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Task 1: Requirement gathering and analysis

Children

Functional requirements

1. The app shall provide different learning modes such as teacher assignments and games, etc. to cater for different learning styles and preferences.
2. The app shall include features that allow students to track progress, such as exercises filled in, correct answers, time spent on each task.
3. The app shall provide the multiplication tables that allow users to have a revision.
4. The app shall provide leaderboards to display high scores and achievements, encouraging healthy competition and motivation among users.
5. The app shall incorporate gamification elements such as rewards, badges, and points to make the learning process more engaging and encourage users to return to the app.
6. The app should include timed challenges where children can solve multiplication problems within a specific time limit, helping them improve their speed and accuracy.
7. The app shall provide instant feedback on correct and incorrect answers to enhance learning.

Non-functional requirements

Look/Feel

1. The interface shall be visually appealing, with bright colours and engaging animations such as playful characters, icons, or themes to capture children's attention.

Usability

1. The app should provide a language button on the settings page to allow users from different countries to use their language in the app.
2. The app should provide background music and allow users to change the music to make the app interesting.
3. Navigation shall be simple and clear, with easily identifiable buttons or icons for different features and functions, such as providing a navigation bar or homepage.
4. The app should allow users to select their preferred avatar and change it on the profile page.

Operational

1. The system shall ensure that certain features of the app, such as multiplication tables and games, can be used offline as users may not always have access to the internet.
2. The app shall be available on multiple platforms such as iOS and Android. Additionally, the app shall be compatible with different devices (phones and tablets) so that children can easily access it.

Parents

Functional requirements

1. The app shall allow parents to view upcoming and completed tasks for their children.
2. The app shall allow parents to see the answers their children have chosen for each task.
3. The app shall allow parents to view an analysis of their child's overall performance (percentage correct in addition, subtraction, multiplication, and division).
4. The app shall provide a chat box for parents to communicate with teachers.
5. The app shall provide flashcards so children and parents can learn together.
6. Apps should provide pop-up notifications to let parents know when their children are engaging in activity on the app, such as when they complete a task.

Non-functional requirements

Usability

1. Flashcards should allow parents to choose difficulty and category.
2. Users shall be able to use all features within 15 minutes of watching the system training video.
3. The app should provide accessibility features, such as the option for larger text.

Performance

1. The average response time of the app should be less than 5 seconds.
2. App download sizes should be small, up to 500 MB, to save storage space on users' mobile devices.

Teachers

Functional requirements

1. The app shall allow teachers to assign different categories of tasks to students such as addition, subtraction, multiplication, and division.
2. The app shall allow teachers to view upcoming tasks as it can remind them to prepare lessons and track student progress on tasks.
3. The app shall allow teachers to see the number of students who have submitted tasks.
4. The app shall allow teachers to view each student's score and submission time for each task.
5. The app shall allow the teacher to see the answers chosen by each student on each task.
6. The app shall allow teachers to view the questions and correct answers for each task.
7. The app shall allow teachers to see an overall class analysis of each task, such as which question students answered most incorrectly.
8. The app shall allow teachers to view an analysis of each student's overall performance (percentage correct in addition, subtraction, multiplication, and division)

9. The app should allow for a chat box for teachers to communicate with each student's parents.
10. The app should allow teachers to view the classes name they are teaching.

Non-functional requirements

Look/Feel

1. The app's colours and components should be natural and clear.

Usability

1. The app should provide filters and a search bar to allow teachers to efficiently search and sort student tasks.
2. The app shall provide a feedback system for users to provide feedback and report issues.

Performance

1. The app should run continuously 98% of the time without crashes or technical issues.
2. The application shall allow automatic software updates on a regular basis to allow users continued access to accurate functionality for current tasks.

Security

1. The app shall have a database and backup of user information, including their task progress. (Backed up every day at 2 a.m. when the user device is connected to Wi-Fi)
2. The app shall have password access so that unauthorized access to the app is not possible.

Task 2: Prototyping and Technical Specifications

The URL to access the prototype

<https://www.figma.com/proto/PTLQP3o4WzOHRnjE28F9tz/HCI-Gp?page-id=0%3A1&type=design&node-id=1-4&viewport=-185%2C-3576%2C0.17&t=MIOjKIHyLVv0audj-1&scaling=scale-down&starting-point-node-id=1%3A4&show-proto-sidebar=1&mode=design>

Flow of viewing the prototype

Flows	Page
General	Welcome, Sign up and Login
Children	All Children pages
Parent	All Parent pages
Teacher	All Teacher pages

Design principles

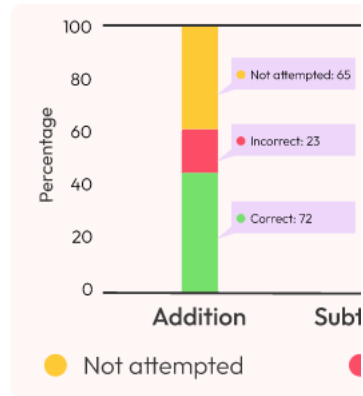
Shneiderman's 8 Golden Rules

Golden Rule #1 - Strive for consistency: We design the interface we used Identical terminology in the menu to help the user easily identify information, also similar colours, layout, capitalization, and fonts those have well consistent.

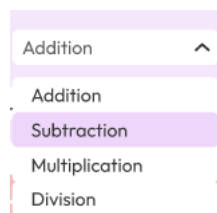
Golden Rule #2 - Seek universal usability: Considering the different age ranges and international differences of our users, we allow users to adjust the sound, font size and language of our apps in the settings page.

Golden Rule #3 – Offer informative feedback:

1. In the game page of Addition, Subtraction, Multiplication and Division, after the user clicks on the correct or incorrect answer, the button color will change.
2. On the Division game page, if the user clicks on the "Hint" box, the hint will be displayed immediately.
3. If the user hovers over a bar chart of student performance or class performance, detailed information for that bar will be displayed.



- If the user clicks on any drop-down list in the application, the options are displayed. Additionally, if the user hovers over any option in the drop-down list, the color will change to identify the selected option.



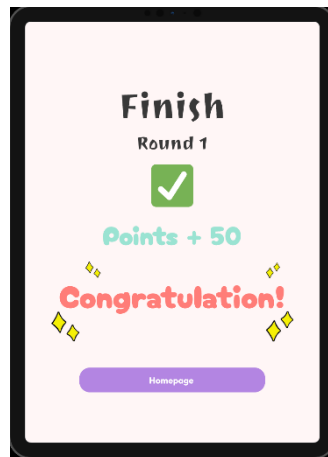
- On the Teacher Task Creation page, if the teacher clicks the check box, a checkmark will appear in the check box, indicating that the teacher has selected this option.



- On the Parent Flashcards page, if the user clicks on the flashcard, the answer will be displayed.

Golden Rule #4 – Design dialogs to yield closure:

- After children complete each round of the game, a congratulations page is displayed.



Golden Rule #5 – Prevent errors:

1. On the sign up and login pages, we provide standard email formats and forget password buttons to prevent users from making mistakes when filling in information and provide effective instructions that users can modify.

Email *	Password *
<input type="text" value="example@gmail.com"/>	<input type="password"/>
	Forgot your password?

2. If a user accidentally clicks the "Exit" button on the Home page, or a child clicks the "Home" button while playing a game or performing a task, they will be taken to a confirmation popup.



3. Prefer selecting rather than typing in most of our app operations because it prevents users from entering invalid data.

Golden Rule #6 – Permit easy reversal of actions:

1. Most pages have a "return" button in the upper left corner that allows users to return to the previous page.



2. On the Teacher Creation Task Page, there is a Redo and Undo button that allows teachers to undo or redo their actions when creating a task.

Golden Rule #7 – Keep users in control:

1. There is a "Notification" button on the homepage. Only when the user clicks the button will a notification message pop up.

Golden Rule #8 – Reduce short-term memory load:

Seven plus or minus two chunks:

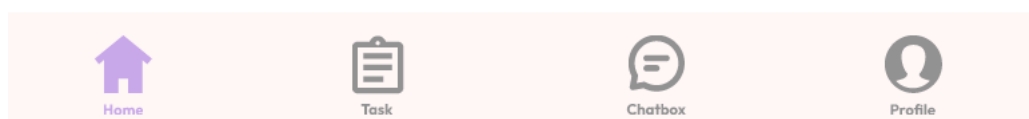
1. The navigation bar on the children's page only has 5 options, and the navigation bar on the teacher page and parent page both has 4 options.
2. Both the children's games and task pages have 4 options for children to answer.
3. The teacher task page has 3 sections and the parent task page has 3 sections.

Recognize than recall:

1. In the navigation bar, the "Home" icon looks like a house, the "Game" icon looks like a game controller, the "Table" and "Task" icons look like a document, the "Ranking" icon looks like a trophy, the "Profile" icon looks like a person, the "Chatbox" icon looks like a dialog and the "Flashcard" icon look like cards.



Children's navigation bar



Teachers' Navigation bar



Parents' Navigation bar

2. On the homepage, the "Notification" icon looks like a bell, the "Setting" icon look like a gear and the "Exit" icon look like a door.



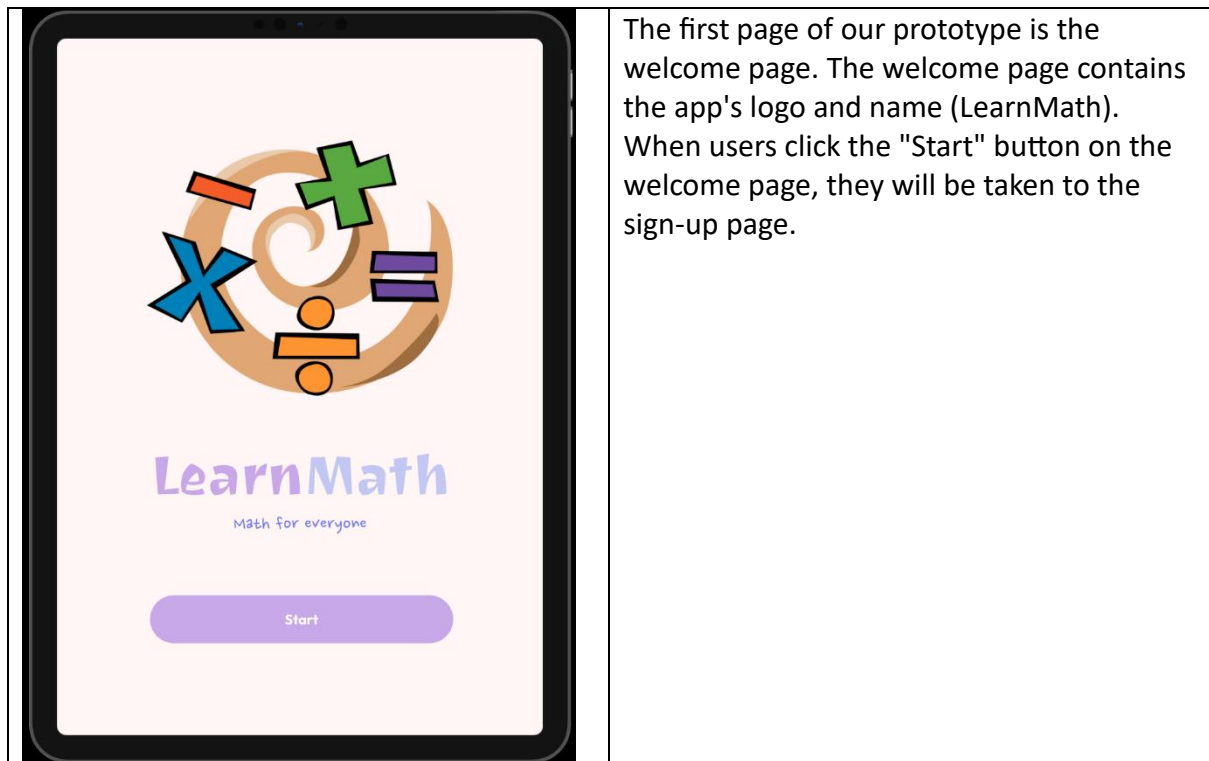
3. On the Teacher Task Creation page, the "Delete" button looks like a trash can and a cross, and the "Add" icon consists of a "+" sign. Additionally, the "Search" icon looks like a magnifying glass.

The screenshot shows a user interface for creating a question. At the top right, there are two circular icons: one with a left arrow and one with a right arrow, followed by a light blue button labeled "Publish". Below this is a light green box titled "Question 1" with a trash can icon in the top right corner. Inside the box is a text input field labeled "Enter the question". Below the input field are four rows, each with a radio button, a text input field labeled "Enter the choice", and a cross icon. Below the green box is a circular icon with a plus sign.

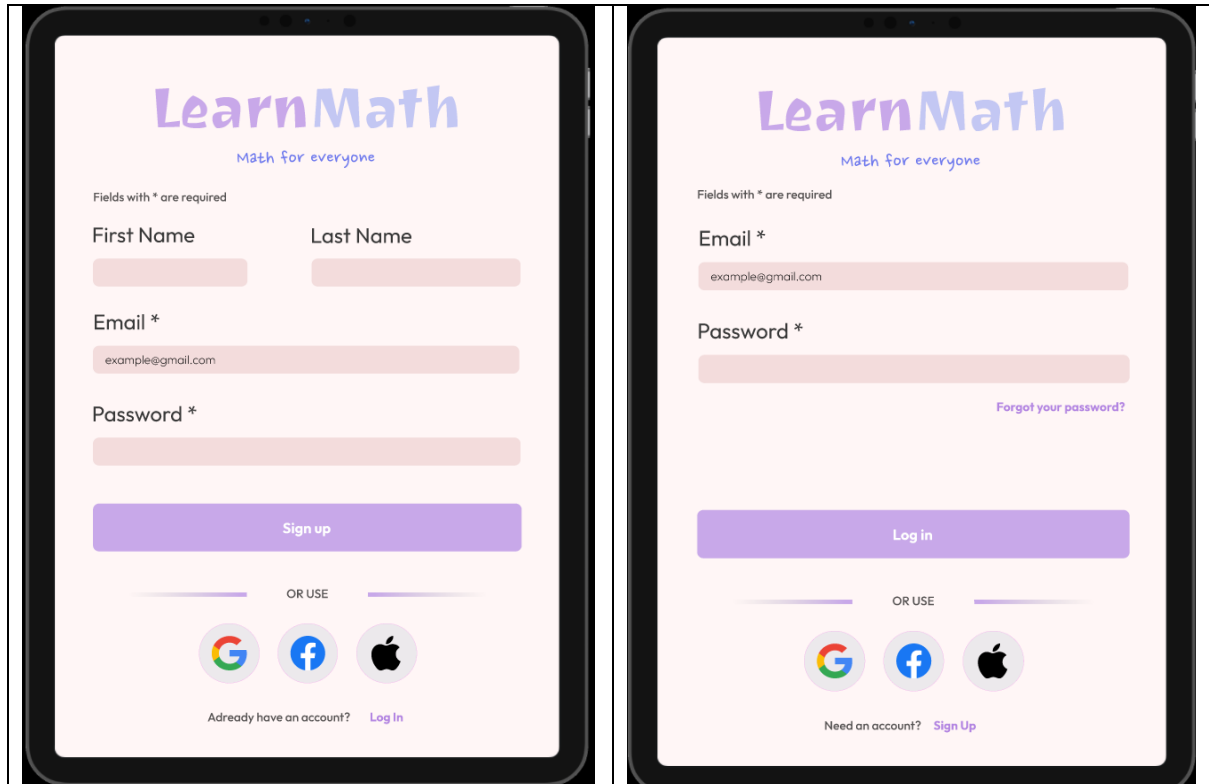
4. We use green for correct answers and "Yes" and red for incorrect answers and "No."

The screenshot shows a purple dialog box with the text "Exit the application?". Below the text are two buttons: a green button with a checkmark icon and the text "Yes", and a red button with a cross icon and the text "No".

