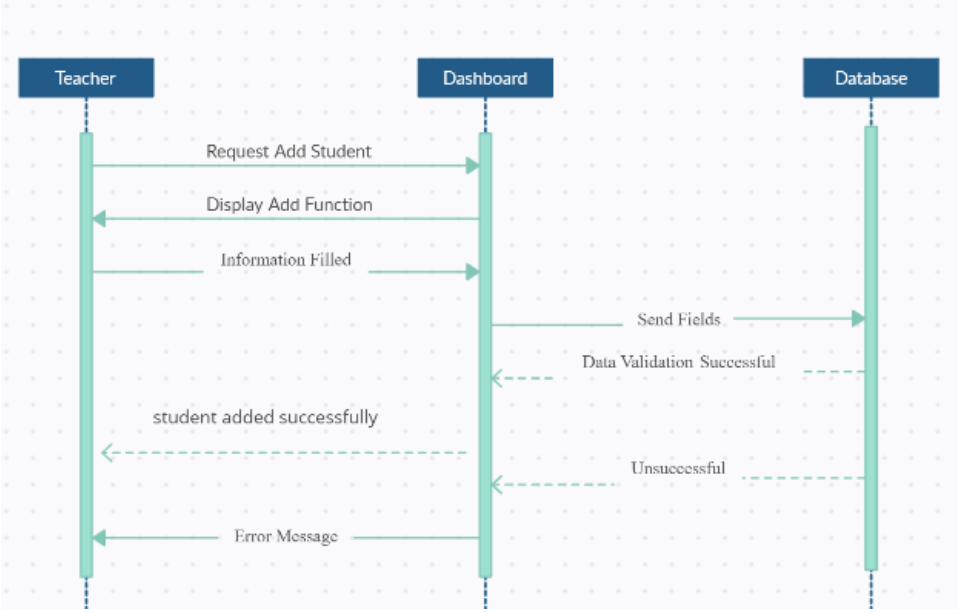

Figure 22: Sequence diagram for add student

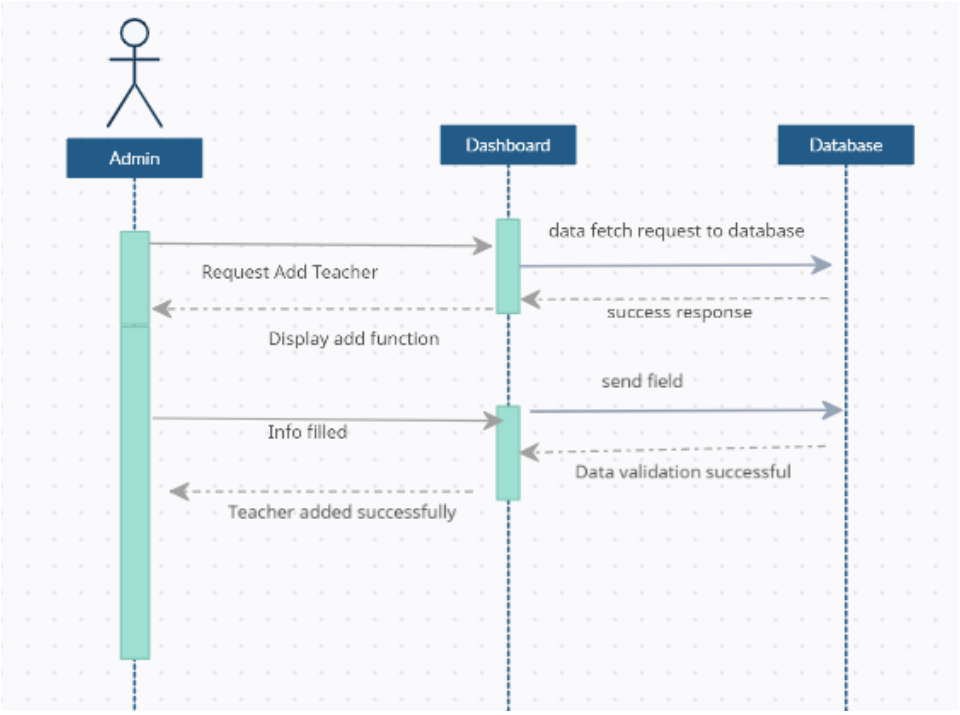

Figure 23: Sequence diagram for add teacher

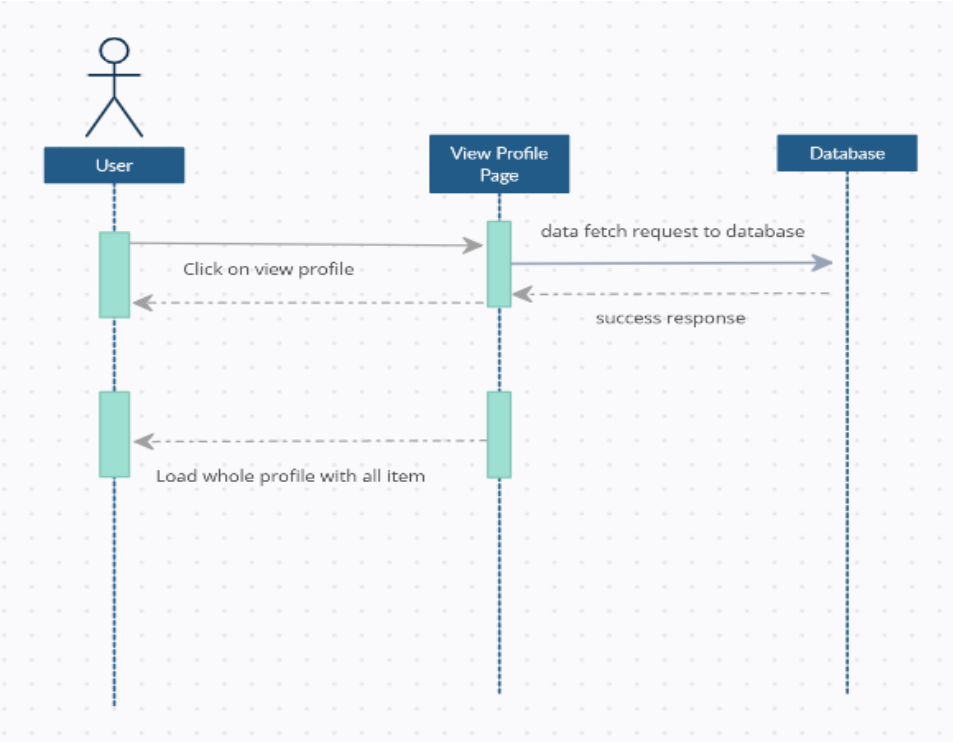

Figure 24: Sequence diagram for view profile

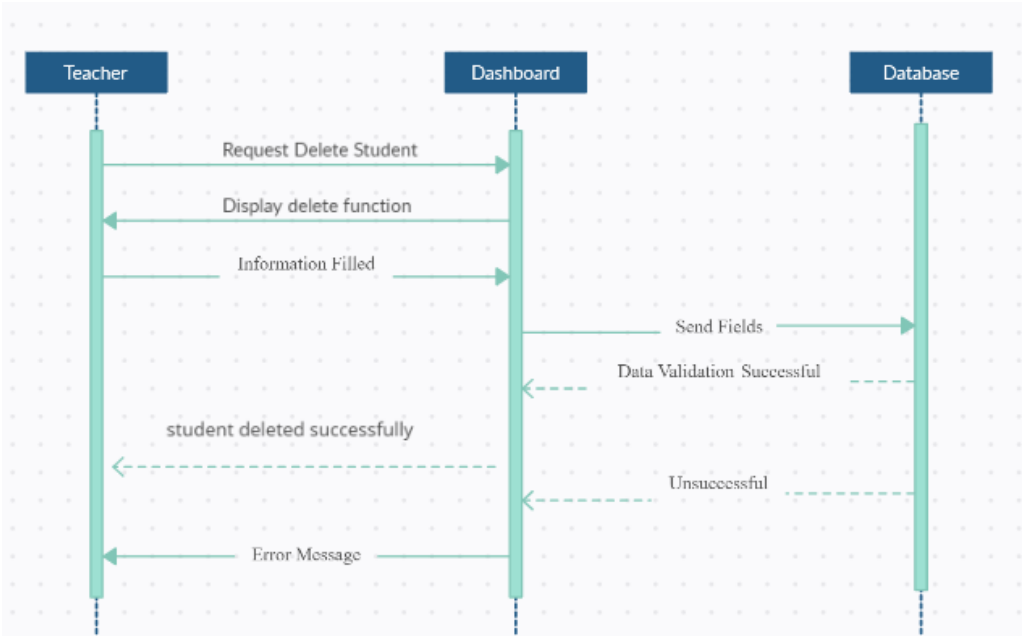

Figure 25: Sequence diagram for delete teacher

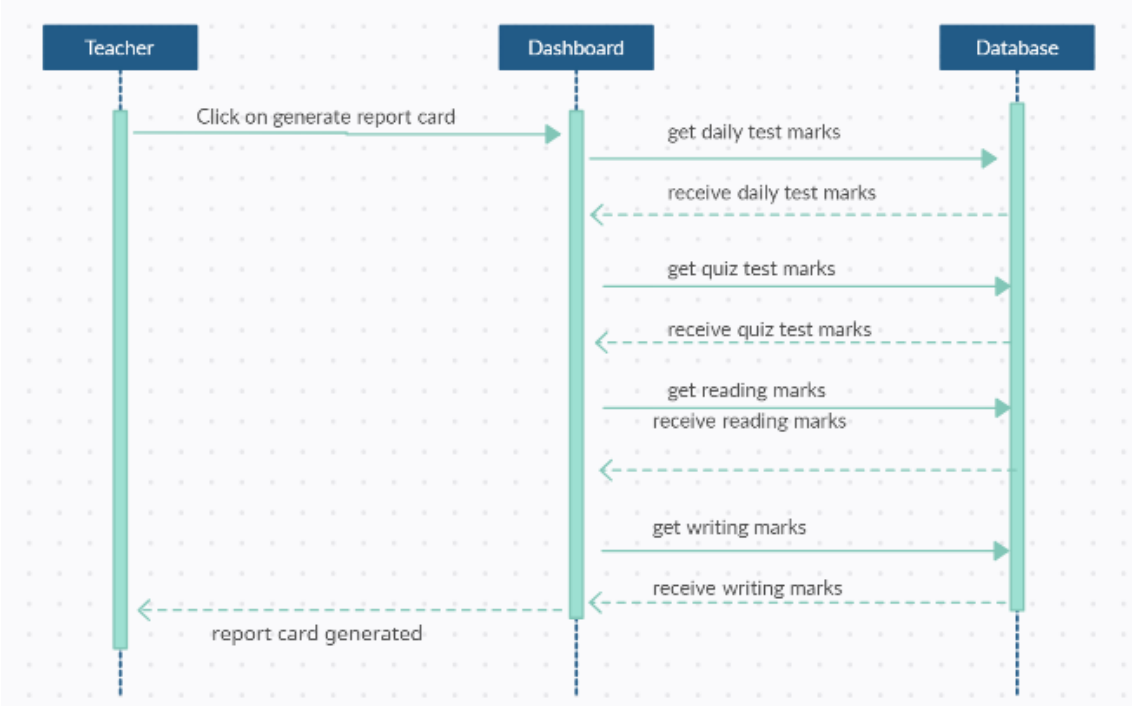

Figure 26: diagram for generate report card

3.5 Class Diagram:

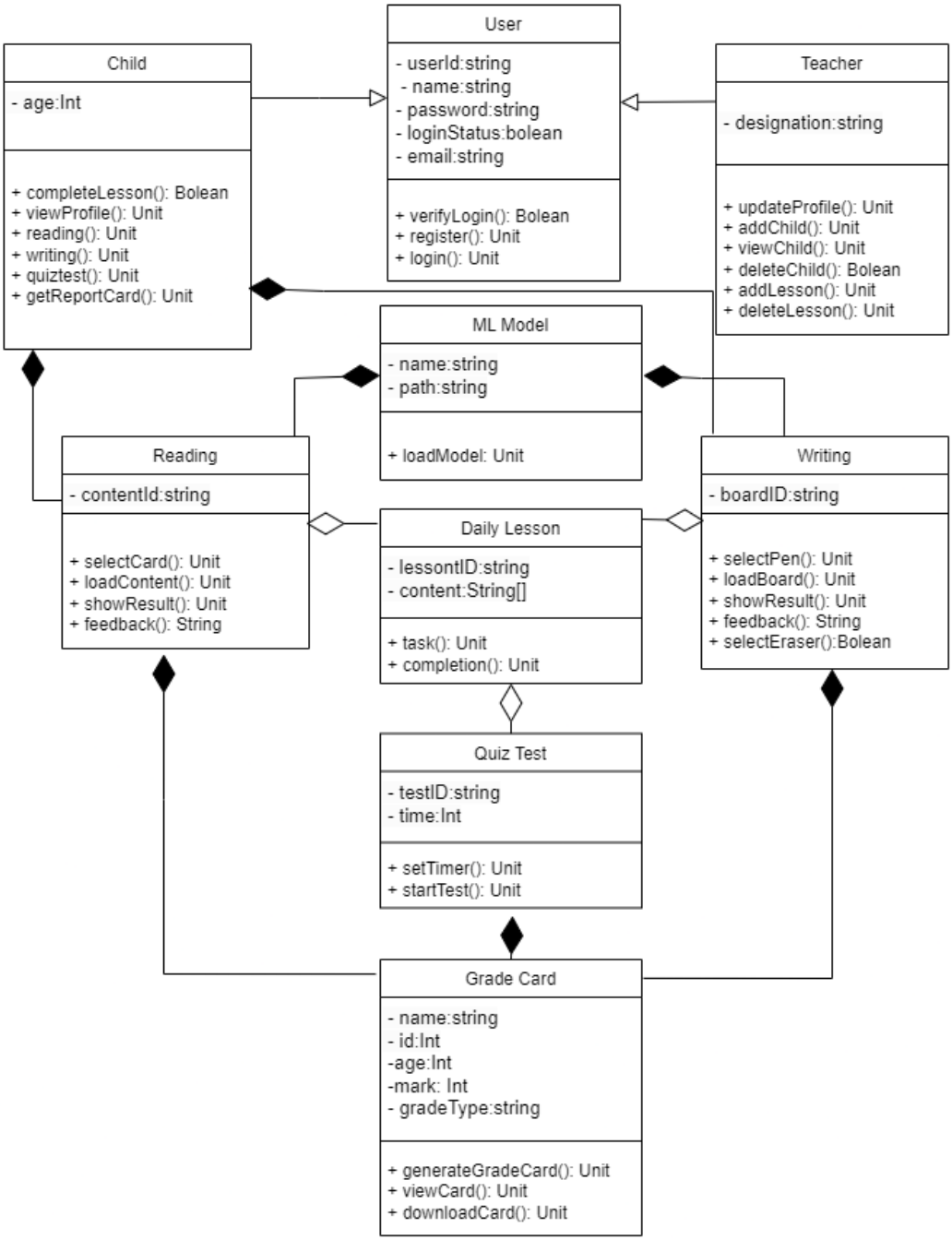

Figure 27: Class Diagram

3.6 Entity Relationship Diagram:

