



Peace Break

Mobile development

Summary: This document provides an overview of the Peace Break project, a mobile game inspired by the classic 'Brick Breaker'. Through this project, you will have to handle authentication, database management, and other key mobile development skills.

Version: 1.00

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Chapter I

Instructions

- Only this page serves as the official reference. Do not trust rumors.
- Read the entire document carefully before starting.
- This project will be evaluated by your peers.
- Trust the document; do not blindly follow demos or example images, which may contain non-required additions.
- Have a question? Ask the peer on your right. If unavailable, try the peer on your left.
- By Odin, by Thor! Use your brain!

Chapter II

Introduction

II.1 Welcome!

Welcome to this Mobile application project!

You are about to embark on an exciting journey into the world of mobile application development. Your challenge: to create a mobile game from scratch, inspired by the classic “Brick Breaker”. This is not just a game programming exercise; it is a unique opportunity to explore every aspect of mobile app development.

Throughout this project, you will learn to design intuitive user interfaces, implement core game functionalities, manage user registration and data, and master the nuances of mobile development. You will have the chance to transform an idea into a fully functional mobile application, guiding you through each stage, from initial design to the management of user data.

By taking on this project, you will gain essential skills to prepare you for a career in mobile application development. You will not only discover how to build an engaging game, but also challenges that come with mobile development.

We are excited to see what you will create and wish you a rewarding and enjoyable learning experience.

Good luck and happy coding!

Chapter III

General Instructions

Your application is a brick breaker game.
The player must be authenticated to play.
The game must consist of multiple stages.

In each stage, the player controls a paddle at the bottom of the screen, using it to bounce a ball against a wall of bricks. The ball bounces off the bricks, destroying them upon impact. A stage is won when all the bricks are destroyed. The player loses lives if the ball touches the bottom of the screen. Losing all lives ends the stage.

You must:

- Implement a scoring system and coin system. The global score should be the sum of scores from each stage the player wins.
- Implement a shop system where players can purchase items with coins they have earned.
- Allow players to replay completed stages to improve their score.
- Include a settings menu that lets players adjust game settings.
- Integrate an authentication system and a database to store player data. You can use any database management system you prefer.

To complete this project, you must create a mobile application. You may use any programming language and game engine of your choice.

Below is an example image of an application created for this project. It was developed using C# programming language, the Unity game engine and Firebase.



To facilitate the evaluation, you must have at least 20 users registered in your application with various scores and stages completed.
You will need to provide the evaluator with accounts that have varying scores and completed stages.
You will also be required to manually modify certain data in your database according to specific test requests.



The application image is illustrative and does not represent the final version of the application you are expected to deliver. Some elements may be missing or different.

Chapter IV

Mandatory part

IV.1 Project presentation

Your application must include the following features:

- An authentication system.
- A login/register page.
- A start menu page.
- A shop page.
- A page displaying completed stages.
- A leaderboard showing the top 10 players.
- An Inventory page.
- A settings page.
- At least 10 stages.
- The application must not crash.
- The application must be secure (protected against SQL injection, XSS; passwords must be hashed and require a high level of complexity, etc.).

IV.2 Authentication

The player must be authenticated before accessing the game.

They must be able to register or log in to the application.

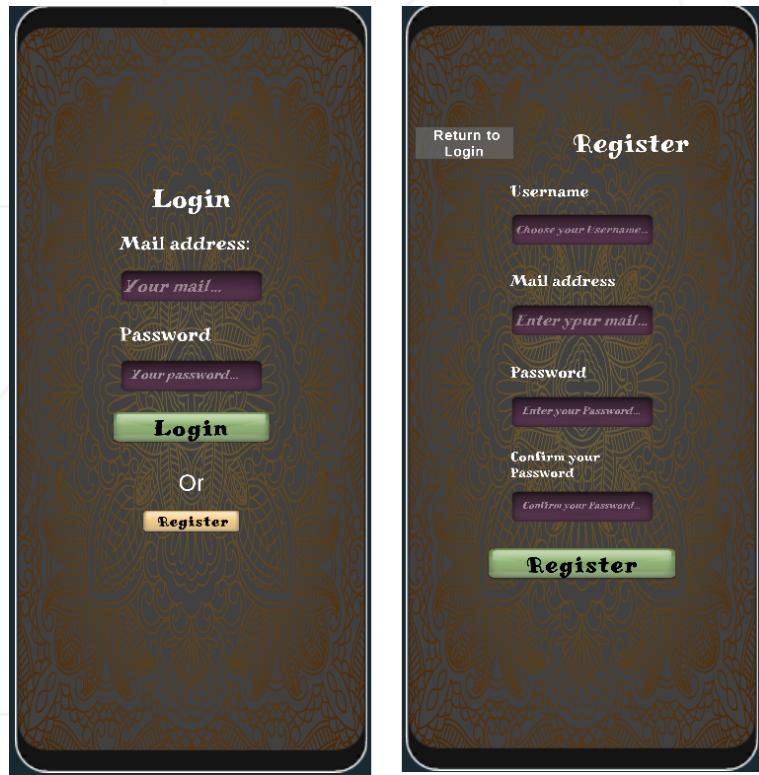
You are free to use any authentication system of your choice.