Welcome Page



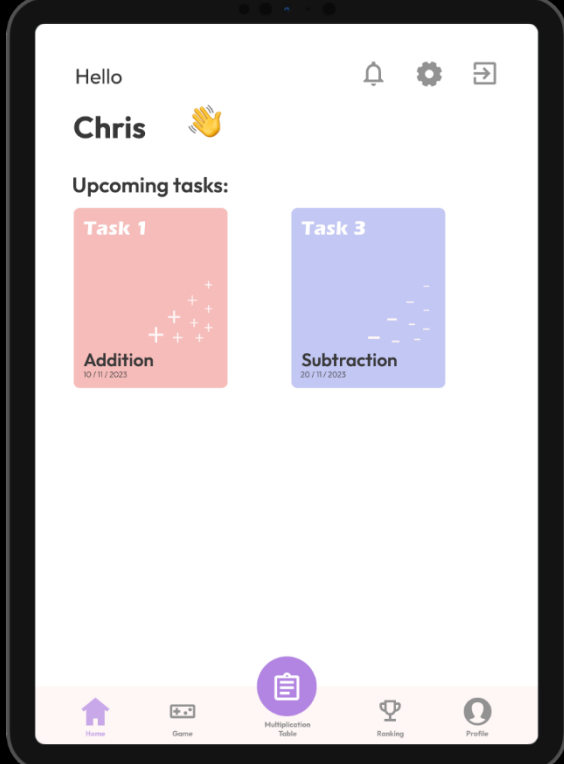
Sign Up and Login Page



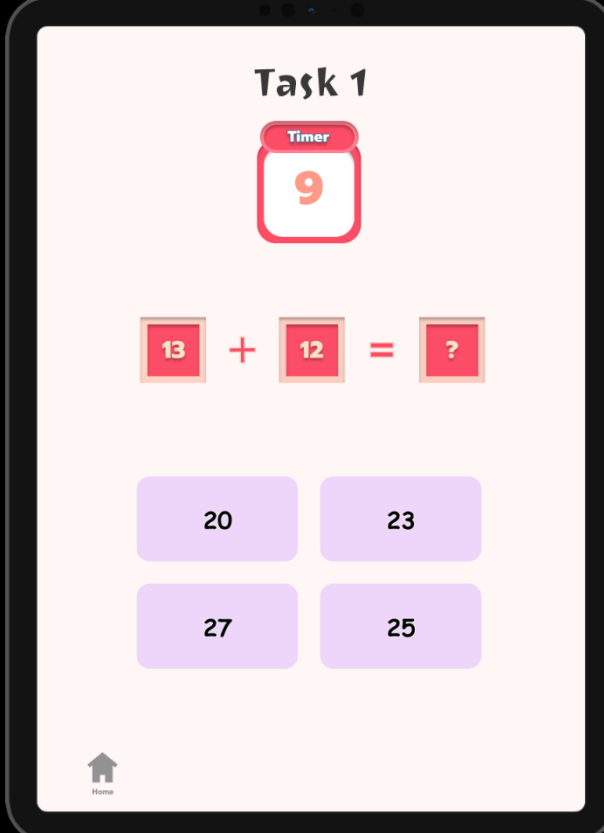
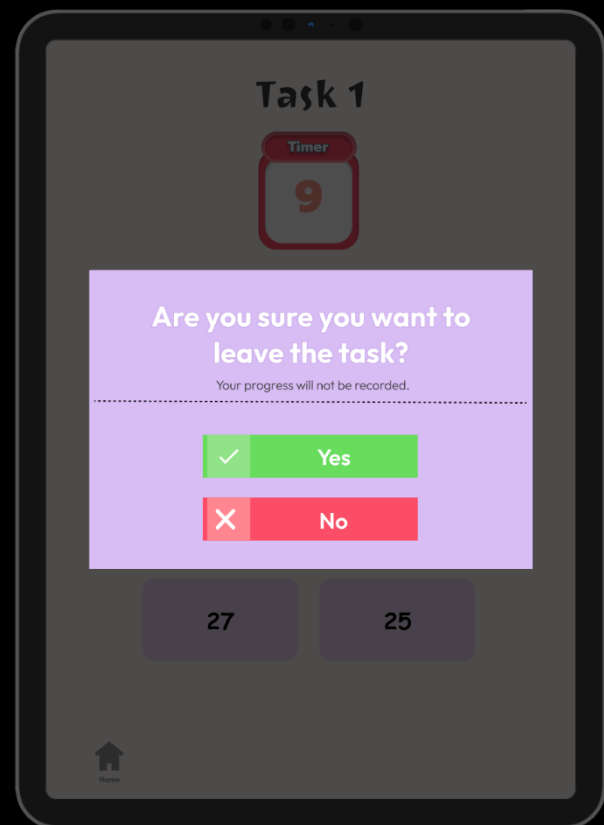
text at the bottom of the registration page to jump to the login page to log in. There is an email format in the email field for user reference. If a user has forgotten their password, they can click "Forgot your password?" on the login page for further assistance. Fields marked with *, such as email address and password, are required to be filled in.

Children

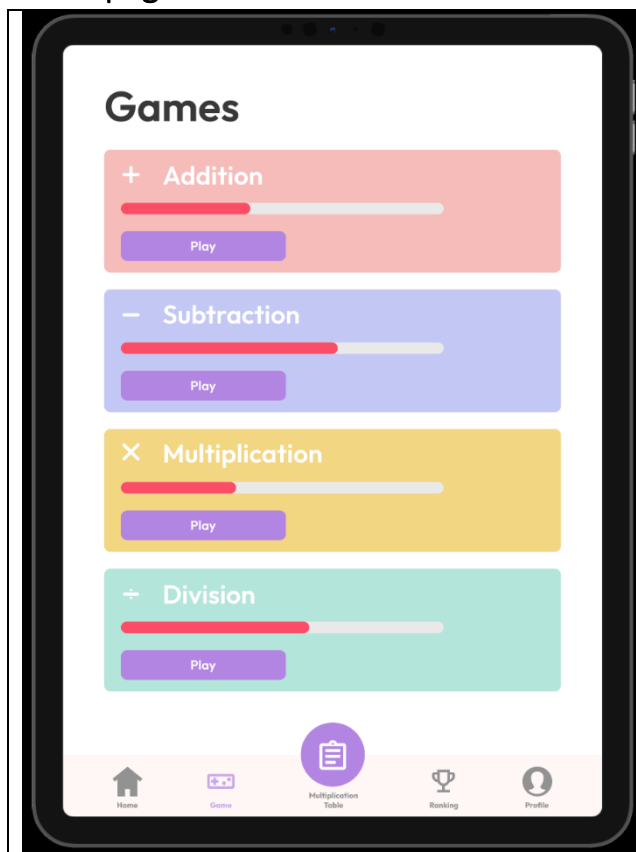
Homepage

	<p>The user will be redirected to the home page after logging in or registering. The home page will display the username and the user's upcoming tasks.</p> <p>Tasks will be marked with the task title, category, and deadline to let users know.</p> <p>In the upper right corner of the home page, there is a "Notifications" button, "Setting" button and "Exit" button for users to view the latest announcements of the application and redirect to the setting pages.</p> <p>At the bottom of the home page, there is a navigation bar for users to go to different pages.</p>
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Task page

	<p>After users click "Task 1" on the homepage, they will be redirected to the task page.</p> <p>There is a timer at the top of the page to let children know the time remaining for tasks set by the teacher.</p> <p>After the user clicks an answer, the application will automatically redirect the user to the next question of the task.</p> <p>In the lower left corner, there is a "Home" button.</p>
	<p>If the user clicks the "Home" button, a confirmation message will pop up.</p> <p>If the user clicks "Yes", they will be redirected to the home page and the progress of the task will not be recorded.</p> <p>If the user clicks "No" they will be returned to the current page.</p>

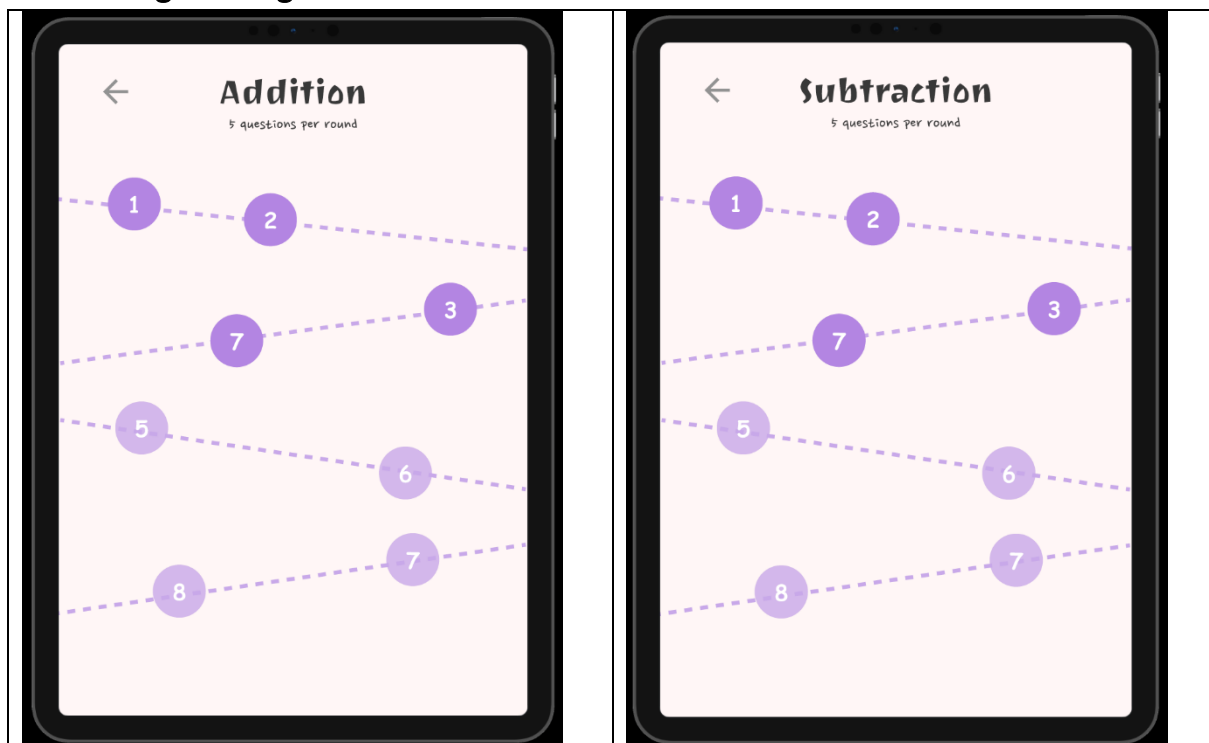
Game page

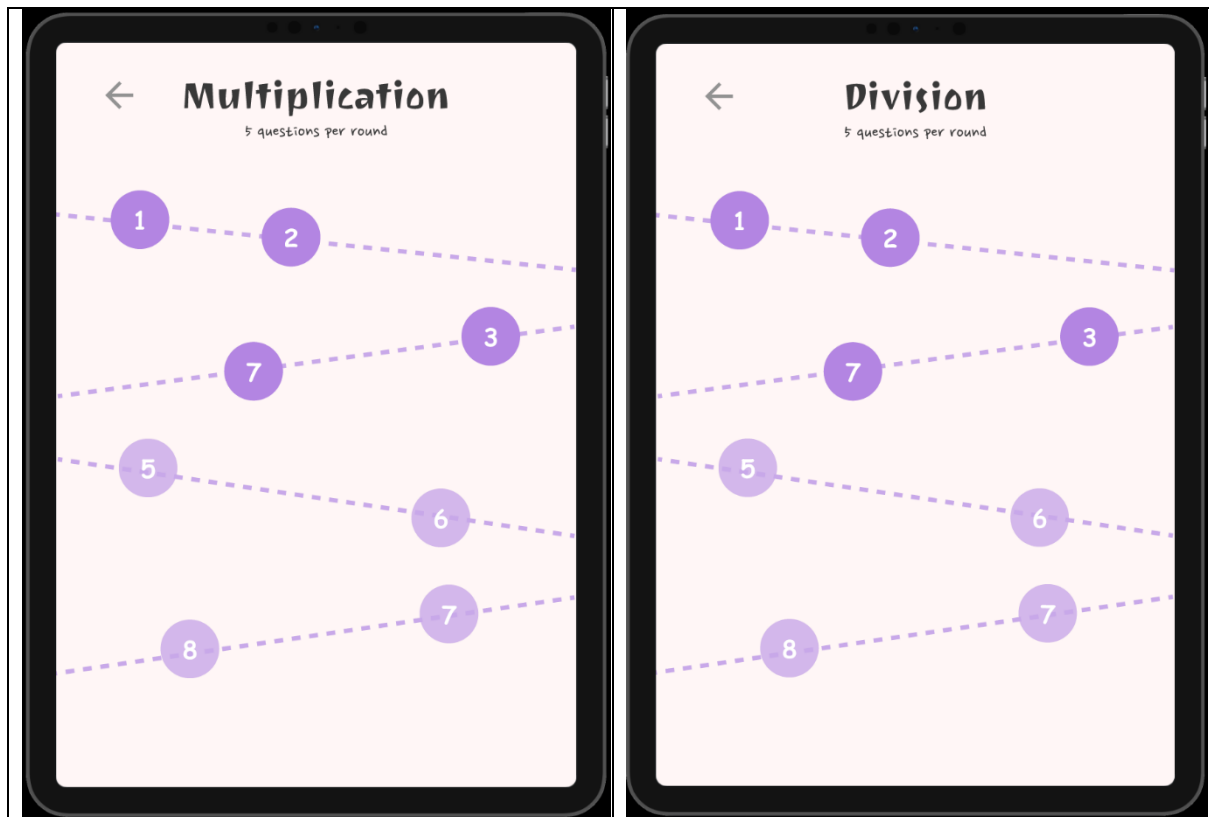


If the user clicks on "Games" in the navigation bar, they will be redirected to this page.

There are 4 categories of games (addition, subtraction, multiplication, division) for users to choose from.

Game Progress Page





After the users clicks the "Play" button on the game page, they will jump to this page to view the progress of the current game.

The return icon appears in the upper left corner, and the page name appears at the top of the screen. If the user clicks on the return icon, he will be returned to the home page. The translucent buttons represent pages that the user has not yet unlocked. Only buttons with 100% transparency are pages that the user has unlocked. Users must complete the unlocked pages to open new chapters.

Addition Game Pages

Step 1

Addition

Round 1

10

+

11

?

21

23

27

30

Home

Step 2

Addition

Round 1

10

+

11

?

21

23

27

30

Home

→

Step 3

Addition

Round 1

12

+

13

?

27

23

25

30

Home

Step 4

Addition

Round 1

12

+

13

?

27

23

25

30

Home

Step 5

Addition

Round 1

$$\begin{array}{r} 12 \\ + 13 \\ \hline \end{array}$$

?

27 23

25 30

Home →

Step 6

Addition

Round 1

$$\begin{array}{r} 13 \\ + 16 \\ \hline \end{array}$$

?

29 24

21 30

Home →

Step 7

Addition

Round 1

$$\begin{array}{r} 13 \\ + 16 \\ \hline \end{array}$$

?

29 24

21 30

Home →

Step 8

Addition

Round 1

$$\begin{array}{r} 18 \\ + 11 \\ \hline \end{array}$$

?

29 24

21 30

Home →

Step 9

Addition

Round 1

$$\begin{array}{r} 18 \\ + 11 \\ \hline \end{array}$$

?

29 24

21 30

Home →

Step 10

Addition

Round 1

$$\begin{array}{r} 19 \\ + 13 \\ \hline \end{array}$$

?

26 34

28 32

Home →

Step 11

Addition

Round 1

$$\begin{array}{r} 19 \\ + 13 \\ \hline \end{array}$$

?

26 34

28 32

Home →

Step 12

Finish

Round 1

✓

Points + 50

Congratulation!

Homepage

Subtraction Game Pages

Step 1

Subtraction

Round 1

$$\begin{array}{r} 20 \\ - 10 \\ \hline \end{array}$$

?

10 23

15 27

Home

Step 2

Subtraction

Round 1

$$\begin{array}{r} 20 \\ - 10 \\ \hline \end{array}$$

?

10 23

15 27

Home

→

Step 3

Subtraction

Round 1

$$\begin{array}{r} 17 \\ - 13 \\ \hline \end{array}$$

?

13 9

4 7

Home

Step 4

Subtraction

Round 1

$$\begin{array}{r} 17 \\ - 13 \\ \hline \end{array}$$

?

13 9

4 7

Home

Step 5

Step 6

Subtraction

Round 1

$$\begin{array}{r} 17 \\ - 13 \\ \hline \end{array}$$

?