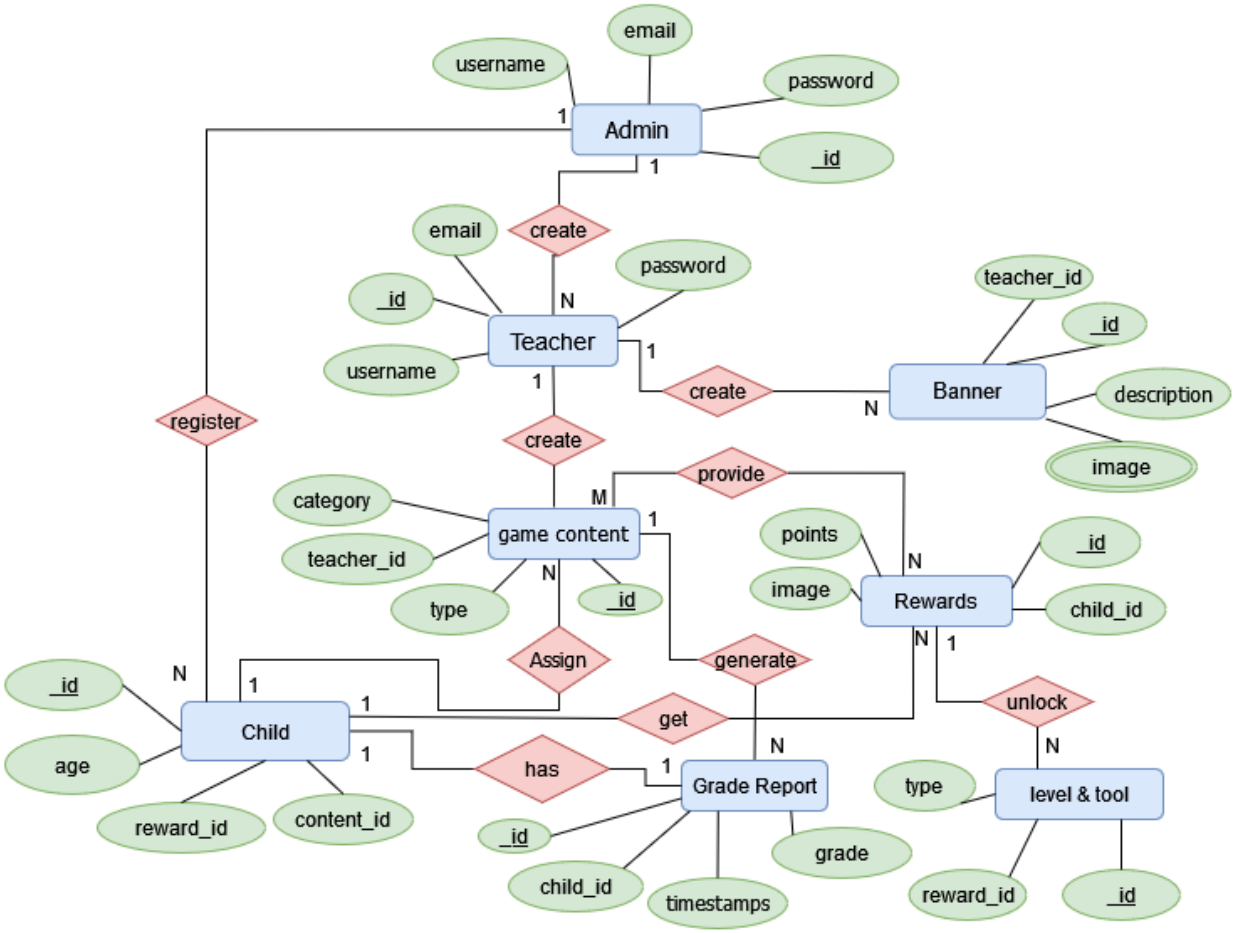

Figure 28: Entity Relationship Diagram

Chapter 4 -System Design Specification

4.1 Development tools & techniques:

In this project all the tools & technology that I used are:

Editor: Android Studio

Front End Technology: XML, Material UI, Jetpack Compose

Back End Technology: Java & Kotlin

Database: Firebase

Framework: Android

4.2 Other supporting tools & technology:

For version control & host my code I have used:

- Git
- GitHub

For testing API, I have used:

- Postman

4.3 Machine learning Model & technology:

