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Dart:

Given a structure K of vertices V, edges E, faces F, volumes U, ..., a dart is a tuple $b=(v,e,f,u,\dots)$, $v \in e \in f \in u \in \cdots$

Analogous to a flag of a simplicial complex, K may not be a simplicial complex, dart must contain components down to vertices

Generalized Map:

Let $n \geq 0$, an n-g-map is defined by

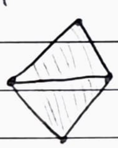
$$G=(B,\alpha_0,\dots,\alpha_n)$$

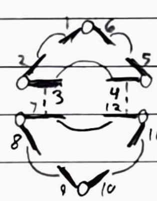
B set of darts

$\alpha_i : B \to B$ s.t. $\alpha_i = \alpha_i^{-1}$

$(\alpha_i \alpha_j) = (\alpha_i \alpha_j)^{-1}$ when $j \geq i+2$

Example:

$K=$ 

$G=$ 

▬ = dart

$\frown = \alpha_0$ link

$\circ = \alpha_1$ link

$\vdots = \alpha_2$ link

No α_i link on b $\Rightarrow \alpha_i(b)=b$

	1	2	3	4	5
α_0	2	1	4	3	6
α_1	6	3	2	5	4
α_2	1	2	7	12	5

Orbit:

Given a set of permutations $\{\Pi_0,\dots,\Pi_k\}$ on B, the orbit of $b \in B$ wrt this set is

$$\langle \Pi_0,\dots,\Pi_k\rangle(b) = \{\varphi(b) : \varphi \in \langle \Pi_0,\dots,\Pi_k\rangle\}$$

Each α_i is a permutation over B, so...

i-cell:

Given G, n-g-map, $b \in B$ a dart, $i \in \{0,\dots,n\}$, the i-cell adjacent to b is

$$\langle \alpha_0,\dots,\alpha_{i-1},\alpha_{i+1},\dots,\alpha_n\rangle(b)$$

Example:

Same K and G, consider $b=3$

0-cell $=\{3,2,7,8\}$ vertex-adjacent

1-cell $=\{3,7,4,12\}$ edge-adjacent

2-cell $=\{3,2,1,6,5,4\}$ face-adjacent

$b=10$

0-cell $=\{10,9\}$

1-cell $=\{10,11\}$

2-cell $=\{10,11,12,7,8,9\}$