Homework Assignment 6
(due on Tuesday December 2, 2003)

- Read Chapters 2 and 5.
- Exercises 2.2, 2.4, 2.14 part (a) only, 7.2, 7.16 (solve this in two different ways: first, by applying the criterion for lossless join decomposition; second, by following the hint given in the book), and 7.21

**Problem 1**: Let $R$ be a relation schema with attributes $A, B, C, D$ and assume that the functional dependencies in the set $F = \{A \rightarrow B, C \rightarrow D, D \rightarrow A\}$ hold on $R$.

1. Determine whether $R$ is in Third Normal Form.
2. Give a BCNF, lossless join decomposition of $R$.

**Problem 2**: Consider the relational schema and functional dependencies of Exercise 7.11 (this exercise was part of the previous assignment).

Determine whether this schema is in Boyce-Codd Normal Form and whether it is in Third Normal Form.

**Problem 3**: Let $R(A, B, C, D, E)$ be a relation schema with the indicated attributes and assume that the following dependencies hold: $A \rightarrow B, BC \rightarrow E, ED \rightarrow A$. Recall that in the previous assignment you had to find all candidate keys of $R$.

1. Explain why $R$ is not in Boyce-Codd Normal.
2. Give a BCNF, lossless join decomposition of $R$.
3. Is $R$ in Third Normal Form? (Justify)