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CSC 220

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Knight’s Tour Discussion

**What is the problem?**

Given an empty 5x5 chessboard, find a path for the knight that visits every square exactly once using the backtracking algorithm.

**What is backtracking algorithm?**

Backtracking algorithm is a way to try any subsequent given paths until a solution is found else back track to the previous point and retry a different path.

**How the program is implemented?**

The program starts by defining a 5x5 board using a 5x5 matrix. The matrix is initialized with zero value indicating that the position is not yet visited. Once the position is visited by the knight, the move number will be recorded.

All eight possible moves for the knight from its current position (delta indexes relative to the current indexes) are also defined.

The program starts by picking a random position on the board for the knight to start moving for different trials.

The algorithm will iterate through all possible moves for the knight from its current position by doing the following steps.

1. Find all possible moves for the knight from the current position.
2. Try to move to a specified position and check if the board is filled to finish the algorithm.
3. If the board is not filled, find all possible next legal moves.
4. If there are any legal moves for the knight, repeat Step 2 until there is a solution.
5. If no legal moves, then backtrack to erase the move and restore to previous setting

**Generally how well does it do?**

Depending on the knight’s starting position from the random generator, the result will either have a solution or no solution. Not every starting position has a solution because of the constraints on the given rule of the knight’s legal moves. If the solution exists for that position, the backtracking algorithm will guarantee to find it.