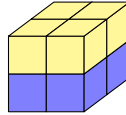


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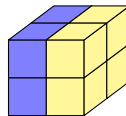
**Coloured Cubes**

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You are given a supply of cubes all of dimension  $1 \times 1 \times 1$ . The cubes are either entirely blue or entirely yellow and you have as many of each type as you want. If you take 8 such cubes you can assemble them into a  $2 \times 2 \times 2$  cube in an obvious way. The  $2 \times 2 \times 2$  cube will have a certain pattern of blue and yellow on its faces. Two cubes with a different pattern might well be the same if you rotate one or the other. For example, if you used four blue and four yellow cubes to make



then you get the same cube as



(the invisible eighth cube is blue in each case).

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**Task**

Determine how many different  $2 \times 2 \times 2$  cubes can you make in this way, using any combination of blue and yellow cubes. How can you ensure that you have found them all, and not counted any arrangement twice? Report on your findings. Your report should clearly show your solutions and explain the approaches you took towards solving the problem. The reader should be convinced, on the basis of the report alone, that the answer you've provided is correct.

(1 point, Pairs)