

Task 1 Individual Project: Syllablast

A solitaire **Syllablast** puzzle is based on four words, each containing four syllables. These original four words are divided into a total of 16 syllables that are then placed in a 4x4 grid. Each syllable has a location identified by its (row, column). The player can swap the location of two syllables. The goal is to make a sequence of swaps to reveal the original four words (when read from left to right) that were disassembled to create the board.

In the initial configuration, none of the syllables in the first column are the first syllable in one of the original four words. Board State #1 below represents the initial configuration, formed from the words “af,fil,i,ate”, “im,mac,u,late”, “in,vis,i,ble”, and “un,der,wa,ter”. As you can see, each word has four syllables, separated by commas.

| Board State #1 (swaps: 0, score: 0) | | | | Board State #2 (swaps: 1, score: 2) | | | |
|-------------------------------------|------|-----|-----|-------------------------------------|------|-----|-----|
| ter | ate | ble | der | ter | ate | ble | der |
| fil | in | im | i | fil | u | im | i |
| i | late | mac | un | i | late | mac | un |
| u | vis | af | wa | in | vis | af | wa |
| Initial Configuration | | | | Swap ‘u’ and ‘in’ syllables | | | |

In Board State #2, the player has swapped the two highlighted syllables – ‘in’ at location (1, 1) and ‘u’ at location (3, 0). The two swapped syllables are highlighted with thick borders. In doing so, the first half of the word “invisible” has been constructed and the score is 2.

The score for a board state is based on the number of **consecutive** syllables in each row (starting from the first column) that match an original word. The score of the Initial Configuration is 0 because none of the syllables in the first column are the first syllable of an original word. The score for Board State #2 is 2 since the first two syllables ‘in’ and ‘vis’ in the third row are in proper place to form the start of the word “invisible”. Below are the two board states that result from two more swaps.

| Board State #3 (swaps: 2, score: 4) | | | | Board State #4 (swaps: 3, score: 5) | | | |
|-------------------------------------|------|-----|-----|-------------------------------------|------|-----|-----|
| ter | ate | ble | der | im | ate | ble | der |
| fil | u | im | i | fil | u | ter | i |
| af | late | mac | un | af | late | mac | un |
| in | vis | i | wa | in | vis | i | wa |
| Swap ‘i’ and ‘af’ syllables | | | | Swap ‘im’ and ‘ter’ syllables | | | |

With each swap, the score increases, but note that a swap could decrease the score if a properly located syllable is moved out of its location.

Counting Swap Moves

Until the puzzle is solved, **Syllablast** records the number of swaps – and **in addition** computes and displays the player's score.

Once the puzzle is solved, the player cannot make any more swaps.

Puzzle Reset

The player can reset the puzzle to its initial state: both the score and the number of swaps is reset to 0, and the board is returned to its initial configuration.

Undo Swap

The player can choose to undo the most recent swap and can do so until the Initial Configuration appears once again.

Use Cases

1. Choose Configuration
2. Swap Syllables
3. Reset Puzzle
4. Undo Swap
5. Complete Puzzle

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 requesting swaps. When a player has completed 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.

| | | | |
|-----|------|-----|-----|
| ter | ate | ble | der |
| fil | in | im | i |
| i | late | mac | un |
| u | vis | af | wa |

Configuration #1

| | | | |
|-------|------|-----|----|
| force | ment | al | in |
| for | ma | am | in |
| tive | ma | ing | in |
| ri | re | te | ex |

Configuration #2

| | | | |
|-----|-----|-----|------|
| di | im | me | di |
| cu | cal | cal | me |
| lat | nal | ing | i |
| o | ate | ag | chan |

Configuration #3

Configuration #1: “in,vis,i,ble”, “im,mac,u,late”, “af,fil,i,ate”, “un,der,wa,ter”

Configuration #2: “ex,am,in,ing”, “re,in,force,ment”, “in,for,ma,tive”, “ma,te,ri,al”

Configuration #3: “me,chan,i,cal”, “cal,cu,lat,ing”, “im,me,di,ate”, “di,ag,on,al”

Challenge Questions (NOT GRADED. JUST CURIOUS)

1. For each configuration, what is the fewest number of swaps required to solve the puzzle? For Configuration #1, I have a ten-step solution and for Configuration #2 I have a twelve-step solution.
2. Can you have your interface change the backgrounds to green for the syllables that are part of the player’s score (as in the sample Board States earlier?)

Change Log

1. 8/6/2024 Initial Description
2. 9/1/2024 Clarified that once a puzzle is solved, (a) the player cannot request to undo the most recent swap; (b) the player cannot swap two syllables; (c) the player **can** request to play any configuration; (d) the player **can** request to reset the puzzle to its initial state.
3. 9/1/2024 Clarified that the player can choose to play any configuration at any time.