CS 423, Spring 2016

Homework (total = 10 points)

Question 1

In security literature, which of the following best describes an access control list?

a) It is a list of public keys that a user stores for decrypting communication from different parties
b) It is a list of passwords that a given user maintains for different accounts
c) It is a list that shows, for each user, which certificates the user has from the certificate authority
d) It is a list that shows, for each resource, who has which access rights to that resource

Question 2

Which of the statements below is true of the NFS file system?

a) It may allow conflicting concurrent updates to the same file
b) It strictly enforces a one-writer-at-a-time rule
c) It makes updates to locally-cached files available to the server only when the session is closed using an explicit "close()" operation
d) It allows physical copying of an entire remote file system onto the local disk via the "mount()" primitive

Question 3

In distributed file systems, what is the difference between location-independence and location-transparency?

a) Location-transparency means that the location of a file is revealed explicitly to the user, whereas location-independence (also known as location-opaqueness) means that the location is not revealed.
b) Location-independence means that the name of a file does not reveal its location. Location-transparency, means that the name does not have to change when the location changes.
c) Location-transparency means that the name of a file does not reveal its location. Location-independence, means that the name does not have to change when the location changes.
d) The two terms mean the same thing

Question 4

Belady's Anomaly occurs in which of the following policies?

a) Least frequently used replacement
b) Least recently used replacement
c) FIFO replacement
d) Either of the first two answers

Question 5
In multi-level security systems, the Bell-La Padula model is used to:

a) Prevent applications of a higher security level from reading less secure content
b) Ensure that more secure information does not leak to lower security processes
c) Ensure that lower-security data cannot contaminate high-security applications
d) Ensure that an application running at a particular security level can only see data of the same security level

Question 6
A TLB is used in a virtual memory system. The access time of the TLB is 0.2 time unit. The regular memory access time is 1 time unit. A single-level page table is used. The hit ratio on the TLB is 50%. What is the average overall latency of accessing a word in main memory in the case of a TLB miss?

1 TLB access (miss) + 1 memory access (page table) + 1 memory access (content) = 2.2 units.

Question 7
A shortest-seek-time-first policy is used to schedule a disk-head in a particular file system. Assume that requests for the following tracks arrive simultaneously: 33, 43, 44, 46, 50, 51, 70. The disk head is initially at track 47. In what order will these requests be served? (Please list requests in the ordered they are served.)

46, 44, 43, 50, 51, 33, 70

Question 8
Answer true or false: In virtual machines, dynamic binary translation occurs at the granularity of a single block at a time. The best definition of a block, in this context, would be: a single function call from entry to exit. If false, please correct.

False: A block is a piece of sequential code that ends with a jump.

Question 9
You are writing a map/reduce application to count the number of times each word appears in a group of articles. Write the input and output of each of the map and reduce functions. (2 points)

Map: List of (Document ID, Document Body) → List of (Word, 1), one per word in the document.
Reduce: List of (Word, 1) → List of (Word, Sum), where Sum is the total number of times Word occurs.

The End