13 9

4 7

Home →

Subtraction

Round 1

$$\begin{array}{r} 18 \\ - 11 \\ \hline \end{array}$$

?

7 11

21 13

Home

Step 7

Subtraction

Round 1

$$\begin{array}{r} 18 \\ - 11 \\ \hline \end{array}$$

?

7 11

21 13

Home →

Step 9

Step 8

Subtraction

Round 1

$$\begin{array}{r} 21 \\ - 13 \\ \hline \end{array}$$

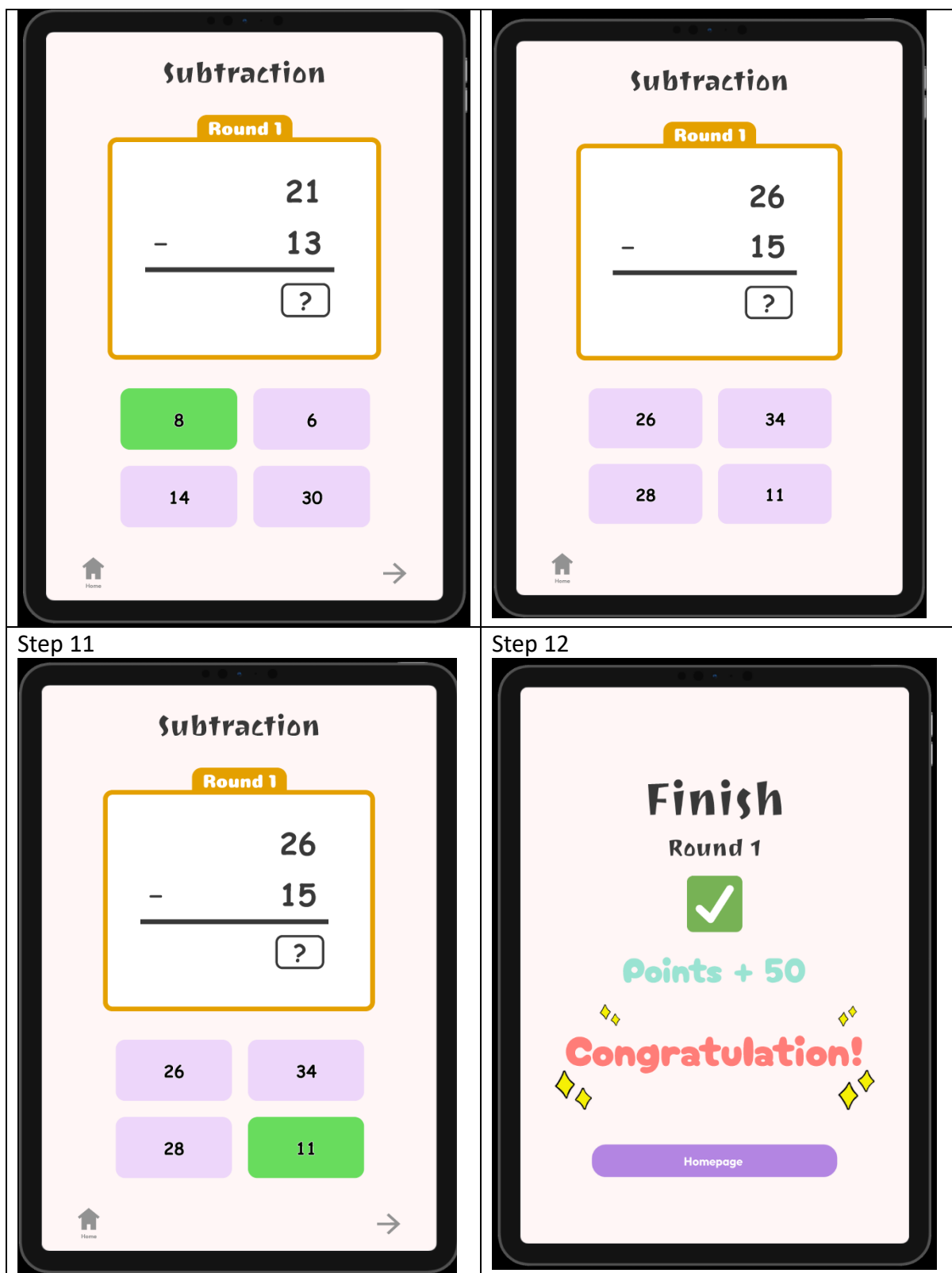
?

8 6

14 30

Home

Step 10



Multiplication Game Page

Step 1	Step 2
--------	--------

Multiplication

Round 1

$$\begin{array}{r} 2 \\ \times 8 \\ \hline \end{array}$$

?

16 18

5 9

Home

Multiplication

Round 1

$$\begin{array}{r} 2 \\ \times 8 \\ \hline \end{array}$$

?

16 18

5 9

Home

→

Step 3

Multiplication

Round 1

$$\begin{array}{r} 7 \\ \times 3 \\ \hline \end{array}$$

?

13 9

21 27

Home

Step 4

Multiplication

Round 1

$$\begin{array}{r} 7 \\ \times 3 \\ \hline \end{array}$$

?

13 9

21 27

Home

Step 5

Step 6

Multiplication

Round 1

7

×

3

?

13

9

21

27

Home

→

Multiplication

Round 1

9

×

6

?

54

49

73

82

Home

→

Step 7

Multiplication

Round 1

9

×

6

?

54

49

73

82

Home

→

Multiplication

Round 1

4

×

5

?

20

32

21

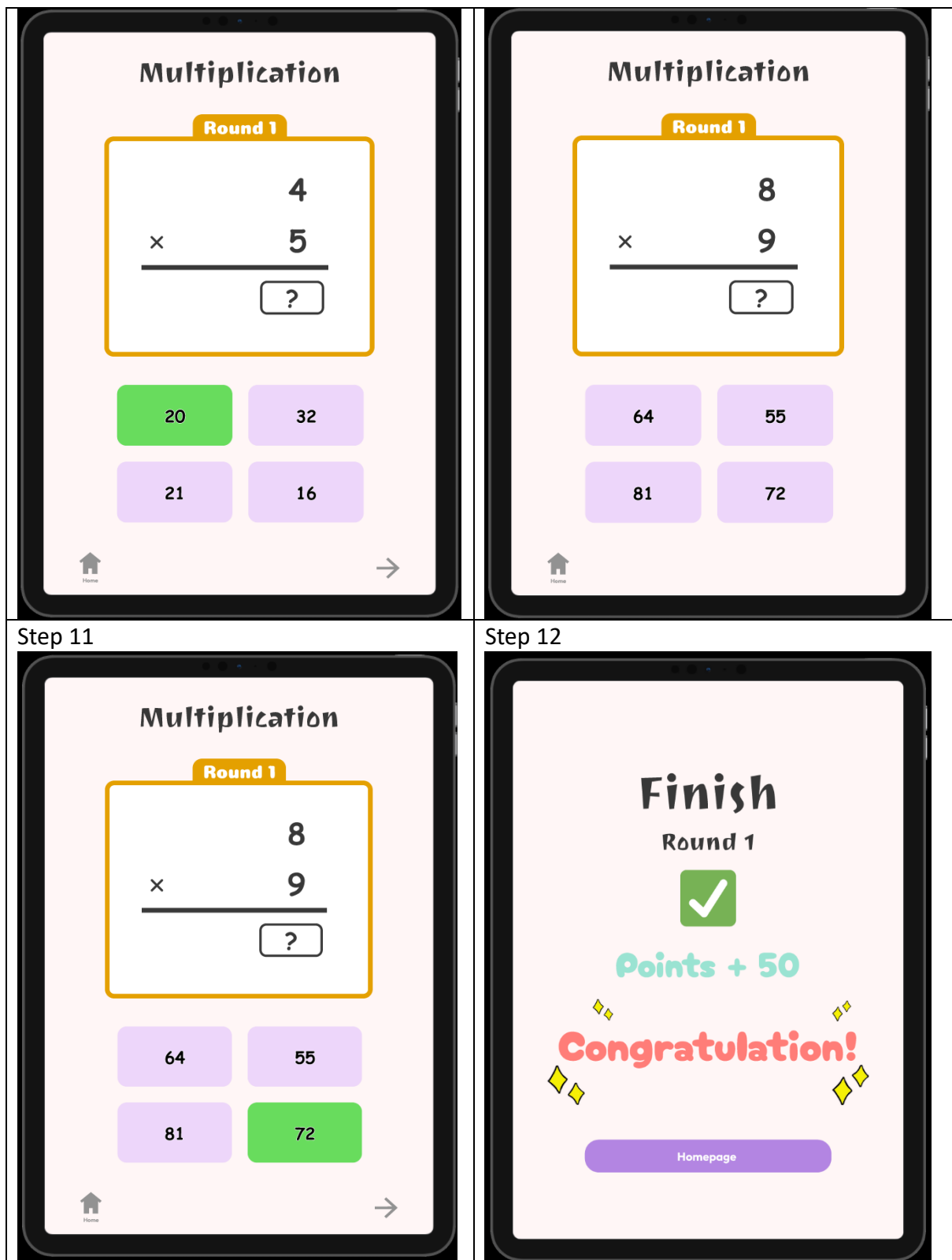
16

Home

→

Step 9

Step 10



Similarities between addition, subtraction, and multiplication games


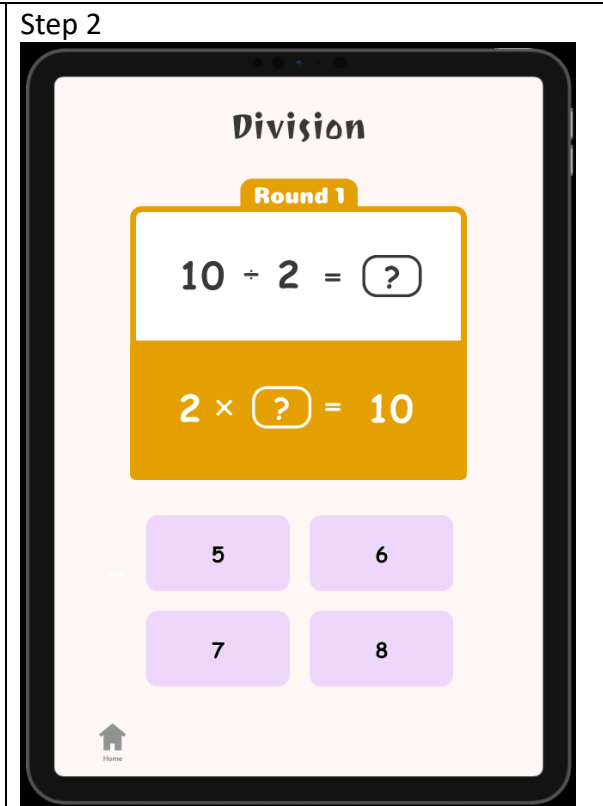
The category and current round of games are displayed at the top. There is a home button in the lower left corner. If the user clicks the "Home" button, a confirmation message will pop

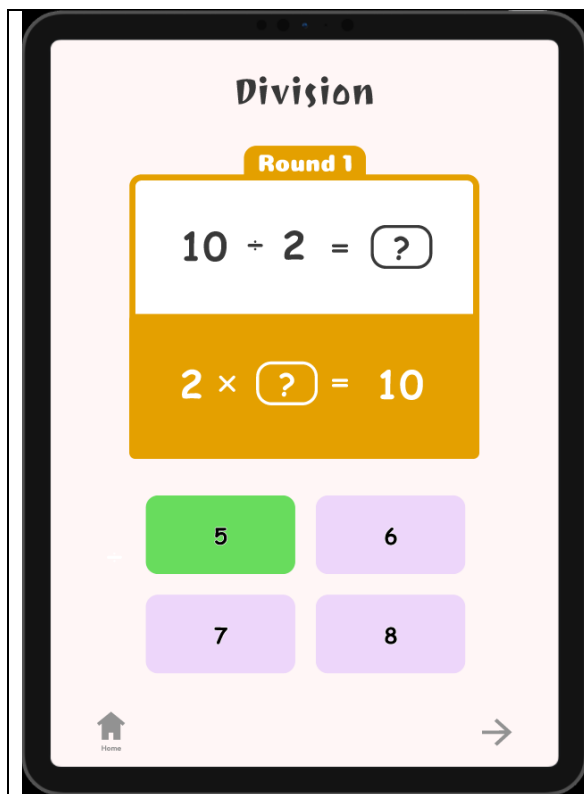
up. Questions are displayed in a brown border and the user must select one of four numbered buttons below the box as the correct answer.

Control process:

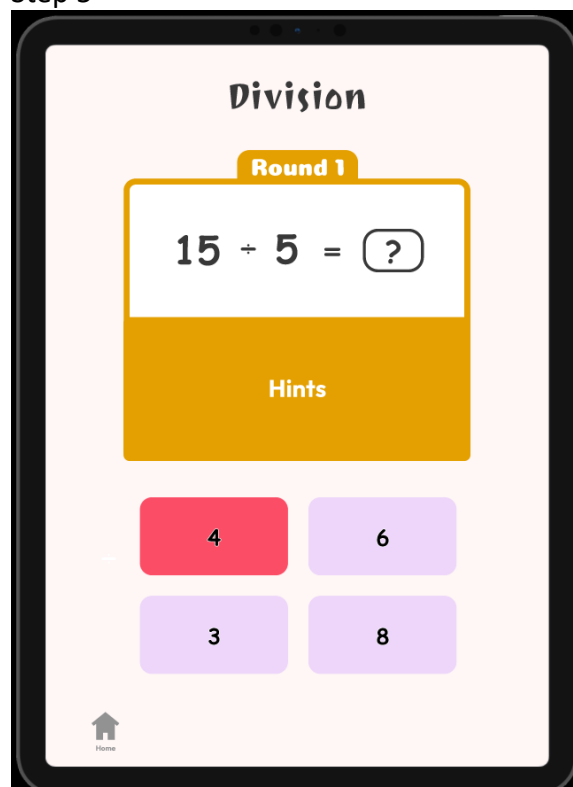
If the user clicks the correct answer, the button will turn from gray to green, and an arrow to the next question will be displayed in the lower right corner. If the user clicks on an incorrect answer, the button will change from gray to red. Users need to keep trying and choose the correct answer before moving to the next question. Once the user completes the round, a congratulations page is displayed, and the user is asked to click the "Home" button to return to the home page.

