System Requirements

CSC 480 - Spring 2018

For "Scrabble"

SUNY Oswego
Version 1.2.0

Contents

Section 1 - Introduction:

Our purpose is to sufficiently outline and shape a system that can effectively deliver a unique variation of Scrabble™ to a workstation in the Richard S. Shineman Center of SUNY Oswego. The system will only interact with those close enough to connect a mobile device, laptop, or any device with web capabilities to the hardware.

1.1 System Definition Glossary:

A.I. -				an artificial intelligent player, that becomes a placeholder for a [human] player
				during a game session

Chosen Dictionary -	refer to 'dictionary'

'Dictionary'	-		the database containing all the allowed words to be used in our game

'Game' -			refers to the system being created

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Game Board -	the graphically displayed shape with smaller shapes inside it representing spaces where tiles may be played
Game Interface -	the screen in which the player will interact with
Game Session -	the allotted time that it takes from the start of a new board to an endgame scenario
Hand -	the set of letters a player is allowed to play onto the board
Player -	a person or AI actively playing the game session
'Randomly' -	is determined by the teams developing the game
Space(s) -	an individual spot that a tile can reside in a game session
Tile -	an individual game piece that has either a single letter or is 'blank'--with a corresponding point value--playable on the board
Word Dictionary -	refer to 'dictionary'

1.2 Misc Glossary

Abbreviation -	a shortened form of a word or phrase
Anagram -	a word, phrase, or name formed by rearranging the letters of another, such as *cinema*, formed from *iceman*.
Apostrophe -	a punctuation mark (') used to indicate either possession (e.g., *Harry's book* ; *boys' coats*) or the omission of letters or numbers (e.g., *can't* ; *he's* ; *class of '99*)
Cardinality -	the number of elements in a set or other grouping, as a property of that grouping.
Noun -	is the word used for a class of person, place or thing
Pronoun -	a word that can function by itself as a noun phrase and that refers either to the participants in the discourse (e.g., *I, you*) or to someone or something mentioned elsewhere in the discourse (e.g., *she*, *it*, *this*)
Proper Noun -	is the name of a person, place or thing (i.e., its own name); a proper

noun always starts with a capital letter

Prefix -   a word, letter, or number placed before another.

Suffix -   a morpheme added at the end of a word to form a derivative, e.g., *-ation*, *-fy*, *-ing*, *-itis*.

Section 2 - Overall Description

2.1 Product Perspective
TBD

2.2 Product Functions
TBD

2.3 User Characteristics
TBD

2.4 Constraints
TBD

2.5 Assumptions and dependencies
TBD

Section 3 - System Requirements:

Section 3.1 - External Interface Requirements:

3.1.1 User interfaces

UI1.0	Functional	The primary monitor shall display information relating to the current game.
UI1.0.1	Functional	The current game statistics shall include the team scores, individual scores, and individual player usernames.
UI1.1	Functional	The primary monitor shall display the gameboard.
UI1.2	Functional	The primary monitor shall display information on each player.
UI2.0	Functional	The secondary monitor shall display information about overall game statistics.
UI2.1	Constraint	Any high scores that are displayed shall only be that of a human player.
UI3.0	Functional	The game board shall be a shape that allows the game to be playable.
UI3.1	Constraint	The game board shall not be circular.
UI3.2	Constraint	The game board shall be two-dimensional.
UI4.0	Functional	The game board and player information shall be displayed left of the current game scoreboard.
UI5.0	Functional	The overall stats should display the ten highest accumulated scores by human players.
UI5.0.1	Functional	The top accumulated scores shall be separated by team, five for each team.
UI5.1	Functional	The overall stats shall display the five all-time highest word scores by human players.

3.1.2 Hardware interfaces

HI1.0	Constraint	The system must operate on a Intel Core i7-3770 CPU which runs at 3.40 GHZ on 8 cores.

HI2.0	Constraint	The system must work on a Gallium 0.4 on NVC1 graphics card.
HI3.0	Constraint	The system must not use more memory than is available on the computer.
HI4.0	Constraint	The data must not exceed the available storage on the hard drive.

3.1.3 Software interfaces

SI1.0	Constraint	The system must run on the Ubuntu 16.04 LTS operating system.
SI1.1	Constraint	The system must run on a 64-bit operating system.
SI2.0	Constraint	The system must work on the following browsers: Google Chrome, Mozilla Firefox, Internet Explorer, and Apple Safari.
SI2.0a	Quality	The browsers used to interact with the system must be to the most current version.
SI3.0	Constraint	The system must be tested on JUnit 5.

