

SQL FOR DB2

Chapter 7 Normalization

CHAPTER OBJECTIVES

- ① Explain the term normalization
- ① Explain the different normal forms

NORMALIZATION

- ⦿ Database design includes the concept of normalization, which is a series of steps used to evaluate and modify table structures to reduce data redundancies
- ⦿ Normalization has two purposes:
 - ⦿ Eliminate redundant; that is, eliminate the storing of the same data in more than one table
 - ⦿ Ensure that data within a table are related

NORMAL FORMS

- ① 1NF - First Normal Form
- ② 2NF - Second Normal Form
- ③ 3NF - Third Normal Form
- ④ 4NF - Forth Normal Form
- ⑤ 5NF - Fifth Normal Form

FIRST NORMAL FORM (1NF)

- ⦿ To move a table from unnormalized form(UNF) to 1NF:
 - ⦿ You remove the repeating groups and use them to form another table
 - ⦿ You must *link* the two tables, by posting the key from the original table into the new table
 - ⦿ Once this is done you should look at the tables that you have and check to see if these tables are in 1NF
- ⦿ A database is in first normal form (1NF) when:
 - ⦿ All columns in the table contain a single value; that is, every intersection of a row and column in the table contains only one value (no repeating groups)
 - ⦿ A primary key has been defined that uniquely identifies each row in the table

SECOND NORMAL FORM (2NF)

- ⦿ To move the tables from 1NF to 2NF:
 - ⦿ 2NF is targeted at tables in which the records (entities) are identified by a concatenated key
 - ⦿ This can be achieved by removing partial key dependency and placing it in a new table with its corresponding key
 - ⦿ You must also leave that key in the original table.
- ⦿ A database table is in 2NF:
 - ⦿ It is in 1NF
 - ⦿ Each non-key column depends on the entire primary key (no partial key dependencies)

THIRD NORMAL FORM (3NF)

- ⊙ To move a table from 2NF into 3NF
 - ⊙ When a non-key attribute determines the value of another not-key attribute, you have a transitive dependency)
 - ⊙ This relationship is removed into its own table, leaving the new table's key in the original table as a *foreign key*
- ⊙ A database table is in 3NF when:
 - ⊙ It is in 2NF
 - ⊙ Each non-key column depends only on the primary key(no transitive dependencies)

FOURTH NORMAL FORM (4NF)

- ⊙ A database table is in 4NF:
 - ⊙ It is in 3NF
 - ⊙ There is no more than one multivalued fact in the table
 - ⊙ A multivalued fact is one in which several values for a column might be determined by one value for another column

FIFTH NORMAL FORM (5NF)

- ⊙ A table in 5NF cannot be split into two or more tables without loss of information



IN THE END IT ALL BOILS
DOWN TO THIS

The Key,
and nothing but the Key,
so help me Codd!

CHAPTER SUMMARY

- ⦿ Normalization is a series of steps used to evaluate and modify table structures to reduce data redundancies.
- ⦿ There are two purposes for normalization:
 - ⦿ Eliminate redundant data. That is, eliminate the storing of the same data in more than one table
 - ⦿ Ensure that data within a table are related.

CHAPTER SUMMARY

- ⦿ A database table is in first normal form (1NF) when:
 - ⦿ No repeating groups
- ⦿ A database table is in second normal form (2NF) when:
 - ⦿ No partial key dependencies
- ⦿ A database table is in third normal form (3NF) when:
 - ⦿ No transitive dependencies
- ⦿ A database table is in fourth normal form (4NF) when:
 - ⦿ There is no more than one multivalued fact in the table
- ⦿ A table in 5NF cannot be split into two or more tables without loss of information.