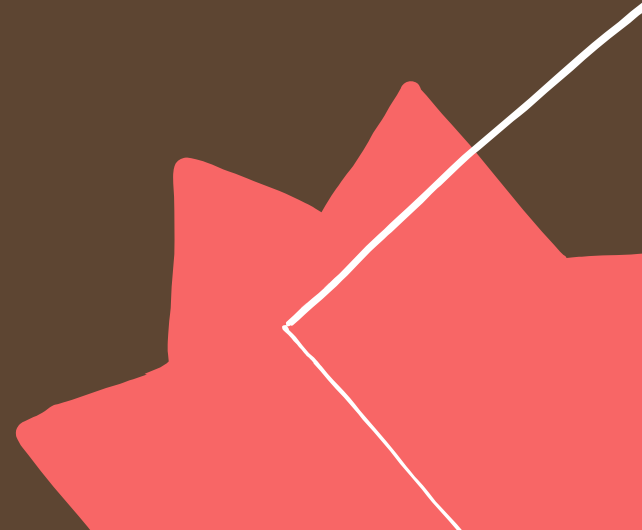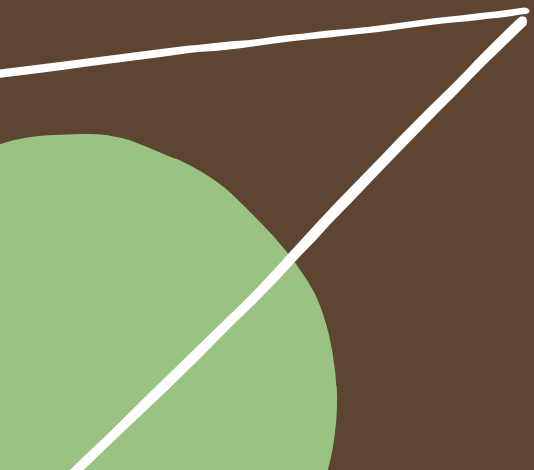# CROSS WORDS
GAME

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PROJECT BACKGROUND

a crossword puzzle game that combines word-solving with adventure elements. Players will progress through levels by completing puzzles, enhancing their language skills, and learning about new vocabulary.

THE PROGRAM FOR OUR CROSSWORD PUZZLE GAME SHOULD

- Provide a variety of crossword puzzles with increasing difficulty.
- Include a hint system to assist players when they're stuck.
- Offer a user-friendly interface suitable for all ages.
- Track progress and reward achievements to keep players motivated.

DATA STRUCTURE USED

2D Array

This is essential for representing the crossword grid where each cell can hold a letter or be empty, indicating the start or end of a word.
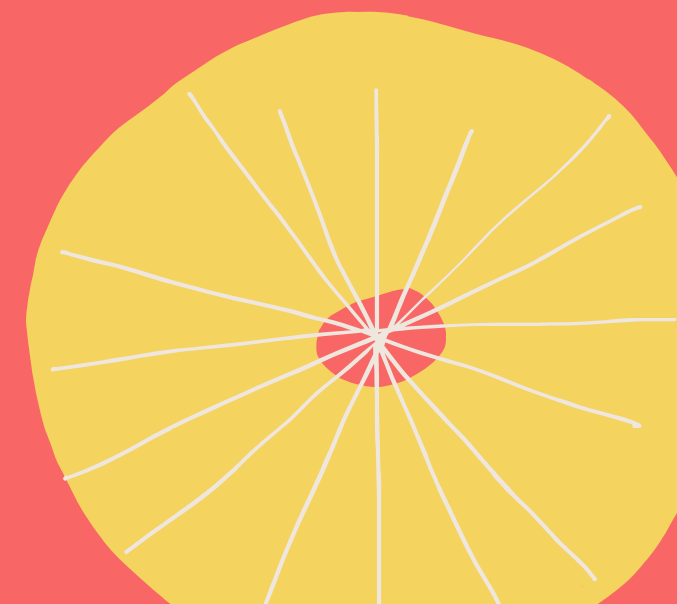
Trie (Prefix Tree)

A trie is crucial for efficiently storing and retrieving words for the puzzle. It allows for quick searches of words based on prefixes, which is helpful when players are filling in letters and the game needs to suggest or check possible words.

