Fail 1999 Test 1 Closed Book Questions - 5 Points Each I. How many processors are used in the blocked CREW sum? 2. Why are barriers useful? 3. What value is returned by a fetch-and-add? 4. Explain how an SR program may use message-passing to dynamically create a process. 5. In the Euter tour technique for solving tree problems, what is a forward edge? 6. Give an example of an algorithm that is not oblivious. Closed Book Questions - 10 Points Each 7. Compare the efficiency of pointer jumping and randomized list ranking. 8. Explain how semaphores may be used to implement a barrier for three processes. CSE 4351/5351 Sec 4351/5351 Name	CSE 4351/535	Name
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CSE 4351/5351       Name         Fall 1999       Test 1         Open Book Questions	<ol> <li>Explain h</li> </ol>	w semaphores may be used to implement a barrier for three processes.
Fall 1999         Test 1         Open Book Questions         1.       Suppose that two pthreads have been created and there are two global integer tables A and B. A has n positive integer elements, B will have elements, and k << n. Give a function modmaxes (), that when ran concurrently by the two threads, will store in each element B [1] the value Al[j] & k. that Al[j] & k. the al[j] is us that table A is randomly generated. 25 points	CSE 4351/535	Name
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<ol> <li>Suppose that two pthreads have been created and there are two global integer tables A and B. A has n positive integer elements, B will have elements, and k &lt;&lt; n. Give a function modmaxes(), that when ran concurrently by the two threads, will store in each element B[i] the value A[j] such that A[j] k = = 1. If no such values exist for some i, then B[i] is to be set to zero. Besides executing correctly, must also be efficient assuming that table A is randomly generated. 25 points</li> <li>Suppose that table A with 1 million integers is partitioned (contiguously) over 4 MPI processes. Give a function that will compute the pref these integers. The result is to be stored in array B which is partitioned like table A. 25 points</li> <li>Suppose that table A with 1 million integers is partitioned to contiguously) over 4 MPI processes. Give a function that will compute the pref these integers. The result is to be stored in array B which is partitioned like table A. 25 points</li> <li>CSE 4351/5351 Name</li></ol>	Open Book Qu	stions
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CSE 4351/5351 Name Fall 1999 Test 2 Open Book Questions	<ol> <li>How man</li> <li>Give the r</li> </ol>	rounds does all-to-all broadcast take on a k-d hypercube when all links may be used simultaneously? umber of steps and the maximum amount of queueing (buffering) needed for greedy routing of a permutation on an n-by-n mesh.
Open Book Questions	CSE 4351/5351 Fall 1999	Name
Open Book Questions	Test 2	
	Open Book Qu	stions
1. How many necklaces are found in a 128 node shuffle-exchange? 10 points	1. How man	necklaces are found in a 128 node shuffle-exchange? 10 points
2. What is the diameter of the butterfly with $2^{k}$ rows and k+1 columns? 10 points	2. What is the	e diameter of the butterfly with $2^{k}$ rows and $k+1$ columns? 10 points
3. Show how to route the following permutation on the Benes network. 10 points	3. Show how	to route the following permutation on the Benes network. 10 points
(0, 1, 2, 3, 4, 5, 6, 7)	(0 1 2 3 4)	(67)

 $\begin{pmatrix}
0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 \\
5 & 1 & 4 & 7 & 0 & 6 & 2 & 3
\end{pmatrix}$ 



- 4. How many vertex equivalence classes does a 5x6 torus have? A 5x6 mesh? 10 points
- 5. For concurrent AVL trees,  $\xi$  locks are not compatible with any other type of lock. Why is it, then, that the C code for setting a  $\xi$  lock only checks for  $\rho$  and  $\xi$  locks on the node? 10 points

CSE 4351/5351 Fall 1999 Test 3 Name \_\_\_\_\_

Closed Book Questions - 5 Points Each

- 1. How many processors are used in the hypercube matrix multiplication algorithm? Why is this number of processors used?
- 2. Is bitonic mergesort theoretically efficient? Why or why not?
- 3. How is the final output stored for shearsort?
- 4. What combination has the highest rank when the set of objects is {0, 1, 2, 3, 4, 5, 6, 7} and each generated combination has 4 elements?
- 5. What permutation has the highest rank when the set of objects is {0, 1, 2, 3, 4, 5, 6, 7} and each generated permutation has 4 elements?
- 6. Explain the GCD test.

Closed Book Questions - 10 Points Each

7. What is the goal of the OpenMP project?

8. Explain how matrix transpose may be implemented on a hypercube to minimize communication.

CSE 4351/5351 Fall 1999 Test 3 Name \_\_\_\_\_

Open Book Questions

- 1. Which combination has rank 160 when combinations with 4 elements are being chosen from the set {0, 1, 2, 3, 4, 5, 6, 7, 8, 9}? 12 points
- 2. Which permutation has rank 160 when permutations with 4 elements are being chosen from the set {0, 1, 2, 3, 4, 5, 6, 7, 8, 9}? 12 points
- 3. Suppose that each processor in an n-node hypercube posesses its own number. Give a  $\theta(\lg n)$  time algorithm that will ensure that all processors will replace their number with the maximum of the n numbers. (Hint: Having a clear concept is much more important than low-level details.) 26 points