N-Queens Configuration Project

Intelligent Systems Programming 2014

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Introduction

Implementation

Building the BDD

Adding the rules for the problem

Inserting a queen

Whenever a queen is inserted, we restrict the overall BDD with the BDD of the position of the newly inserted queen being true. After we have restricted the overall BDD, we update the game board by getting the valid positions of the board (described below) and closing the positions that are not valid.

Getting the valid positions

A valid position on the board is a position that does not contain a queen and would not lead to a unsatisfiable solution if a queen was placed there.

We calculate the valid positions of the board by iterating over every position on the board and attempting to place a queen on that position by restricting that position to true. If the restricted BDD is not zero (false), then that position is valid.

Conclusion

We conclude that we have successfully implemented the N-Queens configurator using the supplied BDD package. We have tested our solution on board sizes 1-12. The configurator offers no solutions on sizes 2-4 (as there are none for the Queens problem). On our machines, the configurator runs at an acceptable speed.