

8.11. The Knight's Tour Problem

Another classic problem that we can use to illustrate a second common graph algorithm is called the “knight’s tour.” The knight’s tour puzzle is played on a chess board with a single chess piece, the knight. The object of the puzzle is to find a sequence of moves that allow the knight to visit every square on the board exactly once. One such sequence is called a “tour.” The knight’s tour puzzle has fascinated chess players, mathematicians and computer scientists alike for many years. The upper bound on the number of possible legal tours for an eight-by-eight chessboard is known to be 1.305×10^{35} ; however, there are even more possible dead ends. Clearly this is a problem that requires some real brains, some real computing power, or both.

Although researchers have studied many different algorithms to solve the knight’s tour problem, a graph search is one of the easiest to understand and program. Once again we will solve the problem using two main steps:

- Represent the legal moves of a knight on a chessboard as a graph.
- Use a graph algorithm to find a path of length $rows \times columns - 1$ where every vertex on the graph is visited exactly once.

You have attempted 1 of 1 activities on this page

user not logged in

