

Frogs and Toads

1. Frogs (represented by the Faces of the pennies) can move right or down.
Toads (represented by the Tails of the pennies) can move left or up.
A frog or toad can slide into an adjacent empty space.
They can also jump over exactly one of the **other** kind of animal to land in an empty space.
To win, exchange all the frogs with the toads. How many moves does it take?



2. That was probably pretty hard. How could we make the problem easier? One way would be to use the 3 by 3 center square only.
3. Another way would be to make it a one dimensional problem instead of a two dimensional problem. Can you solve the middle horizontal row?
4. What if you had a row that was only three spaces long with one of each animal? Seven spaces long? What if you have f frogs and t toads with an empty space in the middle? How many moves does it take to win?
5. Can you use the results of some of the easier problems as part of a solution to the original question?

Further fun: <http://www.puzzles.com/PuzzlesInEducation/HandsOnPuzzles/JumpingCoinsT.htm>
<http://nrich.maths.org/1246>
<http://www.cut-the-knot.org/SimpleGames/FrogsAndToads.shtml>
<http://www.cut-the-knot.org/SimpleGames/FrogsAndToads2d.shtml>