

Addendum

The following are the additional requirements that Phoenix Games wishes the Klax game to have before it ships. Therefore, your design must incorporate these additional requirements.

High Score

Some user focus meetings that were conducted by Phoenix Games indicated a strong user desire to have feedback regarding the highest recorded score at a particular location.

Number Klax

These user focus meetings also highlighted the need for additional complexity with respect to the tiles. Therefore, we have decided to add numbers to the tiles and make that the primary matching condition for a klax instead of using the color.

Save Functionality

The user focus meetings have also emphasized that the pause functionality is not sufficient to meet the demands of the users. Therefore, they would like the ability to save their current game and come back to the game later.

Additional Functional Requirements

A.1.High Score

- A.1.1. The high score information should be stored
 - A.1.1.1....such that from one invocation of the game to the next
 - A.1.1.1.1. ...the data is persistent
 - A.1.1.1.2. ...is not lost on power outages or reboots.
 - A.1.1.2....with the following attributes
 - A.1.1.2.1. Numeric non-negative score
 - A.1.1.2.2. Three alphabetical letter sequence
 - A.1.1.2.3. Timestamp indicating when the high score was received
 - A.1.1.3.If there is no high score information available or the data is corrupted, the high score information should read as:
 - A.1.1.3.1. Score of 0.
 - A.1.1.3.2. Three letter sequence of AAA
 - A.1.1.3.3. Current date
- A.1.2. The high score information should be displayed
 - A.1.2.1....on the main window.
 - A.1.2.2....underneath the number of lives remaining.
 - A.1.2.3....unless otherwise specified, all attributes of the high score should be displayed
 - A.1.2.3.1. ...in white text
 - A.1.2.3.2. ...using Helvetica font
 - A.1.2.3.3. ...with a point size of 18
 - A.1.2.4....numerically
 - A.1.2.4.1. ...without negative numbers
 - A.1.2.4.2. ...with whole numbers only
 - A.1.2.4.3. ...with commas separating every three digits
 - A.1.2.5....with a label

- A.1.2.5.1. ...stating “High score”
- A.1.2.5.2. ...located on the same row as described in A.1.2.4 on page 6
- A.1.2.5.3. ...located to the immediate left of the high score as described in A.1.2.4 on page 6
- A.1.2.6....with a designation indicating the user
 - A.1.2.6.1. ...consisting of three letters
 - A.1.2.6.2. ...with all letters uppercase
 - A.1.2.6.3. ...representing the highest score
 - A.1.2.6.4. ...to the immediate right of the high score number as described in A.1.2.4 on page 6.
- A.1.3. The high score information should be updated
 - A.1.3.1. only when all of the following apply:
 - A.1.3.1.1. The number of lives left is zero
 - A.1.3.1.2. The current score is greater than the last highest score recorded
- A.1.4. When A.1.3 on page 7 is satisfied, a prompt should be displayed to the user
 - A.1.4.1....saying “Congratulations! You have earned a new high score. Please enter your initials.”
 - A.1.4.2....asking for the user to input a three letter sequence
 - A.1.4.3....any input other than alphabetical characters should be ignored
 - A.1.4.4....any input longer than three alphabetical characters should be truncated.
 - A.1.4.5....with an OK button
 - A.1.4.5.1. When pressed, provided the requirements of A.1.4.2 on page 7, A.1.4.3 on page 7, A.1.4.4 on page 7 are satisfied, the high score information is saved on disk pursuant to the requirements given in A.1.1 on page 6.
 - A.1.4.6....with a Cancel button
 - A.1.4.6.1. When pressed, the high score information is not updated.

A.2.Number Klax

- A.2.1. The *target number* is determined
 - A.2.1.1....when the Start Button is pushed
 - A.2.1.2....pseudo-randomly
 - A.2.1.2.1. ...from the possibilities of 2, 3, 5, and 7
 - A.2.1.3....does not change during the life of an individual game.
- A.2.2. Achieving a Klax
 - A.2.2.1.Tiles must be arranged in one of the following contiguous patterns:
 - A.2.2.1.1. vertical
 - A.2.2.1.2. horizontal
 - A.2.2.1.3. diagonal
 - A.2.2.2.Three or more tiles must be arranged pursuant to A.2.2.1 on page 7.
 - A.2.2.3.The numbers associated with a tile must add up to any multiple of the *target number* as described in A.2.1 on page 7.
 - A.2.2.3.1. This supercedes the color matching requirement.
- A.2.3. Scoring a Klax
 - A.2.3.1.The formula is: $(base\ value) * (additional\ tiles) * (factor) * (color\ multiplier) * (bonus\ multiplier)$
 - A.2.3.2.Based on the direction of the klax, the *base value* is awarded as:
 - A.2.3.2.1. Horizontal receives 1,000 points