To recognize text from board the model I have used:

- Digital Ink Recognition (Google)

To recognize speech from audio the model I have used:

- Tiny Whisper (Open AI)

Chapter 5 – System Testing

System Testing:

5.1 Testing Procedure:

- Unit Testing
- Acceptance Testing
- Expresso Testing

5.1.1 Functionality will be tested:

- Registration
- Login
- Log Out
- Profile Manage
- Add student, add teacher
- Text Detection
- Model Accuracy
- Reading, Writing feature
- Grade card generation

Function will not test:

- Terms & Condition
- Policy

5.2 Testing Strategies:

5.2.1 Test Approach:

- Level of test
- Types of test
- Environment of test

5.3 Testing Schedule:

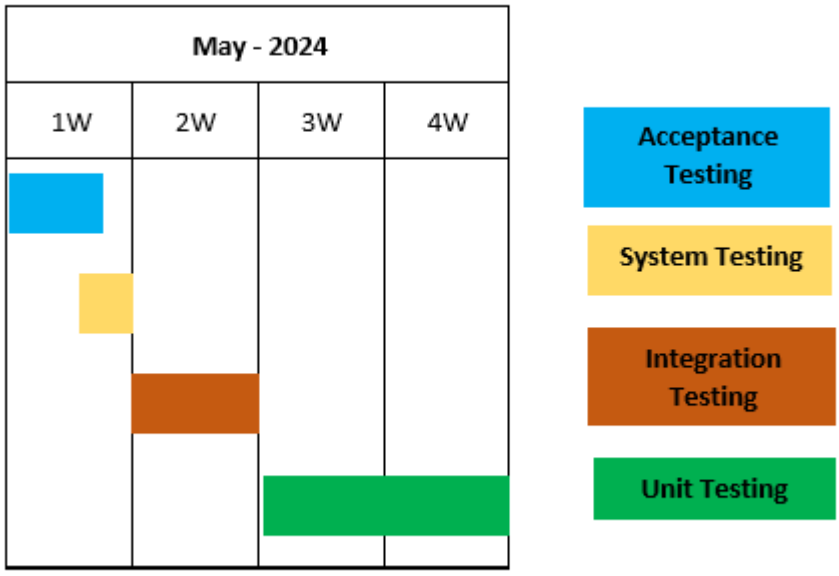

Figure 29: Testing Schedule

5.4 Test case:

5.4.1 Test case of registration process

Test - 01	Test Name: Test Registration Flow
Planned By: Md Rabbi Islam	Plan date: 16.5.24
Tested By: Md Rabbi Islam	Test Date: 16.5.24
Description: It will test registration process of user	
Precondition: Visit signup page	

Test Description: For this test case I have taken some valid and some invalid name, email & password and used that info in many different ways.

