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ITCS - 6150 Intelligent Systems
Project Topic - NQueen Puzzle

Problem Statement :-

Write a program which solves N queens puzzle (8 < N < 13).
Input: N;
Output: N x N Boolean array with 1's showing final position of queens. Your program should use heuristics minimizing the search space.

Introduction:

N queens problem is the problem of placing N number of queens on a chess board such that no queen attacks the another. The queens are placed on a NxN chess board such that no conflict takes place between each of the queen.

Algorithm: -
This project demonstrates N-Queen puzzle solution using Hill Climbing algorithm.

Hill Climbing is an iterative algorithm which solves the problem by incremental approach. It goes on finding new values based on the current position until the best goal is achieved. It always finds what improvements can be done in the existing solution.

Technologies used:-

Programming language :- Java
IDE :- Eclips

Program Structure and Flow:

Input :- N, The number 'N' should be in between the range of 8 to 13 such that 8<N<13 as per the problem statement.

Processing : - Calculating heuristic value for the of the states i.e. positions of queen of the board. Program calculates huritic value until minimum heuristic is achieved.

Output :- Board of size provided by user as 'N', with 1's showing placement of queens using Hill Climbing algorithm, where placement is in such a way that no queen is attacking other queen.

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Screenshot of the output:

```
Enter the size of board
10
0 0 0 0 1 0 0 0 0 0
0 0 0 0 0 0 0 1 0 0
0 0 0 0 0 1 0 0 0 0
0 0 1 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1
0 1 0 0 0 0 0 0 0 0
0 0 0 0 0 0 1 0 0 0
0 0 0 0 0 0 0 0 1 0
0 0 0 1 0 0 0 0 0 0
1 0 0 0 0 0 0 0 0 0
```

References :-

- Artificial Intelligence a modern approach 3rd edition topic 4.1.1
- https://www.youtube.com/watch?v=vEpPMIiTSDI