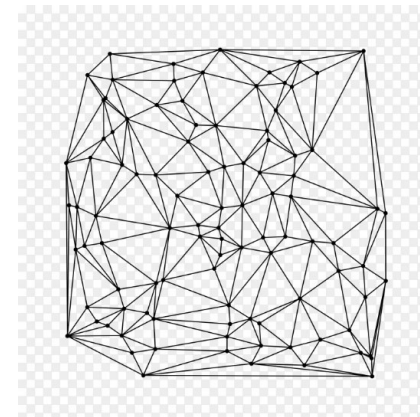
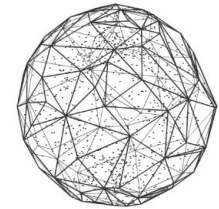


HW 1 part1 (20 points)

1. (5 points) Prove the intersection of two convex set is still a convex set.
2. (15 points) If a plane is divided into polygons by line segments, please design a data structure to store the division information so that for the given line passing two points p_1 and p_2 on the plane, it is efficient to find all the polygons intersected with the line. Please provide the main idea and pseudocode of the algorithm and give the complexity analysis.



HW 1 part2 (80 points)



1. **Implement a 3D convex hull algorithm (not limited to the ones in slides) with visualization.**
2. **Implement collision detection for two convex hulls of two 3D point sets.**
3. **Write a report.**
 - Describe the convex hull algorithm you choose.
 - Prepare some input samples for fast display or you can design interactive input functions.
 - Show some visualization examples in your report, better with obvious differences.
 - Analyze the time complexity and show the runtime with incremental number of points.
 - State the data structure you use to store the convex hull.
 - State how you accelerate your algorithm if have.
 - You can choose C++ or Python.
 - Final submitted files should include code, input files, executable file, readme.txt, and report.
 - You will get **Zero** if the code not passing the plagiarism check.