Division Game Page

<p>Step 1</p> 	<p>Step 2</p> 
<p>Step 3</p>	<p>Step 4</p>

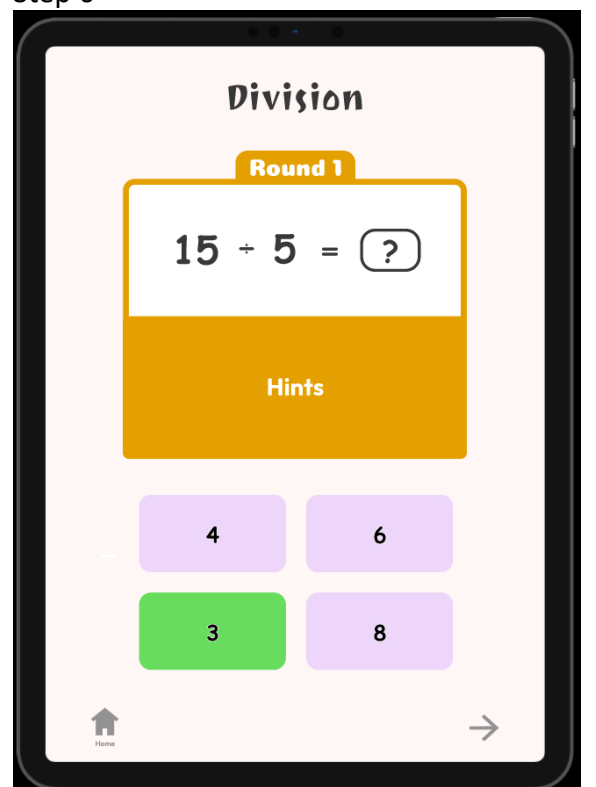


Step 5

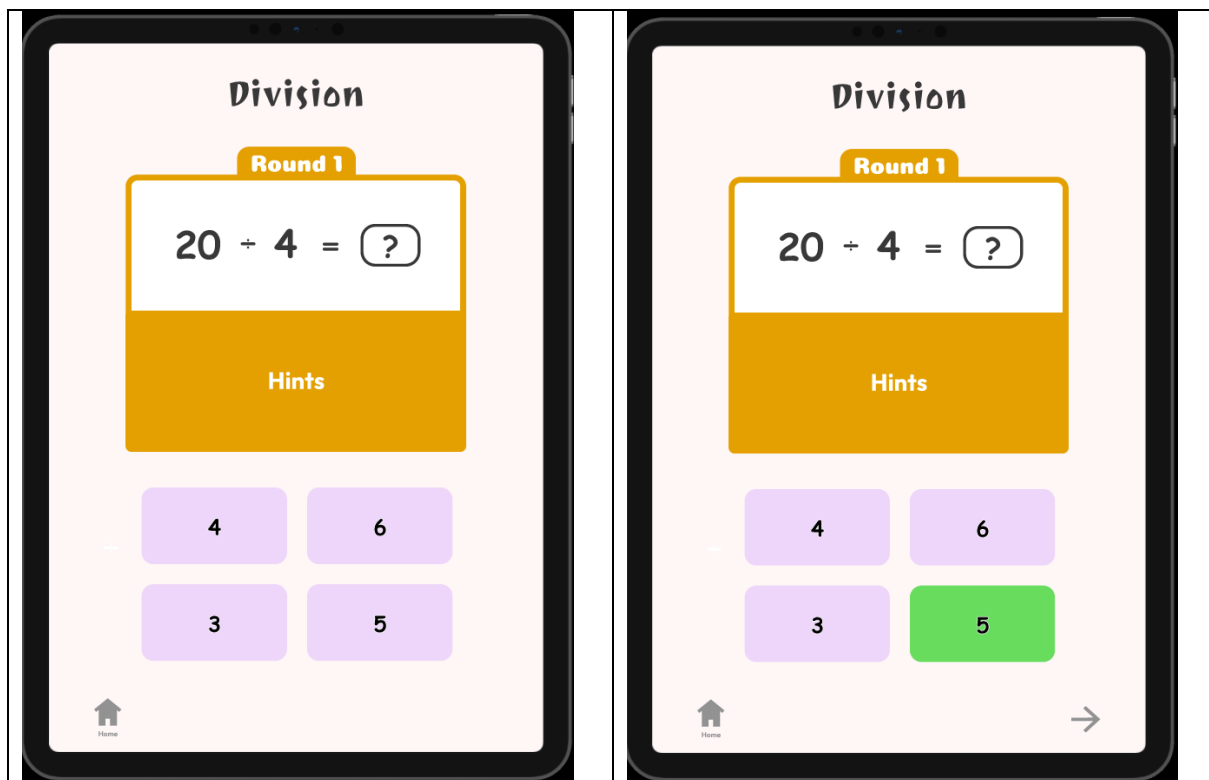


Step 7

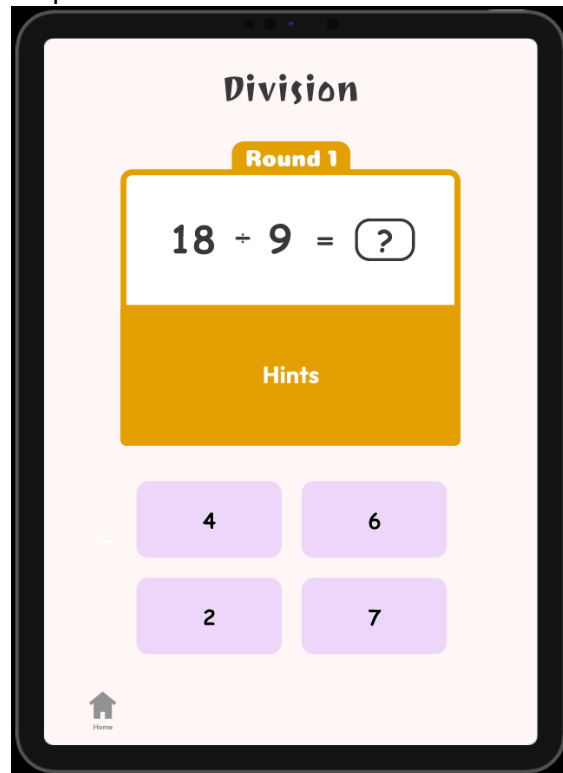
Step 6



Step 8

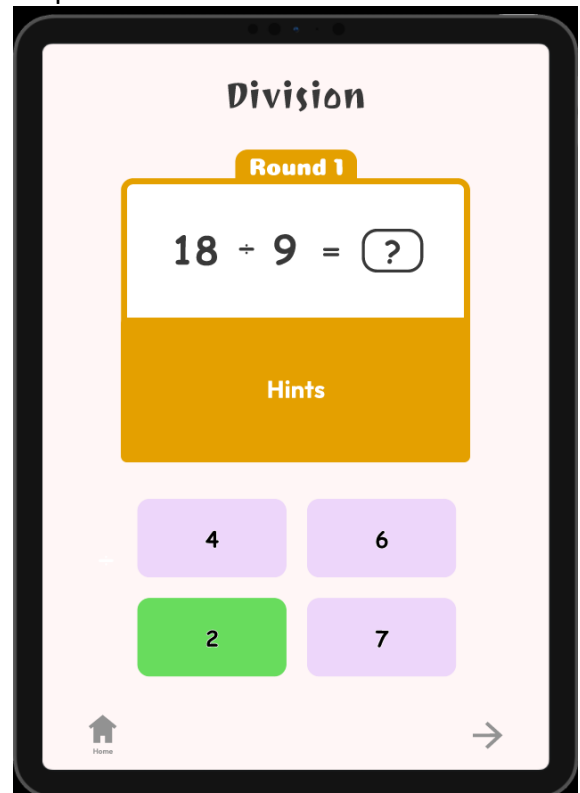


Step 9

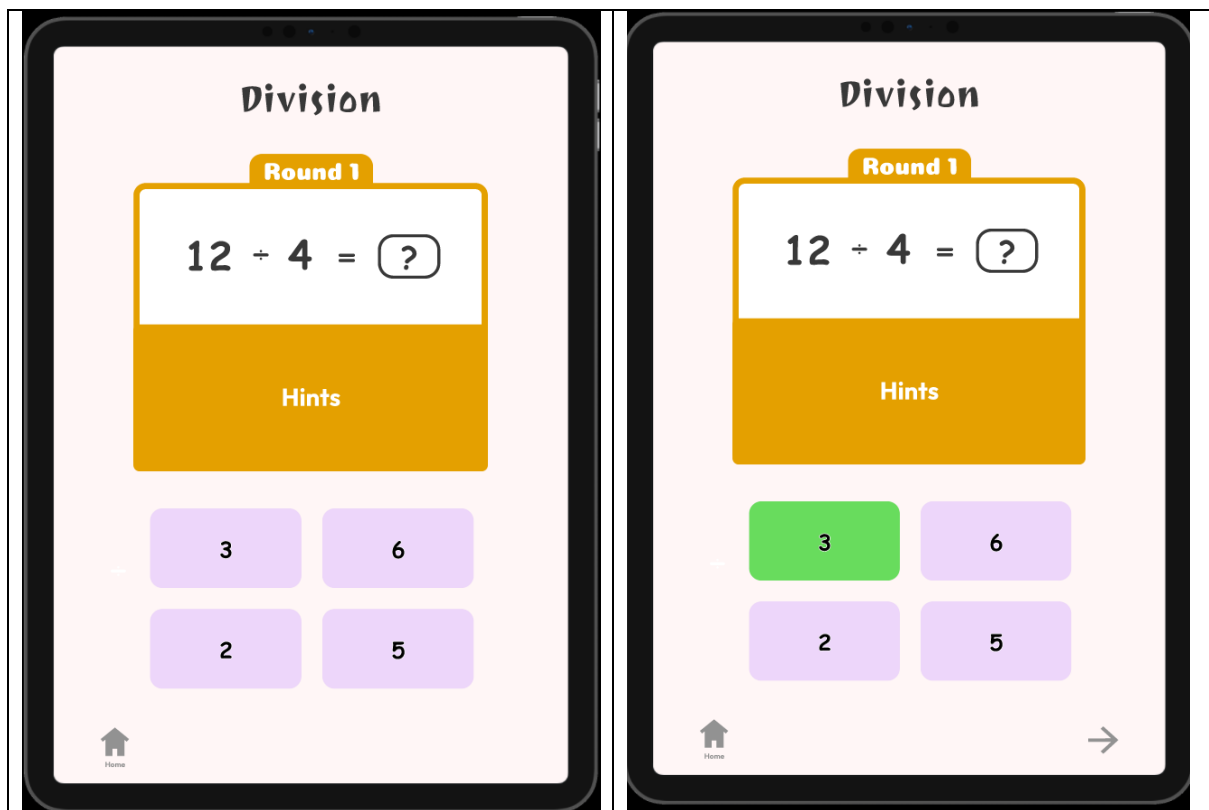


Step 11

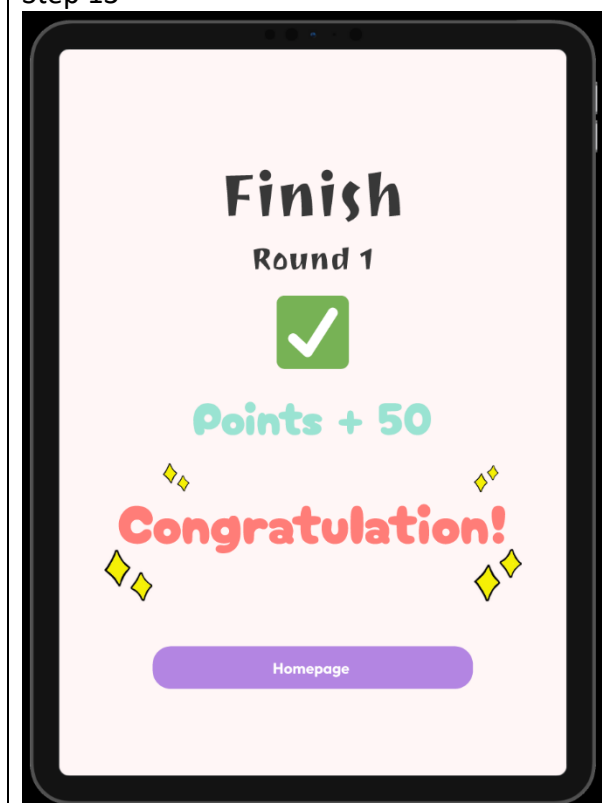
Step 10



Step 12



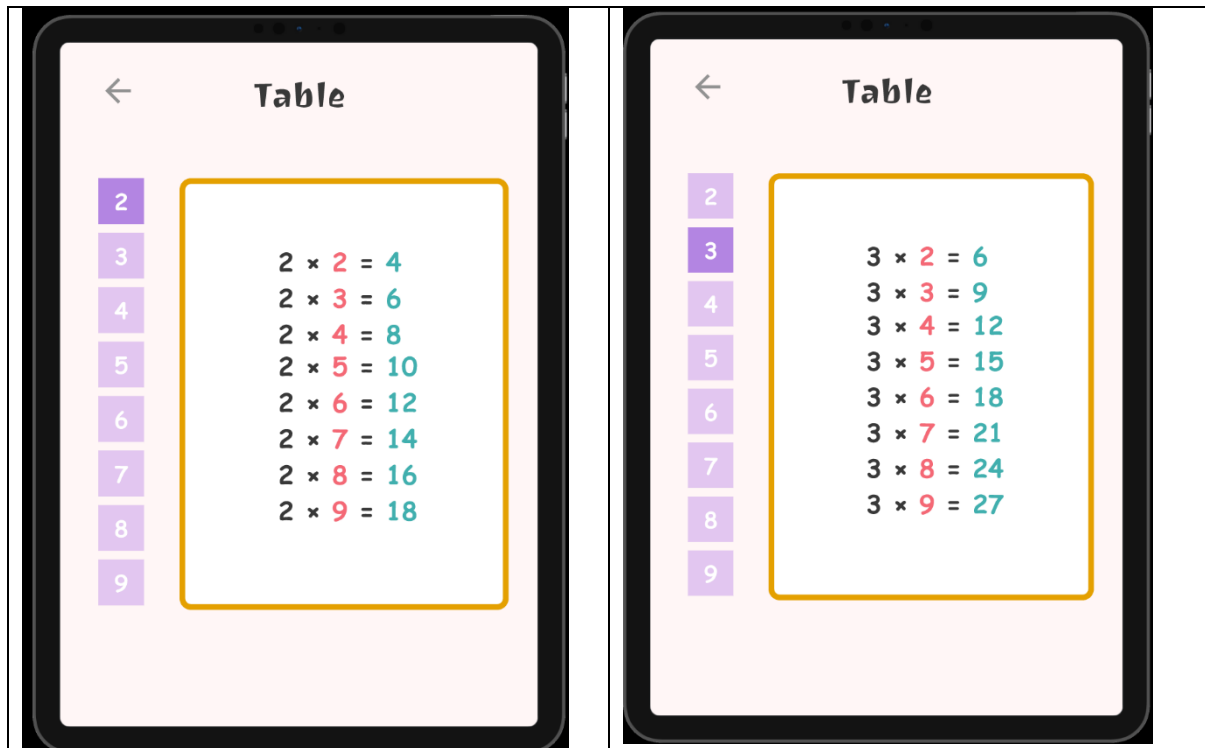
Step 13



The unique feature of Division Game

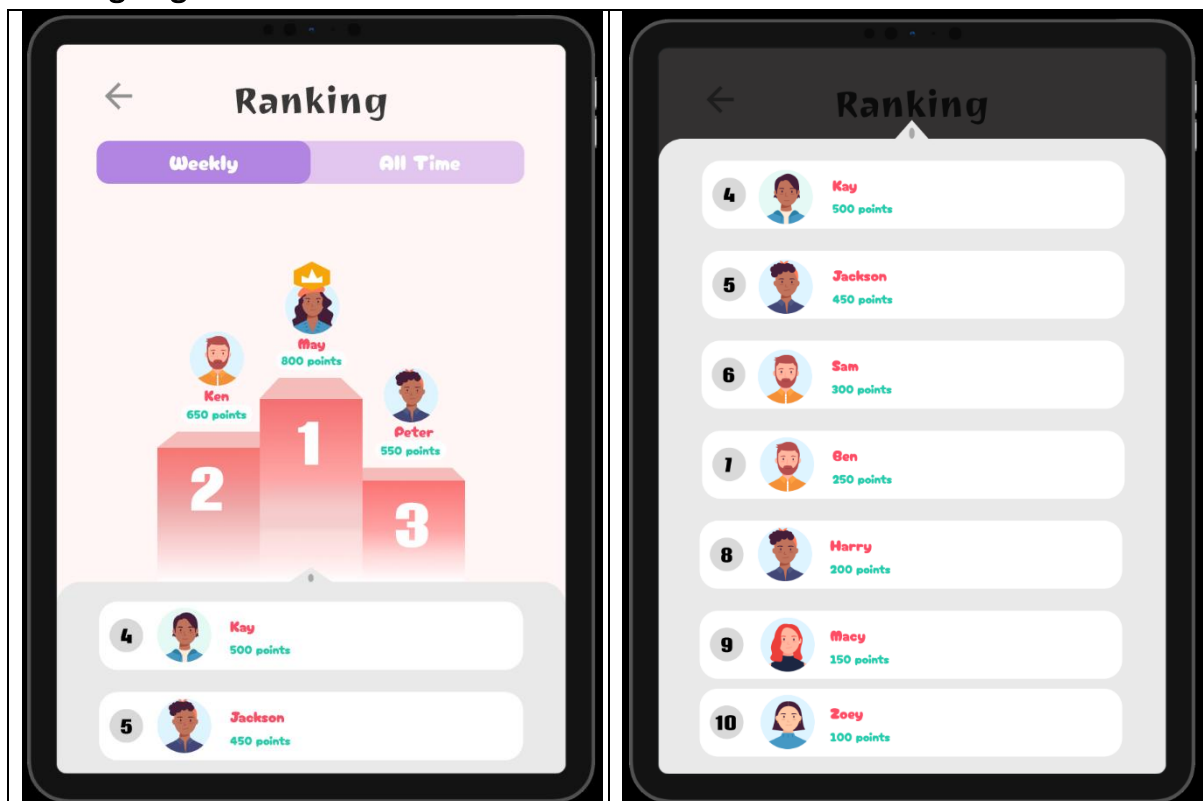
Compared to addition, subtraction and multiplication games, the division game offers hints. If the user does not understand the concept of division but has learned multiplication, they can click on the "Hints" box to see tips that explain division through multiplication.

