Mobile App Design and Feature Template

App/Project Name: Memory Tester Game

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Introduction:

This app is a game which tests the users' short-term memory by testing how well they can remember letter and colour combinations. The app first shows the user four coloured boxes, each with a letter on. The app prompts the user to remember which colour corresponds to each letter. Then, when the user says they are ready, the letters disappear from the boxes, and the boxes move positions so that each coloured box is in a different place on the screen. The app then prompts the user with a letter, the user must select the correct colour which corresponds to that letter. Then the boxes move position again and the user is prompted to select the correct colour for a different letter. After a few rounds the letters that correspond to each colour will change and the user will be prompted to memorise the colours and letters again. This process repeats until the user makes a wrong selection.

Aims and Objectives:

- Storing high scores so the high score does not reset after the app is shut, so that the user can see if they are improving
- Haptic feedback when buttons are pressed for better user feel
- Options for increasing or decreasing font size to better suit different users
- Option for a dark mode
- Hold gesture to activate a setting, such as dark mode
- The game to be easy to follow so users can understand straight away
- A 'how to play' section to detail how the game works if users are confused
- Immersive features for when a user makes a wrong selection or makes a new high score - like a long vibrate for a wrong selection or a torch flash when a new high score is made
- Changes to which letter corresponds to each colour throughout the game – changing colour and letter pairings at stages throughout the game
- Sensible arrangement of pages so that the user does not get lost while using the app

Target Audience:

The target audience for this app is for anybody who wants to test and improve their memory, so the interface and features must account for everybody by being simple to understand and follow. This means that the game must be easy to understand and play, and navigation must be orderly and sensible.

User Experience (UX) Design:

User Research

Below are images of two mobile apps, Kahoot (left) (Kahoot, 2024) and Duolingo (centre and right) (DuoLingo, no date), which have similar functions to the memory tester game and are designed for the same user base. The UX is designed to be engaging for the user. This is done by using mobile features such as haptic feedback when answers are selected for an immersive experience. Also, they implement a focused UI when in the 'game mode', hiding any settings or other pages behind a single button. This creates an overall engaging feel for the user. By the popularity of these apps, it can be inferred that these UX considerations are well received by the target user base.
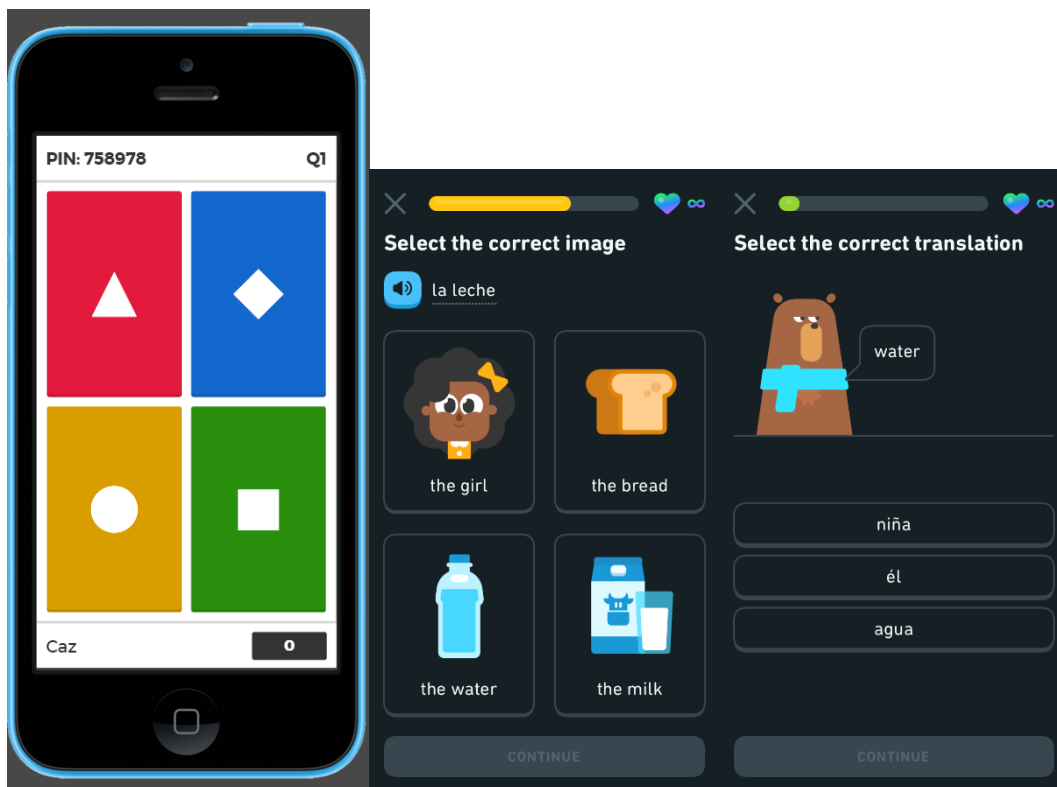
Personas and User Journeys

