

Example questions for CS 111 midterm

These three questions are examples of the kinds of questions you might expect to see on the midterm. None of these questions will appear on the midterm, of course, but similar types of questions will. You should be able to answer these questions in 2-5 sentences. Lengthy essays are not required.

The second page shows answers for these questions. Try answering them and comparing them to the provided answers.

1. What is the difference between partitionable resources, sharable resources, and serially sharable resources? Give an example of each kind of resource that might be found in a computer system.

2. If you wish to go from providing soft modularity to hard modularity on a single machine, what must the operating system ensure happens? Describe three resources on a typical computer where the operating system must do something to ensure hard modularity, and briefly describe what sort of thing must be done.

3. What is the relationship between interrupts and receive livelock?

1. What is the difference between partitionable resources, sharable resources, and serially sharable resources? Give an example of each kind of resource that might be found in a computer system.

Partitionable resources can be divided into discrete parts, each of which can be given to a separate thread. Memory is a good example. Sharable resources can be used simultaneously by multiple threads. A dynamic library or a file are examples. Serially sharable resources can be used by multiple threads, but only one at a time. A network card is an example. Other examples of all kinds of resources are also acceptable.

2. If you wish to go from providing soft modularity to hard modularity on a single machine, what must the operating system ensure happens? Describe three resources on a typical computer where the operating system must do something to ensure hard modularity, and briefly describe what sort of thing must be done.

The operating system must ensure that no thread can inadvertently or intentionally cross the hard modularity boundaries. 1). Memory: the OS must ensure that memory areas belonging to one thread cannot be accessed by another. 2). The file system: the OS must ensure that a process cannot read or write files for which it does not have access permission. 3). Scheduling: the OS must ensure that a thread cannot continue to run when its time slice has expired or it is preempted for some other reason. Other resources could be described, instead.

1. What is the relationship between interrupts and receive livelock?

Receive livelock occurs when requests arrive at a resource faster than they can be handled. Each receipt causes an interrupt. While that interrupt is being processed (and further interrupts are masked), another request arrives. As soon as the first interrupt's handling is done and interrupts are re-enabled, the second interrupt occurs, before any actual handling of the request is possible. In essence, in receive livelock, the processor only services interrupts and has no time to do actual request processing.