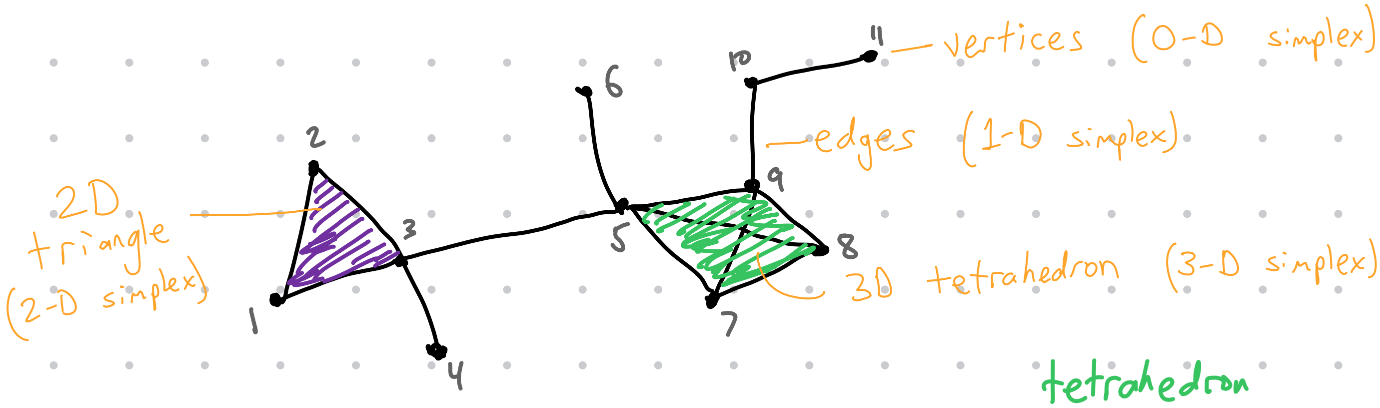
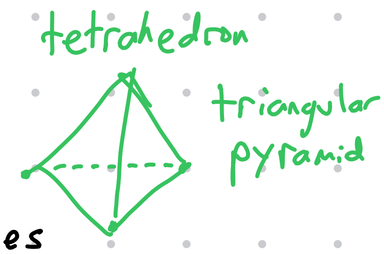
SIMPLICIAL COMPLEXES

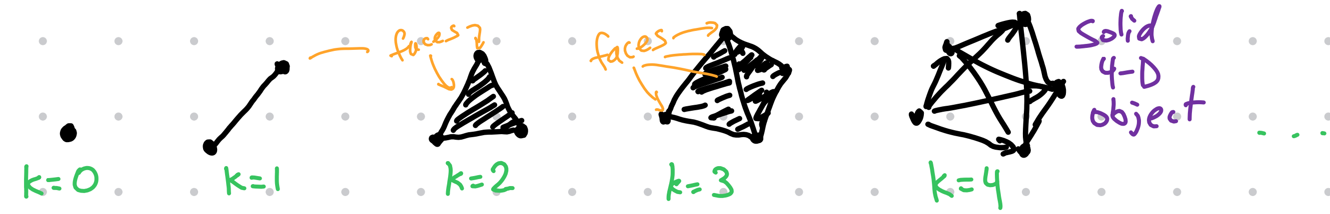
higher-dimensional analogues of graphs



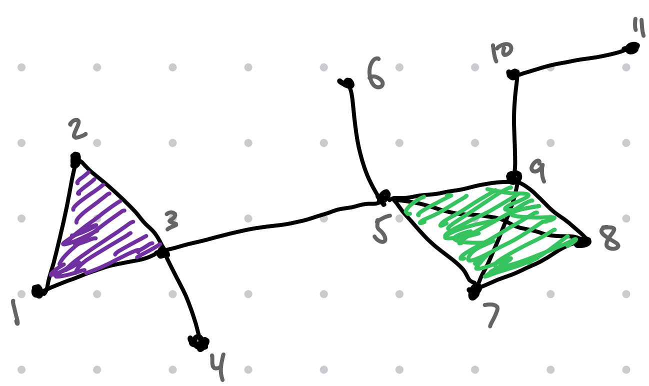


SIMPLEX: a k-dimensional object (polytope) which is the convex hull of its k+1 vertices

plural: "simplices"



A **SIMPLICIAL COMPLEX** K is a set of simplices such that if σ is a simplex in K, then every face of σ is also in K.



represent this simplicial complex: { {1}, {2}, {3}, {4}, {5}, {6}, {7}, {8}, {9}, {10}, {11},
{1,2}, {2,3}, {1,3}, {3,4}, {3,5}, {5,6}, {5,7}, {5,8}, {5,9}, {7,8}, {8,9}, {7,9}, {9,10}, {10,11}, {1,2,3}, {5,7,9}, {5,8,9}, {5,7,8}, {7,8,9}, {5,7,8,9} }

each simplex is a set of vertex labels

This set notation defines an **ABSTRACT SIMPLICIAL COMPLEX**: a family of sets that is closed under the operation of subsets.

A **GEOMETRIC REALIZATION** of an abstract simplicial complex associates a point in $\mathbb{R}^n$ with each 1-element set of the abstract simplicial complex.