Sample final exam

Started: Jun 5 at 9:18am

Quiz Instructions

The following is a sample final exam for CS 111, intended to help you study for the actual final. It is shorter than the real final, but contains similar kinds of questions. You are not required to take this practice exam, and doing so will not affect your grade.

Question 1 — 1 pts

Match the following problems in providing correct behavior in NFSv2 with the solutions used in that system.

Update visibility	[Choose]
Stale cache contents	[Choose]
Non-idempotent mkdir semantics	[Choose]

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Question 2 — 1 pts

Match the following elements of the FAT file system with their role in that system.

BIOS block	[Choose]
FAT table	[Choose]
Directory entries	[Choose]

Question 3

1 pts

Match each REST constraint with a reason why it is required in RESTful systems.

Client-server	[Choose]
Statelessness	[Choose]
Cacheability	[Choose]
Layering	[Choose]
Uniform interface	[Choose]

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Question 4

1 pts

Match the following security design principles to an example of their use.

Economy of mechanism	[Choose]
Complete Mediation	[Choose]
Least privilege	[Choose]
Open design	[Choose]
Fail-safe defaults	[Choose]

Question 5

1 pts

Which of the following general synchronization solutions is most suitable for dealing with the following kinds of synchronization bugs?

Atomicity-violation bugs	[Choose]
Order-violation bugs	[Choose]
Deadlock	[Choose]
Livelock	[Choose]

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Question 6

1 pts

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Which of the following are advantages of a kernel-supported thread approach vs. user-mode threads?

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- [ ] Thread blocking on system calls does not reduce parallelism for kernel threads
- [ ] Kernel threads provide better support for intra-process parallelism
- [ ] Kernel supported threads can make use of a single shared stack per process
- [ ] Kernel threads can protect against infinite loops in threads, while user threads cannot
- [ ] Kernel threads are always cheaper to schedule

Question 7

1 pts

What are the benefits of lazy writes (write buffering)?

- [ ] More efficient scheduling of writes.
- [ ] Avoid performing some writes to the storage devices entirely.

- [ ] Better reliability in the face of system crashes
- [ ] Better performance for very small writes
- [ ] Eliminate writes that are identical to the data on the disk

Question 8

1 pts

Which of the following are effective means of reducing resource contention?

- [ ] identify the conflicting computations, and avoid running them at the same time
- [ ] Divide resources into sub-pools, each with its own lock
- [ ] reduce the number of updates to a shared data structure
- [ ] use a smaller number of more global locks to reduce the number of locking operations
- [ ] Reduce the size of the critical section
- [ ] increase the number of threads (and processors to run them)

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Question 9

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1 pts

Which of the following statements are true of cryptographic hashes?

- [ ] They are a form of public key cryptography
- [ ] It should be hard to deduce characteristics of the plaintext based on the hash
- [ ] The algorithm used is typically secret
- [ ] Two similar plaintexts should hash to entirely different values
- [ ] They must be collision-free
- [ ] They require a shared secret key between sender and receiver
- [ ] It should be hard to find two plaintexts that hash to the same thing

Question 10

1 pts

Which of the following are valid observations about Deadlock Detection and Health Monitoring?

- [ ] Heart Beat detection cannot determine if a component is working correctly.
- [ ] Health monitoring cannot detect formal deadlocks.
- [ ] Deadlock detection demands that we be able to identify all participating resources.
- [ ] Either can be done from outside of the involved applications.
- [ ] Both are invoked only when we have reason to believe the system may be in trouble.

Question 11

1 pts

The best definition of "livelock" is:

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- ○ The necessary lock is available
- ○ Continuing to execute while holding a locked resource
- ○ Failing to achieve a safe resource allocation state
- ○ Deadlock has been avoided, but not prevented
- ○ not blocked, but unable to make progress

Question 12

1 pts

Which of the following problems are likely to be encountered if one uses direct page mapping to implement an FTL?

- [ ] High performance penalties for garbage collection
- [ ] Severe write amplification
- [ ] Severe read amplification
- [ ] High performance cost on writes
- [ ] Poor wear leveling

Question 13

1 pts

Which of the following statements are true of DMA?

- [ ] It can only be performed when the CPU is not using the memory bus
- [ ] It permits devices to obtain data in RAM without going through the CPU
- [ ] Devices can always seize the bus to perform DMA
- [ ] It is controlled by a scheduler that determines who uses the bus at any given moment
- [ ] It is most efficient for small data transfers
- [ ] It can only be used when the CPU is idle

Question 14

1 pts

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Which of the following are benefits of dynamic allocation of a resource to multiple parties, as opposed to static allocation of pieces of the resource among the parties?

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- [ ] Dynamic allocation better ensures that no party is starved of any share of the resource
- [ ] Dynamic allocation is less likely to lead to deadlock than static allocation
- [ ] Dynamic allocation is simpler and cheaper than static allocation
- [ ] Dynamic allocation is likely to achieve better utilization of the resource
- [ ] Dynamic allocation can better adjust to different needs among the parties
- [ ] Dynamic allocation provides more predictable performance

Question 15

1 pts

Which of the following actions typically occur when you create a file?

- [ ] The file's existence is reliably written to persistent media
- [ ] The initial data is written into the file

- [ ] The caller doesn't block, but receives a signal from the OS when the creation is complete
- [ ] A file descriptor is chosen and filled in
- [ ] A name is written into a directory

Question 16

1 pts

Which of the following significant performance issues in prior Unix file systems were identified and fixed by the Berkeley Fast File System team?

- [ ] The difficulty of allocating contiguous or nearly contiguous blocks.
- [ ] Evolving disk technology that made it impossible to identify cylinder boundaries.
- [ ] Improving the interface to the file system
- [ ] Time spent seeking between I-nodes, directories and files.
- [ ] High disk/head motion overhead due to a small block size.
- [ ] The difficulty of optimizing file head motion for processes that operate in multiple directories.

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Question 17

1 pts

Which is the best description of Java synchronized methods?

- ○ Java synchronized methods enforce mutual exclusion, but not before-or-after semantics.
- ○ while a thread executes an object's synchronized method, no other thread can execute a synchronized method for that object.
- ○ the object is locked against other invocations of the same synchronized method
- ○ Java synchronized methods provide full semaphore semantics.
- ○ the class is locked for the duration of any of its synchronized methods

Question 18

1 pts

Which of the following are true observations about spinning?

- [ ] it may delay the availability of the required resource
- [ ] it is usually a bad choice on a single core processor
- [ ] it is usually a bad choice on a multi-core processor
- [ ] waiting lists can eliminate spinning, and they can be implemented without locks
- [ ] if many processes contend for the resource, yielding is the correct choice, rather than spinning
- [ ] it ensures prompt response when the resource becomes available

Question 19

1 pts

Which of the following statements are true of the cloud model of computing?

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- [ ] It exposes virtual resources to its users
- [ ] Cloud services are designed to handle flexible degrees of load gracefully
- [ ] All data access in a cloud environment is remote
- [ ] They do not fit in well with horizontally scalable systems
- [ ] Public cloud services are typically co-located with their clients

Question 20

1 pts

What problem do condition variables solve?

- ( ) coordinating cooperating parallel processes
- ( ) defining the conditions under which a computation should continue
- ( ) awaiting the completion of asynchronous events
- ( ) Shared resource allocation

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