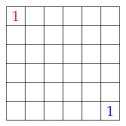## Sequencium

Walter Joris is a prolific composer of pencil and paper games. Some of these were recently highlighted in Math with Bad Drawings including *Sequencium* which is the subject of this étude. Here's a brief description of the standard form for *Sequencium*.

Play takes place between two players, Red and Blue on a 6×6 board. Initially, there is a blue 1 in the lower right corner of the board and a red 1 in the upper left corner.

1					
					1

The players alternate turns and, in each turn can write a number of their own colour onto an empty square of the grid which must be adjacent to another square containing a number of their colour (vertically, horizontally, or diagonally). The number they write down can be at most one greater than the largest number written in a neighbouring cell of their colour. If a player has no legal move they must pass (their opponent can continue). The player who writes down the largest number wins (if the highest numbers for both players are the same, the game is a draw). A partially-completed game is shown below:

1					
	2	6	7	5	
	6	3	5	4	
	5	4	3	6	
	5	4		2	
					1

You need to develop a program that chooses a move in a *Sequencium* position.

Evaluation

What's the goal of your *Sequencium* player? To win as often as possible? To score as highly as possible? To achieve the maximum possible winning margin? You need to know the answer to those questions in order to design a good algorithm for playing.

Your agents will be evaluated against one another in a tournament where the winning player gains a number of points equal to their highest cell number and the losing player

loses that number of points. If you like, the agents are gambling and the outcome is that the loser must pay the winner's score to the winner. Obviously, this prioritises scoring more strongly than just winning (though scoring highly all the time while losing is the worst of all possible worlds!)

The main tournament will be played on the standard 6×6 grid, but side tournaments will be carried out between the agents on other grid sizes (always rectangular).

Task

- Choose a team name.

- Keep and submit a project diary. This should be a PDF file which informally documents your work (it could well include, e.g., scanned handwritten notes and comments like "Stuck because of a bug in Michael's tournament framework".)

- Submit one or more Java implementations of the `sequencium.Player` interface. The name of your implementation should be `TeamName.java` (with the obvious substitution!) and it should be part of the `seqtournament` package.

- Submit a short formal report (from one to two sides of A4 at 10 to 12 point size for the body text, slightly longer if you include illustrations as you should) that explains your strategy and the processes you used to come up with it. Think of this as a sales pitch to a client who is not only interested in the direct comparisons between competing versions of the current product, but of evidence about good processes for future projects.

Relates to Objectives

1.1, 1.2, 2.1, 2.2, 2.7, 2.9, 3.4, 4.1, 4.2, 4.3, 4.7, 4.8.

(Group)