Test Case No	Test Data	Expected Output	Actual Output	Test Status
TC1	Put wrong name, email & valid password	Invalid Format	Invalid Information	Fail
TC2	Put email & password	Name required message	Invalid Information	Fail

TC3	Put wrong name, email & password	Invalid Information	Invalid Information	Pass
TC4	Put valid name, email & password	Registration Successful	Registration Successful	Pass

5.4.2 Test case of login process

Test - 02	Test Name: Test login flow
Planned By: Md Rabbi Islam	Plan date: 16.5.24
Tested By: Md Rabbi Islam	Test Date: 16.5.24
Description: It will test login function for user.	
Precondition: Visit sign in page	

Test Description: For this test case I have taken some registered and some unregistered name, email & password to check whether the system if perfectly working of note.

Test Case No	**Test Data**	**Expected Output**	**Actual Output**	**Test Status**
TC1	Put wrong email & valid password	Invalid Format	Invalid Information	Fail
TC2	Click on sign in without information	Required Field	Error Message	Fail
TC3	Put password	Email required message	Invalid Information	Fail
TC4	Put wrong email & password	Invalid Information	Invalid Information	Pass
TC5	Put valid email & password	Login Successful	Login Successful	Pass

5.4.3 Test case of view profile

Test - 03	Test Name: Test View Profile

Planned By: Md Rabbi Islam	Plan date: 16.5.24
Tested By: Md Rabbi Islam	Test Date: 16.5.24
Description: It will test view profile section.	
Precondition: Visit profile page	

Test Description: For this test case I have click on update button and provide information or data to change name, profile picture, designation etc. to check whether every option is correctly working or not.

Test Case No	Test Data	Expected Output	Actual Output	Test Status
TC1	Click on update information button	Pop up form with information	Information not found	Fail
TC2	Change picture, name, designation	Information Changed	Error occurred	Fail
TC3	Change picture, name, designation	Information Changed	Information Changed	Pass

5.4.4 Test Case of Add teacher

Test - 04	Test Name: Test add teacher
Planned By: Md Rabbi Islam	Plan date: 16.5.24
Tested By: Md Rabbi Islam	Test Date: 16.5.24
Description: This case helps to add teacher	
Precondition: Visit profile page and add teacher section	

Test Description: For this test case I have click on Add Teacher button and provide information or data to change name, profile picture, designation etc. to check whether teacher's data are recording in database or not.

Test Case No	Test Data	Expected Output	Actual Output	Test Status

TC1	Click on add teacher button	Pop up form with field	Form Loading failed	Fail
TC2	Add picture, name, designation	Teacher Added	Error occurred	Fail
TC3	Change picture, name, designation	Teacher Added	Teacher Added	Pass

5.4.5 Test case of writing feature

Test - 05	Test Name: Test writing function
Planned By: Md Rabbi Islam	Plan date: 16.5.24
Tested By: Md Rabbi Islam	Test Date: 16.5.24
Description: It helps to detect writing	
Precondition: Visit on writing practice page	

Test Description: For this test case I have selected the pen option and draw the same displayed text showed and click on check button to test whether it able to recognize the correct alphabet or not.

Test Case No	**Test Data**	**Expected Output**	**Actual Output**	**Test Status**
TC1	Click on recognize text button	Text recognized	No text found	Fail
TC2	Write text and click on recognize text button	Unknown language	Error occurred	Fail
TC3	Select language write text and click on recognize text button	Text recognized	Text recognized	Pass

5.4.6 Test case of generate grade card

Test - 06	Test Name: Test grade card generation
Planned By: Md Rabbi Islam	Plan date: 16.5.24
Tested By: Md Rabbi Islam	test Date: 16.5.24
Description: This case helps to generate grade card	
Precondition: Get all mark from database	

Test Description: For this test case I have selected all the checkbox and put mark for every subject to check whether is able to generate the report card or not.

Test Case No	**Test Data**	**Expected Output**	**Actual Output**	**Test Status**
TC1	Click on generate button	Required field message	No text found	Fail
TC2	Input mark and click on generate button	Generated report card	Failed to load marks	Fail
TC3	Input mark and click on generate button	Generated report card	Generated report card	Pass
TC4	Input mark and click on generate button	In progress	Time out	Fail

