

SPRING 2003: **COT 6405** ANALYSIS OF ALGORITHMS
[HOMEWORK 4; DUE APR 15 IN CLASS]

Signed Statement: For every homework, add a statement to your homework that states that you have read the submission guidelines and cheating policies outlined on the course web page and that you have followed them for the homework you are submitting.

Problems

24. (**Regular**) Given a weighted undirected graph G with non-negative edge weights, if the edge weights are all increased by a positive additive constant, can the minimum spanning tree change? Can the output of Dijkstra's algorithm change for some (fixed) start vertex s ? What if they are decreased by a positive constant? What if the edge weights are all multiplied by a positive constant? Give (very) simple examples, if you claim that they can change.
25. (**Regular**) Does Dijkstra's algorithm work correctly if some edge weights are negative? Does it work correctly if some edge weights are negative, but there are no negative weight cycles?
26. (**Extra Credit**) Problem 23.2-7, page 574.
27. (**Extra Credit**) Problem 23-3, page 577.
28. (**Exercise**) Convince yourself that the biconnected components and articulation points of the graphs shown in Figure 22.10 (page 559) are as marked.
29. (**Regular**) Modify Floyd-Warshall's algorithm to output the number of distinct shortest paths between every pair of vertices in an unweighted undirected graph.