Name:
-------

## CS 6/73201 Exam #2 Advanced OS

## Wednesday 14 March 2001

- 1. Remote procedure calls typically support call-by-value parameter passing, but not call-by-reference.
  - a. Why is call-by-reference not supported? (4 points)

b. What mechanism is used instead of call-by-reference to provide similar functionality, and how does it work? (6 points)

- 2. A common application of distributed systems is to provide access to a server of some kind.
  - a. Briefly describe how a server can be structured using the dispatcher-worker model and threads. (10 points)

Name:	

b. Using threads in a server like this, which would work better — user-level threads or kernel-level threads — and why? (10 points)

- 3. A distributed shared memory system may be structured with non-replicated, migrating pages.
  - a. Briefly explain how the hardware and operating system work together to cause a remote page to migrate to the current machine. (10 points)

b. What additional complications would be introduced if the distributed shared memory system were to support replicated pages instead? (5 points)

Name:				
	Name:			

4. In Christian's algorithm for synchronizing physical clocks, nodes send a request to the time server. How do they account for the network transmission delay? (10 points)

5. Using Lamport's logical clocks, if  $a \to b$ , then C(a) < C(b). However, if C(a) < C(b), we can **not** say that  $a \to b$ . Draw and explain an example to illustrate this last statement. (15 points)

6. Using Garcia-Molina's bully algorithm to elect a coordinator, what happens if two processes independently discover that the coordinator is not responding? (10 points)

		Name:
7.		ppose a particular process A in a distributed system needs exclusive access to a particular ared resource on occasion, but not very often.
	a.	If the system uses the central coordinator algorithm for mutual exclusion, and process A is not the coordinator, what responsibility does A have to the system as a whole? (5 points)
	b.	If the system uses the Ricart and Agrawala algorithm for mutual exclusion, what
		responsibility does A have to the system as a whole? (5 points)
	c.	If the system uses the Suzuki and Kasimi broadcast algorithm for mutual exclusion, what responsibility does A have to the system as a whole? (5 points)

d. If the system uses the Raymond tree algorithm for mutual exclusion, what responsibility does A have to the system as a whole? (5 points)