

FINAL EXAM (May 1, 2003)
COP 6617 Distributed System Design
Open books and notes

Name _____ - SSN _____

1. (15 pts) (Select three out of four questions)

(a) Define peer-to-peer networks. (b) Explain Amdahl's law. (c) Compare reactive and proactive routing protocols in ad hoc networks. (d) Briefly describe functions of RTS (request-to-send) and CTS (clear-to-send) in the wireless MAC protocol.

2. (15 pts)

Apply (1) Dijkstra's algorithm and (2) Bellman-Ford's algorithm on the graph shown in Figure 6.2. Assume P_2 is the destination.

3. (20 pts)

(a) Construct an optimal spanning tree of 17 nodes for $\lambda = 5$ in the postal model. (b) Show all the turns allowed for (a) South-first routing and (b) Positive-last protocols.

4. (25 pts)

Consider a 4-level tree (see a sample 3-level tree of Figure 11.5) in which each intermediate node has exactly five children. Assume that the read quorum is 3 and write quorum is 3. How many read and write quorum are needed at level 4? Critically compare this approach with the 1-level approach.

5. (25 pts)

Perform a dimension exchange algorithm on the following 3-cube: node 0 (with load 4), node 1 (5), node 2 (10), node 3 (34), node 4 (1), node 5 (8), node 6 (15), and node 7 (6). Show all the relevant steps and the diagrams.