

CSE780 Homework 3
Due Friday, Jan 28

1. Page 319: 16.3-5 (1st version), Page 356: 15.4-5 (2nd version), Page 397: 15.4-5 (3rd edition)
2. (i) Professor Dey suggests that a faster algorithm to solve the optimal triangulation problem might exist for the special case in which the weight of a triangle is its area. Is the professor's intuition accurate?
(ii) Suppose that a weight function w is defined on the chords of a triangulation instead of on the triangles. The weight of a triangulation with respect to w is then the sum of the weights of the chords in the triangulation. Show that the optimal triangulation problem with weighted chords is just a special case of the optimal triangulation problem with weighted triangles.
3. Consider an $m \times m$ matrix of non-negative integers. We wish to choose a list of elements of this matrix whose sum is maximized such that:
if (i, j) and (k, l) are in the list, then either:
 - (a) $i < k$ and $j < l$, or
 - (b) $i > k$ and $j > l$.(note: no two elements of the list can lie in the same row or column.)
Describe an algorithm which finds such a list.

(The grader will only grade a subset of these problems.)