Exam #2

CSE 3320.002

Spring 2019

Name: _____

UTA ID:_____

"I certify that the following work is my work alone and I will follow the highest standards of integrity and uphold the spirit of the Honor Code"

Signature:_____

Directions: This is a closed book, closed notes exam. You may use a hand written 3x5 note card with notes. Please answer the questions briefly. Complete sentences are not necessary. Write your answers legibly. Unreadable answers will be counted wrong. There is a powers of 2 table on the last page.

1. [8pts] Given a disk with 10MB per track, a rotation time of 12.64 ms and a seek time of 6 ms. What is the time in ms to read a block of 20000 bytes.

2. [9pts] Given a file system that uses inodes to represent files. Disk blocks are 2KB in size, and 16 bit pointers. This file system's index nodes have 10 direct disk blocks, as well as 2 indirect disk blocks and 2 double indirect block and a triple indirect block. What is the largest file that can be held using this inode layout?

3. [8pts] Given a page request reference string of D C A B C D E F A B D A B and a page table size of three, calculate how many page faults will occur with the optimal page replacement algorithm and LRU. If all pages are equally replaceable pick the first available.

4. [9pts] The FAT-32 is a variation of which of the three allocations schemes we discussed? Give an advantage and a disadvantage of FAT-32.

5. [8pts] List the two schemes we discussed for tracking free disk blocks. Give an advantage of each.

6. [6pts] Explain physical and logical journals.

7. [8pts] How much cylinder skew is needed for a 7200-RPM disk with a track-to-track seek time of 53 msec? The disk has 300 sectors of 512 bytes each on each track

8. [4pts] Give a strength of memory mapped I/O.

9. [8pts] Describe the two main categories of I/O devices.

10. [7pts] Describe the second chance algorithm

11. [8pts] Explain the performance optimizations used by the ext2 file system.

12. [10pts] Given the following request queue -- 8, 17, 4, 76, 42, 20 90, 41, 94, 97 with the disk head initially at the track 50 initially moving in the negative direction (towards 0). The beginning of the disk at 0 and the end of the disk is at 100. Calculate the travel time for the C-LOOK, LOOK, SCAN, and C-SCAN algorithm. Assume all reads are made in the negative direction if applicable.

13. [7pts] Give 4 of the key concepts of I/O software that we discussed.

Bonus:

(5pts) Write a short program that forks a process. In the child process open a file name “first.txt” , read an integer starting at the 1024th byte from the end of the file and print the value in hexadecimal and decimal. Have the parent open a file name “second.txt” and read a byte starting at the 512th byte from the beginning of the file and print the resulting value as a char. Assume each file is large enough.

n	2^n	n	2^n	n	2^n
0	1	11	2,048	22	4,194,304
1	2	12	4,096	23	8,388,608
2	4	13	8,192	24	16,777,216
3	8	14	16,384	25	33,554,432
4	16	15	32,768	26	67,108,864
5	32	16	65,536	27	134,217,728
6	64	17	131,072	28	268,435,456
7	128	18	262,144	29	536,870,912
8	256	19	524,288	30	1,073,741,824
9	512	20	1,048,576	31	2,147,483,648
10	1,024	21	2,097,152	32	4,254,967,296