SOLUTIONS TO THE THIRD 3360/6310 QUIZ

Jehan-François Pâris Summer 2016

- Complete the following sentences:
 - The _____ bit indicates whether a page has been *modified* since it was brought in main memory.

- Complete the following sentences:
 - The <u>dirty</u> bit indicates whether a page has been *modified* since it was brought in main memory.

Complete the following sentences:

In the Berkeley Fast File System, each cylinder group contains both data blocks and

- Complete the following sentences:
 - In the Berkeley Fast File System, each cylinder group contains both data blocks and <u>i-nodes</u>.

- Complete the following sentences:
 - The major advantage of the VMS/Windows page replacement policy over its rivals is that it supports _____.

- Complete the following sentences:
 - The major advantage of the VMS/Windows page replacement policy over its rivals is that it supports <u>real-time processes</u>.

Complete the following sentences:

Each TLB entry contains _____, a page frame number, and the usual bits found in a page table entry.

- Complete the following sentences:
 - Each TLB entry contains <u>a page number</u>, a page frame number, and the usual bits found in a page table entry.

Second question

- A 32-bit Berkeley UNIX file system has a block size of 8 kilobytes.
 - What is the maximum number of **blocks** in a file
 - How many of these *blocks* can be accessed with one level of indirection?

Second question

- A 32-bit Berkeley UNIX file system has a block size of 8 kilobytes.
 - What is the maximum number of *blocks* in a file?
 - **4GB/8KB = 512K or 2¹⁹ blocks**
 - How many of these *blocks* can be accessed with one level of indirection?

Second question

- A 32-bit Berkeley UNIX file system has a block size of 8 kilobytes.
 - What is the maximum number of *blocks* in a file?
 - 4GB/8KB = 512K or 2¹⁹ blocks
 - How many of these *blocks* can be accessed with one level of indirection?
 - 8KB/4B = 2,048 or 2¹¹ blocks

Third question

- A computer has 48 bit addresses and a virtual memory with a page size of 8 kilobytes.
 - □ How many bits are used by the byte offset?
 - How many bits are used by the page number?

Third question

- A computer has 48 bit addresses and a virtual memory with a page size of 8 kilobytes.
 - How many bits are used by the byte offset?
 log₂ 8K = log₂ 2¹³ = 13 bits
 - How many bits are used by the page number?

Third question

- A computer has 48 bit addresses and a virtual memory with a page size of 8 kilobytes.
 - □ How many bits are used by the byte offset?
 - $\log_2 8K = \log_2 2^{13} = 23 \text{ bits}$
 - How many bits are used by the page number?

■ 48 – 13 = 35 *bits*

What is the main purpose of the UNIX mount primitive?

- What is the main purpose of the UNIX mount primitive?
 - The Unix mount primitive makes a disk appear as a subdirectory of another partition.

□ What can we do to prevent *thrashing*?

□ What can we do to prevent *thrashing*?

 We should give all processes enough page frames to run without causing too many page faults.

OR

We should keep the utilization of te paging device below 60 percent.

How does Berkeley UNIX simulate the page referenced bit?

How does Berkeley UNIX simulate the page referenced bit?

- It uses the valid bit:
 - Resets valid bit to zero instead of resetting PR bit to zero.
 - When page is referenced again an interrupt occurs and the valid bit is set back to one.

What is the major advantage of *mapped files*?

- What is the major advantage of *mapped files*?
 - Processes can access the contents of their mapped files without having to do system calls.

OR

Fewer context switches.

□ Where does UNIX store *file name*s?

□ Where does UNIX store *file name*s?

In the directory entry or entries pointing to the file i-node.

What is the main advantage of journaling file systems with synchronous log updates over other journaling file systems?

- What is the main advantage of journaling file systems with synchronous log updates over other journaling file systems?
 - They guarantee the durability of all metadata updates.

What causes internal fragmentation?

• What causes *internal fragmentation*?

- Internal fragmentation occurs each time
 A process address space does not occupy the entirety of its last virtual memory page.
 - A file does not occupy the entirety of its last data block.

What does the Berkeley fast file system do to address this issue?

What does the Berkeley fast file system do to address this issue?

 FFS blocks can be subdivided into 2, 4, or 8 fragments
 FFS uses these block fragments to store
 Small files
 Tail ends of larger files

- When we delete a file, in which order should we delete the file i-node and the last directory entry pointing to that i-node?
 - We should delete the _____ first.

- When we delete a file, in which order should we delete the file i-node and the last directory entry pointing to that i-node?
 - We should delete the <u>directory entry</u> first.

When we create a file, in which order should we create the i-node of the new file and the directory entry pointing to it?

□ We should create the _____ first.

- When we create a file, in which order should we create the i-node of the new file and the directory entry pointing to it?
 - We should create the <u>file i-node</u> first.

Seventh question

- Why do most file systems combine access control lists and tickets to control access to files and directories?
- Because access control lists _____

and tickets

Seventh question

- Why do most file systems combine access control lists and tickets to control access to files and directories?
- Because access control lists <u>are too slow</u>

and tickets are too inflexible.