

Jaap's Puzzle Page

Smart Alex



The Smart Alex puzzle consists of a square central block split into two layers, and sticking out on all four sides an arrangement of six triangular pieces in a hexagon. The hexagons have three of their pieces in each layer. Each hexagon can rotate in place, and the layers can turn in order to intermingle the pieces of the hexagons. Note that there are two versions, the white one shown in the picture, and also a more common black version.

Each side of the centre block is labelled with a colour (blue, yellow, red, white). Each moving piece has a triangular outer face and a small rectangular side face. When solved, only one colour should show when looked at directly from any side, so not only should the hexagonal face you are looking at show only one colour (the colour indicated on the central block), the sides of the adjacent hexagons should also show that colour.

It was patented by Dumitru A. Pop on 26 May 1992, [US 5,116,052](#).

The number of positions:

There are $6 \times 4 = 24$ pieces which all occur in identical pairs. The layers can be rotated in 4 positions relative to each other. This makes the total number of positions $4 \cdot 24! / 2^{12} = 605,906,642,317,616,640,000$.

Notation:

A clockwise quarter turn of the top layer will be denoted by the letter T. Turning it 180 degrees will be denoted by T2, and an anti-clockwise turn by T'. Clockwise turns of the front hexagonal face will be denoted by F, F2, F3, F4 and F5=F'. Similarly turns of the Left, Back and Right faces are denoted with the letters L, B, and R.

Solution:

Phase 1: Solve the top halves of three of the sides.

- a. Do move T, to bring a new, as yet unsolved side of the top half to the front. Note the colour of this side.
- b. Find the piece that belongs at the front top right.
- c. If it lies in the top layer but not in the front face, then turn the top layer until it is at the front, do F3 (a half turn), and turn the top layer back to where it was before.
- d. If it lies in the bottom layer, then turn the bottom layer to bring the piece to the front face.
- e. Turn the front face to bring the piece to the top left position (so it is not yet solved but it will be shifted to the right later when the other two pieces are solved).
- f. Find the piece that belongs at the front, top middle. Use the same method in steps c-d to bring it to the front face. In the unlikely case that the piece is already in the top half of the front face, then do F2 T F2 T' F4 to bring it to the bottom half.
- g. If it does not lie at the bottom left of the front face, then do T, turn F to bring it to the bottom left of the front face, and do T'.
- h. Do F, so that now you have two pieces (nearly) solved in the top half of the front face.
 - i. Find the piece that belongs at the front, top left. Use the same method in steps c-d to bring it to the front face. In the unlikely case that the piece is already in the top half of the front face, then do F T F T' F' to bring it to the bottom half.
 - j. If it does not lie at the bottom left of the front face, then do T, turn F to bring it to the bottom left of the front face, and do T'.
- k. Do F, so that now top half of the front face is completely solved.
 - l. Repeat steps a-k twice more, so that there are now three solved halves in the top layer.
- m. Do T so that the unsolved part of the top layer is at the front.

Phase 2: Solve the bottom halves of three of the sides.

- a. Turn over the puzzle, so that the solved parts of the top layer are now in the bottom layer and not in the front face.
- b. Do the same as phase 1, so that now three whole faces have been solved.

Phase 3: Solve the front face

- a. Find the front pieces that belong on top and bottom, i.e. the front pieces with only one colour.
 - b. If they are on opposite sides of the front face, then put them in position and skip to step e.
 - c. If they are adjacent, then rotate the front so that they lie on the right, and do T' F' T F' T' F4 T F' T' F4 T F2.
 - d. If they are not adjacent (and not opposite), then rotate them to the top half and do F T F2 T' F T F2 T' F T F T'.
 - e. Only the front left and right pieces remain to be solved. Check that F3 won't solve the puzzle.
 - f. If opposite pieces on the front face are identical, then do T F' T' F T' F4 T F' T F T2 F2 T,
otherwise do T' F T F T F' T2 F' T F T F T'.
- It should now be solved, or else F3 will solve it.

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