Homework 3

Due Date: February 15, 2011

Questions

1. (20 points) Prove Theorem 6–1 for the strict integrity policy of Biba’s model. (text, problem 6.1)

2. (15 points) The relations certified (see ER1) and allowed (see ER2) can be collapsed into a single relation. Please do so and state the new relation. Why doesn’t the Clark-Wilson model do this? (text, problem 6.10)

3. (10 points) Why must sanitized objects be in a single company dataset in their own conflict of interest class, and not in the company dataset corresponding to the institution producing the sanitized object?

4. (30 points) Consider the systems Louie and Dewey in Section 8.2.4.
   (a) Suppose the sends and receives for the buffers are non-blocking. Is the composition of Hughie, Dewey, and Louie still noninterference-secure? Justify your answer.
   (b) Suppose all buffers are unbounded. Is the composition of Hughie, Dewey, and Louie still noninterference-secure? Justify your answer.
   (text, problem 8.3)

5. (25 points) Suppose the composite machine catdog (see Section 8.4.1) emits the same value from the left and the right. Show that it has received an even number of inputs from the left. (text, problem 8.7, modified)

Extra Credit

1. (15 points) A physician who is addicted to a pain-killing medicine can prescribe the medication for herself. Please show how RBAC in general, and Definition 7–12 specifically, can be used to govern the dispensing of prescription drugs to prevent a physician from prescribing medicine for herself. (text, problem 7.7)