# Task 1 Individual Project: **WordFold**

In the solitaire **WordFold** puzzle, a 5x5 square board has squares that initially hold a single letter. The player manipulates the board contents by highlighting a non-empty square and then moving its contents UP, DOWN, LEFT, or RIGHT into another non-empty square. The contents of the original highlighted square are removed and prepended to the contents of the square in the desired direction and original square is no longer highlighted.

|  |  |  |
| --- | --- | --- |
| **Board State #1  (moves: 0, score: 0)** | **Board State #2  (moves: 0, score: 0)** | **Board State #3  (moves: 1, score: 2)** |
| **Initial configuration** | **Select a square** | **Move letter “B” DOWN** |

In Board State #2, the player has selected the **B** square. When the player requests to move its contents DOWN, that square is cleared and the square below it has **B** prepended to its contents, resulting in the new contents, **BL**, as shown in Board State #3. Also note that no squares are highlighted. If the player selects the **U** square and requests to move contents DOWN, that square is cleared and the square below contains **UE**, as shown in Board State #4. Now the player selects the **BL** square and requests to move LEFT, resulting in Board State #5. As you can see, the word **BLUE** has been formed. With three additional moves (**C 🡪 CY**, **CY 🡪 CYA**, **CYA 🡪 CYAN**), the player can create Board State #6.

|  |  |  |  |
| --- | --- | --- | --- |
| **Board State #4 (moves: 2, score: 4)** | **Board State #5  (moves: 3, score: 4)** | **Board State #6  (moves: 6, score: 8)** |  |
| **Move letter “U” DOWN** | **Move letters “BL” LEFT** | **Create “CYAN” word** |

The goal of **WordFold** is to move letters around, in this fashion, with the goal of creating five different English words. For this configuration, you might be able to see that the player can form the following words: BLUE, YELLOW, CYAN, MAUVE, PURPLE. Each word in the final solution will contain either 3, 4, 5, or 6 letters. There are some special cases that still need to be considered: (1) The player cannot select an empty square; (2) The player **cannot move** contents into an empty square; (3) No square can contain more than SIX letters; (4) The player cannot move contents UP from the top row, LEFT from the left column, RIGHT from the right column, or DOWN from the bottom row.

Once the player has formed FIVE words (which also means there are TWENTY empty squares), the player can submit their solution, and the result is either a SUCCESS or FAILURE. If SUCCESS, a congratulatory message appears; on FAILURE, an encouraging – but sad – message appears.

## Scoring and Counting Moves

The score for a Board State is the sum total of the score of the squares containing 2 or more letters. If the letters in a square appear **as a substring in** **any word** from the solution, then the score for that square is equal to its number of letters. Board State #3 has a score of 2 since **BL** is a substring of the answer **BLUE**. Board State #4 has a score of 4 since both **BL** and **UE** are substrings of the answer **BLUE**. If, from Board State #4, the player selects the **UE** square and requests to move RIGHT, then Board State #7 is formed. Since **UEBL** is not a substring of a word from the solution, the overall score for that Board State is 0.

|  |  |
| --- | --- |
| **Board State #7 (moves: 3, score: 0)** |  |
| **Move letters “UE” RIGHT** |

Until the puzzle is solved, **WordFold** records the move count and displays it during game play. Once the player has checked the solution, no more moves are allowed. When a player resets a puzzle to its initial state, the number of moves is reset to 0, and the board is returned to its initial configuration.

Note: Because of poor letter management, it may be the case that the player is unable to make any moves because there remain no two adjacent non-empty squares. It is not your responsibility to detect these situations. Should this happen, the player can reset the game to its initial configuration and try again.

## Use Cases

1. Choose Configuration
2. Select Square
3. Move Contents
4. Reset Game
5. Check Solution

## StoryBoards

Mock-up some sample GUI images to visualize the experience from the point of view of the player, showing a sample board state, the number of moves so far, the player’s score, and controls that the player will interact with when making moves. When a player completes the puzzle, a congratulatory message must appear in some form and the puzzle will become inactive until the player chooses a configuration to play.

## Initial Configurations

These are the three configurations that you must allow the player to choose from and you can assume that for each configuration there is a sequence of moves that will allow the player to solve the puzzle.

|  |  |
| --- | --- |
| Config #1 |  |
| **Solution**  CYAN  YELLOW  PURPLE  MAUVE  BLUE | **(2,1,DOWN), (2,0,DOWN), (3,1,LEFT),**  **(0,4,LEFT), (0,3,DOWN), (1,3,RIGHT),**  **(4,0,RIGHT), (4,1,RIGHT), (4,2,UP), (3,2,UP), (2,2,RIGHT), (3,3,DOWN), (4,3,RIGHT), (4,4,UP), (3,4,UP)**  **(1,0,UP), (1,1,UP), (1,2,UP), (0,0,RIGHT),(0,1,RIGHT),** |

|  |  |
| --- | --- |
| Config #2 |  |
| **Solution**  TAPIR, EAGLE, JAGUAR, FOLD, WOLF | TBD |

|  |  |
| --- | --- |
| Config #3 |  |
| **Solution**:  CHERRY  PAPAYA  BANANA  PEAR  FIG | TBD |

# Challenge Questions (NOT GRADED. JUST CURIOUS)

1. Can you construct an initial configuration that has two distinct, different solutions of five words in its solutions?
2. Writing a solver is proving to be interesting… Are you up for the challenge? Let me know if you write a solver that solves these three boards (and how long it takes for each one to be solved). The solver knows the final five words that are the target.

# Change Log

1. 10/21/2024 Initial Description uploaded
2. 10/22/2024 Included scoring as part of this homework assignment
3. 10/25/2024 Clarified what happens to selected square after successful move. Note that there is no **Unselect Square** use case that you have to consider. If one square is selected, and the player selects a different square, then the old square is unhighlighted and the new square becomes highlighted. When a game starts, no squares are highlighted.