CS162, Spring 1998
Midterm 2
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Problem #1
What is the relocation table? What is in it? How does the loader use it? (10)

Problem #2
Suppose we have hardware that supports segmentation. Could we use it to support paging instead? Why or why not? (10)

Problem #3
Could we do page replacement in main memory on a set associative basis? Why or why not? How would it work? What are the tradeoffs? (10)

Problem #4
Given that the following cylinders have I/O requests pending, that the requests arrived in the order shown, that the disk head is currently at track 9, and that the last two requests serviced were on cylinders 8 and 9 (in that order), show the sequence in which the I/O requests are serviced (by listing their cylinder numbers) for each of the following scheduling algorithms. (12)
4 19 20 2 10 21 7 1 26 3 9 11
a) FIFO
b) SSTF
c) SCAN
d) CSCAN

Problem #5
Give the number of page faults for LRU, FIFO, OPT for the following reference string, for memories of size 3 and 4. (no partial credit...) (14)
5 4 3 2 5 4 6 5 4 3 2 6
Also give the number of page faults if the working set parameter is 3.5.

	3	4
FIFO		
LRU		
OPT		

Working Set:

Problem #6
The following questions are true/false. No partial credit will be given for missing answers. The questions you answer will be graded (right-wrong). (44)

___a. According to the "fast file system for unix" paper, the randomization of disk blocks over the disk

surface, as files were created and deleted, lead to a drop in read bandwidth by more than a factor of five, compared to a 'new' file system.

___b. A page frame is a fixed size portion of a process's address space.

___c. A page fault is a type of interrupt.

___d. Internal fragmentation is a problem for segmentation (as implemented without paging).

___e. The STBR points to the page table for a process.

___f. In the absence of paging, segments cannot exceed the physical memory size.

___g. A plausible MTBF for a disk is 30,000 days.

___h. In the absence of paging, the sum of the sizes of all segments cannot exceed the physical memory size.

___i. The 'memory map' is another name for the page table.

___j. Putting the user process page tables in the OS virtual memory avoids having to do a two step translation from virtual address to real address.

___k. When a page table is implemented as a hash table, it is called "an indirect page table".

___l. One solution to the problem of I/O buffers that span virtual addresses which map to non-contiguous page frames is to prevent those pages from being paged out during I/O.

___m. "ATC" and "DLAT" are synonyms for "TLB" (depending on which manufacturer we are considering.)

___n. The set in the TLB is typically selected using the high order virtual address bits.

___o. 'Working set restoration' is a page placement algorithm.

___p. MIN and LRU are both stack algorithms.

___q. The clock algorithm is also called "FINUFO".

___r. A plausible power dissipation for a disk is 3 watts.

___s. A compact disk can hold more data than a twelve inch reel of 9-track tape.

___t. There are current disks that spin at approximately 5000rps.

___u. A unix i-node has the file name in it.

___v. A unix i-node has a field showing the number of bytes in the file.