Squeeze-It Game

Project Description

Zhang Wei and Ahmad Aseeri

1 Introduction

The game is built in a graphical user interface form by Java aiming to be make it more interactive and enjoyable to play with. The user plays against the computer and wins if he can first eliminate (squeeze) all computer's marbles, or loses otherwise. Figure 1 illustrates the initial board configuration.
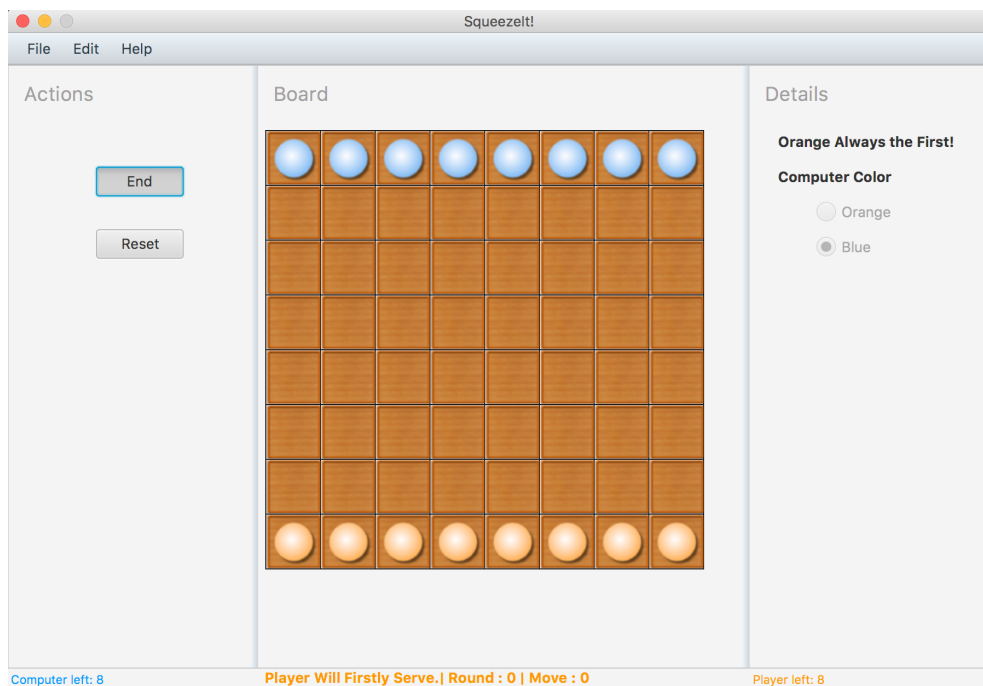

Figure 1: Squeeze it Interface!

2 How to play

There are two types of marbles: blue and orange. We fixed the orange marble to be the starting one so the user may choose the orange to play with or set it as the computer

color. Every player has 50 moves so it is important to manage every movement wisely. The reset of the game rounds should follow easily as the program will control any violated movement according to the game's rules. The below figures 2-5 illustrate the first round of this game.
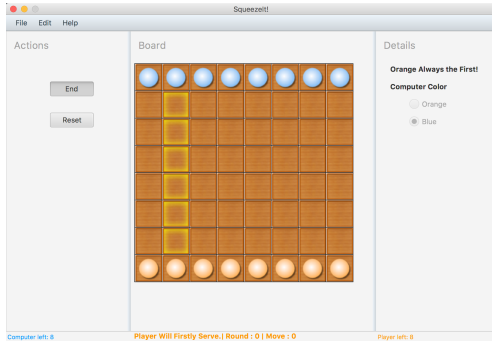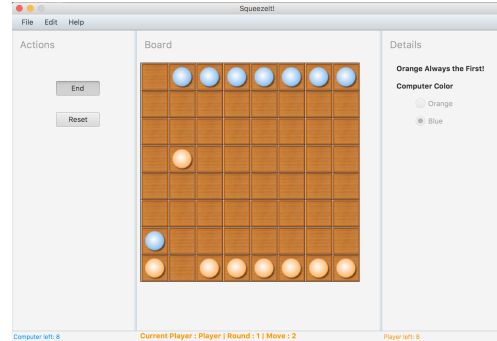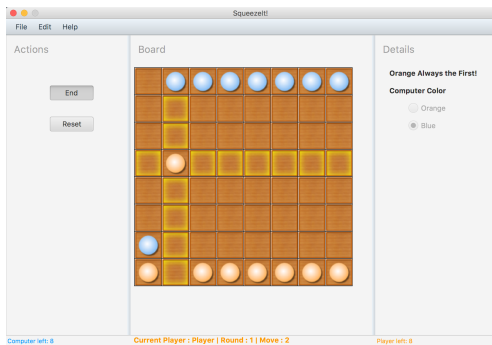

Figure 2: (a)
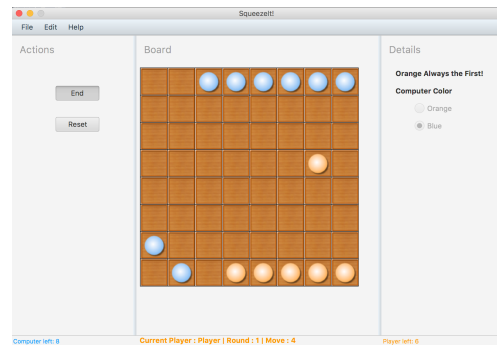

Figure 3: (b)

Figure 4: (c)

Figure 5: (d)

the application controls the possible movement for each player whether vertically and horizontally by highlighting the possible path for each player.

2.1 Pattern Types

The player's goal is to maximize his marbles and minimize the opponent's marbles on the current board configuration as much as possible. The most valuable pattern is similar to what is illustrated below in figure 6.

Figure 6: The pattern with the largest consecutive balls is desired

The other possible pattern is when the player completes his consecutive marbles which causes eliminating two marbles only, as illustrated in figure 7.

Figure 7: The type of pattern causes to squeeze two marbles.

2.2 Game Rules

- The basic rule of the game is that each player can move either horizontally or vertically by any number of steps on the highlighted path.

- Whenever a pattern is formed, the player who most recently forms this pattern will eliminate the opponent's marbles appeared in this pattern.

- Within the specified maximum number of moves, the player who has the most remaining marbles wins.

3 Game Heuristic Evaluation

In general, the game evaluation will be based on the status of current board configuration. There are two types of heuristic evaluations:

1. **Pattern-based Move Generator:**

    (i) Start from each pattern on the current board configuration.
    (ii) Find the moves that can achieve an elimination, or
    (iii) Find the moves the can avoid to be eliminated.

2. **Global Move Generator:**

    (i) Find out every possible move on the current board configuration.
    (ii) Collect those moves that can create a pattern no matter what type of patterns they are (complete gap, incomplete gap).
    (iii) Sort them according to their pattern score (The function for calculating the score will be discussed in 3.1)
    (iv) Therefore, find the move that gives us the pattern with the maximum eliminating score (it will be the best move).

3.1 Elimination Rating

1. **Threatening Score T_c:**

   $T_c = ($The maximum number of opponent's marbles that this pattern could possibly eliminate $+$ The weight of the pattern type$) \times 100$

2. **Global-Eliminating Score G_c:**

   Simply, when reaching to the search depth (3 by default), carry out the global elimination.

4 Source Code

You can visit our source code repository by clicking <u>here</u>.