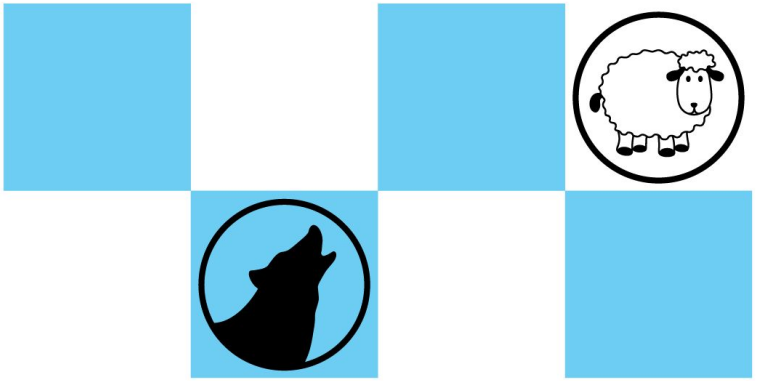
Wolves and Sheep



Julia Robinson Mathematics Festival

San Francisco Math Circle at San Francisco State University

App

jrmf.org

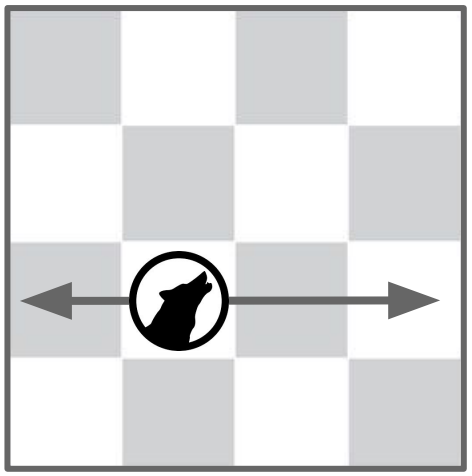
Wolves and Sheep

Goal:
Keep your sheep safe from the wolves.

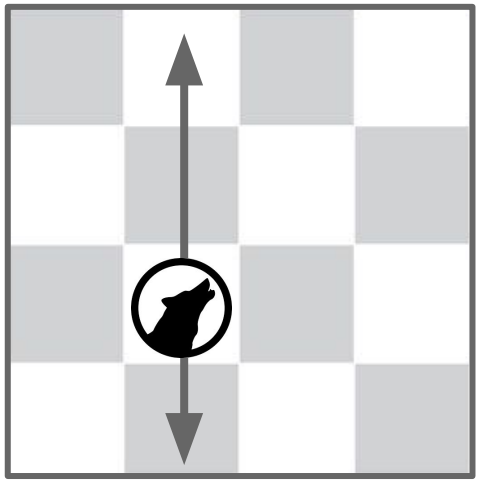
Rules:
1. *All* sheep must be safe from wolves.
2. Wolves will eat any sheep that they see horizontally, vertically, or diagonally.

Wolves eat sheep that are any number of squares away:

