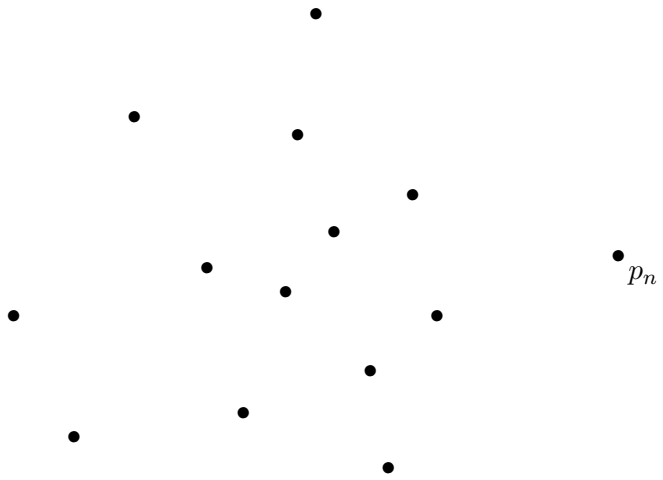
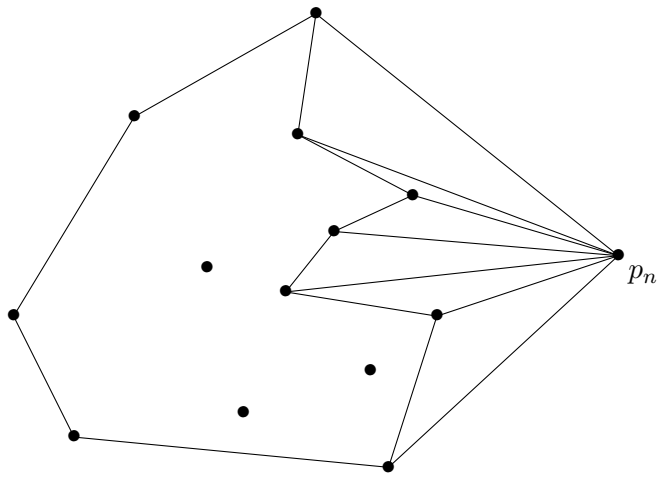
Triangulations and Edge Flips

Math 282 Computational Geometry

1. Consider the following set of points S. Label the points $p_1, p_2, \ldots, p_n$ from left to right. If the incremental algorithm is used to triangulate S, which triangles are incident to p_n? Draw all such triangles below.



2. Suppose a triangulation of S (same S as above) includes the edges shown below. Find a sequence of edge flips that transform these edges into the edges you drew above. That is, you want to transform the edges such that the triangles incident to p_n are exactly those produced by the incremental algorithm on S.



3. Generalize your observations from #1 and #2. Let S be *any* set of n points in the plane, and let p_n be the rightmost point of S. Given *any* triangulation of S, can you always find a sequence of edge flips that result in the triangles incident to p_n being exactly those produced by the incremental algorithm on S? If so, find an algorithm that achieves the edge flips. If not, give a counterexample.