Something More Fun

- I write integers 1, 2, ..., 49, 50 on board
- You repeat until one number left:
  - Select any two distinct $a, b$ on board
    (if same number written twice, can choose for $a, b$)
  - Erase $a, b$ from board.
  - Write $|a - b|$ on board

Goal: Some odd $k$ in $[1, 49]$

- I wonder:
  - What number(s) could be left when you are done?

Choose 1, $k+1$. Write $k$ off to side
Pair $(2, 3), (4, 5), \ldots, (k-1, k)$
also $(k+2, k+3), \ldots, (49, 50)$
Pairs produce 24 ones. Pair remain, 12 zeroes.
Any $\rightarrow k$ is left.
3. Tiling a $2^n \times 2^n$ chessboard

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The $n$-Queens Problem

- $n \times n$ board, $n$ queens
- Place all $n$ queens
  - None to threaten another

Good placement? No
- Good placement?

- Recursive Approach

  for each viable square in this row
  - place queen
  - update threats
  - next row (recursive)
  - if not solved remove queen (and threats)
Recursive Approach