Multiplication Table Page



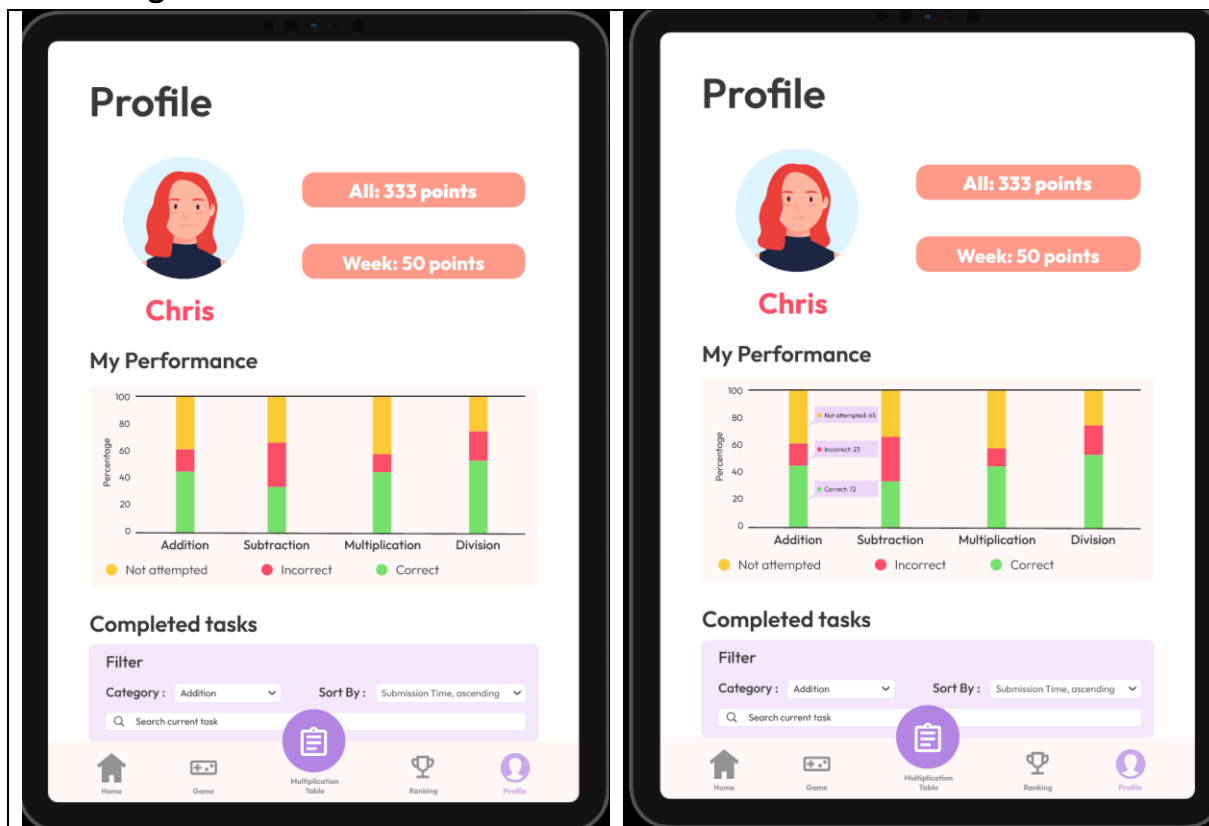
If the user clicks the "Multiplication Table" button on the navigation bar, they will be moved to this page. The return icon appears in the upper left corner, and the page name appears at the top of the screen. If the user clicks on the return icon, he will be returned to the home page. Buttons 2 through 9 are shown below. Dark purple indicates the page the user is currently on, while light purple indicates pages that have not yet been clicked. When the user clicks the button with the number three, it will jump to the multiplication page of three. Within the brown border is a multiplier table showing number patterns in black, red, and blue.

Ranking Page



If the user clicks the "Ranking" button on the navigation bar, they will be moved to this page. The return icon appears in the upper left corner, and the page name appears at the top of the screen. At the top of the page, this week's ranking and the overall ranking are distinguished in shades of purple. If the user completes a round of the game, they will receive 50 points. The page displays the top three users and their scores. The first-place user will have a crown on their icon. Users click on the gray area below to expand users ranked four to ten. When the user clicks on the black range outside of rankings 4 to 10, the area will be returned to the bottom of the page.

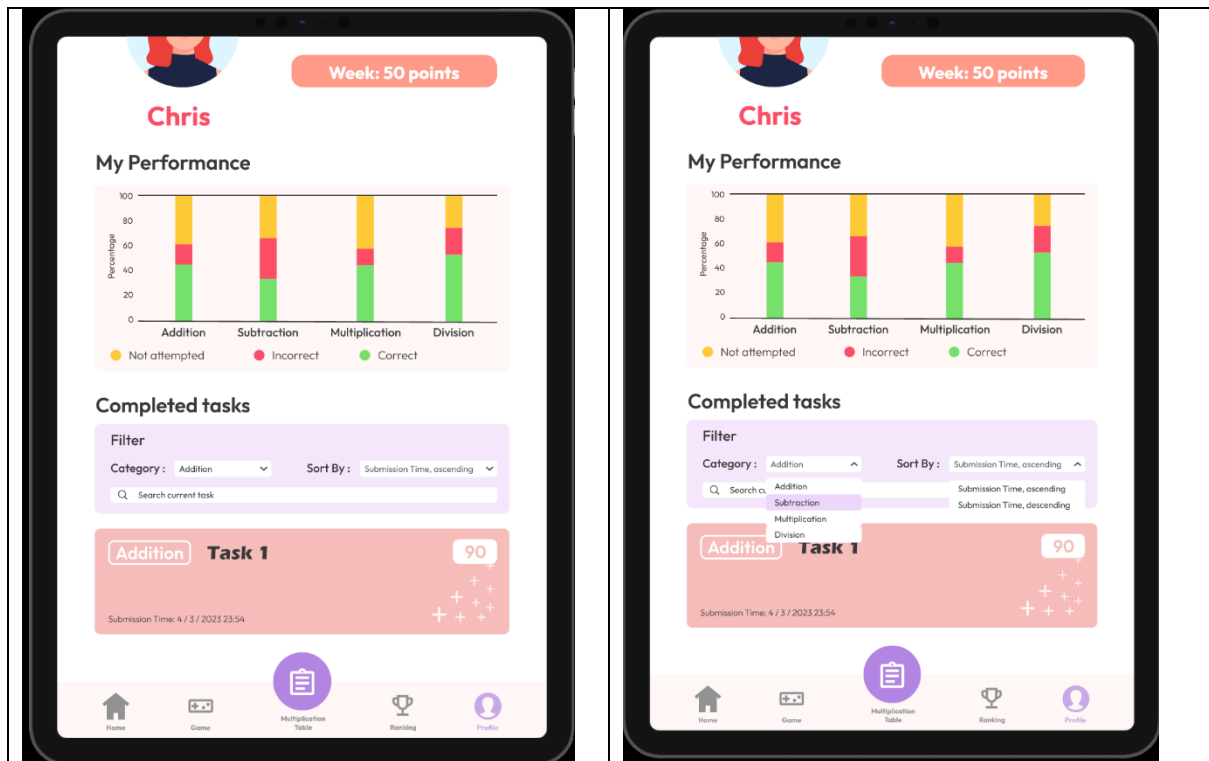
Profile Page



After the user clicks the "Profile" button on the navigation bar, the user will be moved to the profile page.

The page name appears at the top of the screen. The user's name and icon are displayed on the upper left. The upper right corner displays the user's total points, and the points earned this week, distinguished by dark and light colours.

User progress tracking for each category is displayed as a bar chart, and the status of the questions are identified in different colours. If the user hovers over the bar chart, details of the question status (Untried, Incorrect, and Correct) will be displayed.



If the user scrolls down the profile page, they can see filters for their complete tasks. This is a filter drop-down list showing categories and times. Users can use filters to sort tasks completed by category or time. If a user hovers over an option on the drop-down list, the button will change from gray to purple to let the user know which button they are selecting. Users can also search for specific tasks directly from the search bar prompts.

The task box displays the task category, title, score, and submission time.

← **Task 1**

Total questions: 10 Answer Time: 15min 13s
 Correct rate: 8 / 10
 Score: 80

1. $13 + 14$

☒ 27 ☐ 24 ☐ 30 ☐ 32 Ans

2. $29 + 25$

☐ 54 ☐ 36 ☒ 61 ☐ 42 Ans

3. $31 + 12$

☐ 27 ☐ 61 ☒ 43 ☐ 52 Ans

If the user clicks on the task box, they will be moved to the detailed task page.

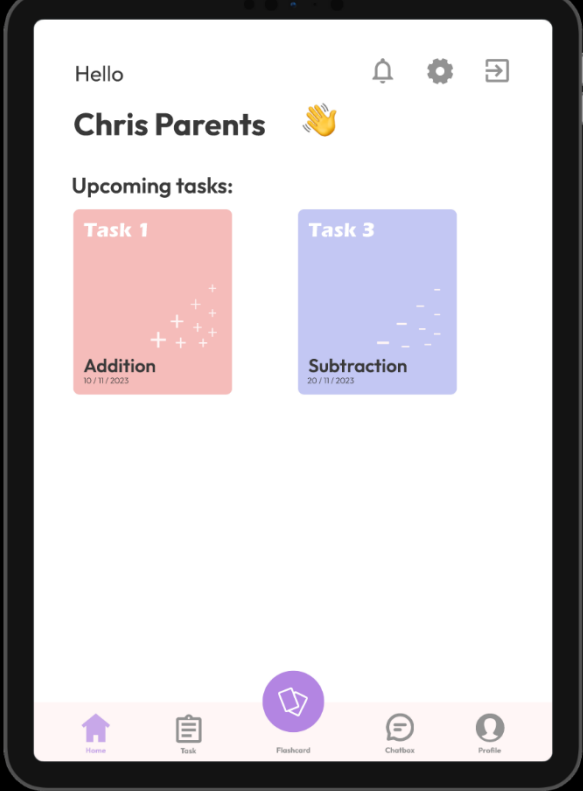
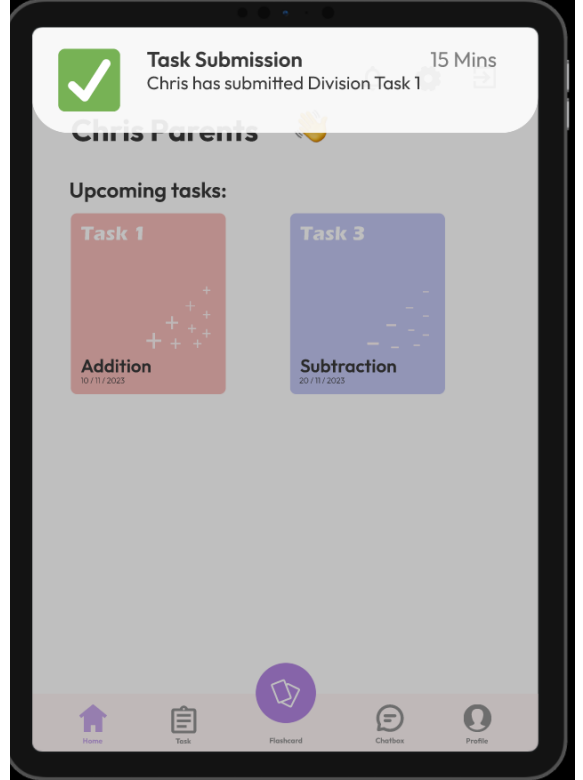
The title of the task appears at the top. There is a return button in the upper left corner that allows users to return to the previous page.

Users can see their submitted answers on the detailed task page.

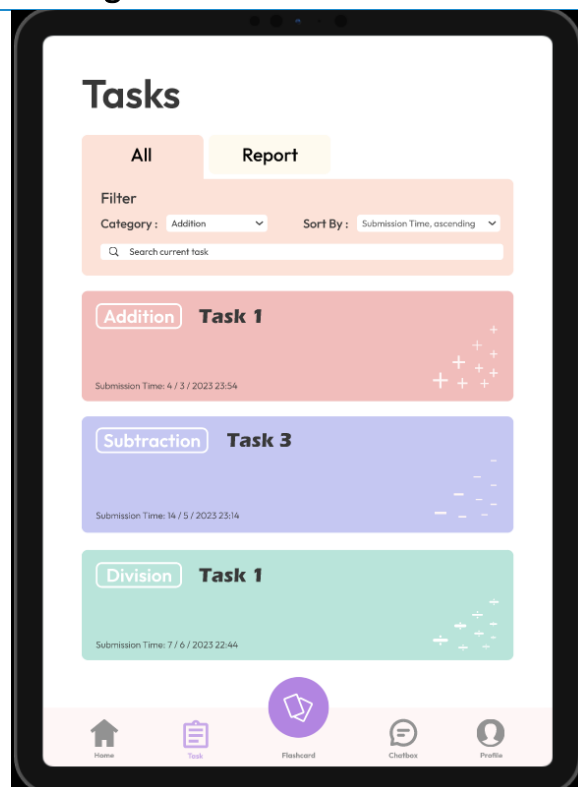
If their answer is highlighted in green, it means they are correct. If their answer is highlighted in red, it means they are incorrect.

There is also an "Ans" box that shows the user which is the correct answer.

Parent Homepage

 A screenshot of the Parent Homepage. At the top, it says "Hello" followed by the name "Chris Parents" and a hand icon. There are three icons in the top right: a bell, a gear, and a square with an arrow. Below the name, it says "Upcoming tasks:". There are two task cards: "Task 1" (Addition, 10 / 11 / 2023) and "Task 3" (Subtraction, 20 / 11 / 2023). At the bottom is a navigation bar with five icons: Home, Task, Flashcard, Chatbox, and Profile.	<p>While user logged in as Parent, user will be navigated to parent's homepage.</p> <p>Differences from children's homepage:</p> <ol style="list-style-type: none">1. The navigation bar is different.2. Username is changed to the name of the child associated with the parent account.
 A screenshot of the Parent Homepage with a notification banner at the top. The banner has a green checkmark icon and says "Task Submission" and "Chris has submitted Division Task 1" with a clock icon and "15 Mins". Below the banner, the name "Chris Parents" and a hand icon are visible. The "Upcoming tasks:" section shows "Task 1" (Addition, 10 / 11 / 2023) and "Task 3" (Subtraction, 20 / 11 / 2023). The bottom navigation bar is the same as the first screenshot.	<p>If the parent clicks the "Notification" button, a notification message will be displayed when the child submits the task.</p>

Task Page

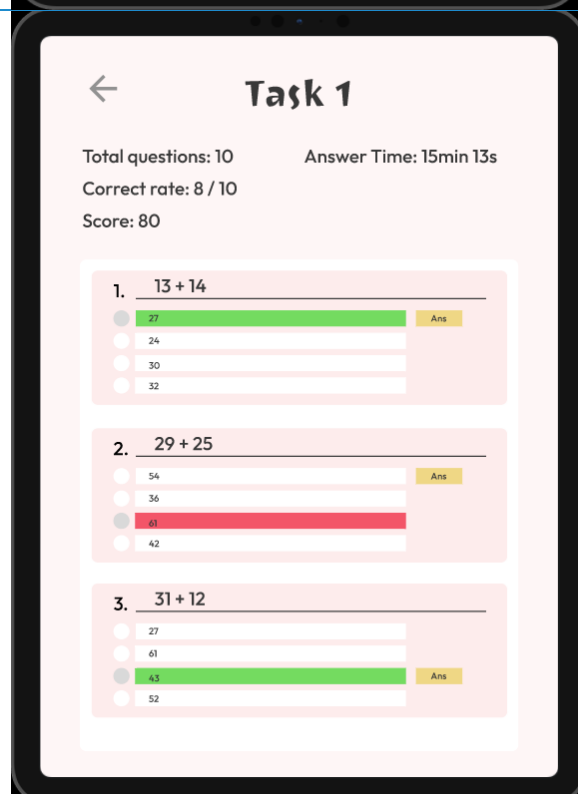


When the user taps on the task button which is at the bottom of the screen, users will be navigated to the Task page.