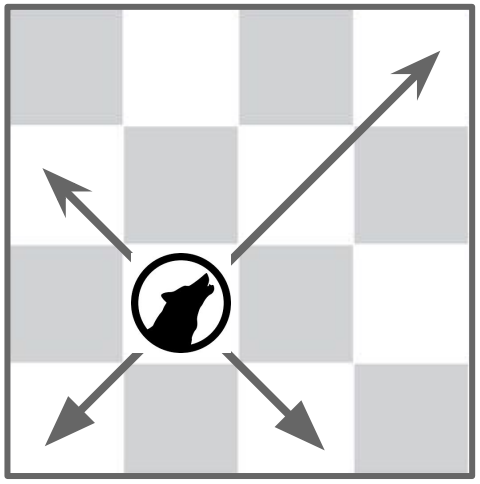
Horizontally



Vertically



Diagonally

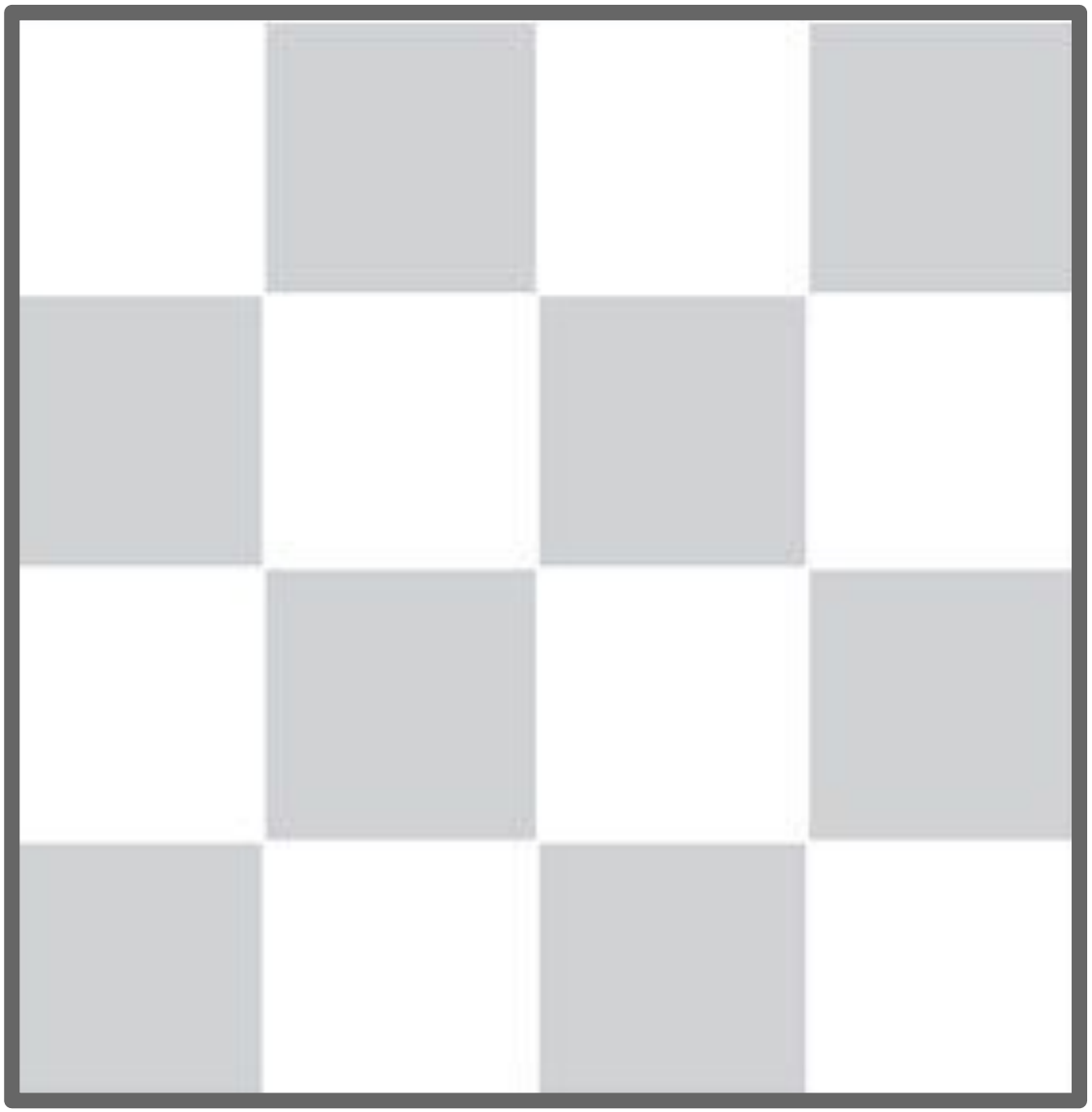


Revised on 2020.05.01

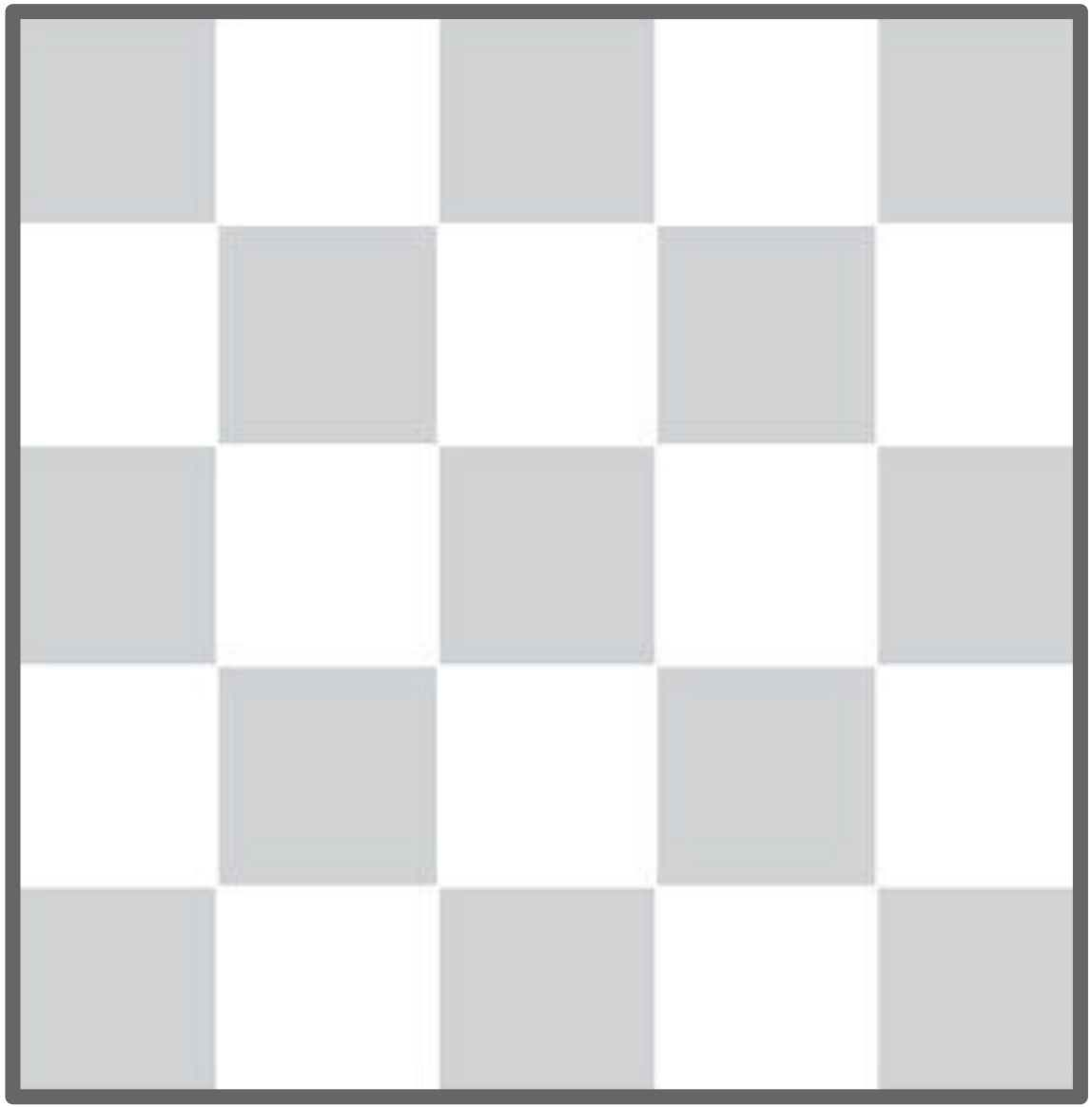
4x4 Board

1. Can you place two wolves on the board so that three sheep can be placed safely?

2. Can you place three wolves on the board so that two sheep can be placed safely?

