Doubly Connected Edge List

Crossed with a KD Tree to allow for orthogonal range search

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# Doubly Connected Edge List (DCEL)

The Doubly Connected Edge List is a winged edge data structure, meant for representing planar graphs. It provides queries to obtain the edges around a face, and edges incident on a vertex in O(m) time where m is the number of edges around the face or vertex. Because it can obtain this information so quickly it is an ideal data structure for making local edits to data.

The data structure is comprised of a series of edges. Each edge is comprised of six references. Two of the references lead to sets of coordinates that define the start and end of the edge. Another two of the references lead to the faces on either side of the edge. While the last two are references to other edges, the first clockwise edge on the end point, and the first counter clockwise edge on the start point.

Another component of the data structure would be two sets of indices. The first set gives us an index into the vertex cycles.