In this Task page, there are 2 main functions:

1. Review the tasks: User can check the upcoming and submitted tasks for their children
2. Report: User can review the overall result of their children

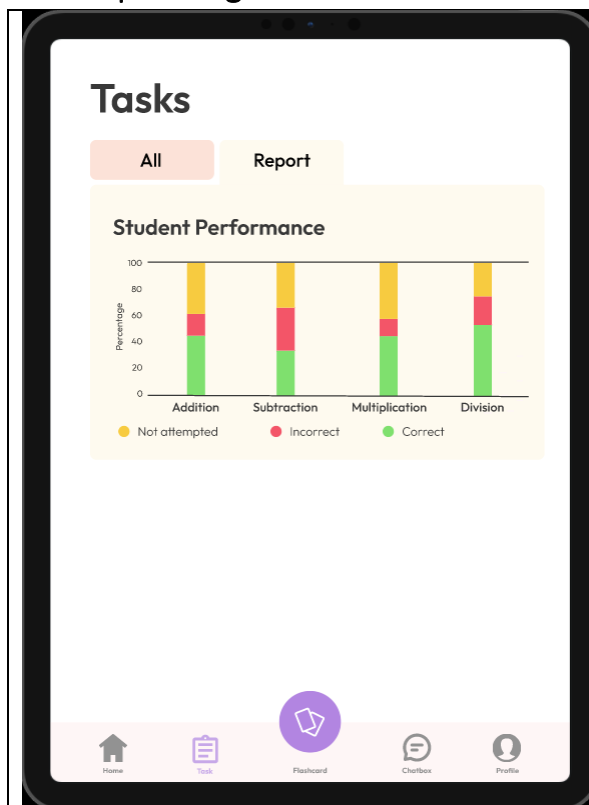
For a more convenient user experience, the page provides a filter for users to find the specified task easily. Also, users can search the task directly by using the search bar.



If the user taps on one of the task buttons shown in the middle of the previous page, they can review more details of the task regarding.

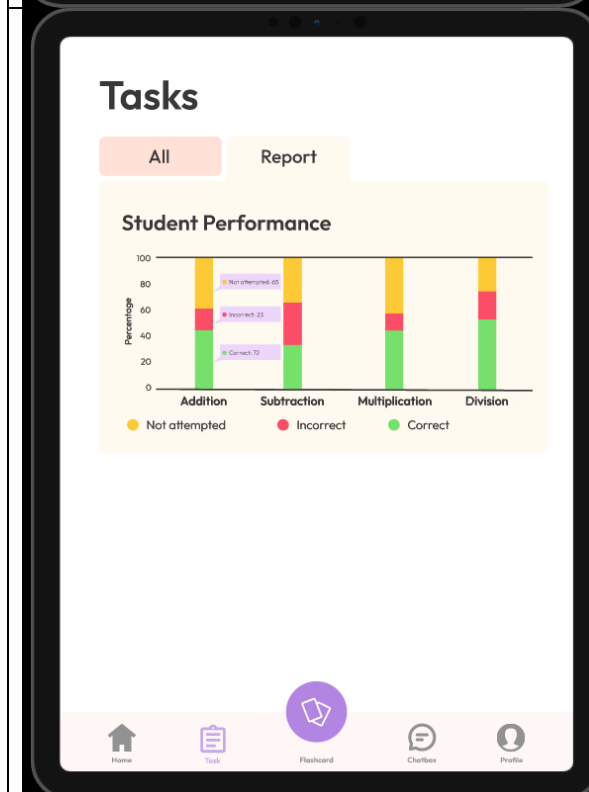
For instance, while user tap on Task 1 button, user will be navigated to the detailed task page. In the page, user can review more details of the task, such as score, time spent and also the choices answered by their children.

Task Report Page



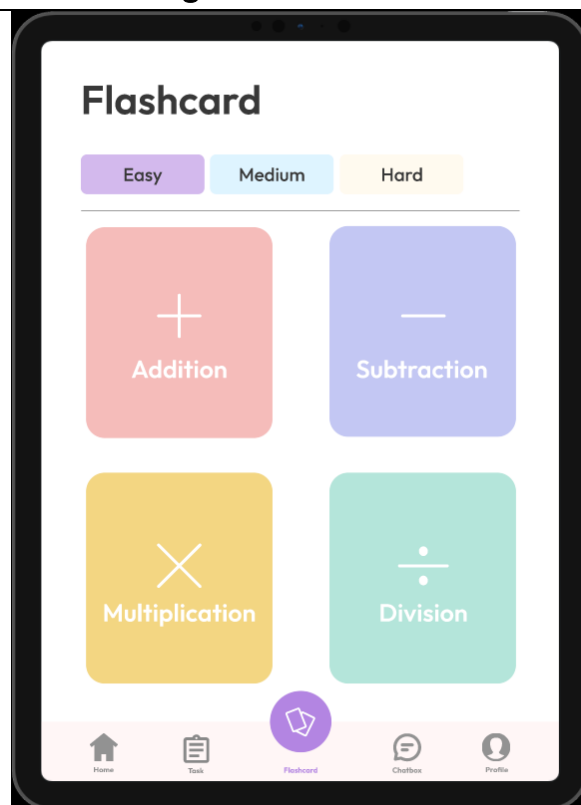
When the user taps on the report button which is at the top part of the screen, users will be navigated to the Task Report page.

In this page, a report will be shown on the screen, user can review their children's overall performance.



While user hovering on one of bar, user can check the detail of the answer status of regarding bar.

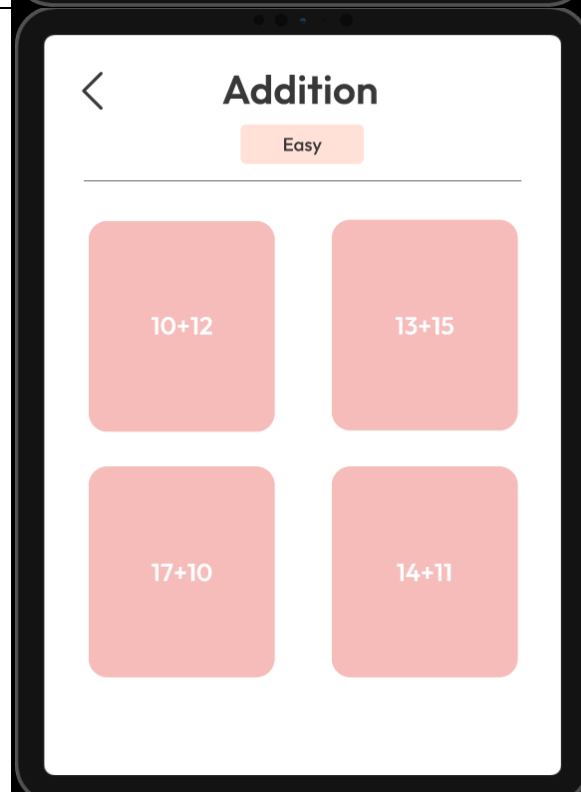
Flashcard Page



When the user taps on the Flashcard button which is at the bottom of the screen, users will be navigated to the Flashcard page.

The page aims to let user can revision the different topics with their children.

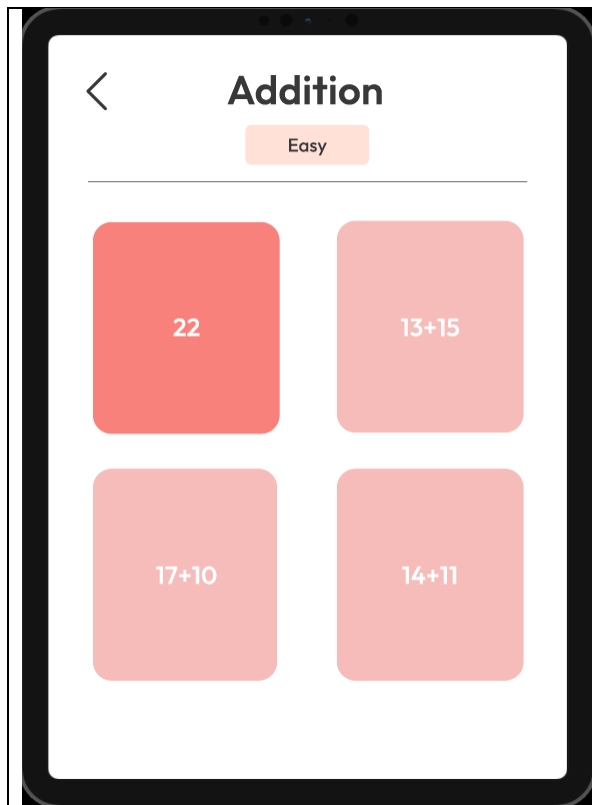
The page provides different levels of difficulties and 4 topics for users, which included addition, subtraction, multiplication and division.



While users select one of the difficulties and taps on one topic from the previous page, users will be navigated to revision page.

In the page, there has 4 cards shown on the screen. Each card will show one question related to the selected topic. Users can revision the regarding topic with their children by using this function.

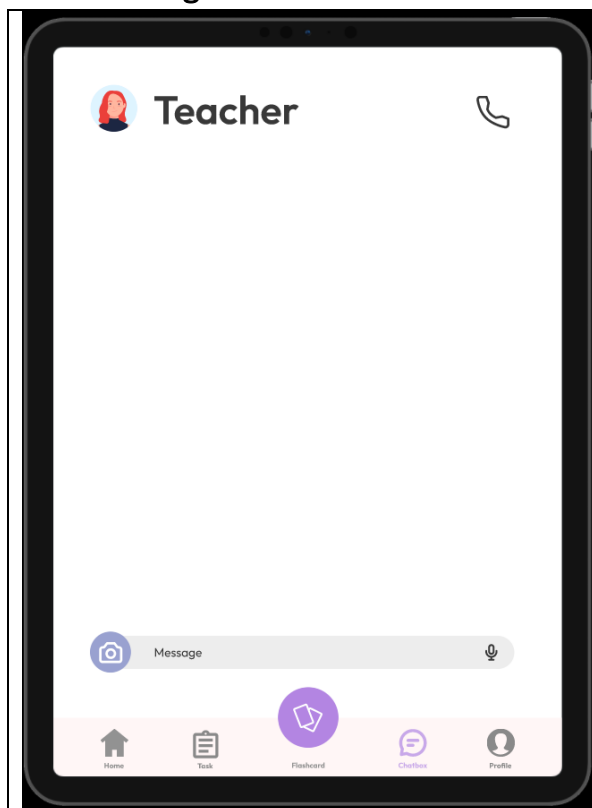
For a more convenient user experience, the page provides a return button for users to return to the previous page. Hence, users can select another topic to revision conveniently.



If the users want to know the answer of the question, users can tap on the regarding card, and then the answer will be shown on the card.

For a more convenient user experience, the page provides a return button for users to return to the previous page. Hence, users can select another topic to revision conveniently.

Chat box Page

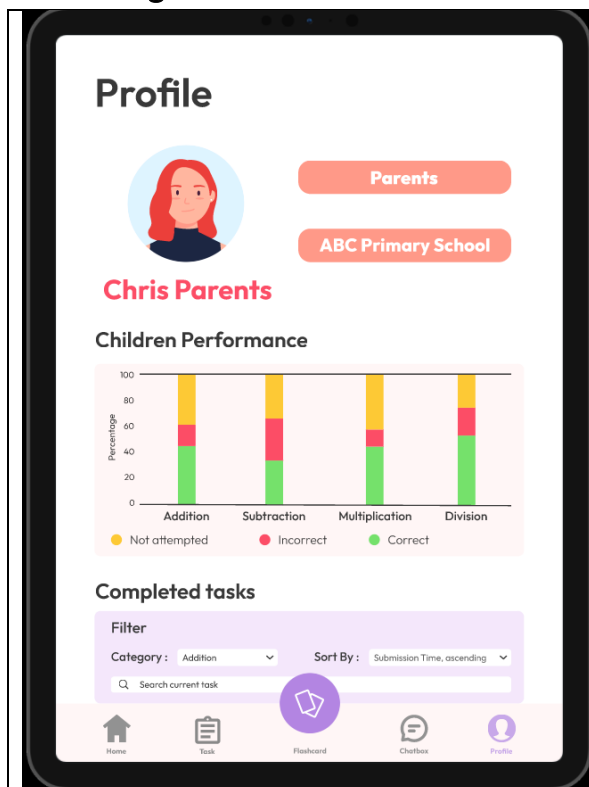


When the user taps on the chatbox button which is at the bottom of the screen, users will be navigated to the chat box page.

The page provides a chat box for users to communicate with teacher directly. Users can either type text message or record voice message send to teacher.

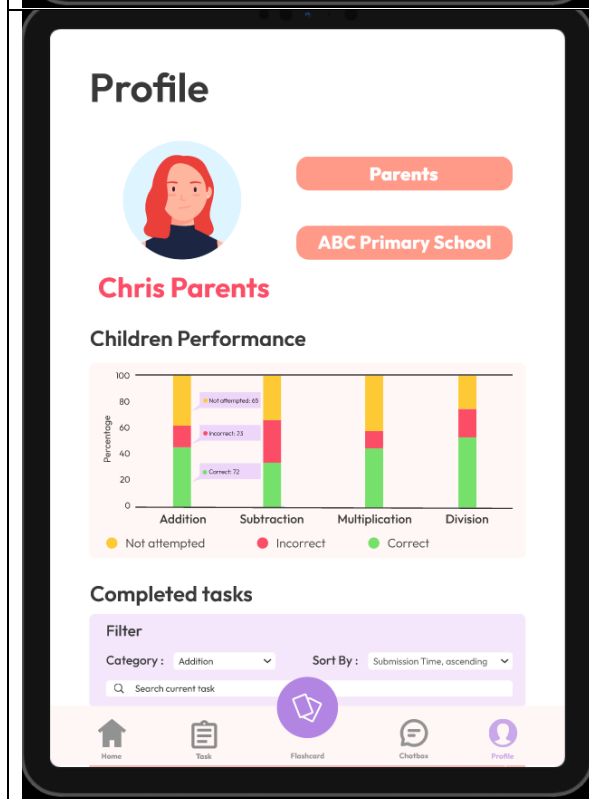
Users can also send photos or make a phone call to teacher.

Profile Page

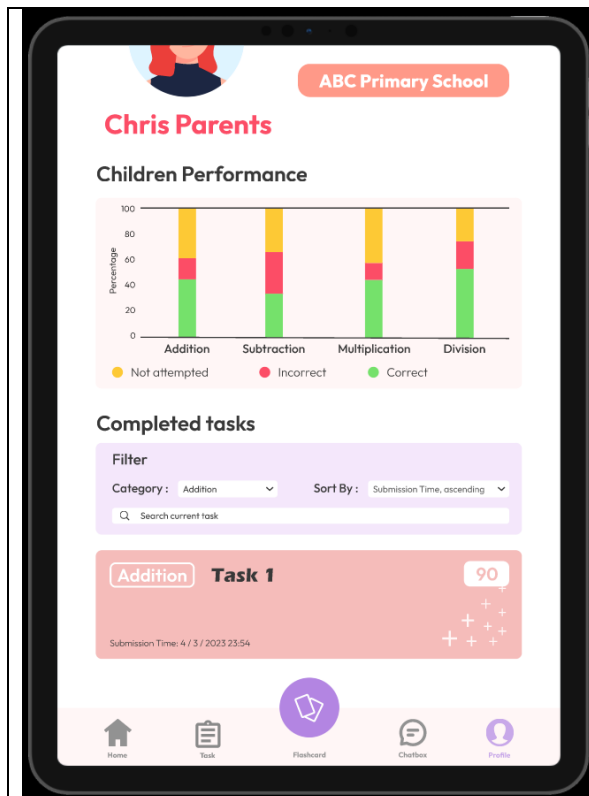


When the user taps on the profile button which is at the bottom of the screen, users will be navigated to the Profile page.

The page shows difference personal information, including name, school that their children studied in, and children performance.



