

Name: _____ (First name first)

Total: _____

COSC 6360

QUIZ #1

JULY 22, 2011

Closed book. You can have with you one single-sided 8½ by 11 sheet of notes.

1. Why does FFS use blocking writes to implement all metadata updates? (10 points)

To ensure that all metadata operations are completed in the right order. One might also add that _____ it ensures their durability. _____

What is the main drawback of this approach? (10 points)

Too many disk accesses and too many seeks, which results in a poor file system throughput.

2. What was the main drawback of requiring a **minimum block size of 4KB** for the FFS? (10 points)

Too much space was lost due to internal fragmentation (especially in file systems consisting of many _____ very small files). _____

How was that issue addressed by the designers of the FFS? (10 points)

By introducing block fragments of size equal to $\frac{1}{2}$ or $\frac{1}{4}$ block. _____

3. Consider an old UNIX virtual memory system using a single-handed page replacement policy? Assuming that the hand makes one rotation every two seconds, what are the minimum and maximum times a page will survive in main memory after it was referenced for the last time? (2×10 points)

The page will survive in main memory for at least two second(s) and at most four seconds after it was referenced for the last time

4. What is the main **performance advantage** of **mapped files**? (10 points)

Fewer context switches as the contents of file blocks already in main memory can be accessed _____
without kernel intervention. _____

5. What is the main disadvantage of selecting large transfer units in a DSM? (10 points)

An increased amount of false sharing. _____

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6. Consider a very small cache that can hold only four pages and assume that the cache is managed by the ARC replacement policy. If the current state of the cache is fully described as

	L1	L2
<i>In cache</i>	4	5
	3	2
<i>Simulated</i>	1	6
	9	7

Which events will result in

- a) An **increase** of target_T1? (10 points)

Cache misses caused by accesses to blocks 1 and 9. _____

- b) A **decrease** of target_T1? (10 points)

Cache misses caused by accesses to blocks 6 and 7. _____
