ANSWERS TO THE FIRST COSC 6360 QUIZ

Fall 2020

First question

- Why is it a good idea to replicate ***superblocks***?

Answer

- Why is it a good idea to replicate ***superblocks***?
  - Because, without it, we cannot access the contents of the whole disk partition.

Second question

- Which problem does ***copy-on-write*** try to solve?

Answer

- Which problem does ***copy-on-write*** try to solve?
  - Copy-on-write tries to reduce the cost of the Unix/Linux **`fork()`** system call by only making copies of the data blocks of the parent process that are modified.

Third question

- What does Unix and Linux do to speed up access to the ***i-nodes*** of ***opened files***?

Answer

- What do Unix and Linux do to speed up access to the ***i-nodes*** of ***opened files***?
  - They cache the i-nodes of opened files at **open()** time.

The question specifically asked what Unix/Linux do to speed up access to the ***i-nodes*** of ***opened files***.

Many of you mentioned cylinder groups but they speed up access to the file data blocks.

Fourth question

- How does FreeBSD detects ***interactive threads***?

Answer

- How does FreeBSD detects ***interactive threads***?
  - FreeBSD detects interactive threads on the base of their ***interactivity score***, that is, their sleep time over run time ratio.

Fifth question

- Would it make sense to keep the two-hand page replacement policy on an architecture having a page-referenced bit that would be automatically set by the hardware each time a page is accessed?

Answer

- Would it make sense to keep the two-hand page replacement policy on an architecture having a page-referenced bit that would be automatically set by the hardware each time a page is accessed?
  - No because we would not have to worry about the linear speed of the hand of the clock.

The two-handed policy was introduced because using a valid bit to simulate non-existing page-referenced bit limited the linear speed of the hands of the clock.

Using a hardware-supported page-referenced bit would eliminate this restriction. Look at slides 142 to 145 of the PowerPoint presentation.

Sixth question

- What does the Unix ***set userID bit*** do?

Answer

- What does the Unix ***set userID bit*** do?
  - The set userID bit allows an executable to run with ***the rights of the owner*** of the executable rather than the rights of the process executing it.

Seventh question

- Give two reasons why Unix/Linux pipes are not a general inter-process communication mechanism.

Answer

- Give two reasons why Unix/Linux pipes are not a general inter-process communication mechanism.
  - Pipes are unidirectional.
  - They have to be set up by a common ancestor of the involved processes.

Answers that mentioned that the two processes had to be on the same machine got significant partial credit.

Eighth question

- Where does Unix file systems store their ***access control lists***?

Answer

- Where does Unix file systems store their ***access control lists***?
  - In the i-node of each file.

Ninth question

- When we delete a Unix/Linux file, what ***could happen*** if we deleted the i-node of the deleted file ***before*** deleting the directory entry that pointed to it?

Answer

- When we delete a Unix/Linux file, what ***could happen*** if we deleted the i-node of the deleted file ***before*** deleting the directory entry that pointed to it?
  - The file system would be left in an ***inconsistent state*** if the system crashed ***after*** the deletion of the file i-node but ***before*** the deletion of the directory entry that pointed to the i-node.

Tenth question

- Whatever personal computer you use today, its operating system is ***extremely likely*** to descend from one of two operating systems that were running forty years ago on a specific computer.
- Which one?

Answer

- Whatever personal computer you use today, its operating system is ***extremely likely*** to descend from one of two operating systems that were running forty years ago on a specific computer.
- Which one?
  - The Digital Equipment Corporation VAX

Because both Berkeley Unix, which influenced all further versions of Unix, and VMS, which influenced Windows NT, Windows XP and all their successors, ran on it.

Answers that mention the PDP-11 family of minicomputers got partial credit because Unix ran on it and RSX-11, its native OS, influenced VMS. There were too many differences between RSX-11 and VMS to deserve full credit.