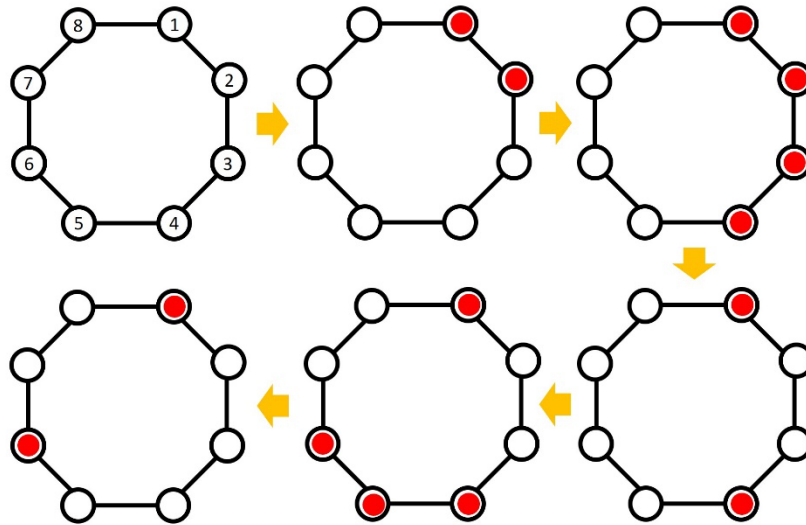


UC Merced Applied Math Problem of the Month

March 2023



There are 8 holes located in vertices of an octagon (labeled 1 through 8) and you have 8 identical balls. Each hole either can hold one ball or it can be empty. If there are two empty neighboring holes, then you are allowed to put two balls into these holes. If there are two neighboring holes with balls, then you are allowed to remove those two balls. When all 8 holes are initially empty and you keep performing these allowed actions, what is the total number of configurations that can be found? Some possible configurations are shown in the figure. Can you generalize this result to the case with $2k$ holes ($k=2,3,4, \dots$)?

To submit your solutions for a chance to win an Amazon gift card, and to find out detailed contest rules,

- scan the QR code to the right, or
- go to <https://appliedmath.ucmerced.edu/news-events/problem-month>