Chapter 6 – User Manual

6.1 Registration Page:

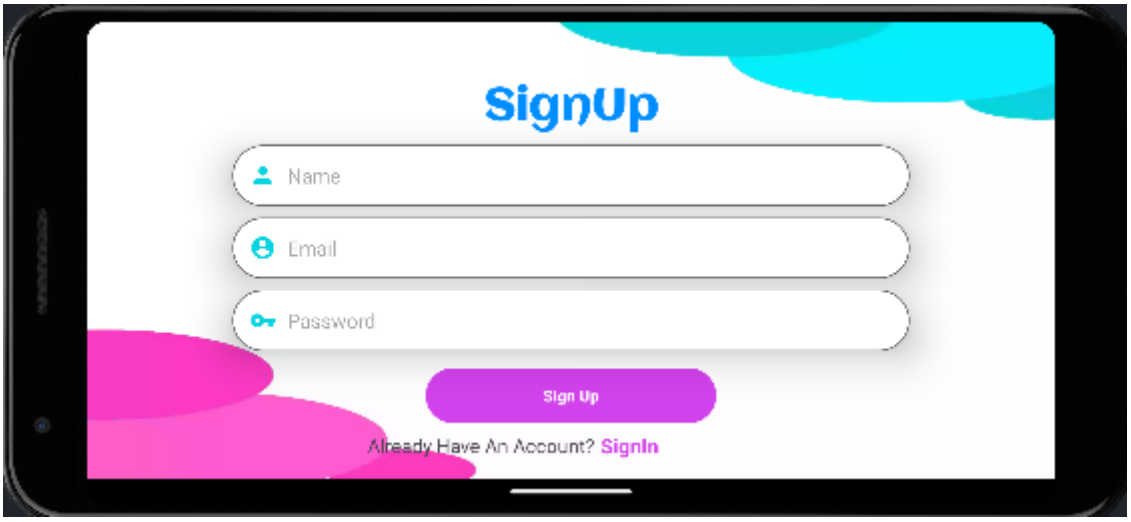

Figure 30: Screenshot for signup panel

- Put a valid email
- Put a password at least 6 character
- Click on signup button

6.2 Login Page:

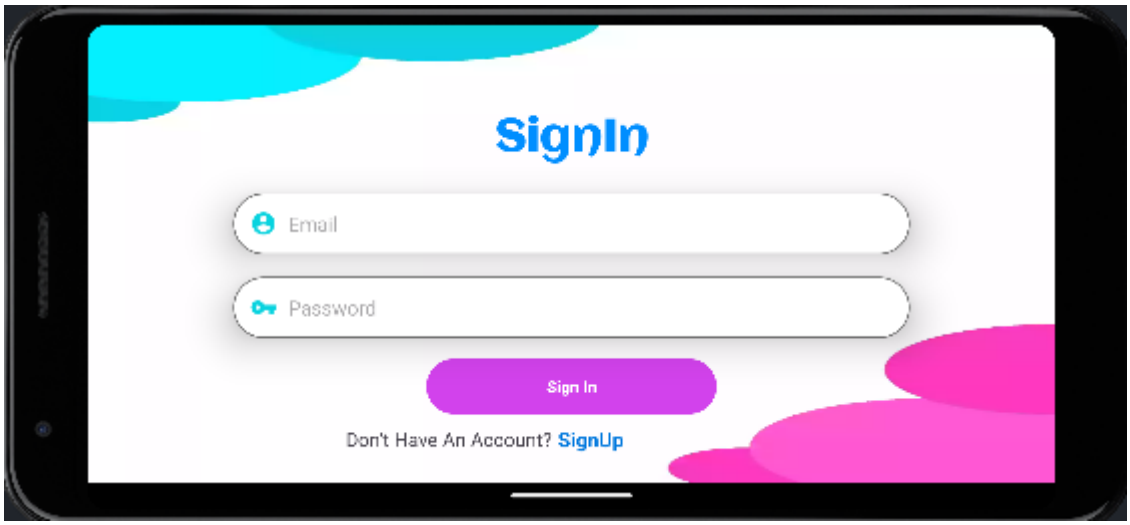

Figure 31: Screenshot for sign in panel

- Put registered email
- Put registered password
- Click on sign in button

6.3 Splash Screen:

Figure 32: Screenshot for splash screen

- Click on anywhere of screen to visit home page
- Click on “hamburger” icon to login

6.4 Admin Dashboard:

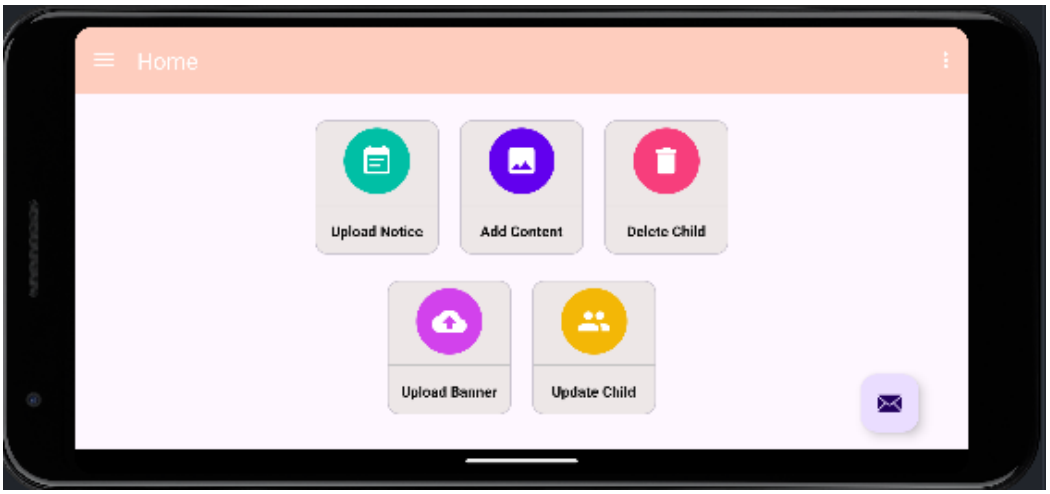

Figure 33: Screenshot for admin dashboard

- Click on “hamburger” icon to open side bar option
- Click on any item to perform specific task

