Homework 1

Due Date: April 15, 2004   **110 Points**

1. (*20 points*) Chapter 1, exercise 17

2. (*30 points*) The Tick Tock Tech administration, concerned that Wassamatta U. students are breaking into their systems, instructs the Tech system administrators to block incoming traffic at the Tech's perimeter firewall. In practical terms, this means that Tick Tock Tech can initiate outbound connections, and if the external host replies, the reply will be allowed through the firewall. But if an external host attempts to send a message to a Tick Tock Tech host behind the firewall, the firewall will reject the message and the destination computer will never receive it.

    a. The system administrators protect, pointing out that certain critical mechanisms for the Tech folks will no longer work. Please name at least two types of network messages that the administration will agree should be allowed through, but will no longer be. Explain why they should be allowed through, and why the administration will agree. (Remember, only network conenctions *originating* from outside Tick Tock Tech's perimeter will be blocked.)

    b. The Nuclear Time Travel Lab, which is experimenting with time travel, needs very accurate clocks, so they use NTP to sync their calibration clocks with ntp.frostbite-falls.us. They have arranged with the Frostbite Falls administrator to excchange time synchronization messages. But the administration does not know about the NTTL's experiments. What problems does this suggest about the way that the administration attempted to secure the campus' computers and networks?

    c. Continuing part b, what procedures should the administration have used to ensure the problems that the NTTL had would not occur?

3. (*20 points*) Chapter 13, exercise 5

4. (*20 points*) Discuss the use of virtual machines to enforce the principle of least common mechanism on a single computer. In particular, if the virtual machines are *not* to communicate with one another, what conditions must they satisfy—in other words, how must the virtual machine monitor manag their use of resources to prevent them from communicating?

5. (*20 points*) Chapter 23, exercise 2

Extra Credit

6. (*20 points*) Chapter 23, exercise 7