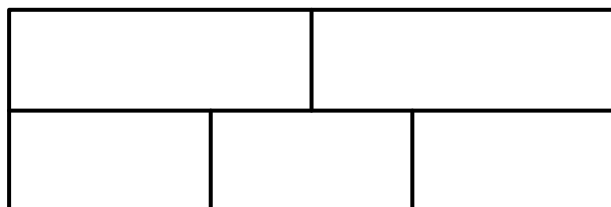




Circuits and Tours—questions

1.



Explain why it is not possible to copy this drawing of a brick wall in one continuous stroke without taking your pencil from the paper, so that no line is traced more than once.

What is the smallest possible number of such strokes?

2. Which platonic solids have an Eulerian circuit?

3. A **rook** is a chess piece which moves in a straight line on an $m \times n$ rectangular board any number of squares along a row or a column.

A rook's **tour** of a chessboard is a sequence of moves by a rook such that each square of the board is visited exactly once.

A rook's **circuit** of a chessboard is a sequence of moves by a rook such that each square of the board is visited exactly once, except that the rook ends up on its starting square.

In both cases the rook is considered to visit every square that it passes over.

(a) Show that there is a rook's tour on any size of rectangular board.

For an $m \times n$ board with both m and n greater than 1:

(b) show that there is a rook's circuit if either m or n is even;

(c) explain clearly why a rook's circuit is impossible if both m and n are odd.