6.5 Admin Sidebar:

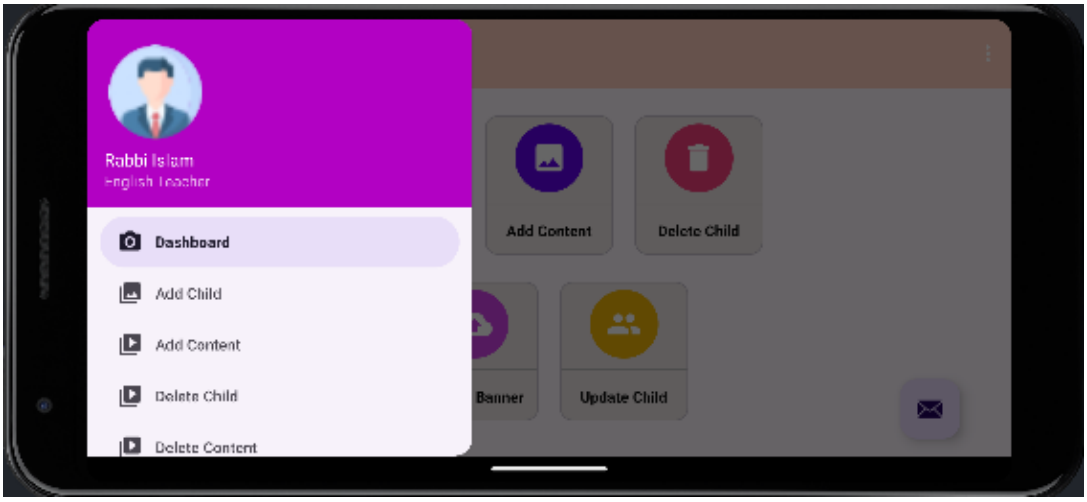

Figure 34: Screenshot for admin sidebar

- Click on any item of sidebar to perform specific task

6.6 Add Child:

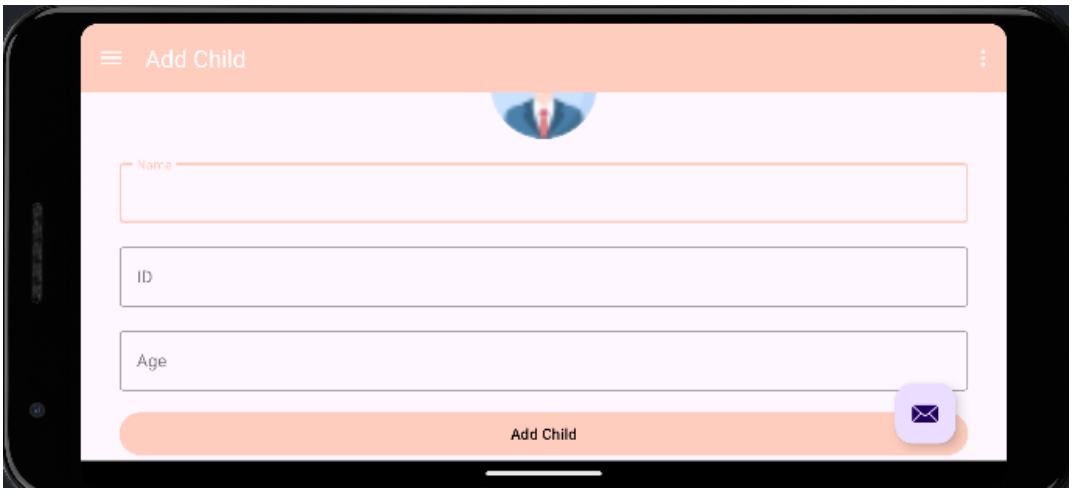

Figure 35: Screenshot for add child

- Put valid name
- Put a valid ID
- Put age
- Click on “Add child” button

6.7 Home Page:

Figure 36: Screenshot of home page

- Click “Daily Lesson” button to check daily lesson
- Click “Reading” button to practice reading
- Click “Writing” button to practice writing
- Click “Test” button for quiz test
- Progress bar show daily activity progress
- Coin, banner, profile, message and notification icon for their action

6.8 Daily Lesson Page:

Figure 37: Screenshot of daily lesson

- Setting icon for customization

6.9 Writing Practice Page:

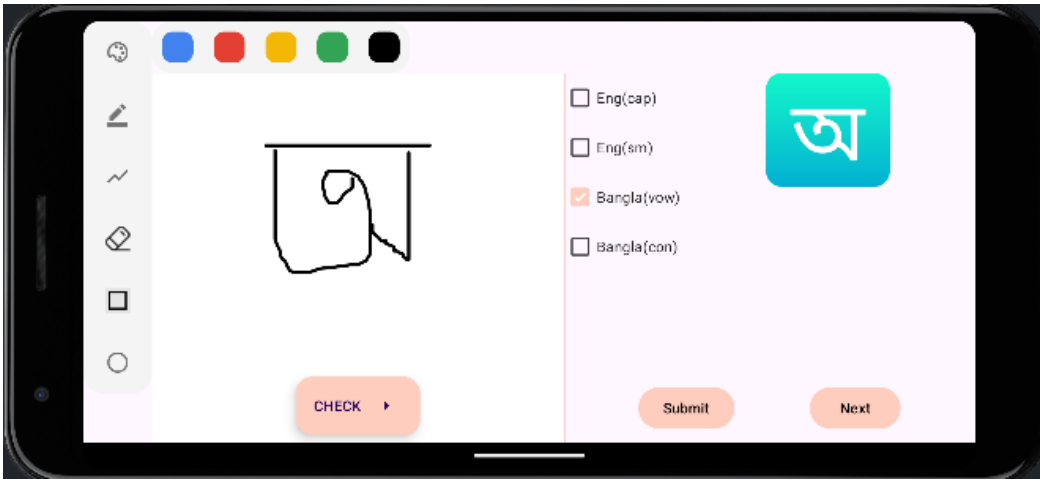

Figure 38: Screenshot of writing page

- Eraser icon to clear the board
- Color palate for changing pen color
- Select desired checkbox and click on submit
- "Next" button will bring content serially
- "Check" button for checking whether the written letter is matched or not

