ECS 150 Written Homework #2

Due date: Beginning of Final Exam

1. What are the possible return values of the `fork()` system call?
2. The three possible runstates of a process are RUNNING, READY, and WAITING. Is it possible for a process to transition from READY state into WAITING state? If so, how? If not, why not?
3. What is the response ratio of a process? Why would we use this metric instead of turnaround time, service time, etc.?
4. What is libc?
5. If all processes in a system arrive at the same time, which scheduling algorithm will give the optimal average turnaround time? Explain briefly why this is.
6. What advantage does a scheduler with processor affinity provide over a scheduler that doesn't take it into account?
7. What does it mean to mask a signal for a process?
8. What is wired memory?
9. What is the most important design goal of a kernel memory allocator?
10. Describe how a Unix shell can implement input/output redirection for its child processes. What system calls allow this and how are they used?
11. What is advisory locking? How does it differ from mandatory locking?
12. What is the superblock of a filesystem?
13. What is an advantage of a symbolic link over a hard link?
14. Assume we have a "mini" version of UFS that stores only 4 data block pointers in the inode and can store 10 pointers in an indirect block. How would we fine the 63rd data block of a file on disk given its inode?
15. Where are filename to file mappings stored by the filesystem?

16. Page replacement. Fill in the following tables.

- LRU Algorithm

Page Referenced	Page Fault?	Result (pages in mem)
5	Y	5
2	Y	5 2
4	Y	5 2 4
3	Y	5 2 4 3
6		
2		
6		
5		
1		
7		
1		
4		
6		
5		
2		

- Optimal Algorithm

Page Referenced	Page Fault?	Result (pages in mem)
5	Y	5
2	Y	5 2
4	Y	5 2 4
3	Y	5 2 4 3
6		
2		
6		
5		
1		
7		
1		
4		
6		
5		
2		