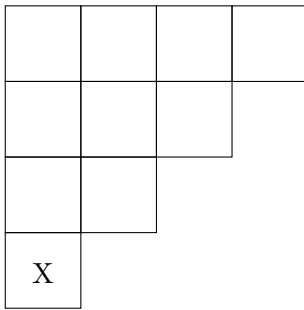


Game theory homework 1

- Find the set of P-positions for the subtraction games with subtraction sets
 - $S = \{1, 3, 5, 7\}$.
 - $S = \{1, 3, 6\}$.
 - $S = \{1, 2, 4, 8, 16, \dots\} = \text{all powers of } 2$.
 - Who wins these games if play starts at 100 chips, the first player or the second?
- Find all winning moves in the game of nim,
 - with three piles, containing 12, 19, and 27 chips, respectively.
 - with four piles, containing 13, 17, 19, and 23 chips, respectively.

What is the answer to (a) and (b) if the misère version of nim is being played?

- In a game of nim with piles $(1, 2, 3, \dots, 63)$, find a winning move.
- A game of chomp begins with the following shape.



Is this an N-position or a P-position? Justify your answer.