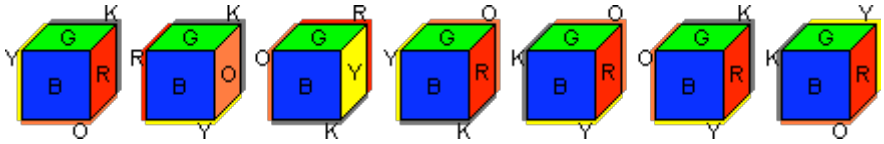
Jaap's Puzzle Page

Clark's Cube

The Clark's Cube is a 2×2×2 sliding cube puzzle with a twist. Superficially it is similar to the Varikon Box 2×2×2, and like that puzzle it is a transparent box containing 7 cubes and a space. There are however holes next to one edge of the box that give enough room for a cube to be rotated there. Therefore, not only do the cubes have to be positioned correctly, they have to be oriented correctly too.
The puzzle has white cubes with six coloured stickers on the faces (Black, Blue, Green, Orange, Red, Yellow). Each cube has the six colours arranged differently so they are all unique. When solved, each face of the box must show a single colour, including the parts visible in the space.

The cubes are shown in the picture below.



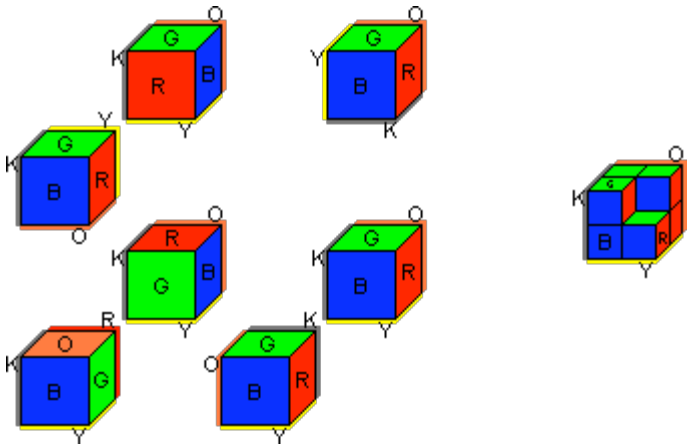
The puzzle was invented by William H. Clark, and its patent, US 4,488,725, was published on 18 December 1984.

The number of positions:

There are 7 loose cubes and a space. Any even cube permutation is possible, but no odd permutations, so for any position of the space there are 7!/2 cube positions. Every cube has 24 orientations, so this gives $24^7 \cdot 8 \cdot 7!/2$ = 92,463,263,907,840 positions. There are however 12 solutions because the whole solution arrangement can be built in different orientations inside the box. This gives only $24^7 \cdot 8 \cdot 7!/ (2 \cdot 12)$ = 7,705,271,992,320 essentially unique positions. Note that there are only 12 ways to build the solution inside the box and not 24 because of the permutation parity restriction. The figure on the packaging says "Over 3 trillion positions" so they may have forgotten to take that into account.

Solution:

The picture below shows the solved arrangment of the cubes.



The easiest way to solve it is to first orient all the cubes properly. Note that one cube has all six colours matching the solved colour configuration (the cube at the bottom right back corner), four cubes have four colours correct, and two cubes (those at the bottom left in the picture) have only three colours correct.

Once you have the orientations correct, you can solve the puzzle using the solution for the Varikon Box 2×2×2.

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