6.10 Reading Practice Page:

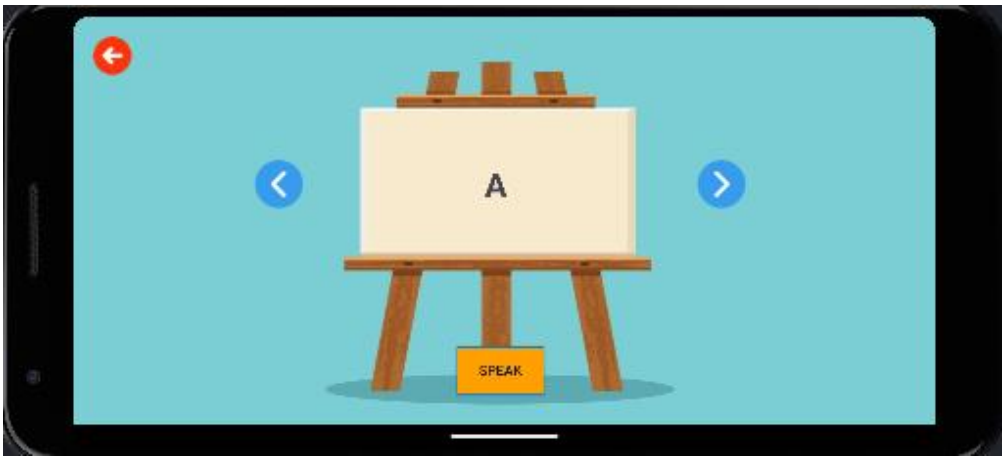

Figure 39: Screenshot of reading page

- Left arrow to load immediate previous one and right arrow for next
- Click on "Speak" button and say same letter showing on board
- Wait 2-3 sec for match and showing result whether matched or not

6.11 Quiz Page:

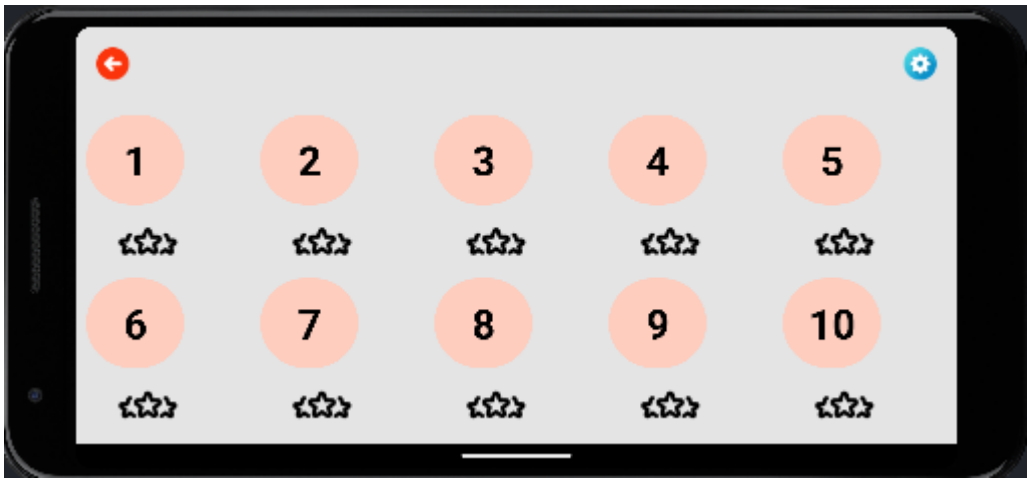

Figure 40: Screenshot of Test page

- Select any level
- Click on ready and play
- “Setting” icon to change game level

Chapter 7 – Conclusion

7.1 Project Link:

Apk Link:

https://drive.google.com/file/d/1DcBBz3t3j5qh0F3GnjWhR-tdDPXKzvsQ/view?usp=sharing

GitHub Link:

https://github.com/rabbi-islam/Little-Leaps

7.2 Limitation:

During working in this project, I have found some limitation and since I am using two machine learning model so it drives me some points where I couldn't able to break it out. I used "Digital ink" & "tiny-whisper" model for reading and writing recognition and I found "Digital Ink" has failed to recognize some special regional text variation and in "tiny-whisper" it failed to detect alphabet when audio file has surrounding. As a result, it detects wrong alphabet though pronunciation is correct.

- Regional text variation detection issue
- Higher surrounding frequency failed to detect alphabet
- Wrong detection in lower voice tone

7.3 Future Scope: In this project, there is more case to implement along with make more stable and customize functionality for more optimization.

- Improve UI/UX of the application
- Implement more stable ML model for text detection.
- Reduce surrounding from audio file.
- Compress audio file and remove noise to get exact content.
- Some feature still in development phase will be completed future

Appendix A

Reference:

Link:

- https://play.google.com/store/apps/details?id=com.bebi.family.baby.games.mg2&hl=en
- https://play.google.com/store/apps/details?id=com.binary.banglaalphabet&hl=en
- https://www.unicef.org/parenting/child-care/science-of-play
- https://www.unicef.org/sites/default/files/2018-12/UNICEF-Lego-Foundation-Learning-through-Play.pdf

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