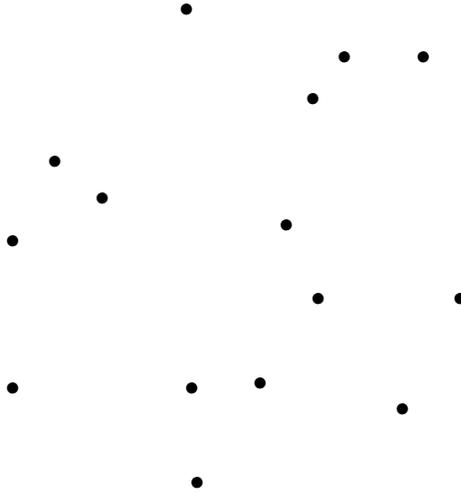


# Convex Hulls

Math 282 Computational Geometry

1. Let  $S$  be a set of points in the plane. Given points  $a$  and  $b$  in  $S$ , how would you determine whether the segment  $ab$  is part of the convex hull  $\text{conv}(S)$ ?

Here is a sample set of points  $S$ :



2. Given the coordinates of all points in  $S$ , how would you program a computer to determine whether a particular pair of points in  $S$  are endpoints of an edge of  $\text{conv}(S)$ ?

Here is a sample set of points, specified by coordinates:

(0.9, 4.7)  
(1.1, 9.3)  
(6.6, 2.5)  
(8.2, 1.8)  
(6.8, 8.1)  
(4.7, 7.3)  
(3.8, 1.5)  
(5.0, 2.9)  
(2.6, 5.2)  
(5.9, 6.4)

3. Given the coordinates of all points in  $S$ , how would you program a computer to find *all* edges of  $\text{conv}(S)$ ?

4. How many operations would your algorithm require to find the convex hull of 10 points? ...of 100 points? ...of 1000 points?