Registration:

- The registration form must request the player's email, username, password, and password confirmation.
- The email must be valid and unique.
- The username must be between 3 and 10 characters long, consist only of letters and numbers, and be unique.
- The password must be at least 8 characters long and contain at least one uppercase letter, one lowercase letter, one number, and one special character.
- Password must be hashed in your database and all database calls must be secure.
- Errors must be handled and displayed to the player (e.g., incorrect password, email already registered, username too short... etc.).
- After registration, the player must be redirected to the login page.

Authentication:

- The Authentication system asks for the player's username or email (it is up to you to decide which to use, or you can allow both if you prefer), and a password.
- Errors must be handled and displayed to the player (e.g., invalid username or email, invalid password etc.).



IV.3 Starting Menu

After authentication, the player should be redirected to the main menu.

Main Menu: On the main menu, players should be able to:

- View their name, global score, coins. This information must be updated each time the player returns to the start menu.
- Access the stage to play. This should always lead to the next available stage (stage completed + 1). Upon account creation, it should be the first stage.
- Access the shop.
- Access the inventory of purchased items
- Access the completed stages.
- Access the settings.



IV.4 Stages

The game must contain at least 10 stages.

From the main menu, players should be able to access the next stage to play.

IV.4.1 Stages content

- Each stage must include 1 paddle, 1 ball, and 1 wall of bricks.
- The player must be able to win or lose the stage.
- Each stage must differ from the previous one(e.g., difficulty level, bricks colors, etc.)
- The stage must display real-time information in an information bar.
- The stage must have a scoring system that allows players to earn coins.

IV.4.2 Stage Gameplay

- Players start the game with their maximum lives. (Initially 3 lives at account creation)
- Players control a paddle at the bottom of the screen using their finger.
- Players must use the paddle to bounce a ball against a wall of bricks.
- The ball bounces off the bricks, destroying them upon impact. (Some bricks may require multiple hits).
- Difficulty should gradually increase with each stage.
- Players win a stage by destroying all the bricks.
- Players lose lives if the ball touches the bottom of the screen.
- Losing all lives results in losing the stage.
- When losing a stage, players must have the option to retry the stage or return to the main menu.
- Upon winning a stage, players should see a summary (including score and coins earned) and can proceed to the next stage or return to the main menu.
- Players must be able to pause the game, when paused, they should have the option to resume the game or return to the main menu.
- Power-up and Power-downs must be implemented.



IV.4.3 Bricks

- Bricks must be displayed in a wall at the top of the screen.
- Bricks must be destroyed when hit by the ball. (in one or multiple hits)
- The number of hits required to destroy a brick must be visually represented by its appearance. You can use color, size, or any other visual cue, but it must be clearly visible to the player.
- Each Brick must provide a score and coins when hit or destroyed. It is up to you to decide whether different bricks provide different amounts of score and coins.

IV.4.4 Lives

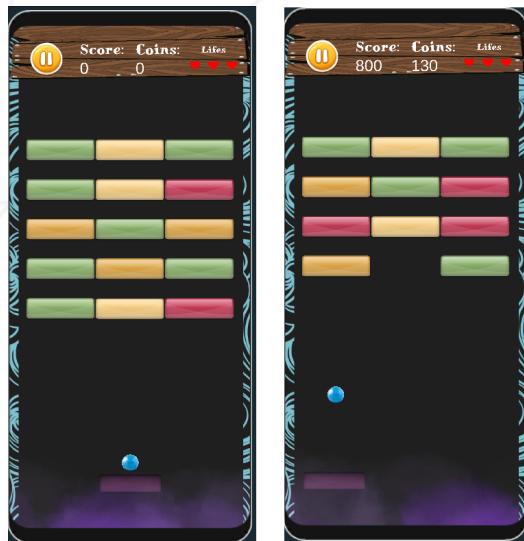
- Players start with 3 lives upon account creation.
- The player must be able to purchase Life+ in the shop to permanently increase their maximum lives.

IV.4.5 Information bar

- The information bar must display at least the following details during the game, updated in real time:
 - Stage name/number.
 - Number of remaining lives.
 - Stage score.
 - Coins earned in the stage.

