

Packing polyominoes into a 3-by- n box is as hard as it gets

A popular way of classifying the hardness of puzzles is by determining their membership of and completeness for the complexity class NP – essentially determining whether a certain kind of computation can be "represented" by an instance of the puzzle. The problem of determining whether a given set of polyominoes can be arranged into a given shape is NP-complete, and this is the case even if the target shape is a 2-by- n rectangle. From a classical viewpoint, this essentially settles the complexity. We take a more detailed look at this problem: we show that the problem of packing polyominoes into a 3-by- n rectangle is – in some sense – even harder, but that moving up to 4-by- n or even \sqrt{n} -by- \sqrt{n} does not complicate things further.