



24 Tempting Vanilla Crescents

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Project: MATH+ School Activities

Challenge

The baking elves have outdone themselves again this year and baked the very best vanilla crescents. The crescents are delicately sweet, buttery, tenderly melt in the mouth, and leave a wonderful Christmas feeling. To prevent the recipe from being stolen and ending up as “Granny’s vanilla crescents—the best!!1!” on elfrecipes.np, the elves have secured it against thieves in a special safe with seven switches.

Shortly before Christmas, however, the vanilla crescents have to be baked again, because the gluttonous elves have already eaten up all the supplies at their various Christmas parties. Hidden on the top shelf of the bakery, the baking elves must climb a ladder to get to the safe manual. It says:

The safe opens only if all switches are set to “off”. The switches can be operated as follows:

- The rightmost switch can be turned on or off as desired.
- Any other switch can be turned on and off only if the switch directly to its right is “on” and all the others to its right are “off”.
- Only one switch can be operated at a time.

At the moment, all the switches are turned “on”. How many moves are necessary to open the safe? Here, toggling one switch counts as one move.



Artwork: Frauke Jansen

Possible answers:

1. 81
2. 82
3. 83
4. 84
5. 85
6. 86
7. 87
8. 88
9. 89
10. 90