Report

Homework exercise 3

TDT 4136 - Logical and resonating systems

Rune Holmgren

## Task 1:

The source code is attached to the delivery in it’s learning.

## Task 2:

The egg carton is represented by a simple 2-dimentional array of boolean values. An egg is represented as a true, and an empty slot is represented as a false.

The neighbor generation is done by flipping one cell ( true 🡪 false, false 🡪 true). That way each state will have height x width children. I found that to be a sufficient neighbor generation routine.

The objective function works by counting the eggs and giving a value based on the number of eggs. Too many or too few eggs will result in a reduced function value. It also counts the eggs in each column, row and diagonal and reduces the score based on the number of extra eggs found in each one of them.

## Task 3:

**Here is the solutions to the egg carton puzzle, copied from my program output.**

Found an optimal solution! Search depth: 9

+ - - - - - +

| ' ' O ' O |

| O O ' ' ' |

| ' ' O O ' |

| O ' ' ' O |

| ' O ' O ' |

+ - - - - - +

This is the solution found with M=5, N=5, K=2

Found an optimal solution! Search depth: 83

+ - - - - - - +

| ' ' O O ' ' |

| O ' ' ' O ' |

| O ' ' ' O ' |

| ' O ' O ' ' |

| ' O ' ' ' O |

| ' ' O ' ' O |

+ - - - - - - +

This is the solution found with M=6, N=6, K=2

Found an optimal solution! Search depth: 565

+ - - - - - - - - +

| ' ' ' O ' ' ' ' |

| ' ' ' ' ' O ' ' |

| ' ' ' ' ' ' ' O |

| ' ' O ' ' ' ' ' |

| O ' ' ' ' ' ' ' |

| ' ' ' ' ' ' O ' |

| ' ' ' ' O ' ' ' |

| ' O ' ' ' ' ' ' |

+ - - - - - - - - +

This is the solution found with M=8, N=8, K=1

Found an optimal solution! Search depth: 443

+ - - - - - - - - - - +

| ' ' ' O ' ' O ' ' O |

| O ' ' ' ' ' ' O O ' |

| ' ' ' O O O ' ' ' ' |

| ' O ' ' ' ' ' ' O O |

| O ' ' O ' ' ' ' O ' |

| ' ' O ' ' ' O O ' ' |

| O ' O ' ' ' ' ' ' O |

| ' O ' ' O ' ' O ' ' |

| ' ' O ' ' O O ' ' ' |

| ' O ' ' O O ' ' ' ' |

+ - - - - - - - - - - +

This is the solution found with M=10, N=10, K=3

## Task 4:

A heuristic function evaluates how good the path in your search is looking, with regards to both how close to the goal you appear to be and how hard it was getting to where you are in the search. It will guide the search in such a way that you will find a good path from your starting position to the goal. It is supposed to be used in cases where the goal is known or we have a clear idea of what the goal state look like.

The objective function only evaluates the state the search is currently in. It evaluates how close to a goal state the current state is. It helps the search in find a solution, but it’s not necessarily the closest one to the starting position. It can also find a non-optimal solution and abandon the search if it run out of time. It is supposed to be used in cases where the goal have certain properties that is hard to match, and we do not know what the goal itself look like.