BILKENT UNIVERSITY
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Project Proposal
Comparison of Three Voronoi Diagram Computation Algorithm

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In this project, we will implement three different calculating and visualising algorithms to build a Voronoi Diagram of a set of points in 2D. After implementation, comparison of these three implemented algorithms will be done in terms of time complexity and space complexity.

One of the algorithms will be Randomised Incremental Algorithm which adds points randomly to the diagram and updates Delaunay triangulation in each addition. Delaunay triangulation is later used to create Voronoi diagrams by connecting the centers of the circumcircles.

Second algorithm will be Fortune’s algorithm which is a sweep algorithm that processes 2d space from one side to the opposite site by adding points to the diagram one by one and updating the Voronoi diagram at the same time. We will also visualise the algorithm at runtime.

Last algorithm will be The Flipping Algorithm. This algorithm takes arbitrary triangulation and converts it by flipping the diagonals. This flipping is done to satisfy Delaunay triangulation conditions. After having valid Delaunay triangulation, we will compute the Voronoi diagram.

After implementing these three algorithms, visualisation of algorithms at runtime will be shown with a good UI and the comparison of running time will be displayed in the UI with input data information as well.