The app will open and allow a user to instantly start playing the game without needing to configure their settings or create an account, as this could instantly put off a user. The game will be easy to follow from the start, with the user only needing to read one sentence before they start the game. However, if the user wishes to change anything on the screen, such as font size or switch on dark mode this can be done on the settings page which will be one tap away via a

common three parallel lines symbol called a hamburger symbol, which nowadays is a universal symbol for a settings page (Fedewa, 2021). The first option on this page will be a 'how to play' button which when pressed opens instructions on how to play the game, a back arrow is in place to navigate the user back to settings. Also on settings will be a dark mode button, which is enabled by holding it (there will be text to tell the user this) and a font size button which changes the font when pressed. When any of these settings are changed, they instantly change universally throughout the app. A back arrow on the settings page takes the user back to the main page.

Wireframes

This is the design of how the app will look. Comic sans is used for the font as it is the most unserious font available on the software I used (reasoning for unserious font is outlined in UI design section).

The wireframes labelled 1 – 4 are the main views of the app.

1) The front page, what the user sees when they first load up the app or after they get a question wrong – when the game restarts.
   a. The 'I'm ready' button starts the game.
   b. Hamburger button navigates to the settings page when pressed.
   c. The coloured buttons cannot be pressed yet.
2) Midgame, this is how the app looks when the user is being prompted to find the colour that corresponds to a certain letter.
   a. The I'm ready button disappears.
   b. The coloured buttons are pressable.
3) The settings page
   a. The arrow navigates back to the main page.
   b. How to play navigates to the how to play page.
   c. Dark mode is enabled when the dark mode button is held.
   d. Font size flips through small, medium and large when pressed (medium is default).
4) How to play page
   a. The arrow navigates back to the settings page.
   b. Crosshatched area is where instructions will be.

The wireframes labelled 5 – 8 are the alternate views of the app.

5) Midgame reset, this shows what the game looks like when the user is prompted to learn a different set of letters and colours after a few rounds of a game.
6) Large font size, the main page when large font size is enabled.
7) Small font size.
8) Dark mode, the main page with dark mode enabled.

1)

≡

Memorise the colours and letters!

Score: 0

A	B
C	D

I'm ready!

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2)

≡

Find the colour for:
A

Score: 4

(yellow)	(blue)
(green)	(red)

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3)

←

Settings

How to play

Dark mode (hold)

Font size: Medium

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4)
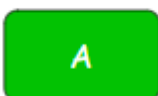
←

How to play:
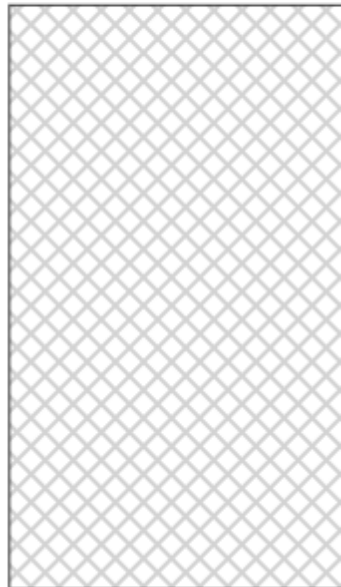
5)
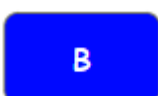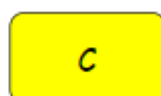
Now memorise these colours and letters!