- A.2.3.2.2. Vertical receives 50 points
- A.2.3.2.3. Diagonal receives 5,000 points
- A.2.3.3. The *additional tiles* is awarded according to how many tiles (above 3) are involved.
 - A.2.3.3.1. Pursuant to A.2.2.2 on page 7, if only three tiles are involved in the klax, the additional tiles factor is 1.
- A.2.3.4. The *factor multiplier* is how many times the *target number* from A.2.3.3 on page 8 can be evenly divided by the total sum of the klax.
- A.2.3.5. The *color multiplier* is
 - A.2.3.5.1. ...only in effect when all tiles involved with a klax are the same color.
 - A.2.3.5.2. ...set to 5 when A.2.3.5.1 on page 8 applies.
- A.2.3.6. The *bonus multiplier* is set as:
 - A.2.3.6.1. For each klax achieved, the *bonus multiplier* is increased by 1.
 - A.2.3.6.2. The initial value upon startup is 1.
 - A.2.3.6.3. When a life is lost, the value is reset to 1.
- A.2.4. Tiles should additionally
 - A.2.4.1....have a numerical property
 - A.2.4.1.1. ...in the range from 1-9, inclusive.
 - A.2.4.1.2. ...generated pseudo-randomly for each tile when it initially appears.
 - A.2.4.1.3. ...that remains the same once the tile appears on screen.
 - A.2.4.2....display the associated number
 - A.2.4.2.1. ...in white text
 - A.2.4.2.2. ...using Helvetica font
 - A.2.4.2.3. ...with an appropriate point size
- A.2.5. The target number is displayed to the user
 - A.2.5.1....on the main window
 - A.2.5.2....above the current score
 - A.2.5.3....unless otherwise specified, all attributes of the target number should be displayed
 - A.2.5.3.1. ...in white text
 - A.2.5.3.2. ...using Helvetica font
 - A.2.5.3.3. ...with a point size of 18
 - A.2.5.4....numerically
 - A.2.5.4.1. ...without negative numbers
 - A.2.5.4.2. ...with whole numbers only
 - A.2.5.5....with a label
 - A.2.5.5.1. ...stating “Target Number”
 - A.2.5.5.2. ...located on the same row as described in A.2.5.4 on page 8
 - A.2.5.5.3. ...located to the immediate left of the high score as described in A.2.5.4 on page 8

A.3. Save and Restore Functionality

- A.3.1. The *game state* shall be defined with respect to:
 - A.3.1.1....the *tiles*
 - A.3.1.1.1. The number of *tiles* visible
 - A.3.1.1.2. The properties of the *tile*, pursuant to A.2.4 on page 8 and previous specifications.

- A.3.1.2....the *palette*
 - A.3.1.2.1. The current chute position of the *palette*.
 - A.3.1.2.2. The number of *tiles* stored on the *palette*, referring to A.3.1.1 on page 8 as necessary.
 - A.3.1.2.3. The ordering of *tiles* stored on the *palette*, referring to A.3.1.1 on page 8 as necessary.
- A.3.1.3....the *chute*
 - A.3.1.3.1. The location of a *tile* (if any) in the *chute*, referring to A.3.1.1 on page 8 as necessary.
- A.3.1.4....the *well*
 - A.3.1.4.1. The location of a *tile* (if any) in each of the *well* positions, referring to A.3.1.1 on page 8 as necessary.
- A.3.1.5....the number of *lives* remaining
- A.3.1.6....the accumulated *score*
- A.3.2. All existing buttons and those as described in A.3.3 on page 9 and as described in A.3.4 on page 9 should be amended as follows:
 - A.3.2.1....to have a width of 40 pixels
 - A.3.2.2....to have a height of 60 pixels
 - A.3.2.3....to have a blue foreground
 - A.3.2.4....to have a white background
- A.3.3. A new button (“Load”) should be added:
 - A.3.3.1....that reads “Load”
 - A.3.3.2....that is located immediately to the right of the “Pause” button with suitable padding.
 - A.3.3.3....that is located at the same vertical position as the “Pause” button.
- A.3.4. A new button (“Save”) should be added:
 - A.3.4.1....that reads “Save”
 - A.3.4.2....that is located immediately to the right of the button as described in A.3.3 on page 9 with suitable padding.
 - A.3.4.3....that is located at the same vertical position as the “Pause” button.
- A.3.5. When the button as described in A.3.3 on page 9 (“Load”) is activated:
 - A.3.5.1.If a game is currently in progress, this button should have no effect.
 - A.3.5.2.Otherwise, the following specifications in this section should apply.
 - A.3.5.3.The *game state* as described in A.3.1 on page 8 should be retrieved on disk.
 - A.3.5.3.1. The location of the previously saved should be determined by a standard File dialog prompt.
 - A.3.5.3.2. Upon the OK button being closed with the valid selection of a file, the *game state* should be loaded from the specified file.
 - A.3.5.3.3. If the Cancel button is pressed or no selection is made, the *game state* should not be loaded and no side effects should be observed as described in A.3.5.1 on page 9.
 - A.3.5.4.If there is an error restoring the *game state*,
 - A.3.5.4.1. ...then an error message dialog should appear with the message “Load Unsuccessful!”
 - A.3.5.4.2. Upon acknowledgement of the error message, no side effects should be observed as described in A.3.5.1 on page 9.

- A.3.5.5.If there is no error restoring the *game state*,
 - A.3.5.5.1. ...then an OK (only) dialog should appear with the message “Load Successful”
 - A.3.5.5.2. upon the OK button being closed, the game should resume at the now-restored *game state*.
- A.3.6. When the button as described in A.3.4 on page 9 (“Save”) is activated:
 - A.3.6.1.If no game is currently in progress, this button should have no effect.
 - A.3.6.2.Otherwise, the following specifications in this section should apply.
 - A.3.6.3.The information as described in A.3.1 on page 8 should be stored on disk.
 - A.3.6.3.1. The location of the save file should be determined by a standard File dialog prompt.
 - A.3.6.3.2. Upon the OK button being closed with the valid selection of a file, the game state should be saved to the specified file.
 - A.3.6.3.3. If the Cancel button is pressed or no selection is made, the game state should not be saved and the game should continue normally.
 - A.3.6.4.If there is an error saving the *game state*,
 - A.3.6.4.1. ...then an error message dialog should appear with the message “Save Unsuccessful!”
 - A.3.6.4.2. Upon acknowledgement of the error message, the game should continue.
 - A.3.6.5.If there is no error saving the *game state*,
 - A.3.6.5.1. ...then an OK (only) dialog should appear with the message “Save Successful”
 - A.3.6.5.2. upon the OK button being closed, the game should quit (refer to previous specification).