Normal Forms

Assume without loss of generality that every functional dependency in F+ is of the form X=>A, where A is a single attribute.

A relational scheme is said to be in **first normal form** (1NF) if and only if each of it's domains contains only scalar values (i.e., no "repeating groups" or unbounded lists).

Example:

  R1=(SS#,Name,Hobbies) is not in 1NF, but R2=(SS#,Name,Hobby) is.

A functional dependency X=>A is a partial dependency if
- X is a proper subset of any candidate key, and
- A is not part of any candidate key.

A relational scheme is said to be in **second normal form** (2NF) if and only if it is in 1NF and contains no partial dependencies.

A functional dependency X=>A is a transitive dependency if
- X is not a superset of any candidate key, (i.e., its not a superkey),
- X is not a proper subset of any candidate key, and
- A is not part of any candidate key.

A relational scheme is said to be in **third normal form** (3NF) if and only if it is in 2NF and contains no transitive dependencies.

"Every non-key attribute depends on the (some) key, the whole key, and nothing but the key."

A relational scheme is said to be in **Boyce/Codd normal form** (BCNF) if every attribute depends on the (some) key, the whole key, and nothing but the key.