Computational geometry and optimization

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"Computational geometry is devoted to the study of algorithms which can be stated in terms of geometry. Some purely geometrical problems arise out of the study of computational geometric algorithms, and such problems are also considered to be part of computational geometry. The main branches of computational geometry are combinatorial computational geometry, which deals with geometric objects as discrete entities (mainly with points, line segments, polygons, polyhedra, etc), and numerical computational geometry, which deals primarily with representing real-world objects (mainly curve and surface) in forms suitable for computer computations."

(Wikipedia)

We'll deal with geometrical optimization problems closely related to combinatorial computational geometry and some its extensions based on classical differential geometry. In particular, we'll discuss how one can construct a shortest path (geodesic) joining two given points on a surface; some generalizations of the previous problem to the case of more than two boundary points (Minimal Spanning Tree construction, Steiner Problem, one-dimensional Gromov Minimal Filling Problem etc.); some combinatorial computational geometry stuff referred to the problems mentioned above, for instance, Delaunay triangulation, Voronoi diagram etc.

To illustrate theoretical material, we'll use Wolfram Mathematica Package that is why we plan to give a short introduction to the package.