Midterm #2 practice questions
Fall 2000 15-712

The midterm is open book, open notes, and will be held in class. We suggest that you prepare for the exam by answering these review questions, reading your classmates' paper reviews posted to the course webpage, studying the lecture notes and any of your own notes that you have taken, and skimming the assigned papers.

In the actual exam, you should write brief, precise answers. Rambling brain-dump answers may be punished twice — you run out of time writing them and we run out of patience reading them. :–)

1. It has been argued that the nature of both the Internet and UNIX around the time of the Internet worm were both helpful in allowing the worm to disseminate and helpful in defeating the worm. List two characteristics being referred to and indicate how each helped and hurt.

2. What is priority inversion? Describe how it can be caused by locks and a negative effect that could result.

3. What makes a fault model Byzantine? Why is this more difficult to deal with than "fail-stop" faults?

4. How many nodes are needed to continue operating in the face of a fail-stop fault? Why? How does this answer change for a Byzantine fault?

5. Explain one way that threads can be used to avoid deadlock.

6. Can priority inheritance be used to avoid priority inversion caused by condition variables? If so, how? If not, why not?

7. Schneider claims that it is not possible to implement a "t" fault-tolerant system by using a single voter to combine the outputs of an ensemble of state machine replicas into one output. Instead, the voter should be replicated and whatever reads the output of the system should combine the output of the voters. This "critical voter" is not considered part of the system by Schneider. Why?