



PARITY

EVEN AND ODD NUMBER

- $O + O = E$

- $O + E = O$

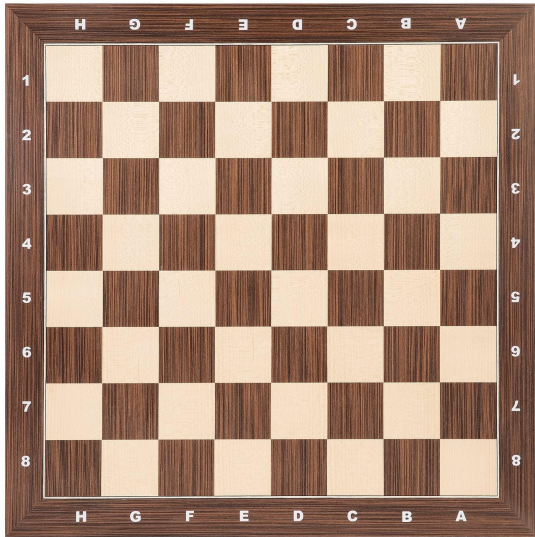
- $E + E = E$

- $O \times O = O$

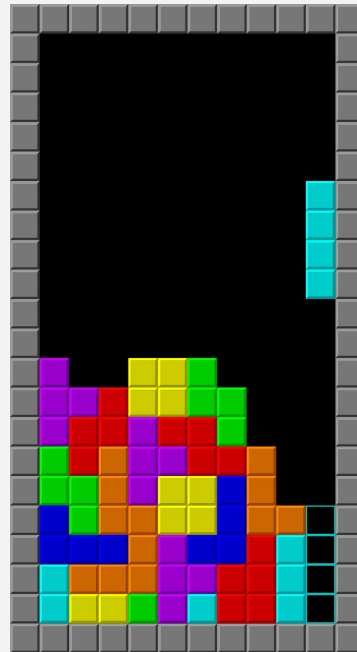
- $O \times E = E$

- $E \times E = E$

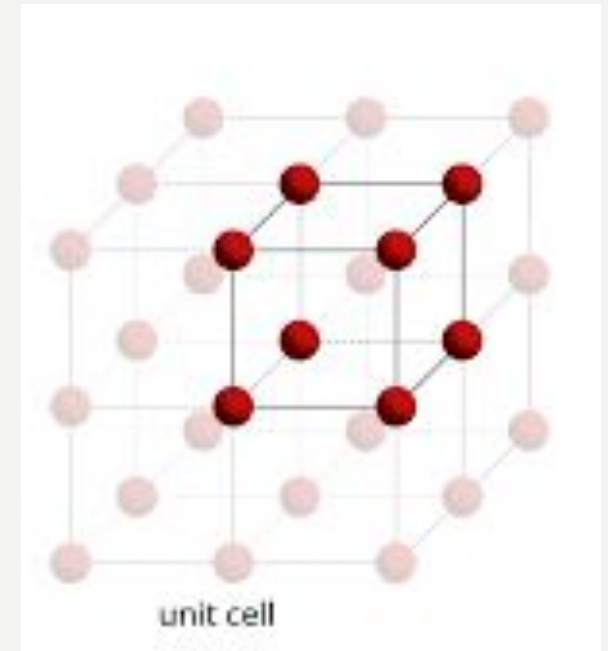
LATTICE



- Chessboard

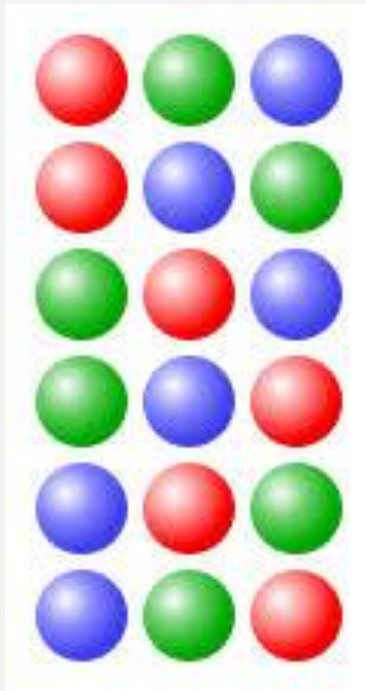


- Tetris

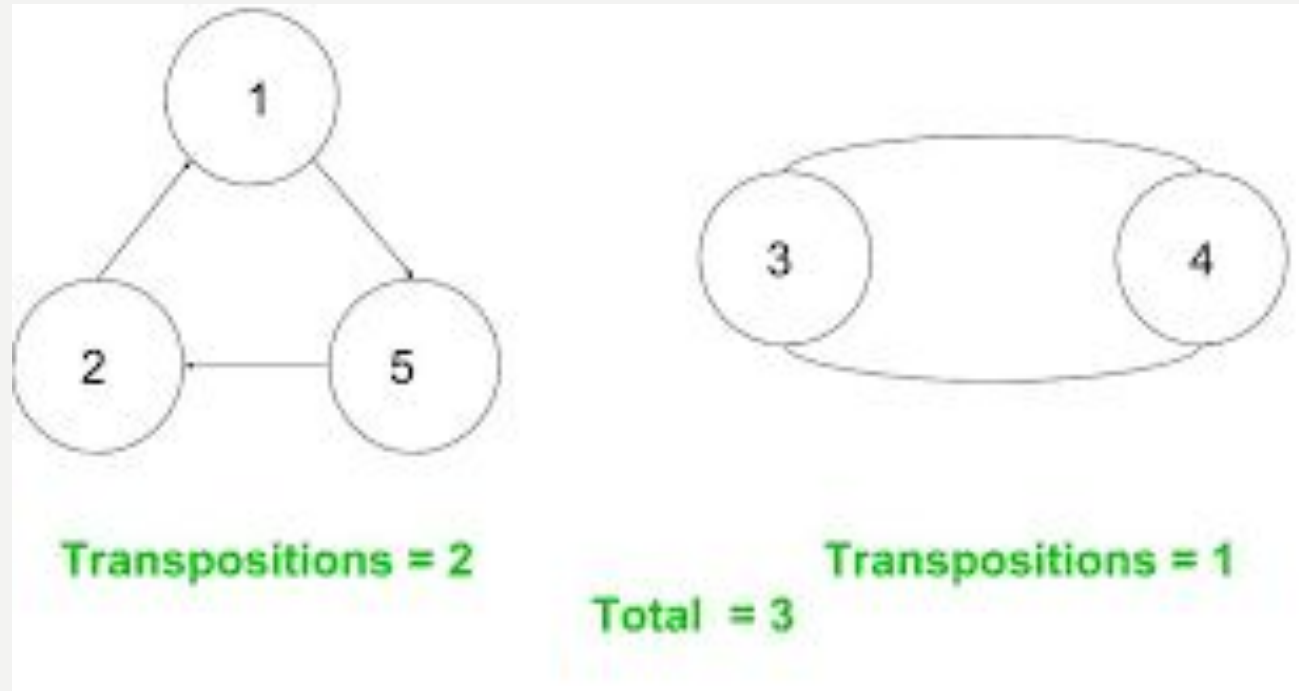


- Lattice structure

PERMUTATION

