Indian Institute of Technology, Kharagpur
Computer Science and Engineering Department

Autumn 2019-2020
Algorithms II (CS31005)

Tutorial Problem T4 [06-07-2019—30-09-2019]

Write a C/C++ program to generate a set S of n random sites (user input: value of n and a seed for random function). Construct the Voronoi diagram of S and store it in DCEL. The time complexity of your algorithm in the worst case should be $O(n \log n)$, and space complexity $O(n)$, as discussed in class. Now, use the DCEL to draw the largest circle centered at each site $s_i \in S$ and contained in the Voronoi cell of s_i, as shown in the figure below. As you are using DCEL for circle construction and there are n circles, the total time complexity for circle drawing would be $O(n)$.

The output of your program should be an SVG file named `t4.svg`.

You should write the code with proper functions, modularity, and important comment lines, so that your code is easily comprehensible during evaluation.

Standard libraries in C/C++ can be used for required data structures. But I guess, DCEL needs to be implemented by you.

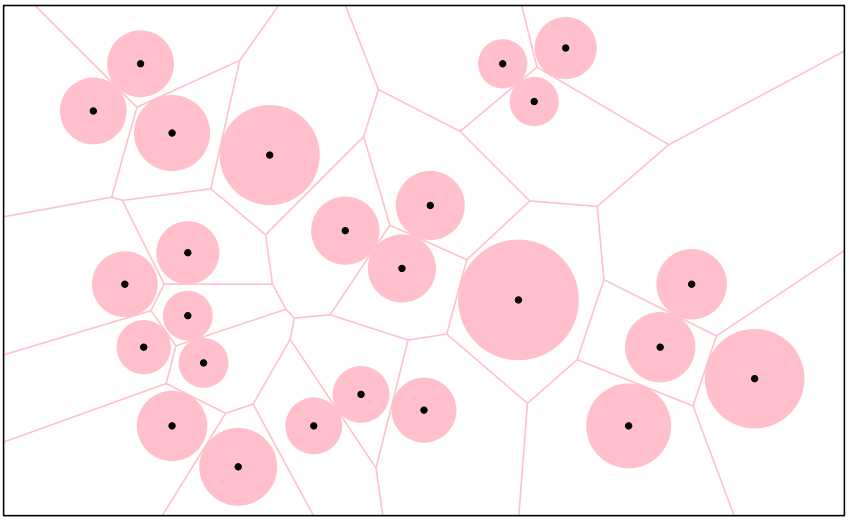

Figure 1: An example of `t4.svg`: Voronoi diagram for 25 sites and the site-centered largest circles in the Voronoi cells.