Similar with the previous task report page, when user hovering on one of bar, user can check the detail of the answer status of regarding bar.



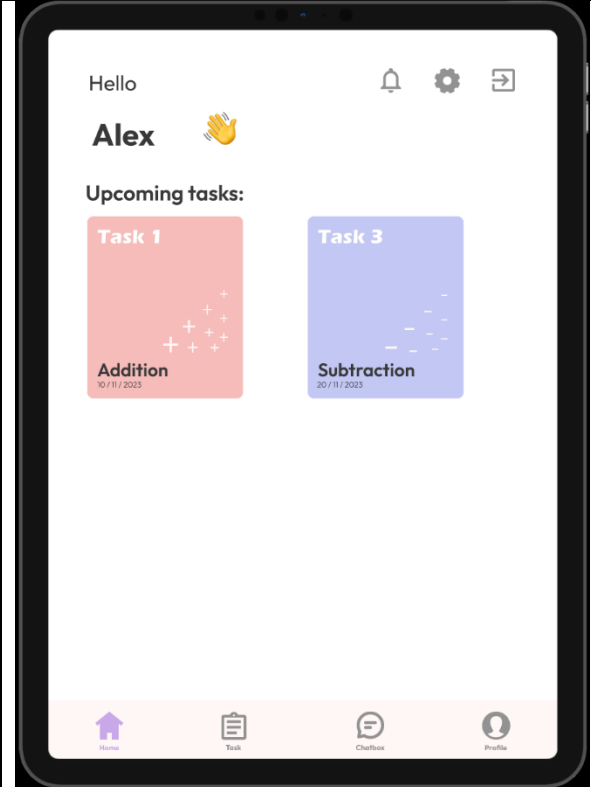
If the user scrolls down the profile page, there is a part shown the completed task.

For a more convenient user experience, the page provides a filter for users to find the specified task easily. Also, users can search the task directly by using the search bar.

The task box displays the task category, title, score, and submission time.

Teachers

Homepage

 A mobile app interface for a teacher's homepage. At the top, it says "Hello" followed by the name "Alex" and a yellow hand icon. To the right are icons for a bell, settings, and a share button. Below this is a section titled "Upcoming tasks:" containing two cards. The first card, "Task 1", is pink and labeled "Addition" with a date of "10 / 11 / 2023". The second card, "Task 3", is purple and labeled "Subtraction" with a date of "20 / 11 / 2023". At the bottom is a navigation bar with four icons: a house (Home), a clipboard (Task), a speech bubble (Chatbox), and a person (Profile).	<p>While the user logged in as Teacher, user will be navigated to teacher's homepage.</p> <p>Differences from children's homepage:</p> <ol style="list-style-type: none">1. The navigation bar is different.2. The username is changed to the name of the teacher.
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Task Page



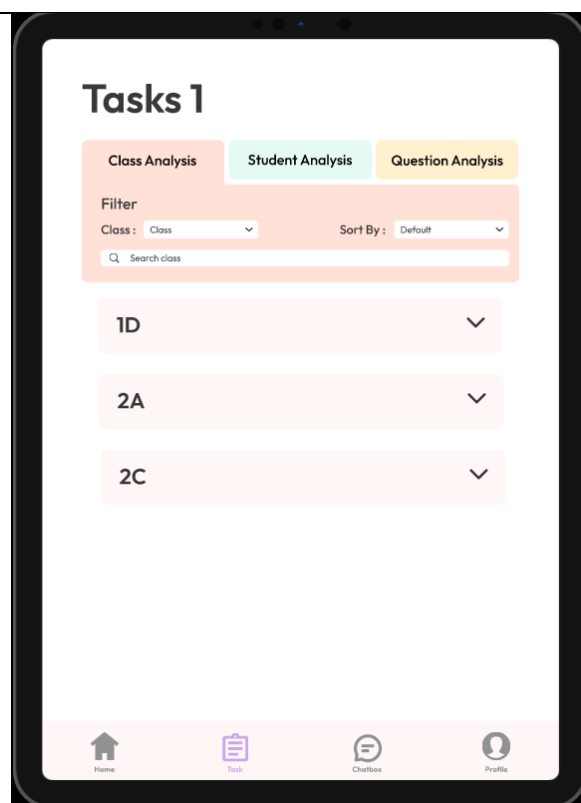
When the user taps on the task button which is at the bottom of the screen, users will be navigated to the Task page.

In this Task page, there are three main functions:

1. Review the tasks: User can check the upcoming and submitted tasks for student
2. Create tasks: User can create a new task for student
3. Report: User can review the overall result of students

If the user taps on one of the task buttons shown in the middle of the previous page, they can review more details of the task regarding.

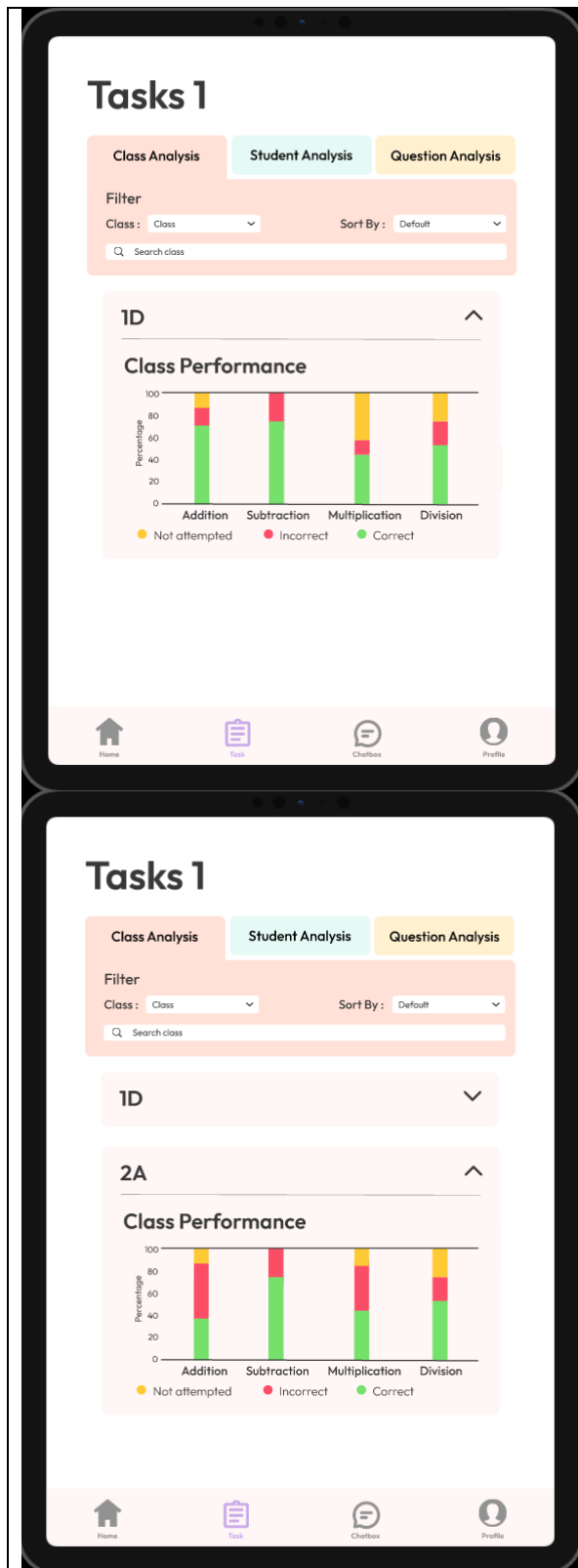
For a more convenient user experience, the page provides a filter for users to find the specified task easily. Also, users can search the task directly by using the search bar.



After entering the page, the user can view the performance in three aspects, including class analysis, student analysis and question analysis.

In this page, the page provides the analyzed data of the classes that have submitted the task.

For a more convenient user experience, the page provides a filter for users to find the specified class more easily. Also, users can search the class directly by using the search bar.



By clicking the drop down button of each class, the analyzed data of the selected class will be shown by the drop down screen.

Tasks 1

Class Analysis Student Analysis Question Analysis

Filter

Class: Class Sort By: Default

Search class

1D

2A

2C

Class Performance

Percentage

100 80 60 40 20 0

Addition Subtraction Multiplication Division

Not attempted Incorrect Correct

Home Task Chatbox Profile

When the user taps on the student analysis button which is at the top part of the screen, users will be navigated to the student analysis page.

In this page, the detailed performance of all students who have submitted the task will be shown. The analyzed data included time spent, ranking and score.

For a more convenient user experience, the page provides a filter for users to find the specified student more easily. Also, users can search for the student directly by using the search bar.

Tasks 1

Class Analysis Student Analysis Question Analysis

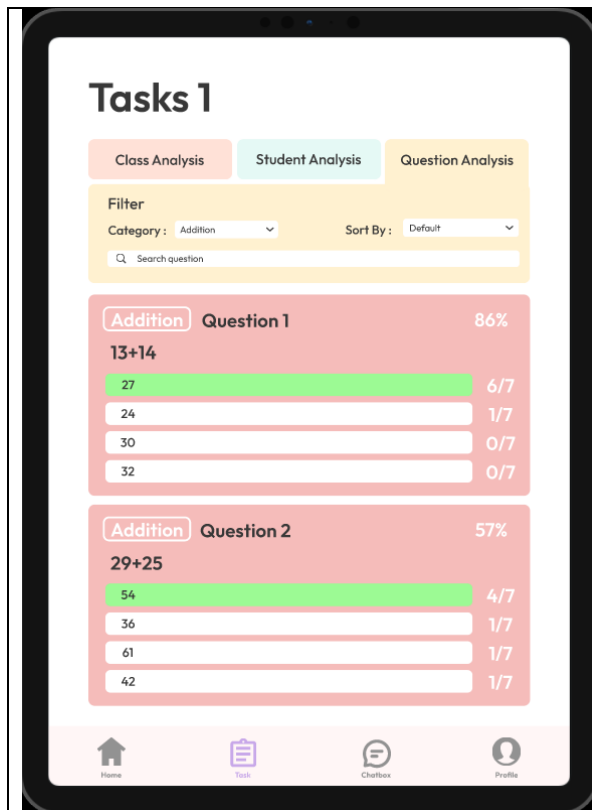
Filter

Class: Class Sort By: Default

Search student

Student	Class	Time spent	Ranking	Score
Apple	2C	14 mins	3	7/10
Ben	2C	11 mins	6	4/10
Chris	2A	30 mins	4	6/10
Danny	2C	1h 1 mins	2	9/10
Gigi	2A	10 mins	7	2/10
Kelly	2A	26 mins	5	5/10
Yannes	2A	56 mins	1	10/10

Home Task Chatbox Profile

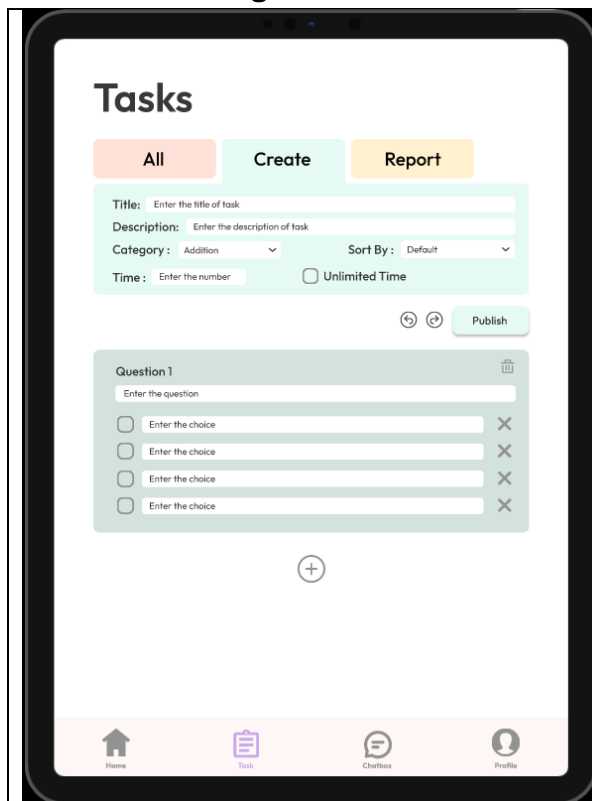


When the user taps on the question analysis button which is at the top part of the screen, users will be navigated to the question analysis page.

In this page, the detailed performance of each question of the task will be shown. The analyzed data included the percentage of correctness, correct answer and the number of people have chosen the option.

For a more convenient user experience, the page provides a filter for users to find the specified class more easily. Also, users can search the class directly by using the search bar.

Task Creation Page





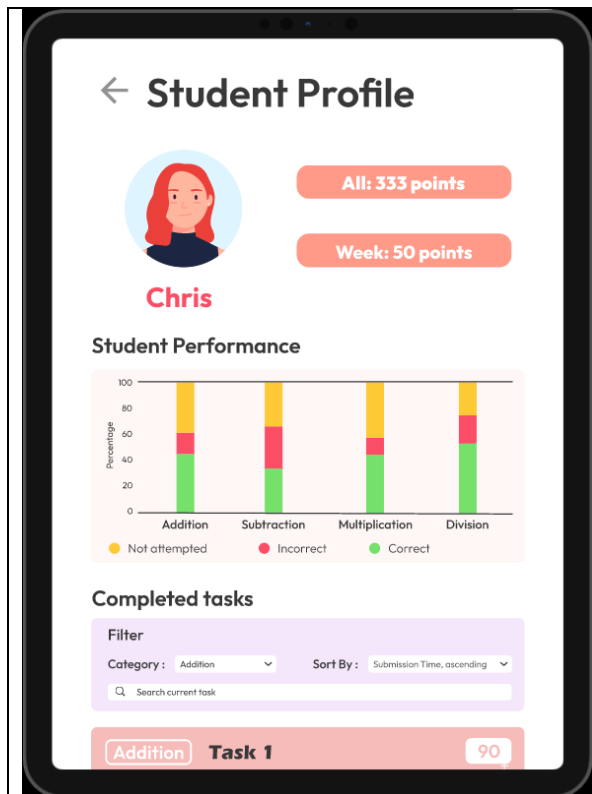
Instead of checking the task performance, user can create a new task for students.

While user clicking the create button which is at the top part of the Task page, user will be navigated to the Task creation page.

User can create a new task in this page by entering the necessary information, including title, description, category and the time limitation.

Task Report Page

	<p>If user clicking the report button which is at the top part of the Task page, user will be navigated to the Task report page.</p> <p>User can check the detailed performance of each student from this page. User can find the student by finding the class.</p> <p>For a more convenient user experience, the page provides a filter for users to find the specified class more easily. Also, users can search the class directly by using the search bar.</p>
	<p>By clicking the class button, a list of the student name will be shown on the screen.</p> <p>User can review student's performance by clicking their name.</p>

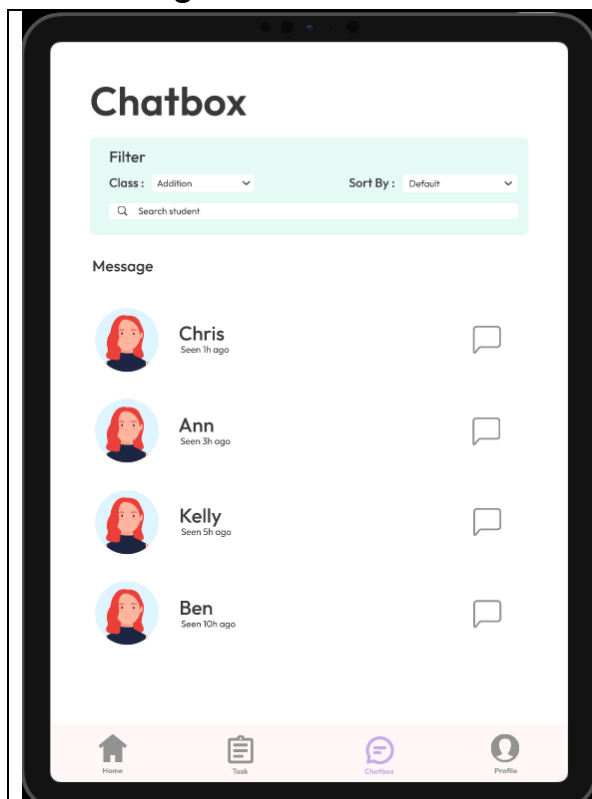


If user clicking the name of the student from the previous page, user will be navigated to the selected student profile page.

