

Assignment/Coursework part 1: Implementing Depth-First Search to solve the NQueens problem

This task assesses the learning outcome: "Design and implement a range of different search methods".

Description of first few steps through the while loop

- the open list should have all the partial solutions on it that you have generated (because they were children of the working candidate solution you were considering at the time) but have not fully examined yet
- So the things on the open list might have different numbers of queens defined - I'll use curly brackets to show this below - of course that's not quite how they look in c

What it looks like step-by-step

Let's say you start by putting a queen in column 0

So you put {0} onto the open list - in other words you make the appropriate changes to the working candidate and then copy that into the open list.

Then you go into your while loop

On the first time around you move (copy then remove) the only thing off the list - which is {0} - leaving the list empty.

This partial solution is fine so you make its children and put them all on the list.

So at the end of the first time through the loop the open list contains {00} {01} {02} {03} {04} {05} {06} {07}

On the second time around you move the last thing off the list which is {07}.

{07} is fine, so you make its children and put them on open list.

So at the end of the second time through the loop your open list contains

{00} {01} {02} {03} {04} {05} {06} {070} {071} {072} {073} {074} {075} {076} {077}

On the third time around the loop you move the last thing off the list which is {077}

But this time the last two queens are vulnerable - in other words you have got to a dead end - there is no point exploring this further.

So you don't make the children and put them on the open list. -

Thus at the end of the third time around the while loop the open list contains

{00} {01} {02} {03} {04} {05} {06} {070} {071} {072} {073} {074} {075} {076}

(This is effectively back-tracking out from the {077} dead-end)

and so on

4th time around you take off 076 which also has vulnerable queens

5th time around you take off 075 which is ok, so you make its children and add them to the list