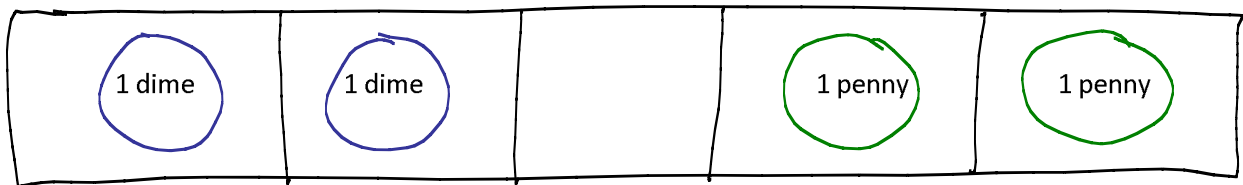# A DOZEN PROBLEMS

1. Put two dimes and two pennies in the spaces that contain their pictures. The object is to make the pennies and dimes change places in EXACTLY EIGHT moves.
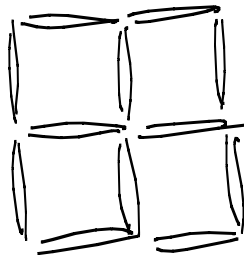
    You are allowed two kinds of moves:

    a) You can slide any coin into an empty space next to it.

    b) You can jump any coin over the coin next to it, like a jump in checkers, provided you land on an empty space.
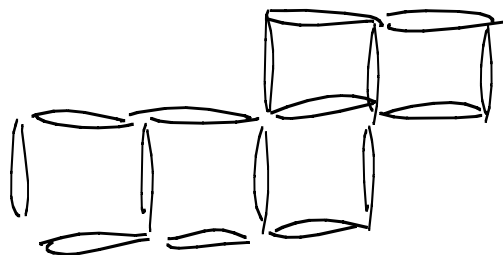

Remember, only eight moves are allowed. If you do it in more than eight moves, you haven't solved the puzzle.
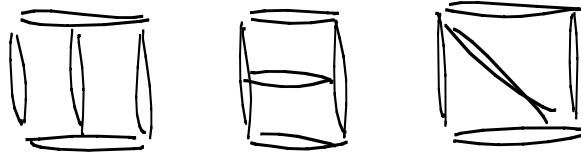
2. Change the positions of four toothpicks to make three small squares, all the same size and no toothpicks left over.
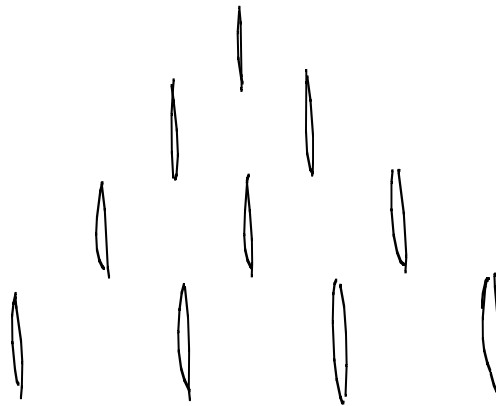

3. Change the positions of two toothpicks to make four small squares, all the same size and no toothpicks left over.
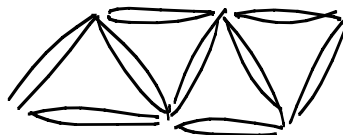
4. Remove six toothpicks completely, leaving ten on the table.
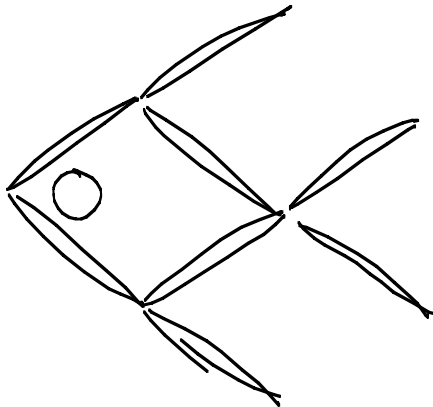

5. Change the positions of three toothpicks so that triangular pattern points down instead of up.

6. The picture shows how to make four triangles with nine toothpicks. Can you find a way to make four triangles, all the same size as the ones shown, with only six toothpicks?

7. Move the dime and just three toothpicks to make the fish swim in the opposite direction.

8. One day, centures ago, an alchemist brought a small bottle to the king. "This bottle," said he, "holds a liquid so powerful that it will instantly dissolve anything it touches." How did the king know the man was lying?

9. One large piece of the cake is to be shared between Henry and his sister Henrietta. The two are squabbling over who gets to cut the cake. Each thinks the other will cut it so as to give himself or herself the larger portion. Dad let them argue for a while before he said, "May I make a suggestion? I'll show you how to decide the matter so both of you will be completely satisfied with your share." When Henry and Henrietta heard Dad's scheme, they agreed it would work. What did Dad suggest?

10. There are four kingdoms located on an island. Each kingdom has common borders with the other three kingdoms. Draw a possible map of the island.

11. There are two equal glasses on the table: one with coffee and the other with the milk. Peter poured one table spoon of milk from the milk glass into coffee, then stirred it, and poured the table spoon of the mixture back into milk glass. Is there more coffee in the milk or milk in the coffee?

12. A troll caught one hundred wise men. Very late at night he came to the prison and said: "Tomorrow all of you will line up in the yard, such that the first wise man sees all ninety nine wise men in front of him, the second sees only ninety eight, and so on. The last person sees nobody. Then, my servants will put either red or green hat on each one's head. I will ask each of you starting from the first wise man what color is the hat on your head. If your answer is right you are free to go. If it is wrong I will kill you and feed to my dogs."
    The wise men thought the whole night and came up with the scheme to save as many people as possible. How many can they save and how?