In this page, user can check the detailed performance, including their total points, point gained each week, overall performance and also the complete tasks.

For a more convenient user experience, the page provides a return button for users to return to the previous page. Hence, the user can check another student's performance more conveniently.

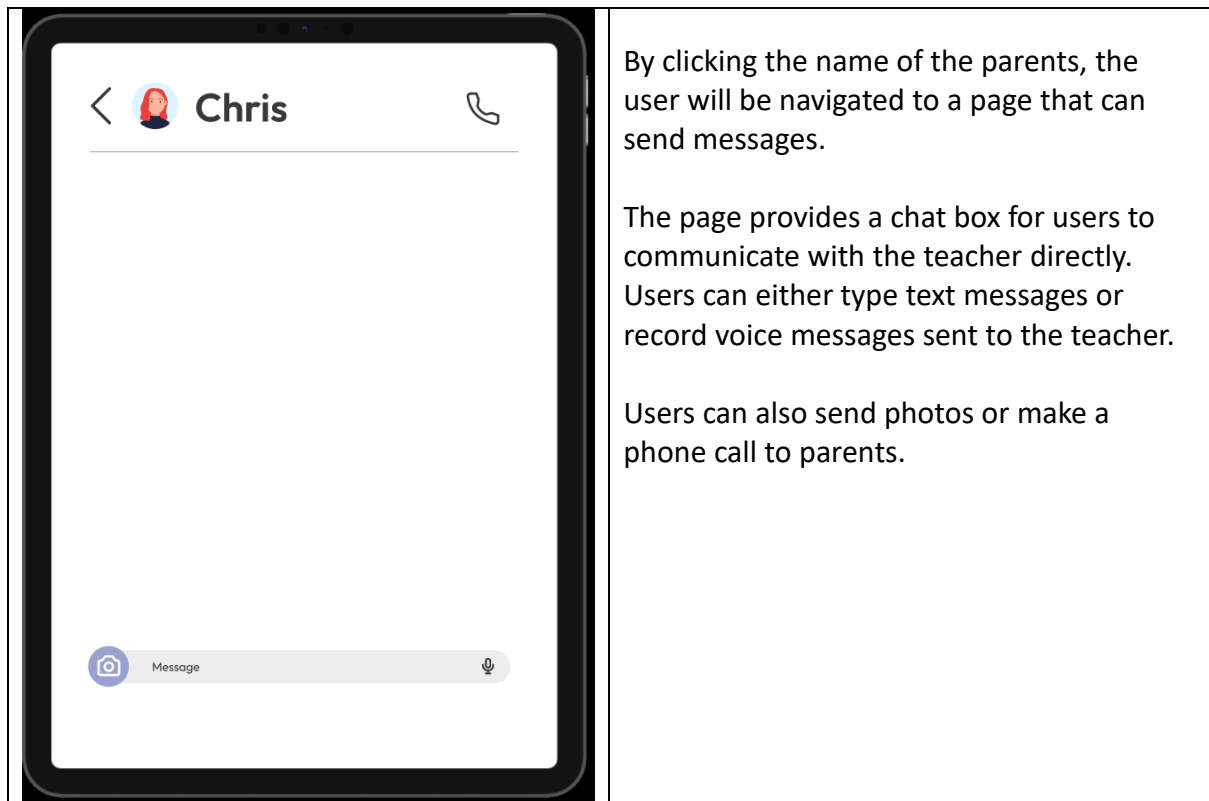
Chatbox Page



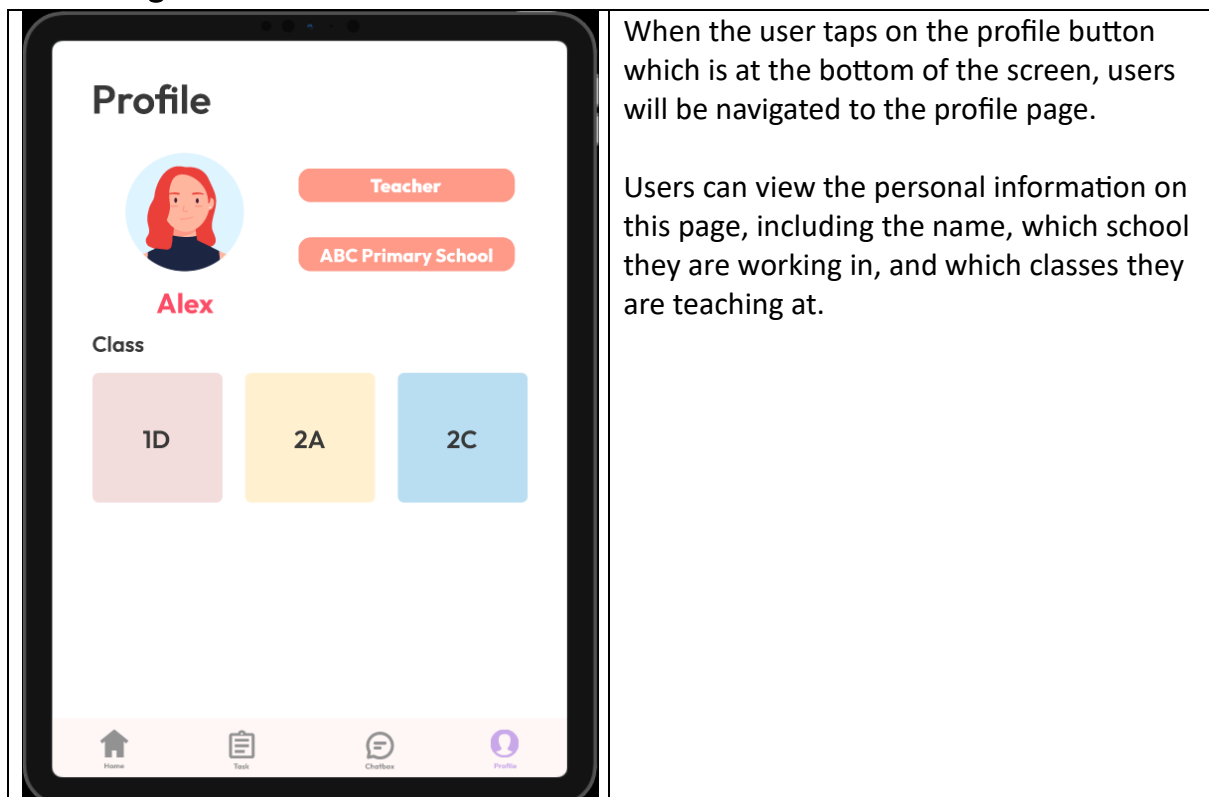
When the user taps on the chatbox button which is at the bottom of the screen, users will be navigated to the chat box page.

User can communicate with the parents in this page, all parents will be shown as a list on screen.

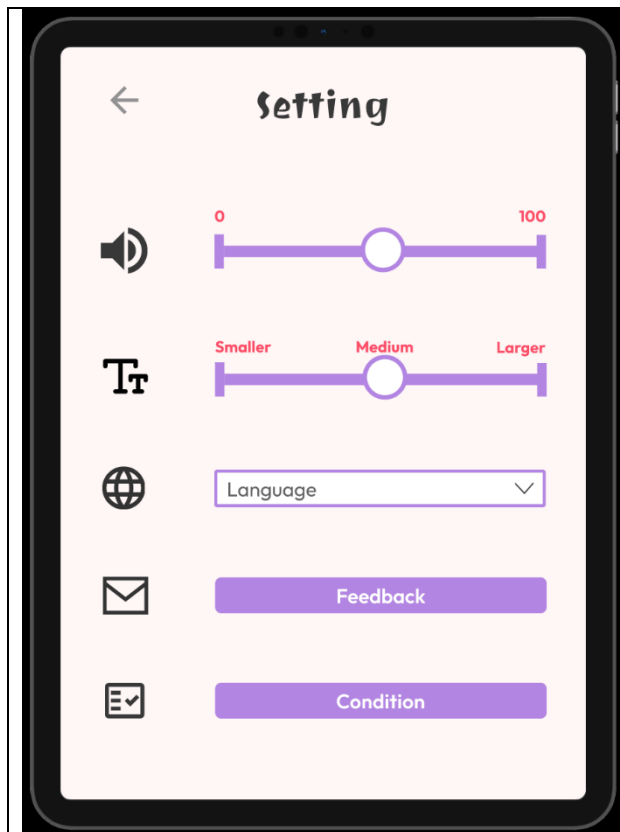
For a more convenient user experience, the page provides a filter for users to find the specified class more easily. Also, users can search the student's parents directly by using the search bar.



Profile Page



Setting Page



After the user clicks the "Settings" button on the homepage, the user will be redirected to the settings page.

In the settings page, users can adjust the app's sound, the app's font size and select their preferred language such as English, Chinese, Japanese and Korean.

Users can also click on the "Feedback" button to report issues with the app or make suggestions to the app through the feedback form.

Users can also click the "Condition" button to view the app condition.

Feedback Page

A mobile app mockup of the 'Feedback' page. At the top, there is a back arrow and the title 'Feedback'. Below the title is a red header box with the text 'Send us your feedback'. Underneath this header, there is a message: 'Do you have suggestions or find some bugs? Please tell us in the field below. (Questions with * must be filled in)'. This is followed by four input fields: 'Name *' with a placeholder 'e.g. Chan Tai Man', 'Email *' with a placeholder 'e.g. chantaiman@gmail.com', 'Phone' with a placeholder 'e.g. 12345678', and 'Preferred Contact Method *' with two radio button options: 'Email' and 'Phone'. At the bottom of the form is a purple button labeled 'Next'.

Step 1

There is a feedback form that provides examples for user input. If the user clicks the back button in the upper left corner, they will return to the setting page.

After the user enters their contact information, they can click the "Next" button.

← **Feedback**

Send us your feedback

Do you have suggestions or find some bugs?
Please tell us in the field below.
(Questions with * must be filled in)

How was your experience? *

🙄 😞 😐 😊 😍

Feedback Type *

☐ Bug ☐ Suggestion ☐ Others

Message *

Please write down your inquiries or suggestions

Submit

Step 2

After the user fills out the form, they can click the "Submit" button.

← **Feedback**

Send us your feedback

Do you have suggestions or find some bugs?
Please tell us in the field below.
(Questions with * must be filled in)

✓

Thank you for your feedback

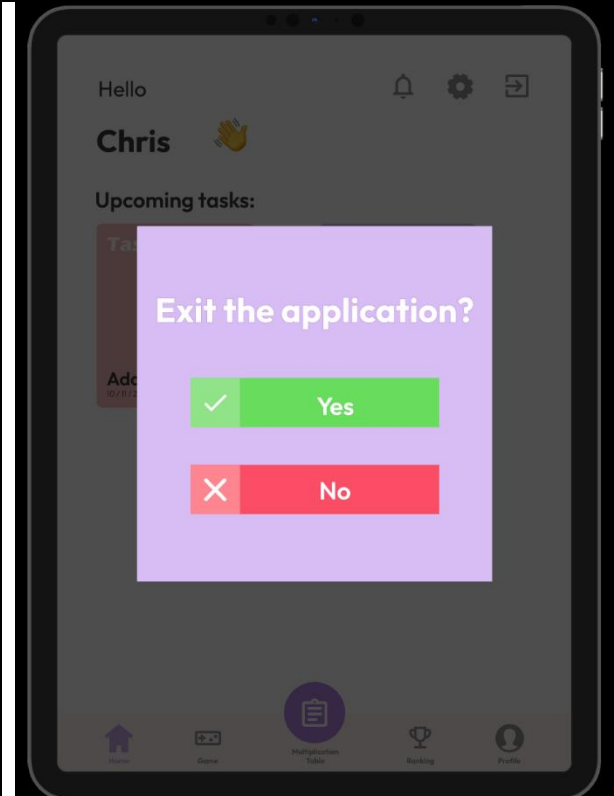
We will contact you within a week

Homepage

Step 3

After the user submits the form, they will be taken to this page, letting the user know they have completed the form and telling them when they will get a response. If the user clicks the homepage button, they can return to the homepage.

Exit Confirmation Popup

	<p>After the user clicks the "Exit" button on the home page, a confirmation message will pop up.</p> <p>If the user clicks the green "Yes" button, they will exit the application. If the user clicks the red "No" button, they will be returned to the home page.</p>
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Task 3: Testing

Testing method

We conducted structured interviews and asked two primary school children how they felt after using our prototype.

Questions and Responses

Aim	Questions	Child A's reply	Child B's reply	Conclusion
Assess welcome page initial engagement and clarity	What attracted you most when you first saw the welcome screen?	The color is attracting.	The operators on screen.	A clear and attractive logo that gives users a brief idea of what our app is about.
	When you see our welcome page, what do you think our app will offer?	Math game.	Math learning tools.	
Evaluate user friendliness and understanding of the sign	Do you know what the required fields are?	Yes, I know the star represent required.	Yes, there is a prompt at the top "Fields	Some input tips and examples of input content in the form can help

up/login process.	Do you know exactly what a valid email format is?	Yes, it has taught on our computer lesson.	with * are required". Yes, the email field has examples of email formats.	primary school students clearly understand what should be entered and how to log in.
	In addition to logging in using email, what other methods can you use to log in or sign up?	Google account	Facebook account	
	Please select a number between 1 and 5 based on how difficult it is to log in or register an account. Five is the hardest, one is the easiest.	1	1	
Measures a user's ability to locate key features and understand the importance of a homepage.	Do you know what the main functions of our app are? Where is it located?	Yes, at the bottom.	Yes, next to the purple button.	The navigation bar at the bottom of the interface allows users to easily identify the main features of our application. Additionally, using math symbols allows children to easily identify different math categories.
	Can you clearly identify the different categories of tasks? Why?	Yes, there are mathematical symbols identifying task categories.	Yes, there are task boxes that directly display Addition" and "Subtraction".	
Measure user satisfaction and effectiveness of the gaming experience.	Do you think the game's breakout mode will entice you to continue playing levels and earning points? Why?	Yes, because I can compare with others in the ranking.	Yes, because I would like to complete all the stages.	The level-breaking mode in the game can attract students to challenge level by level. In addition, the function of instant

	What is your favourite feature of this game?	In the Division Game, there are some hints that help me think about the answers.	The answer box will directly show whether my answer is correct or wrong through colour.	reflection of answers and the prompt function in the game can also help students learn independently.
Evaluate the user's experience and effectiveness of the multiplication table feature	How do you think this multiplier table differs from the usual multiplier table?	Display different numbers in different colours.	Similar except the colour are more interactive.	Our multiplication tables are similar to regular multiplication tables, but we display the answers and multiplicands in different colours to make the interface familiar to children and make it easier for children to identify the multiplication rules.
	Please rate your satisfaction with this multiplier chart on a scale of 1 to 5, with 5 being most satisfied and 1 being least satisfied.	1	2	
Assess user perceptions of ranked pages and their motivational impact.	Do ranking pages motivate you to perform better? Why?	Yes, the rankings showed the results of the top ten students, which made me more motivated to become one of them.	Yes, I want my classmates and teachers to know how good my grades are.	Rankings increase competition and motivation among students.
Evaluate the user-friendliness of viewing and understanding past tasks on the profile page.	Can you easily find and view your previous tasks on the profile page?	Yes, under the "Completed Tasks"	Yes, there is a search bar where I can search directly for specific tasks.	Subtitles make it easier for children to identify content in the area, and filters and search bars allow children to quickly find what they're looking for.
Assess the clarity and effectiveness of bar chart representations	Can you explain what the numbers and bars in the chart represent?	The numbers in the bar chart represent the	The bars in the bar chart represent my questions in	Bar charts make it easy for students to identify questions they have not yet completed and

of student performance		questions I completed.	different categories.	answered correctly. This gives them more incentive to eliminate all yellow and increase the amount of green.
	How does the bar chart help you understand your overall performance?	I know that if the green one is longer, the more correct answer I have got.	I know the length of yellow represents my unanswered questions and I'm trying to make all the yellow go away.	

Appendix

Date of meeting	Time of meeting	Venue of meeting	Discussed Content
6/11/2023	16:00 – 18:00	N001	User requirement
13/11/2023	16:00 – 18:00	N001	Prototype design and testing