

# University of Utah

## School of Computing

CS 4960

Project #4

Spring 2016

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**Due April 5, 2016 at the start of class**

Please contact the instructor Bei (beiwang@sci.utah.edu) or TA Vikram at (vikram.raj@utah.edu) for questions regarding the project. Please contact Vikram for questions regarding Blender specifically.

The project submission should include all your source code, the output files of CGAL (according to Blender format requirement described later), the input files to Blender (using the parser.c), and screen captures or outputs from Blender or some other tools that visualize your results.

For bonus points, your project submission could include the visualization of a 2D image where each Voronoi cell is colored by some random color (see details below). For this project, you get 15 points total, with additional 5 bonus points, with a total of 20 possible points.

## 1 Computing and Visualizing 2D Voronoi Diagram

Use CGAL library involving either triangulation or Voronoi diagrams, for example:

[http://doc.cgal.org/latest/Triangulation\\_2/index.html#title15](http://doc.cgal.org/latest/Triangulation_2/index.html#title15)

[http://doc.cgal.org/latest/Triangulation\\_2/index.html#Chapter\\_2D\\_Triangulations](http://doc.cgal.org/latest/Triangulation_2/index.html#Chapter_2D_Triangulations)

[http://doc.cgal.org/latest/Voronoi\\_diagram\\_2/index.html](http://doc.cgal.org/latest/Voronoi_diagram_2/index.html)

to complete the following task.

Task (15 points): Generate a set of 20+ points sampled randomly from a 2D plane, compute its Voronoi diagram and visualize the resulting diagram via Blender or some other visualization tools. The visualization must include the location of the points, the Voronoi vertices and the Voronoi edges.

5 points for having a CG output file that describes the Voronoi vertices and Voronoi edges. 10 points for visualizing the correct Voronoi diagram.

## 2 Voronoi Diagram Elevated

For this bonus round, you could completely ignore Task 1 stated above, but instead, using Delaunay triangulation or Voronoi diagram from CGAL to create the effect found on:

[https://en.wikipedia.org/wiki/Voronoi\\_diagram#/media/File:Coloured\\_Voronoi\\_3D\\_slice.svg](https://en.wikipedia.org/wiki/Voronoi_diagram#/media/File:Coloured_Voronoi_3D_slice.svg).

The coding you will need to complete for this task would include Task 1 anyway.

Task (20 points): the first 15 points include generating a set of 50+ points sampled randomly from a 2D plane. Compute its Voronoi diagram. And finally visualize (5 points extra) the Voronoi diagram such that each Voronoi cell is colored by some random color.