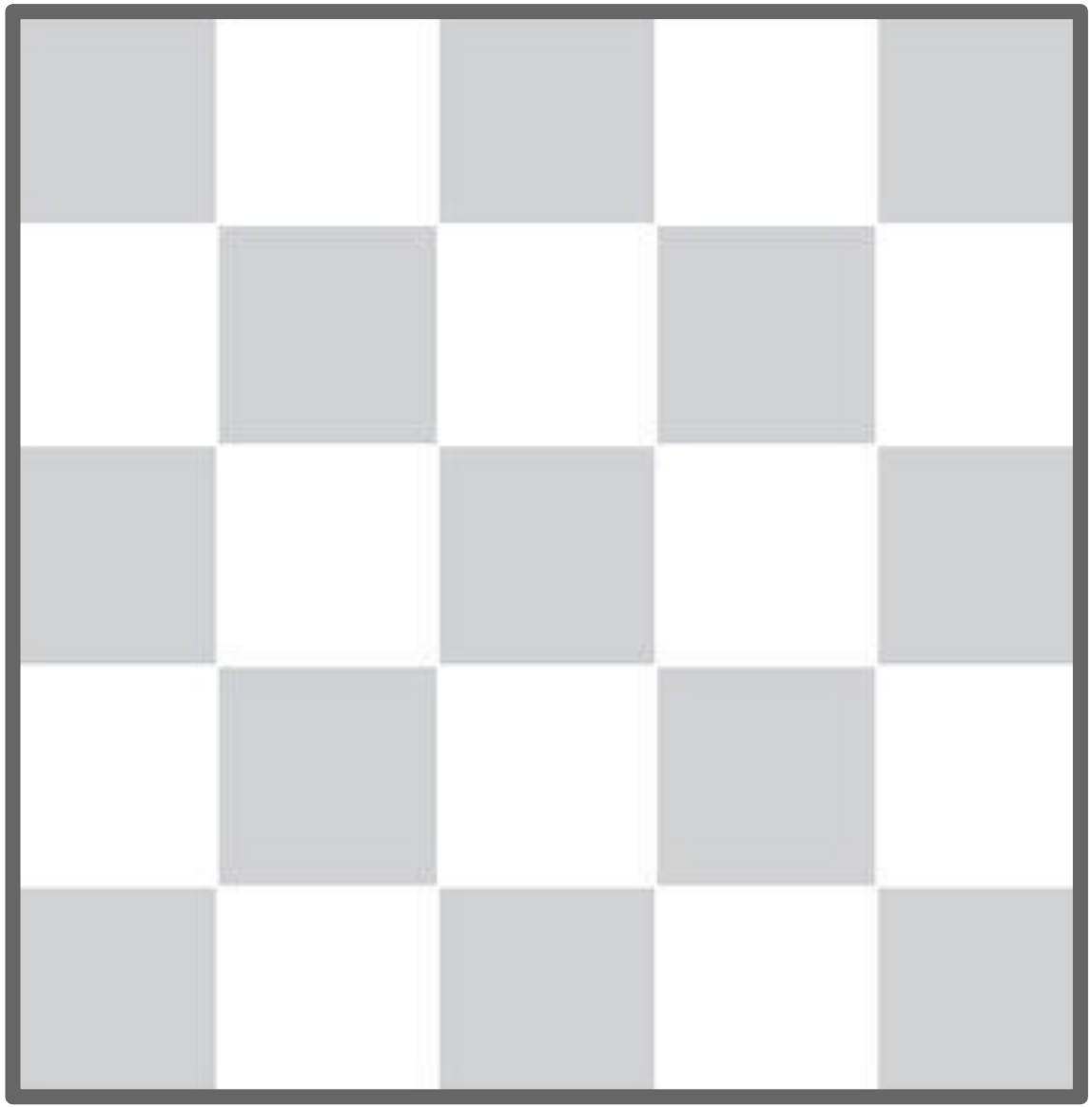


5x5 Board



1. Is it possible to place five wolves so that three sheep are safe?
2. Is it possible to place three wolves so that five sheep are safe?
3. Where should you place one wolf so that the maximum number of sheep are safe? What is that maximum number?
4. Where should you place one wolf so that the minimum number of sheep are safe? What is that minimum number?

5x5 Board (cont.)



5. Where should you place two wolves so that the maximum number of sheep are safe? What is that maximum number?
6. Where should you place two wolves so that the minimum number of sheep are safe? What is that minimum number?
7. Can you generalize questions 3-6 for an *nxn* board?