3.1.4 Communications interfaces

CI1.0	Constraint	The game must be accessible from mobile devices.
CI1.1	Functional	Mobile devices include smartphones, tablets, and laptops.
CI2.0	Constraint	Mobile devices must be able to communicate with the game via a wireless connection.
CI2.1	Functional	The user shall interact with the game via web browsers allowed in SI2.0.

3.2 Functional Requirements

3.2.1 Performance Requirements

3.2.2 Design Constraints

DC1.0	Constraint	The game shall only use the English language.
DC2.0	Constraint	A game must have four players.
DC2.1	Functional	Either four human players, four A.I. players, or some combination of both.
DC3.0	Functional	The game shall have an English word dictionary.
DC3.1	Constraint	The dictionary shall not contain any proper nouns.
DC3.2	Constraint	The dictionary shall not contain any word that includes suffixes, abbreviations, and prefixes, or any word that requires a hyphen or apostrophe.
DC3.2a	Constraint	The dictionary shall not include any word that requires a hyphen or apostrophe.
DC3.3	Functional	If a word does not exist in the chosen dictionary, it cannot be played.
DC3.3.1	Functional	All words formed from a tile being placed must exist in the chosen dictionary.
DC3.4	Constraint	Foreign words are not allowed to be placed on the board unless it is already in the dictionary described in DC3.0.

DC3.5	Constraint	There shall be no word deemed as profanity in the chosen dictionary.
DC4.0	Constraint	Each player will always start their turn with 7 tiles in their hand.
DC4.1	Functional	Each player's tiles should be visible to all other players.
DC5.0	Constraint	On their turn, a player must either add a new word to the board or replace existing tiles in their hand.
DC6.0	Constraint	The first player's word must cover the center space.
DC7.0	Constraint	All words played by any player must share at least one letter with an existing word on the board.
DC7.0a	Functional	Except for the first word played on the board; refer to DC6.0 for further constraints.
DC7.1	Functional	Words played horizontal must be read from left to right.
DC7.2	Functional	Words played vertically must be read from top to bottom.
DC8.0	Functional	Blank tiles can represent any letter, but award no points.
DC8.1	Functional	A blank tile already played, cannot change its assigned letter.
DC9.0	Functional	The teams will be: Green and Gold.
DC9.1	Constraint	Once a human player has been assigned a team, they are permanently on that team.
DC10.0	Functional	The game interface will display information pertinent to its human player.
DC10.1	Functional	Pertinent information includes, the gameboard and the player's tiles.
DC11.0	Functional	Each tile shall have a letter with a numeric value in one of the corners.
DC11.0.1	Quality	There must be design consistency between tiles.
DC11.1	Constraint	DC8.0 and DC8.1 are exempt from DC11.0
DC11.2	Constraint	The letter shall be bigger in print size than that of the numeric

		value.
DC12.0	Functional	On the game board, some spaces shall be allocated as multipliers.
DC13.0	Constraint	The game board must be significantly different from Hasbro's scrabble board.
DC13.1	Constraint	Point values of tiles must differ from the official Hasbro point distribution.

3.2.3 Software System Attributes

SA1.0	Functional	When a word is placed on the game board, the system shall search the word dictionary, upon submission, for validity in the chosen dictionary.
SA2.0	Functional	There will be a seperate dictionary representing Oswego oriented words.
SA2.1	Functional	A certain set of proper nouns shall be created that somehow reference SUNY Oswego; thus are to be exempt from Constraint DC3.1
SA2.2	Functional	A word referencing SUNY Oswego should receive a predetermined bonus to its score.
SA3.0	Functional	The sequence of players shall be determined randomly.
SA4.0	Functional	If a human player is inactive for a determined amount of time, replace them with an AI player.
SA5.0	Functional	Tiles used to form a word will be removed from that player's hand.
SA5.1	Functional	After a word is played, the player will receive random tiles until they have 7.
SA6.0	Functional	An equivalent amount of randomly selected tiles will replace the players hand at the end of their turn.
SA7.0	Functional	Tiles on the board will persist until the game is over.

