DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

6.033—Computer System Engineering Handout 20—April 3, 1995

ASSIGNMENT: April 11 through April 21

For Recitation: Tuesday, April 11

Read "The protection of information in computer systems" by Saltzer and Schroeder, reading #30. This paper is a heavy duty paper. Read sections I and II with care. You can skip Section III. You have seen most of the concepts in lectures, but this paper puts it all together in a coherent way.

Your one-page reading report should address the following question. Although "The Protection of Information in Computer Systems" by Saltzer and Schroeder was published in 1975, many of the concepts presented are illustrated in today's computer systems. For example, suppose that a fictitious bank SecureBank provides automatic teller machines (ATMs) to its customers in the following manner:
1. Each customer is given an ATM card with a magnetically encoded account number.
2. Before performing any transactions at an ATM, a customer must insert his or her ATM card, and enter a personal identification number (PIN). The PIN is agreed upon between the customer and the bank before the ATM card is issued. If the PIN that the customer enters matches the PIN stored in the ATM system, then the customer is granted access to make transactions.

Describe this ATM system in terms of the concepts presented in Saltzer and Schroeder's paper. Specifically, answer the following questions:
1. What type of protection mechanism does the ATM system use, access control lists or capabilities? How is the protection mechanism implemented?
2. How is the ATM system a "descriptor-based protection system"?
3. How can the ATM system provide "single and universal protection groups" for groups of customers (e.g., married couples or employees of a company)?
4. How can the ATM system revoke a customer's access to a bank account?
5. Describe two security problems with this ATM system.

Organize your answers into a coherent sequence of paragraphs. Do not merely list answers to these questions.

For Lecture, Wednesday, April 12

Lecture on the management of storage systems. In preparation read Tanenbaum Chapter 4, section 1 through 3. Although the reading has a significant number of pages, it is pretty easy reading.

For Recitation, Thursday, April 13

The reading for today is "Disk system architectures for high performance computing" by Katz et al., reading #32. This paper is another heavy duty paper; read it with care. While reading you might want to ask yourself the question: how RAID 3, 5, and 6 will perform differently for transaction processing and for supercomputer I/O workloads (Section III of this paper describes these workloads).
The second paper assigned is "The long levity of digital documents" by Rothenberg, reading #31. This paper is very light reading; zip through it.
Today the second design project will be assigned. This design project can be done in teams.

For Lecture, Friday, April 14

John Markoff from the New York Times will be giving an invited lecture. He will undoubtedly give some interesting insights in the impact of computer technology on society. One of his favorite topics is security and protection.

Monday and Tuesday, April 17 and 18

No class. **No reading report this week**.
You might want to use these days to get prepared for *Quiz II on Friday April 21*.
You also may want read ahead for the recitation on Thursday April 20 so that you have more time on Wednesday and Thursday to prepare for quiz II.

For Lecture, Wednesday, April 19

New topic in 6.033: I/O and storage. I/O is an often neglected topic. In preparation read Tanenbaum Chapter 5. Most of this chapter is light reading, but read Section 5.3 on disks in more detail. You need to understand them in detail for the papers assigned for tomorrow's recitation.

For Recitation, Thursday, April 20

The readings are sections from reading #33, "The design and implementation of a log-structured file system" and sections from reading #34, "The logical disk: a new approach to improving file systems". From reading #33, reading sections 1 through 3, and section 5 through 5.1. From reading #34, read sections 1 through 3. As a personal exercise, you can contrast the two approaches described in the papers, and consider their advantages and disadvantages.

Quiz II, Friday, April 21

Quiz II covers all the material from recitation 8 through recitation 16: networking, naming, and protection/ security. We will make quiz questions from previous years available as soon as possible.
The location for Quiz II is Walker. Time is 2-3pm.

System Aphorism of the week: KISS: Keep It Simple, Stupid.