Exercise 4 - TDT4136

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Our custum algorithm

We have choosen to show the first task in the exercise. The egg cartoon puzzle.

Representation

We chose a simple representation for our algorithm with basic console output. This was the make the main resources avaliable for solving the algorithm itself. We colour the output so it is easier to see where the eggs are located.

Objective function

Our objective function checks for the validity of the board. If the board is valid then it calculates the score given by the number of eggs located on the board.

Neighbour generation

We generate neighbours by shuffling the row/column where there is more than the max amount eggs on the same column/row. This works quite well for the first three problems, but for the last one (m=n=10, k=3) it takes a very long time, sometimes it will run indefinetly, to find an optimal solution. At any rate, we managed to find an optimal solutions for that problem as well as posted under.

Further improvement sugestions are to do the same on the diagonals. We could also try different implementations for the neighbour algorithm but we are so far unable to find a generation method that improves our result.

Printed results

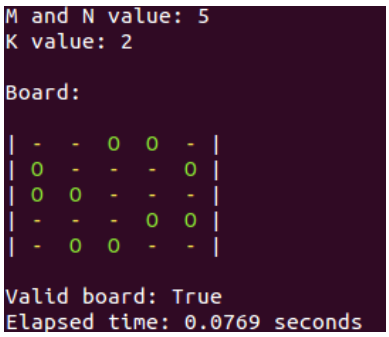

Figure 1: Optimal solution for a 5x5 board with k=2

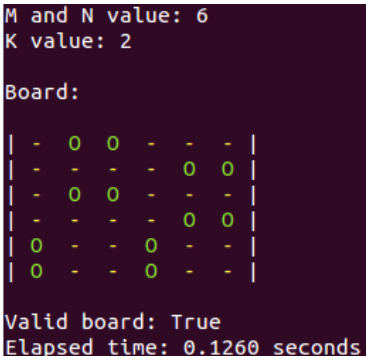

Figure 2: Optimal solution for a 6x6 board with k=2

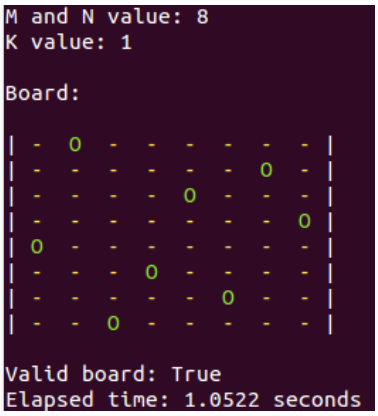

Figure 3: Optimal solution for a 8x8 board with k=1

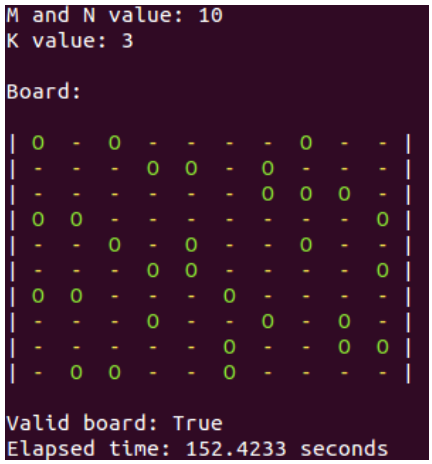

Figure 4: Optimal solution for a 10x10 board with k=3

Heuristic- vs Objective functions

Objective functions measures a given state compared to the optimal state, so that a set of states can be compared to each other. It works on complete solutions, or states. This makes it possible to constantly choose the better state. It is a guidance for an algorithm to get closer and closer to an optimal solution.

An heuristic function on the other hand, is used on incomplete solutions, where it looks at the solutions cost so far, and the remaining cost.