# Homework 4

**Points**: 100 **Due Date**: Monday, December 6, 1999 at 11:59PM

1. (*25 points*) Chapter 7, exercise 2
2. (*10 points*) Chapter 7, supplementary exercise 2
3. (*15 points*) The relations certified (see ER1) and allowed (see ER2) can be collapsed into a single relation. Why doesn't the Clark-Wilson Model do this?
4. (*25 points*) Consider the following protection mechanism. Each object and each process is assigned a number. A process can only access an object if the object has a higher number than the process. Which of the mechanisms discussed in class (ACL, capabilities, lock-and-key, the MULTICS ring protection scheme) does this most closely resemble, and why? In what essential way does it differ from the scheme discussed in class?
5. (*25 points*) Assume the Clark-Wilson model is implemented on a computer system. Could a computer virus that scrambled constrained data items be introduced into the system? Why or why not? Specifically, if not, identify the precise control that would prevent it from being intorduced, and say why it would prevent the virus from being introduced; if yes, identify the specific control or controls that allow it to be introduced and say why they fail to keep it out.

**Extra Credit**

6. (*10 points*) Chapter 7, exercise 4
7. (*5 points*) Chapter 7, supplementary exercise 1