2D ARRAY

- A 2D array can represent the grid of letters in the game. Each cell in the array corresponds to a letter in the grid. Players can traverse horizontally, vertically, and diagonally to form words.
- The 2D array can efficiently store the letters of the grid and facilitate easy access to each cell's contents.
- The space complexity of a 2D array is $O(m * n)$, where 'm' is the number of rows and 'n' is the number of columns in the grid. This means the space required grows linearly with the size of the grid.

TRIE (PREFIX TREE)

- Trie efficiently stores a dictionary of words. Each node represents a letter, aiding in word validation.
- Trie nodes contain links to child nodes, representing subsequent letters. Leaf nodes mark the end of valid words.
- $O(n * m)$ in the worst case, where 'n' is the number of words and 'm' is the average word length. However, due to common prefixes, practical space usage is lower.
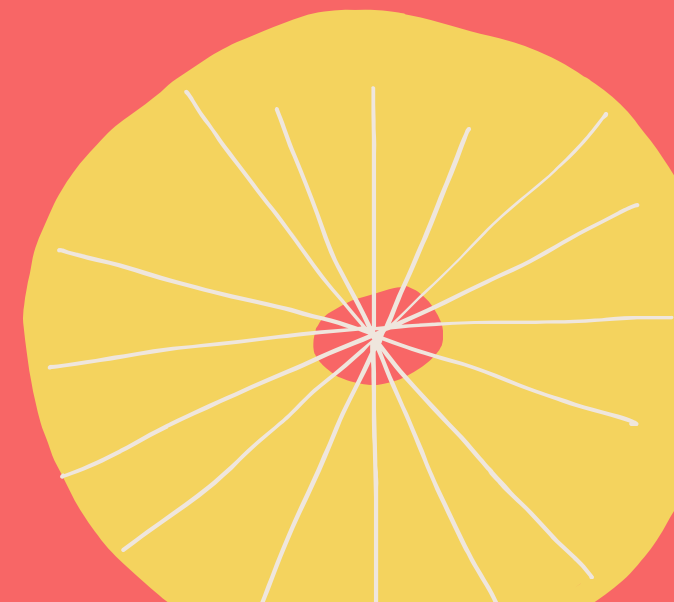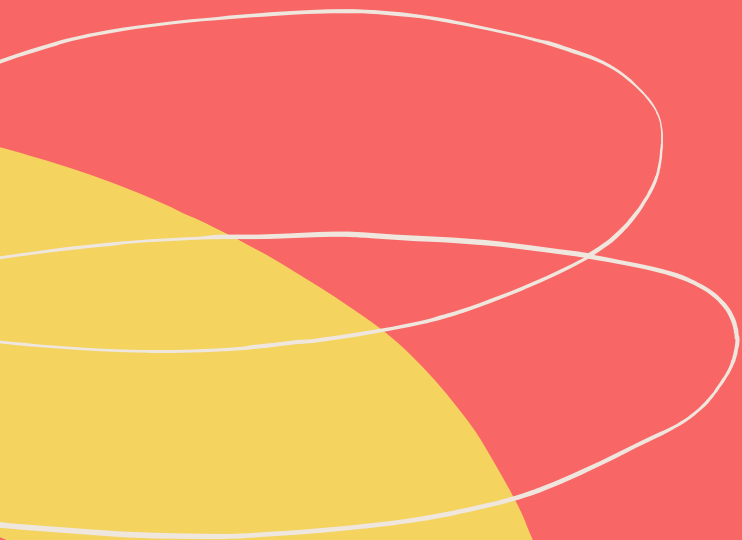
PLAN B

Onet
(match and connect pairs of identical images)

In the Onet game, players aim to clear the board by connecting pairs of identical images within a time limit. The challenge lies in linking these pairs with up to three straight lines without any obstructions. Players can choose from various themes and use hints or shuffles to assist them. The game requires strategic thinking and quick reflexes, advancing through levels as players successfully match all pairs. It's a test of pattern recognition and speed, offering a fun and engaging experience.

References

- Cormen, T. H., Leiserson, C. E., Rivest, R. L., & Stein, C. (2009). Introduction to algorithms (3rd ed.). MIT Press.

- Li, Q., & Ma, J. (2015). Space Complexity Analysis of Trie Data Structure. Journal of Computer and Communications, 3(10), 75–79. https://doi.org/10.4236/jcc.2015.310011

THANK YOU