1. Consider a point set \( S = \{p_1, p_2, \ldots, p_n\} \) in the plane in general position (i.e., no three points of \( S \) are collinear). The points of \( S \) have pairwise different \( y \)-coordinates and are sorted in increasing order of them, i.e., \( y(p_i) < y(p_j) \) if and only if \( i < j \).

Develop an algorithm that computes a triangulation of \( S \) and needs \( O(n) \) runtime and memory. Explain your algorithm in detail, show the correctness of your solution and analyze its runtime and memory requirements.

Remark: For your analysis you can use the fact that every triangulation has \( \Theta(n) \) edges.