

SPRING 2004: **COT 6405 ANALYSIS OF ALGORITHMS**
[HOMEWORK 4; DUE APR 8 IN CLASS]

Problems

22. (**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.
23. (**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?
24. (**Extra Credit**) Problem 23.2-7, page 574.
25. (**Extra Credit**) Problem 23-3, page 577.
26. (**Exercise**) Convince yourself that the biconnected components and articulation points of the graphs shown in Figure 22.10 (page 559) are as marked.
27. (**Regular**) Modify Floyd-Warshall's algorithm to output the number of distinct shortest paths between every pair of vertices in an unweighted undirected graph.