SECOND QUIZ ANSWERS

COSC 6360

October 1, 2018

WHITE QUIZ

First question

- How does Nooks ***recover*** from an extension failure?
- What is the ***main limitation*** of this approach?

First question

- How does Nooks ***recover*** from an extension failure?
- What is the ***main limitation*** of this approach?

  - ***Nooks recovers from an extension failure by killing and restarting the failing extension.***
  - ***The approach des not work for all extensions.***

Second question

- Give one reason for the relatively high overhead of Nooks.

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  - ***Each switch of lightweight protection domains involve fetching a new page table and results in a TLB flush.***

Third question

- How do ***mapped files*** reduce the number of context switches during file accesses?

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- How do ***mapped files*** reduce the number of context switches during file accesses?
  - ***They bring file blocks directly into the address space of the process accessing them.***
  - ***They eliminate the context switches required to transfer data between the system I/O buffer and the process space.***

Fourth question

- In Mach, what are the ***inheritance attributes*** of

  a) The ***code segment*** of a process:

  b) Any of its ***mapped files***:

Fourth question

- In Mach, what are the ***inheritance attributes*** of

  a) The ***code segment*** of a process: ***Shared***

  b) Any of its ***mapped files***: ***Shared***

Fifth question

- Why TLB sizes have remained small while memory sizes have been exploding?

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- Why TLB sizes have remained small while memory sizes have been exploding?
  - ***Because larger TLBs would be slower and TLBs must be very fast***

Sixth question

- Consider a virtual memory system with 4 KB pages, 24 GB of RAM and a TLB with 512 entries.
- What would be the ***coverage*** of this TLB?

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- Consider a virtual memory system with 4 KB pages, 24 GB of RAM and a TLB with 512 entries.
- What would be the ***coverage*** of this TLB?
  - ***512×4KB = 2MB***

Seventh question

- How do Navarro et al. propose to handle ***dirty superpages***?
- Why?

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- How do Navarro et al. propose to handle ***dirty superpages***?
- Why?

- ***They propose to disband superpages the first time one of their base pages gets modified.***
- ***Otherwise we would have to save the whole superpage when it gets expelled from main memory***

Eighth question

- What can cause ***false sharing*** in a multicore system
- How can we solve the problem?

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- How can we solve the problem?

- ***False sharing occurs when two distinct data items appear in the same cache line, they are accessed by two different threads and one of them is frequently updated.***
- ***We should move one of the two items to a different address.***

YELLOW QUIZ

First question

- Why TLB sizes have remained small while memory sizes have been exploding?

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  - ***Because larger TLBs would be slower and TLBs must be very fast***

Second question

- Consider a virtual memory system with 4 KB pages, 16 GB of RAM and a TLB with 256 entries.
- What would be the ***coverage*** of this TLB?

Second question

- Consider a virtual memory system with 4 KB pages, 16 GB of RAM and a TLB with 256 entries.
- What would be the ***coverage*** of this TLB?
  - ***256×4KB = 1MB***

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- In Mach what are the two possible ***inheritance attributes*** for the ***data segment*** of a process?

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  a) Copy

  b) Share

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- Why does Nooks XPC mechanism use ***calls by value and result***?

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  - ***The call by value and result delays updates until the procedure has completed and allows the Nooks XPC mechanism to check their validity.***