Advanced Programming Report

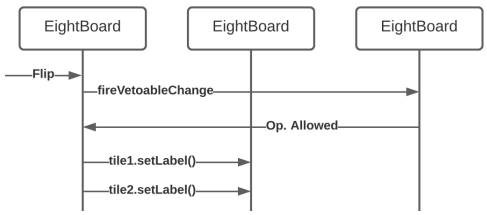
July 14, 2023

1 The 8 Puzzle

As requested in the project, the solution provides three classes:

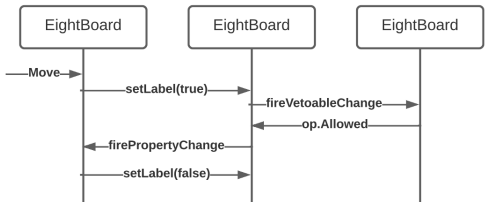
- EightBoard, which provides the dashboard for the game. It implements PropertyChangeSupport because it listens to the propertyChange of the EightTile and it has also a PropertyChangeSupport in order to fire to EightController the property change of the hole when the restart button is pushed.
- EightTile, the bean that represents a tile of the game. It extends JButton and it has a PropertyChangeSupport to fire to EightBoard that the operation of tiles move is allowed.
- EightController, the bean that checks if the operations are allowed. It implements both VetoableChange and PropertyChange. The method VetoableChange checks if the operations are allowed. In particular, it checks the "move" and the flip operation. If the operation is not allowed then throw a PropertyVetoException with a message.

1.1 Flip Operation



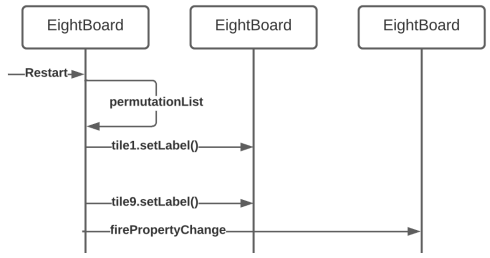
In the diagram above it's possible to see how the classes interact with each other in order to perform the flip operation. First of all, the Flip button is pressed then it triggers the action performed function of the button. Then the function does a fireVetoableChange in order to ask permission to EightController to flip the tiles. If the operation is allowed (as in the figure) then the EightBoard sets the label of the first two tiles with the method setLabel.

1.2 Move Operation



In the diagram above it's possible to see how the beans interact in order to perform a "move" operation. When a tile button is pushed it triggers the action performed by that tile that calls the setLabel(9, true). As designed setLabel takes two parameters: the new label value and a boolean value that indicates if it requires the EightController approbation or not.
So the EightTile ask to EightController if the operation is allowed. Assuming that the operation can be done, the EightTile set the label and fire property change to EightBoard in order to swap the old hole tile with the tile clicked. Then the EightBoard send a new setLabel with the approbation flag to false and the old label of the new hole.

1.3 Restart Operation



The figure above shows how beans interact in order to restart the game. When the restart button is pushed it triggers the perform action of the button that first of all calls the function permutationList that returns a permutation of a list that contains the value from 1 to 9. After that, the EightBoard set the label of all the tiles with the values returned by the permutationList function. Finally, the EightBoard needs to communicate the new hole position to the EightController in order to have the last updated value. In order to do that the EightBoard fire the property change and the EightController set its value.