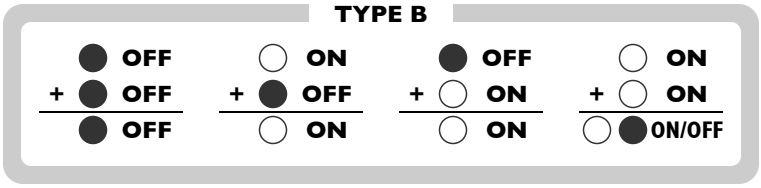
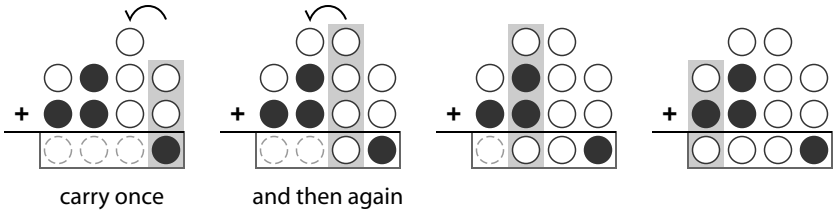
light addition type b *instructions*

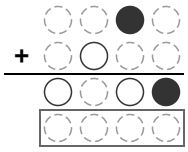
The following puzzles use rows of on and off light bulbs. The first two rows are illuminated randomly, but then each successive row is a combination of the two above it. The rules for combining two rows to get next one are as follows:



Here's an example of how to combine two rows of light bulbs to obtain a third:



For each puzzle, you are to complete a sequence of combinations, until you determine the illumination of the boxed row of light bulbs. Unfortunately, someone has come along and removed most of the light bulbs, leaving only a few light bulbs to solve each puzzle. (Missing light bulbs are represented by a dashed circle.) Can you still determine the illumination of the light bulbs in each boxed row?



Some additional rules:

No row of light bulbs will ever be completely off.

In each puzzle, there are always enough columns to complete the combinations. You will never have to carry past the left-most column.

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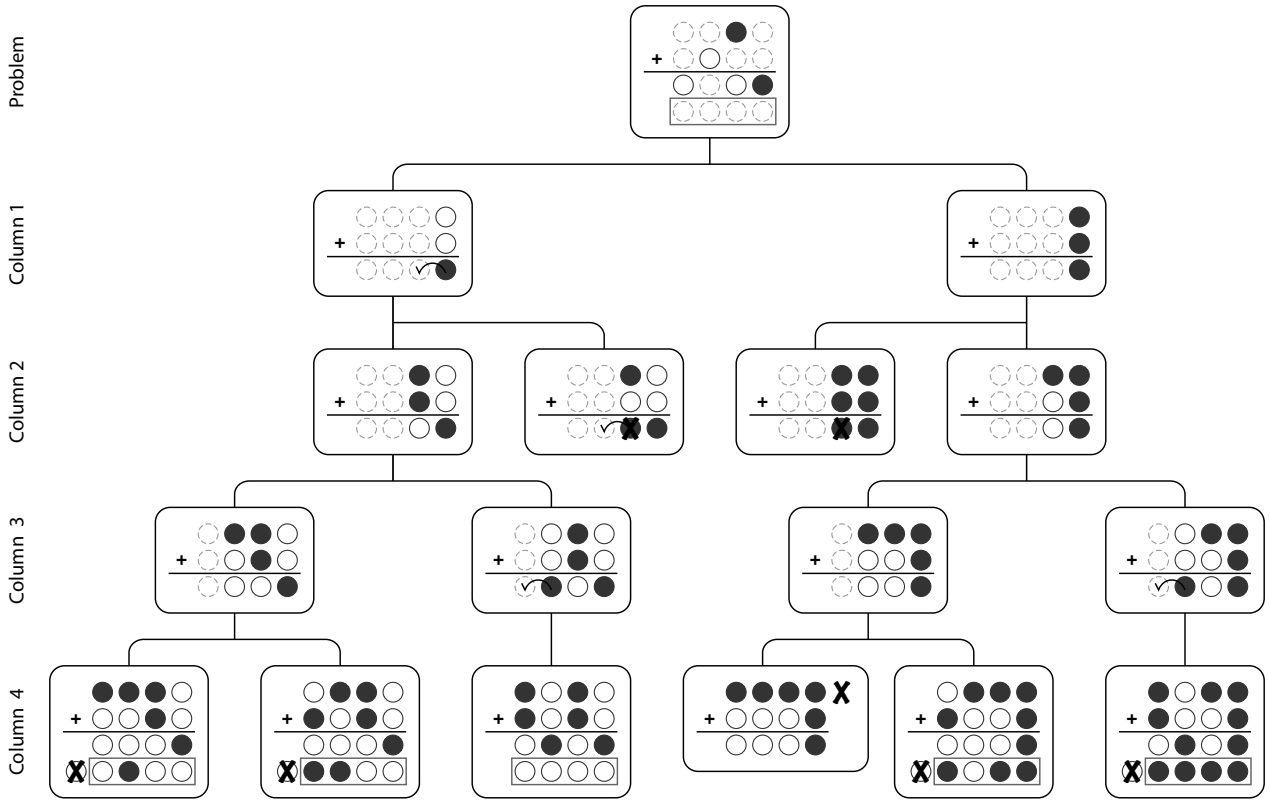
One way to solve this example is to go column by column, starting on the right. The light bulbs that are given dictate the illumination of some of the missing light bulbs. However, there are some choices left to be made, and those are explored in the problem space tree below. (Not every possibility will be explored in each problem space tree, just the ones that are the most important.)



Notice that by the time we get to the end, all but one of the possibilities are eliminated because they either go beyond the number of columns available in the puzzle, or they contain a completely off row of light bulbs. The single possibility left must be the solution.

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