Score: 6

D (red)	**A** (green)
C (yellow)	**B** (blue)

I'm ready!

6)

Memorise the colours and letters!

Score: 0

A (green)	**B** (red)
C (blue)	**D** (yellow)

I'm ready!

7)

Memorise the colours and letters!

Score: 0

A (green)	**B** (red)
C (blue)	**D** (yellow)

I'm ready!

8)

Memorise the colours and letters!

Score: 0

A (green)	**B** (red)
C (blue)	**D** (yellow)

I'm ready!
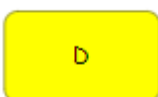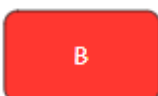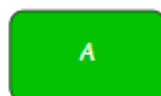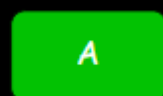
User Interface (UI) Design:

Colour Palette

The colour palette for this app will be very simple, by using an overall theme of greys, white and black, with bold colours being used for the option buttons for easy visibility. The reason the rest of the UI will only incorporate greys and white and black is because the game revolves around remembering colours, so using colours elsewhere in the UI may distract the user. Also, for scalability reasons. If different colours are used for headers and buttons, the ratio of colours is likely to change when using the app on a tablet as opposed to on a mobile device. For example, if the header was a similar colour to one of the coloured buttons, then that colour would be more prevalent than other colours on the UI on different devices. This could distract the user and hinder their focus and ability to memorise the other colours.

The alternate theme (dark mode) will change the background from white to black and the text from black to white where appropriate. The text inside the buttons will not change colour as this would make it harder for the user to see the letters inside the buttons; white text over a yellow background is difficult to see. The necessity of a dark mode option is outlined in the government guidelines for making accessible apps (Heathcote, 2021).

Typography

The font chosen for this app is called 'Komika Axis'. It was chosen as it has an unserious feel, similar to the fonts used in Kahoot and Duolingo. This makes the app feel more friendly and fun, so a user is more likely to return to it. The font size can change on user request, to a larger or smaller font size. This is also outlined in the government guidelines (Heathcote, 2021).

Iconography

The menu icon is three horizontal parallel lines on top of each other, aka the 'hamburger button'. This is widely recognised as representing a menu page (Fedewa, 2021).

Imagery

There is no imagery used. The menu icon is technically a PNG image stored locally, but it is not used as 'imagery', it is there for a function. The reason there are no images used is for a consistent style and scalability. The focus of the app is to test the users short term memory, so as little distraction as possible is best. Also, if there were excessive images used then the app may not scale well to tablet devices.

Layout and Spacing

The UI design of Kahoot and Duolingo include a question towards the top of the screen, and large option buttons in the centre. This means that the interface is not confusing for the user, as it is easy to tell what the question is and how to answer it without the need for instructions.

Validation and Testing

- Option button spamming: does the app handle a lot of inputs being given when the user spams buttons
- Two presses at the same time: what happens when a user presses in two places at the same time
- Feature tests: do mobile features all work as intended
- Game tests: does the game work as intended
- High score saving: is the high score saved after the app shuts
- Device scalability: does the app run the same on a different OS / screen size

Feature Implementation

Button colour and location randomisation

The colours of each button randomise every time the game is played. Including when the app loads up, so it doesn't show the same sequence for every first go. This means that each turn is random, and the user cannot get easy points on their first go each time. This is done with various randomise functions which run every time the game ends, restarts and when the app is first opened.

Haptic feedback

Haptic feedback will be used on the buttons on the front page; the coloured buttons and the 'I'm ready' button. This improves user experience as it provides the user with a physical response when they make a selection. This improves usability as it confirms the game's responsiveness with physical feedback.

