SOLUTIONS TO THE THIRD 6360 QUIZ

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Fall 2016
First question

- A system of physical clocks consists of two clocks, namely, one that is fast and gains one minute every hour and another that is neither fast nor slow.

- Assuming that the clocks are managed by Lamport’s physical clock protocol, what will be the time marked by each clock at 4 pm given that:
  - Both clocks indicated the correct time at noon
  - The processors on which the clocks resides stopped exchanging messages at 3 pm
  - Message transmission delays are negligible.
First question

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Second question

- For what purpose does SSH use HMAC-SHA?
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- To verify the integrity of messages
  - SHA guarantees that any message tampering will affect the SHA
Third question

- Both RAFT and Pirogue are said to use a “strong leader” approach.
- What do we mean by that?
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- What do we mean by that?

  - Only the leader can issue log updates
Fourth question

- What is the main disadvantage of letting a Pirogue cluster run with a single operational server?
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  - *It will sometimes leave the service in a state where the loss of one server will result in a data loss*
Fifth question

According to Shah and Pâris, which is the best policy for selecting chunks within the sliding window of their video streaming solution?
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- The best chunk selection policy is *rarest first*
Sixth question

- Consider a RAID level 5 array with 10 disks per parity stripe.
- What would be its space overhead?
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- What would be its space overhead?

- **TEN percent of the array will be occupied by parity data.**
Seventh question

- According to Rosenblum and Ousterhout, what is the absolute minimum write cost of their log-structured file system?
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- **TWO disk accesses per write operation.**
Eighth question

- Why can log-structured file systems recover faster after a crash than traditional file systems?

- *Since all recently modified blocks are at the tail end of the log, we do not need to check whole file system for inconsistencies*
Ninth question

- In a journaling file system, when can log entries be *purged* from the log?
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- In a journaling file system, when can log entries be purged from the log?

  *Log entries can be purged from log as soon as the buffer blocks they have modified are written back to disk.*
Tenth question

- What kind of *dependency information* does *soft updates* maintain?
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- They keep track of which i-node blocks must be written before or after which directory entry.