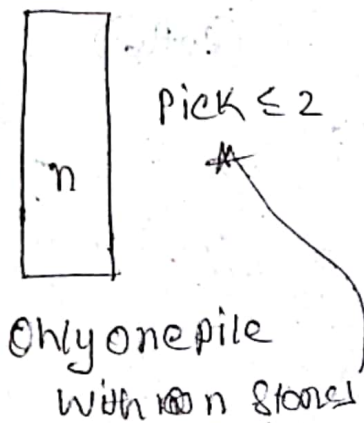# Game theory

→ Two or more players

→ sequential moves

→ partial game / impartial game.

→ State :

→ Winning / losing state.

problem

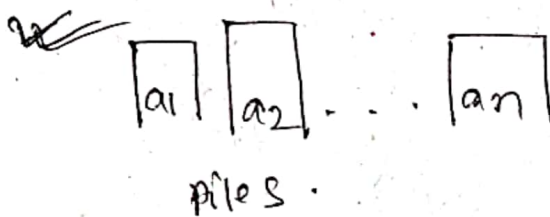① Mirror move (problem).

② Pattern

Pick ≤ 2

n

Only one pile
with n stones

n	first
0	L
1	W
2	W
3	L
4	W
5	W
6	L
7	W
⋮	⋮

ⓘ যেকোন $K \leq P$ আমরা কিছু ধরতে নামতে পারলে
first player এর জন্য lossing state হবে।

if $\{n \% (K+1) == 0\}$ তাহলে ① loss হবে
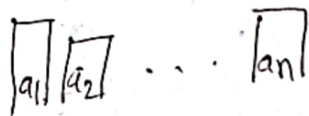
otherwise win হবে।

W node = If has an edges to a losing node

L node = All edges result to a winning node.

Piles.

Let a_k be the first non-empty pile.

then the player choose some stones from a_k.

Who cannot pick any stone loose the game.

⟹ problem linx (Sequential move) cc

NIM Theory:

প্রতি-খেলায় যে কোন পাইলি হতে কিছু সংখ্যক Stone সরাবে।

যে কোন stone remove করতে পারবে না সে হারবে।

$x = a_1 \oplus a_2 \oplus \cdots \oplus a_n$

If

xor > 0	Winning state for first player
xor = 0	lossing state for first player