

# Extra Problems. V.

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November 14, 2011

## Reversi

Reversi buttons are placed on a chess board. Each of the 64 cells has a button. One of the buttons is black, and all the others are white. In one move you are allowed to flip all the buttons in one column or in one row. Can you make all the buttons white? What if the chessboard is 5 by 5?

## Cube

**1988 Tournament of Towns.** Every vertex of a cube is assigned a number  $+1$  or  $-1$ . Every face has a number that is the product of all the numbers in its corners. Then the 14 numbers are summed up (all the vertices and faces). Can the sum be 0?

## Another Cube

We put seven zeroes and one one in the vertices of a cube. In one move you are allowed to add 1 to the two numbers at the endpoints of some edge of the cube. Can you make all the numbers the same after several moves? Can you make all the numbers divisible by 3?