

OS HW1 DUE: 22/10/2009

1.3 Give two reasons why caches are useful. What problems do they solve? What problems do they cause? If a cache can be made as large as the device for which it is caching (for instance, a cache as large as a disk), why not make it that large and eliminate the device?

1.6 How does the distinction between kernel mode and user mode function as a rudimentary form of protection (security) system?

1.13 Which of the following instructions should be privileged?

- a. Set value of timer.
- b. Read the clock.

1.18 Direct memory access is used for high-speed I/O devices in order to avoid increasing the CPU's execution load.

- a. How does the CPU interface with the device to coordinate the transfer?
- b. How does the CPU know when the memory operations are complete?
- c. The CPU is allowed to execute other programs while the DMA controller is transferring data. Does this process interfere with the execution of the user programs? If so, describe what forms of interference are caused.

2.3 Why is a just-in-time compiler useful for executing Java programs?

2.10 What is the main advantage of the layered approach to system design? What are the disadvantages of using the layered approach?

2.13 What is the main advantage of the microkernel approach to system design? How do user programs and system services interact in microkernel architecture? What are the disadvantages of using the microkernel approach?

2.18 How could a system be designed to allow a choice of operating systems from which to boot? What would the bootstrap program need to do?