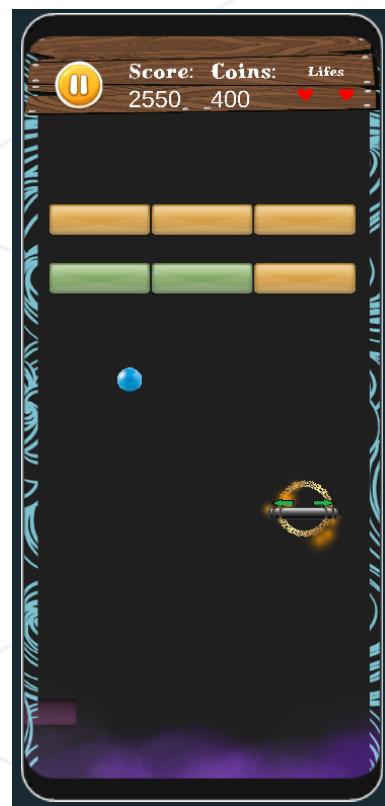
IV.4.6 Score and Coins

- Players earn score points and coins for each brick destroyed and/or hit.
- Stage score and coins are displayed and added to the player's total if the stage is won.
- Score and coins for a stage are NOT saved if the player loses the stage.



IV.4.7 Power-ups and Power-downs

- Players must be able to collect power-ups and power-downs during the game. You can decide how and when.
- At least, the following must be included:
 - Power-ups: Extra life (adds a life for the current stage only; you decide whether players can exceed their max life limit).
 - Power-ups: Increase paddle size for a limited time.
 - Power-downs: Reduce paddle size for a limited time.
 - Power-downs: Increase ball speed for a limited time.



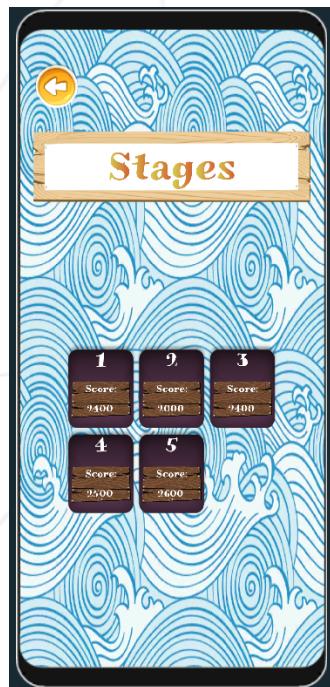
IV.5 Completed Stages

A page displaying completed stages must be implemented.

From the main menu, players should be able to access the completed stages page.

Completed stages page:

- Players must be able to view stages they have completed.
- Players should be able to select a stage to replay by clicking on it.
- When a player replays a stage:
 - If the player wins: A summary is displayed with the previous score, the new score, the saved score (The highest score between the old and the new score), and the coins earned for the stage.
 - If the player loses: the initial score for this stage should remain unchanged.
 - At the end of the stage, the player must be redirected to the completed stage page or the main menu.
- Remember that the total score is the sum of all completed stages. If the player replays a stage and wins, the total score must be updated accordingly.

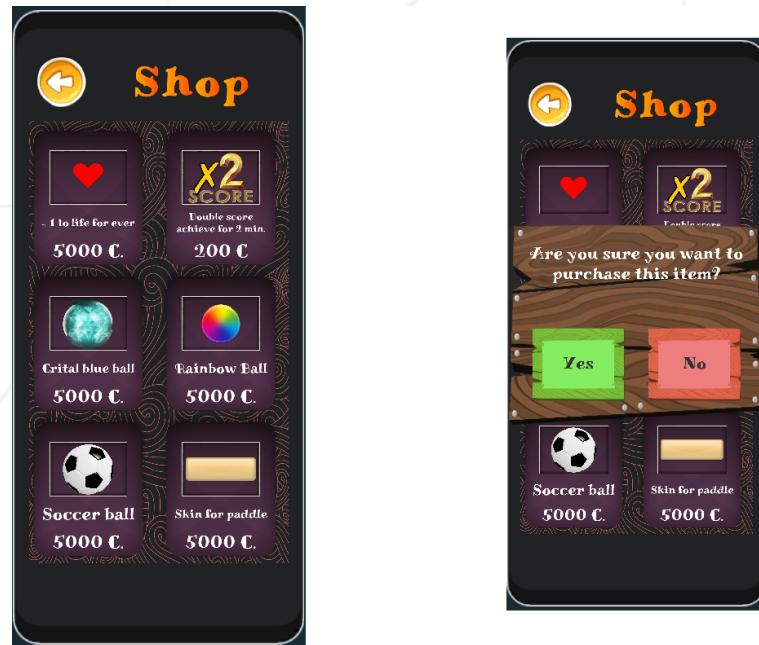


IV.6 Shop

You must implement a shop system where players can purchase items with coins.

