Practice Test for Språkdatabaser (VT97,970520) page 1 of 1

This test contains 10 questions each of which is worth 10 points. To pass this test you should obtain at least 60 points. You may answer in English or in Swedish. Try to give short answers.

1. Describe the three database levels of the ANSI/SPARC database architecture.
2. What is the difference between a DDL and a DML?
3. What is the main datastructure is the relational database model?
4. What constraint does a relation have to satisfy to be in 5NF?
5. Give at least two advantages of object-oriented databases.
6. Give at least two advantages of using language databases.

A relation R with 4 attributes A, B, C and D satisfies the functional dependencies in the irreducible set containing: $A \rightarrow B$, $A \rightarrow D$, $B \rightarrow C$ and $D \rightarrow A$. R is at least in 1NF.

7. Determine all candidate keys of R.
8. Is R in any other normal form than 1NF? Motivate your answer.
9. Convert R to BCNF.
10. Give a relational algebra operation for extracting a relation with two attributes A and B from R such that the corresponding value for D in the A-B-tuples is equal to 27.

Answers Practice Test Språkdatabaser VT97:970520

1. The ANSI/SPARC database architecture contains three levels: the internal level describes how data is stored at the physical level, the external level is the level on which the database users perceive the data and the conceptual level is the logical representation level in between the first two on which the database operations work.
2. A DDL or data definition language defines the structure of the data and a DML or data manipulation language is a set of commands which can be used for processing data.
3. The main datastructure in the relational database model is the table.
4. In order to be in 5NF a relation may only contain join dependencies which are implied by its candidate keys.
5. Object-oriented databases have as advantages that they able the database users to define their own datatypes and they offer the possibility of letting datatypes inherit structural information from each other.
6. Language databases have as advantages that they store data in a more economical way and they are more easily accessible than non-database collections of language data.
7. The candidate keys of R are {A} and {D}.
8. R cannot be in 2NF since it has two candidate keys and the 2NF definition covers only relations with one candidate key. Since all relations in higher NFs than 2NF are also in 2NF I conclude that R is only in 1NF.
9. A relation is in BCNF iff every left-irreducible FD has a candidate key on its left-hand side. In R this is not true for the FD B→C so we split R in {A,D,B} and {B,C}. Now B is a candidate key for {B,C}. The resulting set of two relations is in BCNF.
10. (R WHERE D=27) [A,B]