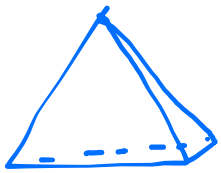
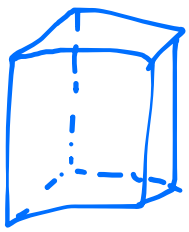
$\cong S_4$





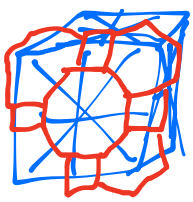
Symmetric group of cube

$(\mathbb{Z}/2\mathbb{Z})^3 \rtimes S_3$

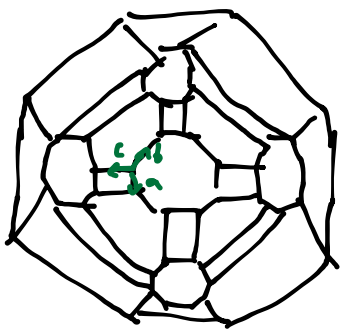
48 elements

$\cong$

Cayley Diagram



$\longrightarrow$



$(ab)^4 = 1$

$(bc)^3 = 1$

$(ac)^2 = 1$

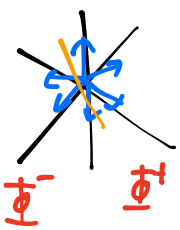
Every vertex must have all generators

Coxeter group

$\langle S \mid R \rangle$

1) $|S| < \infty$
2) $s_i \in S$, $s_i^2 = 1$
3)

Root systems



classify by simple roots as generating set

$S_3 = \langle a, b \mid (ab)^3 = 1 = a^2 = b^2 \rangle$

Coxeter diagram

$S_4 = \langle a, b, c \mid (ab)^3 = (bc)^3 = (ac)^2 = a^2 = b^2 = c^2 = 1 \rangle$