Vibration

A vibration will be triggered when a user selects the incorrect coloured button, which ends the game. This adds an additional layer of feedback to the user by making the consequence of an incorrect selection more noticeable. Implementing vibration also can reinforce the user's learning since it affects one of the user's senses other than vision; their touch.
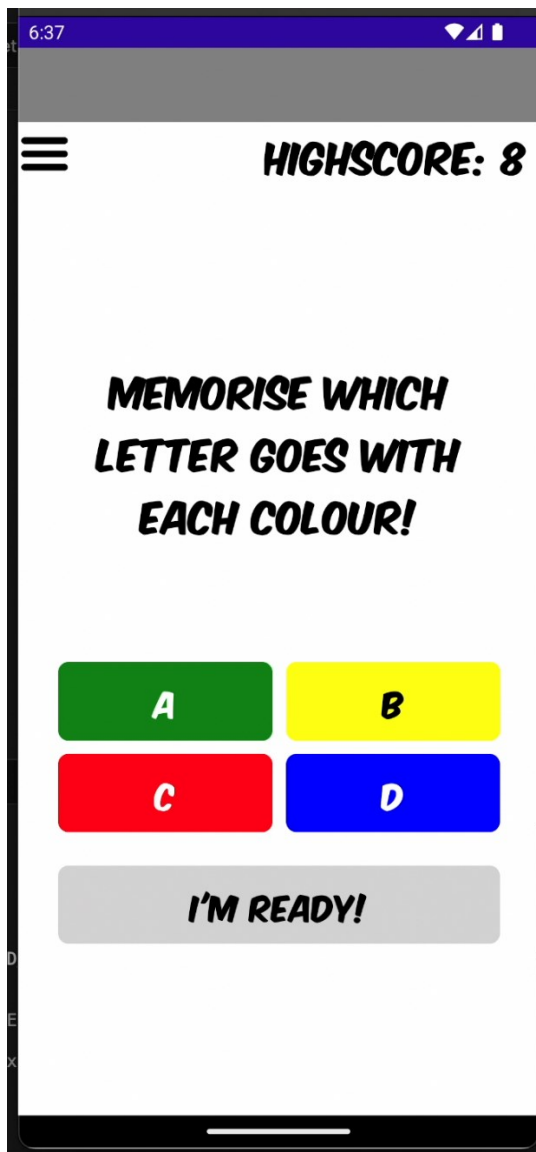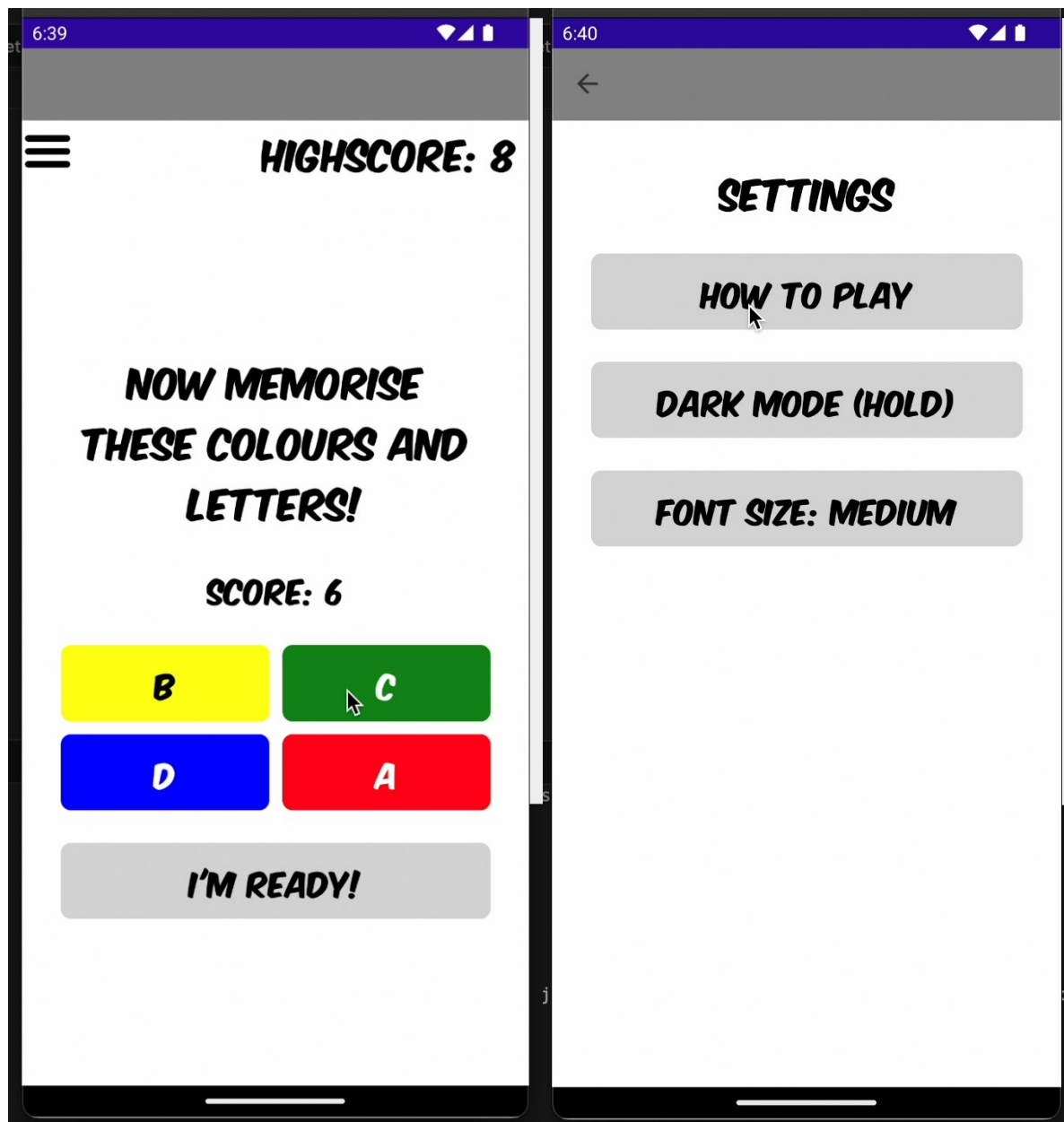
Torch flash