Shop:

- Players must be able to purchase items with their coins.
- The number of coins the player has must be displayed in the shop.
- Each item must have a price in coins and a brief description.
- When a player clicks on an item to purchase it, a confirmation popup must appear, asking the player to confirm the purchase.
- The player's total coins must be updated after a purchase.
- The shop must include at least the following items:
 - Life+: Immediately and permanently increase the player's max life by 1. (You choose the maximum life a player can have).
 - Paddle skins: Changes the appearance of the paddle (at least 2 different skins).
 - Ball skins: Changes the appearance of the ball (at least 2 different skins).
- Skin items:
 - Must be available for purchase only once for each skin.
 - Skins should not appear in the shop if they have already been purchased.
 - Must be placed in the inventory after purchase.
- Life+ item:
 - Must be available for purchase as long as the player meets the requirements (e.g., max life not reached, etc.).
 - It is immediately added to the player's max life.
 - Must NOT BE placed in the inventory after purchase.



IV.7 Inventory

You must implement an inventory system where players can view items they have purchased.

Inventory:

- Players should be able to view each item they have purchased unless specified otherwise.
- Players must be able to select and use the items from their inventory
- If the item is a skin, the player should be able to apply or remove this skin on the paddle or the ball.
- If the skin is applied to the paddle or the ball, the skin should display the label “applied”.

IV.8 Top 10 Leaderboard

A top 10 leaderboard must be implemented.

Top 10 leaderboard:

- Players must be able to view the top 10 players registered in the application with at least their ranking, username, and score.
- Players should be able to see their own rank and score.
- It is not mandatory to update the leaderboard in real time. But the leaderboard must be updated each time the player loads this page.

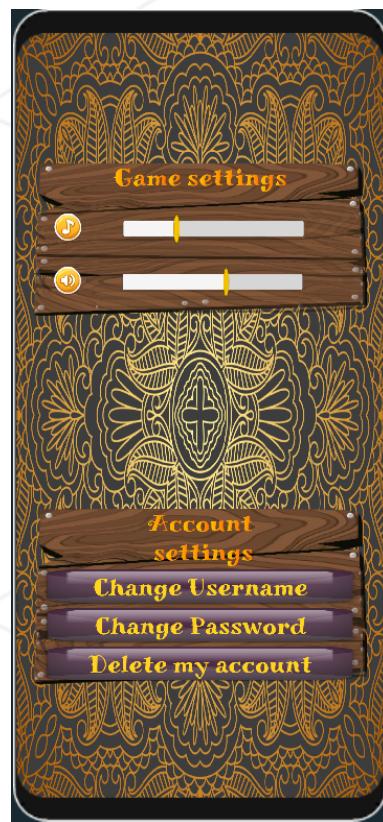


IV.9 Settings

A settings page must be implemented.

Settings:

- Players must be able to change the game's settings.
- At least the following account settings should be available: delete game progress, delete account, change password, and change username.
- Before any changes in the account setting, a confirmation popup must be displayed asking the player to confirm the change.
- After any change in the account setting, the player must be redirected to the login page.



Chapter V

Bonus part



The bonus will only be evaluated if the mandatory part is fully completed and validated.

Now that you have completed the mandatory part, you can add bonuses to your application.

You can implement all of them, but a maximum of 5 bonuses will be considered for the evaluation.

V.1 Bonus 1 : Graphics

- The graphics of your app should accomodate visual impairments, at least Tritanopia and Protanopia.

V.2 Bonus 2 : Sound

- Include at least 1 background music track for the stages and sound effects for collisions with bricks and the paddle.

V.3 Bonus 3 : Powers

- Include at least 3 new powers-ups and/or power-downs of your choices. Be creative!
- Example of a power-up: The player can shoot the bricks with a laser.
- Example of a power-down: The player cannot move the paddle for a limited time.

- Another example of power-up: Double the score points or coins earned for a limited time.

V.4 Bonus 4: Tutorial System

- Implement an interactive guide for new players to learn the controls and rules of the game.

V.5 Bonus 5: Advanced save

- Allow players to pause a stage, exit the game, and resume the stage where they left off when they return.

V.6 Bonus 6: Persistent connection

- Allow players to quit the application and remain logged in when they return.

Chapter VI

Submission and peer-evaluation

Turn in your assignment in your **Git** repository as usual. Only the work inside your repository will be evaluated during the defense. Don't hesitate to double-check the names of your folders and files to ensure they are correct.

For this project you must build your application in presence of the evaluators. You will need to demonstrate your application and be prepared to answer questions about your implementation choices.

Your build must provide a file that can be used on a mobile device or emulator.



Ensure that no credentials are present in your repository! If any credentials are found in your repository, your project will be considered a failure.



The evaluation process will take place on the computer of the evaluated group.