Ingenious Game RFP

Advanced Object Oriented Design

Gerb

# Overview

An application that plays the game Ingenious.

# Initial Screen

When the application opens up, it offers a screen with four sets of 3 radio buttons. Each set corresponds to four possible players. On the bottom of the screen is a button labeled “Play” and another labeled “Exit”. Play launches the game as long as there are at least two players chosen (otherwise a pop-up window informs the player of the problem). Exit exits the game. The options for each player are:

**None**: Meaning this player is not playing.

**Human**: Selecting this option activates a text box allowing the human to enter a name. The default (erased immediately when something is entered) is player <#> where <#> is 1, 2, 3, or 4.

**Computer**: Selecting this option activates a menu which allows selection of a computer strategy from a series of options. Your delivery version will include at least two computer strategies.

The default configuration of the screen will have a single human player and three computer players that are the most expert.

# Game Screen

Once the game starts, the game screen will be presented. It will have three parts to it:

**The Board**: Displays the game board, including all the pieces that have been played.

**Scores**: The scores of all four players. The score of the player, who is currently playing, will be highlighted.

**Tiles**: The available tiles of the player whose turn it is.

When it is a human player’s turn, the human player is given a way to choose a tile and a place to play it. If a player clicks on a tile to play, it becomes “attached” to the mouse: the tile moves with the mouse. When the tile hovers over a position on the board, the place it is played will be highlighted in some way and the number and color of the points available are displayed. There needs to be a way the tile can be rotated using the mouse and a way the tile can be placed on the board or returned to the player’s hand if the player decides not to play it. These actions should require a minimum number of mouse clicks. After the player’s turn, if the option to trade in the entire hand is available, a pop-up dialog will ask the player whether or not to empty the hand.

When it is a computer player’s turn, the computer’s tile is placed on the board with a series of “blinks” to make it easy to spot.

When a tile is placed, the score for that player is updated. If the player is given an additional tile from completing a row, the player remains on turn to play an additional tile. Once the turn is over, the player’s hand is replenished so that it has the necessary number of tiles. If the game is over, a pop-up window informs the user and lists the scores in decreasing order. When the window is dismissed, a New Game button is activated that returns the user to the initial screen.

# API

One of the deliverables of this project is a description of the computer strategy API. It should allow creation of classes that implement a specific Java interface to easily create a new computer strategy. The API should specify how a computer player will be informed of the hand, the state of the board, and the scores, and how decisions are communicated on what tile to play where and with what orientation, and whether to empty the hand.

# Computer Strategies

At least two strategies should be provided. One will simply be a “greedy algorithm”, choosing the placement that most improves the players scores. The second will also take into account how much more the next opponent’s score would improve if the best possible tile were optimally placed.

# Strategy Analyzer

If all players are computer players, the game is assumed to be run in strategy analysis mode. When the Play button is pressed, a pop-up window asks the user to enter how many games will be played and whether it will run using *fast* mode, where the board is not shown and the results of games are computed without screen updates, or *slow* mode, where all the moves occur on the game board as if a human were also playing. After the stage analysis is run, each strategy is listed on a pop-up window with the number of games it has won.