SA8.0	Functional	Information on the player includes: current tiles, current score, player name.
SA9.0	Functional	Relevant statistics shall be determined by developers.
SA10.0	Functional	A playable space with a multiplier will have a combination of one number followed by a "W" or "L".
SA10.1	Functional	The "W" multiplier shall be applied to the summed value of the word or the 'whole word'.
SA10.2	Functional	The "L" multiplier shall be applied to the individual letter placed on that space.
SA10.3	Functional	If a word is placed upon multiple multipliers, the "L" multiplier(s) is applied first, followed by any "W" multiplier(s).
SA11.0	Functional	When a word is played by a player, the total points earned are from all the tile values added together; along with the multipliers.
SA12.0	Functional	Multiple word multipliers will be resolved multiplicatively.
SA12.1	Functional	The multiplier space counts only once towards the player's score.
SA13.0	Functional	Points shall be kept track of throughout the game session.
SA14.0	Functional	Spaces allocated as multipliers will be distributed as designed by each respective team.
SA15.0	Functional	There shall be a bag of tiles.
SA16.0	Functional	The value of each tile will be determined preemptively by the developers.
SA17.0	Functional	Any other letters connecting to the tiles placed will also be added into the total score; so long as the subsequent connecting letters form a dictionary accepted word.
SA18.0	Functional	The AI shall use an anagram generator when playing.
SA19.0	Functional	Any player can quit and or forfeit during the game at any time.
SA19.1	Functional	All players should be given the option to play again or quit.
SA20.0	Functional	Players should be able to temporarily switch teams.

SA20.1	Functional	This is an exception to DC9.1.
SA21.0	Constraints	The system shall inform the players of the rules of the game.

3.2.4 Other Requirements

OR1.0	Constraint	The chosen name of the game must be significantly different from "Scrabble".
OR2.0	Functional	The game shall end when there are no available moves.
OR2.1	Functional	There are no available moves if every space is filled.
OR2.2	Functional	There are no available moves if a player is unable to play at least one tile resulting in a valid word.
OR3.0	Functional	Each human player shall have a profile to track overall statistics.
OR3.1	Functional	If a human player does not have a profile, they shall be required to make one before playing.
OR3.2	Functional	The statistics tracked will be determined by the developers.
OR4.0	Functional	The player profile will be placed on a team.
OR5.0	Constraint	There will only be a single game session running at any given time.
OR6.0	Functional	The team with the the most points at the end state is deemed the winner.
OR7.0	Functional	After a game session ends, a new game session will begin.
OR8.0	Quality	Extra Rules may be added so long as they are deemed fun by the stakeholder.

Section 4 - System Scenarios:

4.1 Primary Scenarios

ID	Actor Action	System Response
S1	Player exchanges a number of tiles.	The system gives them random tiles until they have seven tiles.
S2	A human player joins the game.	The system prompts the user to create a profile or log in before placing them in the game.
S3	A human player elects to switch teams.	For one game session, the system tracks statistics as if the player is on the opposite team.
S4	A human player walks away from the game.	The system removes the player from the game, and the tiles in their hand are deleted from the game instance.
S5	A human player puts down a valid word.	The system calculates the value of the word, looks for any multiplier bonuses and adds the score to the players respective team. The score is then recorded in the database for statistical analysis.
S6	A human player puts down an invalid word.	The system prompts an error message indicating that the attempted word is invalid.
S7	The game ends.	The system records all relevant game statistics, prompts a "Gold team/Green team Wins" message, and starts a new game.

4.2 Alternative Scenarios

ID	Actor Action	System Response
A2	Human player decides to close the webpage.	The system replaces them with an AI player.
A3	A human player switches their phone from horizontal to vertical.	The system GUI changes from horizontal to vertical.
A4	A human player switches their phone from vertical to horizontal.	The system GUI changes from vertical to horizontal.
A5	A human player tries to play a word on top of another word.	The system prompts an error messaging indicating that the chosen spot is already taken.

Section 5 - System Goals:

5.1 System Goals

ID	Type	Goal
G1	Quality	The players will have an engaging and fun experience
G2	Quality	The statistics screen shall show accurate stats of players.
G3	Functional	The game will have a functional and beatable AI.
G4	Constraints	The UI shall be simple and easy to use.
G5	Quality	The game will have a catchy name.
G6	Quality	The system will use the two screens in an interesting and intuitive way.

G7	Quality	The system shall run smoothly with no game breaking bugs.
G8	Constraint	The system shall have a SUNY Oswego theme.
G9	Functional	The system shall be fair for all players.
G9.1	Functional	The game board will be evenly balanced for all players.
G10	Quality	The game shall feel rewarding to the players.
G11	Quality	The kiosk shall be visually appealing and inviting.
G12	Functional	Creating a new game shall be easy and fast to do.