Five In a Row

Instructor: Eric Walkingshaw
Oregon State University
Xu, Zheng (zhengxu) Tien-Lung,Chang (changti)

1. Introduction

Our project is to implement board game called “Five in a Row” (which is also known as “Gomoku” in Japanese). It is a two players game that is suitable for all ages. The principle for this game is the first player who make a coherently sequence of five stones will win the game. The sequence can be vertically, horizontally or diagonally. The user can choose to play against another user or the A.I.. The program will check if there is a winner at the end of every turn. Although there are many people different kinds of version of “Five in a Row”, most of the people implement it in a other programming language. The difference between our game and others is the language we are using is Haskell, which is a more elegant and simplify programming language. That is, the pattern and flow will be more clearly than other and also more efficiently.

2. Implementation

To implement the game “Five in a Row”, we define couple data types and functions to realize our idea.

2.1 *Types*

There are three main data type, Cell, Player and Board in our game.

The Cell data type represents the state of the stone. The Cell can be “Black”, “White” or “Blank”. In the initial state, all the Cell will be “Blank”. As the game start, the first player will use the “Black” stone as a mark for the position that he input and the second player will be “White”. The data type is shown below:

```
data Cell = Black
          | White
          | Blank
```

The Player data type represents the player. If we choose to play with real person, each round the player will be either First player or Second player. If we choose to play with A.I., each round the player will be AI or PlayerAI. The data type is shown below:

```
data Player = First
            | Second
            | AI
            | PlayerAI
```

The Board data type represents the board. The data type is shown below:

```
data Board a = Board [[a]]
```

2.2 *Functions*
There are six main function in our game, showBoard, updateBoard, checkFive, isGood, playerHelpe and gameLoop.

showBoard: The function for showBoard is to print out the current statement of the board. We will show the current status of the board every game round, so that the player can player the game much easier.

updateBoard: The function for updateBoard is to update the board every turn. After the player put a stone on the board, the updateBoard function will update the current board.

checkFive: The function for checkFive is to check if one of the player wins the game at the end of every turn.

isGood: The function for isGood is to check whether the input position is valid or not. If the position is not blank then the position is invalid.

playerHelper: The function for playerHelper is a high-order function that help to identify the player for several functions. We have several function to modify the state of player and cell. The higher order function can help us to get a more clear and well organized function.

gameLoop: the function for gameLoop is the main function to control the logic of whole game. It will help the game continues running in a correct way.

Design description