

Instant Insanity (Tantalizer)

Instant Insanity was a big fad in the United States during the 1960's, but it was well known much before that. In England, it was called the Tantalizer. Many variations have been sold, some with patterns or figures or numbers instead of colors, and some with 5 or 6 cubes. Interestingly, all the popular 4-cube versions were essentially the same as each other!

The puzzle: Stack the 4 cubes in a tower, so that each side (front, back, left and right) contains **all 4 colors**.

1. Play around with the puzzle, and see if you can solve it in a short time. Then look down this list for hints and suggestions.
2. How many ways could you put the bottommost cube (if all faces were different)?
 - a. How many faces could face front?
 - b. For each front-facing face, how many ways could you put the rest of the cube?
 - c. Therefore, in how many ways could you put a single cube (with all different faces) on a table?
3. How many ways are there to stack the 4 cubes (assuming 6 different colors on each cube)?
4. For this puzzle, how many ways could you place each cube? Does it matter which face is to the front and which is towards the back? Does it matter which color is on the right and which on the left? Which up and which down? Does it matter what order the cubes are, from bottom to top? If you turn the tower around, or upside-down, is it still solved?

5. Note that in solving this puzzle, you can look at the pairs of opposite faces of each cube. You only need to find which pair is front-back, which pair left-right, and which pair are hidden (because they will be up-down.)
6. If the puzzle is solved, each side has all four colors, so each pair of opposite sides (of the tower) will have each color exactly twice.
7. How can we represent the cube in some way that shows the opposite-face relationships?
 - a. First, we need to have a representation of each cube.
 - b. Then we need a way to look at the set of all 4 cubes.
8. Using this representation, we need to be able to choose a pair of opposite faces from each of the four cubes, so that all together the eight faces show each color twice. Then we need to repeat: we need to find a **SECOND** set of opposite face pairs from each cube, that **ALSO** show each color twice. If it is possible to find these two sets, then the puzzle can be solved (and we can use those two sets to construct the solution).
9. Try to find some ways to do this before going on. On the next page, there will be hints to construct a graphical representation, but there are also some numeric representations (using primes), and you may be able to find your own representation that is new and better than the other ones.

10. We need to represent each cube to show opposite colors. There are several ways, but here is a graphical way:
 - a. Put a dot for each color. For this puzzle, put the dots in a square.
 - b. Connect a pair of dots to match the opposite faces of the cube.
 - c. You will end with 3 lines connecting 3 pairs of colors. If the opposite faces are the same color, the line will be a loop connecting the dot to itself.
11. Now label all the lines on the first cube "1", on the second cube "2", etc.
12. Overlay all 4 graphs (of the 4 cubes.) Each line connecting 2 (or 1) color will have a cube number on it.
13. Pick out a path that contains all 4 colors, and each cube number once. (Note the path may not be connected.) This represents a way to stack the 4 cubes, so the front and back each have all 4 colors - each number is a cube, and the two colors it connects are the front and back colors for that cube. You just have to make sure there are not two of the same color on either the front or back.
14. Now pick out a second path that does the same thing. It must not use any of the same lines as the first path. This tells you how to arrange the left and right faces of each cube. So using this second path as a guide, twist each cube so the front-back stays the same, and the left-right matches the colors the second path shows.
15. Once you have done that, the puzzle is solved.

Stan Isaacs
stan@isaacs.com
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Variations

- 4 cubes, different patterns or symbols or pictures
- 4 cubes, different color arrangements
- 5 cubes (Flags?)
- 6 cubes
- 6 hexagonal cylinders
- 6 cubes, arranged 2x3 (6 Blocks to Madness)
- 3x3 square, each line has 3 colors on both top and bottom ("On the Spot" appetizer)
- 3x3 square, all 6 sides show 5 shapes ("On The Spot Insanity")
- 8 cubes in a cube (need different technique to solve)
- Tetrahedron
- Other polyhedra (not shown)