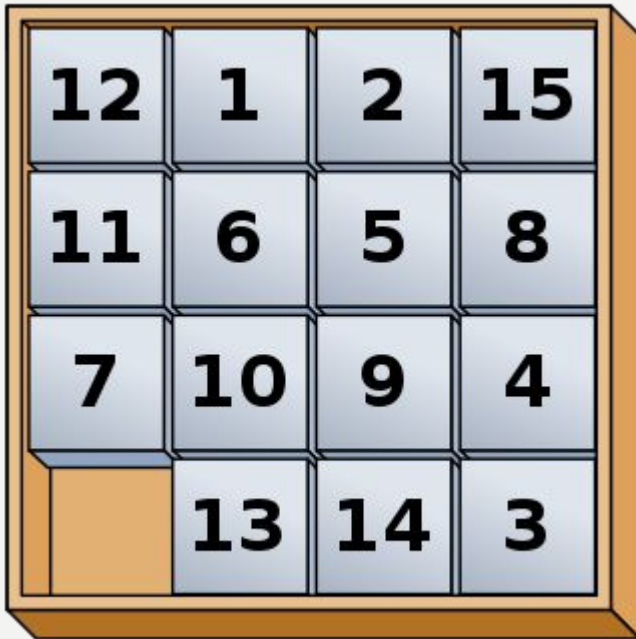


- Permutation

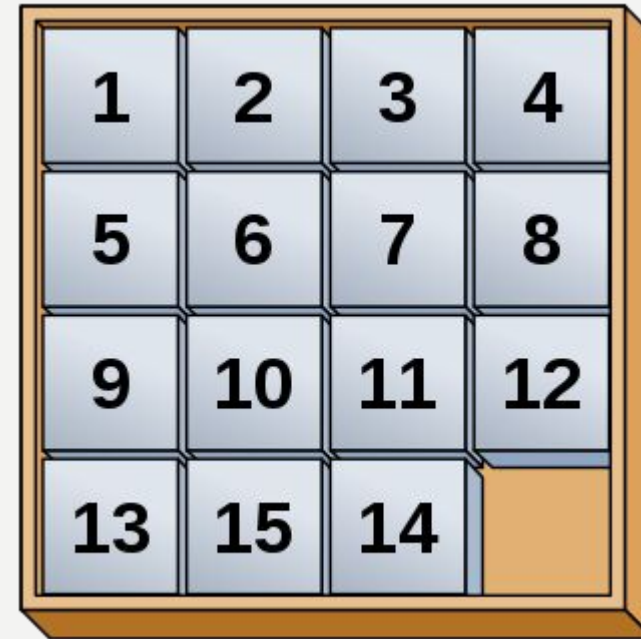


- Transposition Decomposition

15 PUZZLE

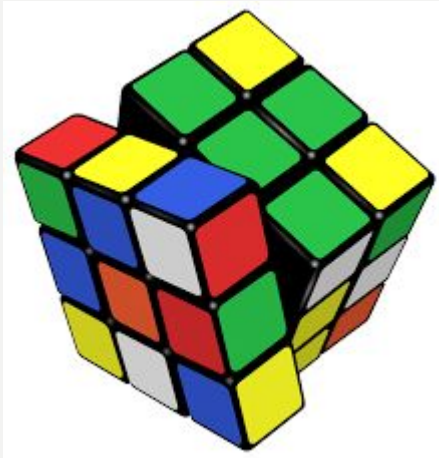


- 15 Puzzle



- 15 puzzle ?

GROUP



- Group structure

- $\mathbb{Z} = \{ \dots, -2, -1, 0, 1, 2, \dots \}$
- $2\mathbb{Z} = \{ \dots, -4, -2, 0, 2, 4, \dots \}$
- $1 + 2\mathbb{Z} = \{ \dots, -3, -1, 1, 3, 5, \dots \}$