When the user makes a new high score, a torch flash will be triggered. A torch flash acts as a celebratory feature for the game, adding a visual element to the achievement of making a new high score, making the game more rewarding for the user and incentivising them.

Hold to activate

To activate dark mode (and light mode) the user is prompted to hold the button down. By making the user hold down the button to toggle dark and light mode, it makes the user feel as though they are using a real switch. It makes the experience more homely for the user. Also, it means that they do not turn it on by mistake when attempting to tap the other options in the setting page, which are either side of the dark mode button.

Screenshots (Pixel 5, iPad 10)

HIGHSCORE: 8

MEMORISE WHICH
LETTER GOES WITH
EACH COLOUR!

A   B
C   D

I'M READY!

Android Emulator - pixel_5_-_api_33:...

HIGHSCORE: 8

FIND THE COLOUR FOR:
B

SCORE: 3

HIGHSCORE: 8

NOW MEMORISE THESE COLOURS AND LETTERS!

SCORE: 6

B	C
D	A

I'M READY!

SETTINGS

HOW TO PLAY

DARK MODE (HOLD)

FONT SIZE: MEDIUM

HOW TO PLAY:

THE START SCREEN SHOWS 4 DIFFERENT COLOURED BUTTONS, EACH WITH A LETTER ON.

YOU NEED TO MEMORISE WHICH LETTER IS ON EACH COLOUR BUTTON

WHEN YOU PRESS THE 'I'M READY!' THE LETTERS DISAPPEAR FROM THE BUTTONS.

THE SCREEN WILL THEN PROMPT YOU WITH A LETTER.

YOUR JOB IS TO PRESS THE COLOUR WHICH HAD THAT LETTER ON BEFORE THEY DISAPPEARED.

YOU GET POINTS FOR CHOOSING THE RIGHT BUTTON, AND THE GAME ENDS IF YOU CHOOSE THE WRONG ONE.

HIGHSCORE: 9

MEMORISE THE COLOURS AND LETTERS!

SCORE: 0

A	B
C	D

I'M READY!

6:40

SETTINGS

HOW TO PLAY

LIGHT MODE (HOLD)

FONT SIZE: LARGE

6:40

HIGHSCORE: 9

MEMORISE THE COLOURS AND LETTERS!

SCORE: 0

A	B
C	D

I'M READY!

6:40

HIGHSCORE: 9

MEMORISE THE COLOURS
AND LETTERS!

SCORE: 0

A	B
C	D

I'M READY!

MEMORISE WHICH LETTER GOES WITH EACH COLOUR!

