Homework Assignment 5
(due on Thursday November 14, 2002)

- Continue reading Chapter 7 of the Database System Concepts book and also read Chapter 2.
- Exercises 7.9, 7.11, 7.12, 7.15 (solve the first part only),

Problem 1: Consider the relational schema and functional dependencies of Exercise 7.11
Determine whether the schema is in Boyce-Codd Normal Form and whether it is in Third Normal Form.

Problem 2. Let $R(A, B, C, D, E)$ be a relation schema with the indicated attributes and assume that the following dependencies hold: $A \rightarrow B$, $BC \rightarrow E$, $ED \rightarrow A$.

1. Find all candidate keys of $R$.
2. Is $R$ in Boyce-Codd Normal Form? Is $R$ in Third Normal Form? (Justify)

Problem 3. We say that two sets $F$ and $G$ of functional dependencies are equivalent if $F^+ = G^+$, i.e., if they imply exactly the same functional dependencies. Show that the sets

$$F = \{ A \rightarrow B, B \rightarrow C, C \rightarrow A \}$$

and

$$G = \{ A \rightarrow BC, B \rightarrow A, C \rightarrow A \}$$

are equivalent. Note: You may compute $F^+$ and $G^+$ if you want, but there are easier ways to show that $F$ and $G$ are equivalent, namely it suffices to show that $F \subseteq G^+$ and $G \subseteq F^+$ (why?)