Name: _____

CS 6/73201   # Exam #1   **Advanced OS**

Wednesday 16 February 2000

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1. In trying to distinguish between parallel and distributed systems, I often used the terms "tightly coupled" and "loosely coupled".

    a. What is the distinction between "tightly-coupled hardware" versus "loosely-coupled hardware"? (7 points)

    b. What is the distinction between "tightly-coupled software" versus "loosely-coupled software"? (7 points)

2. For each of the network topologies below, explain when (if ever) it might be suitable for use in a physical network.

    a. fully connected (7 points)

b. star (7 points)

c. bus (7 points)

3. In message passing, explain the distinction between direct communication and indirect communication (using mailboxes). (10 points)

4. In the Ethernet protocol, explain how contention is avoided between multiple processes that want to send data on the shared bus at the same time. (20 points)

5. In many situations, threads are much more suitable than processes. What are the advantages of threads? (17 points)

6. For each of the following architectures, briefly explain how remote memory is accessed. (Do not explain the <u>caching</u> mechanism to me, only the mechanism for <u>accessing</u> remote memory.)

   a. UMA multiprocessors / SMPs (6 points)

   b. NUMA multicomputers (6 points)

   c. Distributed shared memory (6 points)