COURSE MATERIALS

COMMUNICATION

ASSESSMENTS

MY TOOLS

Quiz Submissions - Homework 1 *

Daniel Davis (username: DanielDavis.dkd6)

Attempt 1

Written: Sep 29, 2013 8:57 PM - Sep 29, 2013 9:01 PM

Submission View

released: Sep 30, 2013 1:00 AM

Question 1 1 / 2 points

Which of the following instructions should be privileged, i.e. run in kernel mode?

- ★ Write to main memory.
- V Interrupts.
- ➡ X ☐ Access data on a DVD drive.

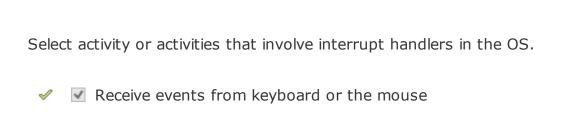
✓ Hide Feedback

This is not a privileged instruction. A user program may access memory in user mode.

Privileged so that a process cannot control CPU time and disable any communication between devices and CPU.

It is privileged so that a process cannot be arbitrarily suspended from the CPU and replaced by another process for the duration of its time.

Question 2 2 / 2 points



- ✓ Printing a message to the screen.
- Open a file in a word processor program.
- ✓ Sort numbers stored in an array in memory assuming all data are in memory.

✓ Hide Feedback

Pressing a key on the keyboard or moving the mouse triggers hardware interrupts that cause the processor to read the keystroke or mouse position.

Printing a message requires access to the graphics adapter, which is an output device. Any access of a device requires privileged instructions.

Opening a file requires system call, which triggers a switch to kernel mode. It is a privileged instruction to protect unauthorized access from user files.

Question 3 0.5 / 0.5 points

Classify the vending machine as a hard or soft real-time system:

- hard real-time
- ✓ soft real-time
- ✓ Hide Feedback

It is sufficient to priorities the tasks that the vending machine has to complete.

Question 4 0 / 0.5 points

Classify the robot arm in a manufacturing plant as a hard or soft real-time system:

x soft real-time

⇒ ∩ hard real-time
✓ Hide Feedback
This cannot be a soft real-time system because all jobs need to be completed within fixed time constraints.
Question 5 0.5 / 0.5 points
Classify the control system of an elevator as a hard or soft real-time system:
o soft real-time
✓ ● hard real-time
✓ Hide Feedback
All tasks must be completed within fixed time constraints to ensure that the elevator works properly.
Question 6 0.5 / 0.5 points
Classify the aircraft navigation system as a hard or soft real-time system:
osoft real-time
✓ ● hard real-time
✓ Hide Feedback
Hard because all jobs should be completed on time and catastophic events may follow if not completed on time.
My Home SYS & NET I Daniel Davis points

Consider a multi-core computer system and a multi-threaded program written using the many-to-many threading model. Which of the following scenarios may lead to an optimal performance assuming the program is CPU-bound (computationally intensive)?

- The number of threads is below the number of cores in the system
- ➡ The number of threads matches the number of cores in the system
 - The number of threads far exceeds the number of cores in the system

✓ Hide Feedback

Having fewer threads than cores generally means you can't take advantage of all available cores. This will result in degradation of performance.

Question 8 1.5 / 2 points

Indicate which of the following actions by the OS are necessary to create a new process using system call fork()? (Note: order not relevant)

- ➡ ✓ Switch from user mode to kernel mode.
 - ★ Locate free memory.
- ➡ ✓ ☑ Indentify a new process ID.

✓ Hide Feedback

A user process will enter the kernel-mode when it starts executing fork(), which is a privileged instruction. Other cases, when the user process will switch to kernel mode include:

When it is interrupted (e.g. by the timer).

When an exception occurs (e.g. divide by 0).

The new process created will initially not be located in a separate address space. It will initially share the same address space as the caller process.

System call fork() is used to create new process. It takes no arguments and returns a process ID.

Process control block is a data structure in the kernel that contains information needed to manage a particular process.

Close