A	B
C	D

I'M READY!

FIND THE COLOUR FOR: D

SCORE: 1

MEMORISE THE COLOURS AND LETTERS!
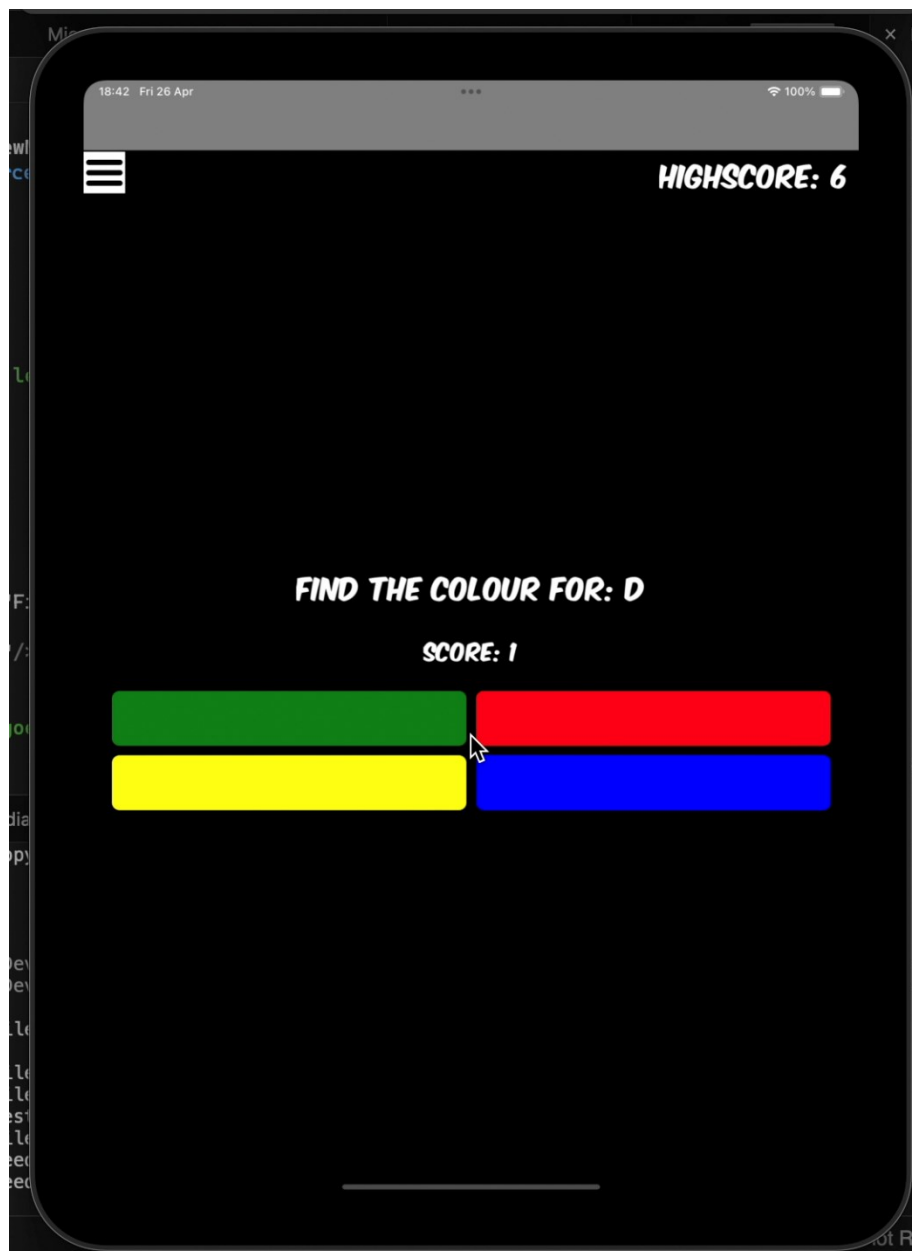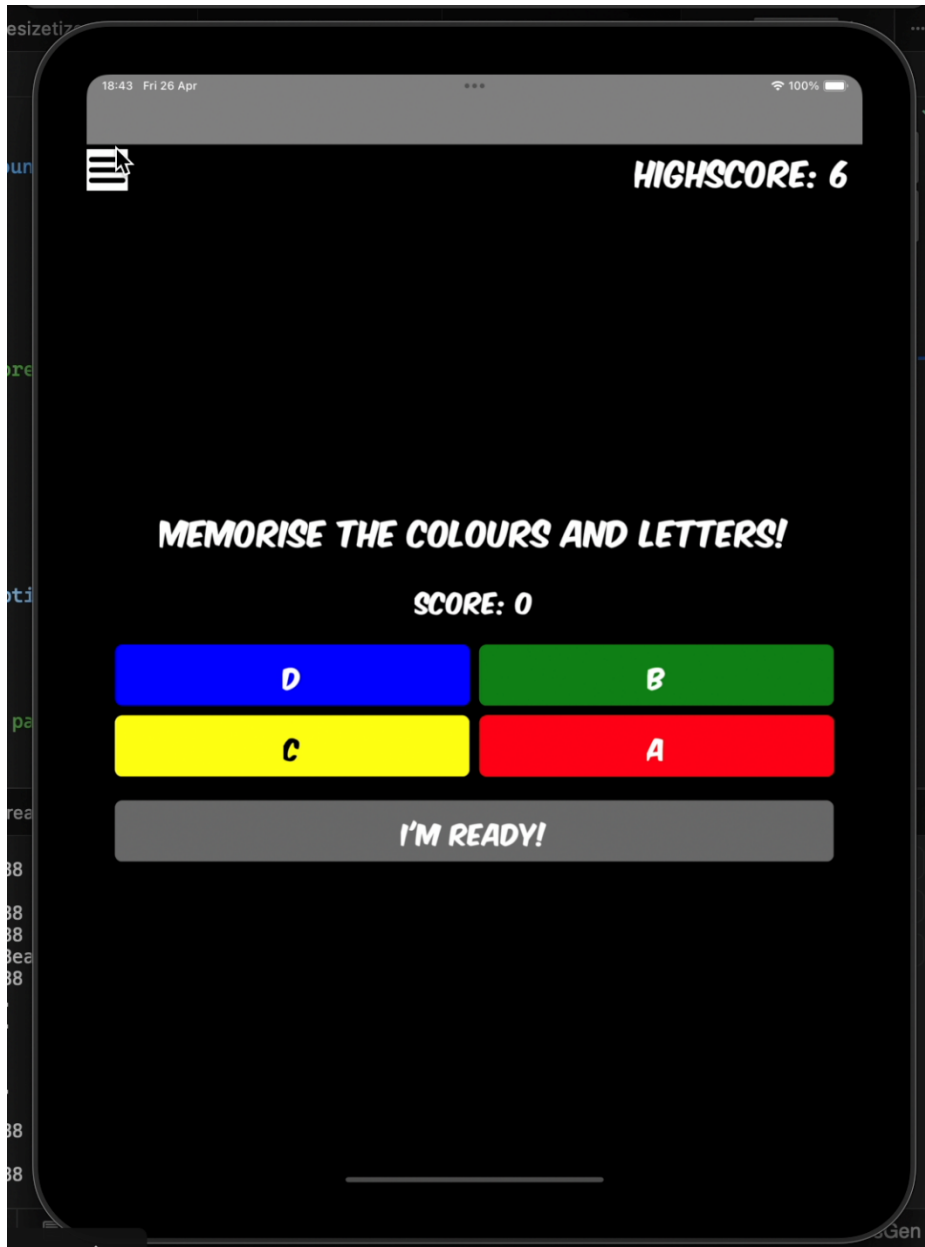
SCORE: 0
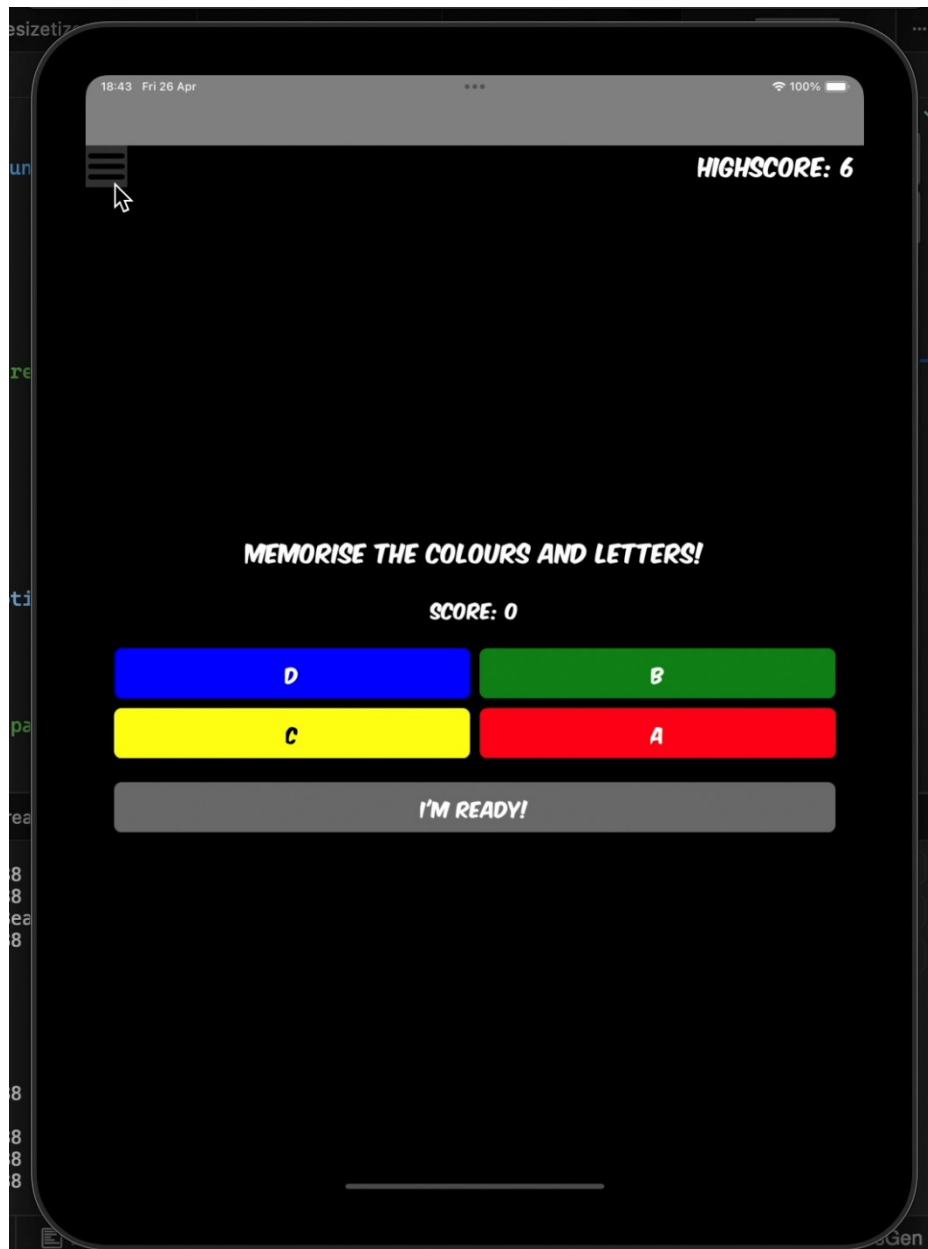
D	B
C	A

I'M READY!

References

- Heathcote, C. (2021) *Making Great Accessible Mobile Apps*, *Accessibility in government*. Available at: https://accessibility.blog.gov.uk/2021/05/04/making-great-accessible-mobile-apps/ (Accessed: 22 April 2024).
- Fedewa, J. (2021) *What is a hamburger menu button?*, *How*. Available at: https://www.howtogeek.com/720214/what-is-a-hamburger-menu-button/ (Accessed: 22 April 2024).
- DuoLingo (No Date)*, Learn a language for free* (no date) *Duolingo*. Available at: https://www.duolingo.com/ (Accessed: 22 April 2024).

- Kahoot, (2024) *Learning games: Make learning awesome!* (2024) *Kahoot!* Available at: https://kahoot.com/ (Accessed: 22 April 2024).