CSI 4337 **Exam #3** **Dec. 13, 2002**
2 Hr. **CLOSED BOOK**

Name_____

All questions are worth 10 points. Maximum score:

1. Suppose you are using a shared variable named **S**, and that **S** currently has the value 18. You are running two independent processes, $\mathbf{P_1}$ and $\mathbf{P_2}$, which contain the following two statements.

$\mathbf{P_1}$	$\mathbf{P_2}$
S = S+9;	**S = S-8;**

   These two statements are executed once and only once. After these two processes complete, what are the possible values of **S**? Explain how each possible value could occur.

2. Suppose the following jobs arrive in the following order at time zero. Give the GANTT chart and the average wait time for the following algorithms: First Come First Served, Shortest Job First. Assume that a process switch requires zero time. Calculate the average wait time for both algorithms.

Job Number	Burst Time
1	2
2	4
3	3
4	5
5	1

3. Suppose we have created a decimal computer with two kinds of virtual memory, segmented memory and paged memory. A bit in the status register allows the operating system to switch between the two. When in paging mode the page size is 1000. Segments may begin at any real address, but maximum size is 1000, with segment offset being the last three digits of the virtual address. Translate the following four addresses twice. Once using the page table and once using the segment table. If any address is illegal write ERROR in the appropriate column

Page Table

0	14
1	9
2	21
3	40

	Seg. Addr.	Seg. Len
0	1025	300
1	76	50
2	4125	210
3	36721	400

Virtual	Real (paging)	Real (Segmentation)
275		
3672		
2125		
1024		

4. You have constructed a decimal computer with a three-level tree-structured page-table system. Each field in the address has three digits. Consider the following three virtual addresses. These addresses have been translated into the given virtual addresses. Construct the page tables that will permit these translations to be done properly.

Virtual	Real
001,000,001,333	111,222,333,333
000,000,000,421	000,444,555,421
000,000,001,626	999,888,777,626

5. Using the FIFO page replacement algorithm, show how many page faults would occur with the following reference string, assuming that you have 3 available page-frames.

fault													
page	1	2	1	3	1	4	1	2	5	2	3	1	2

Total Faults_____

6. Using the FIFO page replacement algorithm, show how many page faults would occur with the following reference string, assuming that you have 3 available page-frames.

fault													
page	1	2	1	3	1	4	1	2	5	2	3	1	2

Total Faults_____

7. Using the FIFO page replacement algorithm, show how many page faults would occur with the following reference string, assuming that you have 3 available page-frames.

fault													
page	1	2	1	3	1	4	1	2	5	2	3	1	2

Total Faults_____

8. You have a hard disk with a number of files recorded on it. You are examining the high-level structure of this disk. Name three things that you would expect to find there.

9. What is middleware? Give an example of a middleware system.

10. You have a file named "mooie.txt" that is stored on a hard disk. This file is stored in five consecutive sectors, 75, 76, 77, 78, and 79. Give the directory entry for this file, as it might appear in the three different file organizations given below.

Linked List

Multiple Contiguous Blocks

Indexed
