Sarah Walsh

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Lab 4: Exercise 7-5

Database normalization is the process of structuring a relational database in accordance with a series of so-called normal forms in order to reduce data redundancy and improve data integrity. Normalization entails organizing the columns and tables of a database to ensure that their dependencies are properly enforced by database integrity constraints. It was first proposed by Edgar F. Codd as part of his relational model.

There are five normalization levels:

**1NF or First Normal Form**

Rules: - Each table cell should contain a single value.  
 - Each record needs to be unique.

**2NF or Second Normal Form**

Rules: - Be in 1NF.  
 - Single column primary key.

**3NF or Third Normal Form**

Rules: - Be in 2NF.  
 - Has no transitive functional dependencies.

**BCNF or Boyce-Codd Normal Form**

Rules: - No more than one Candidate key.

**4NF or Fourth Normal Form**

Rules: - No database table instance may contain two or more independent and multivalued data.

**5NF or Fifth Normal Form**

Rules: - Be in 4NF.  
 - Cannot be decomposed into any number of smaller tables without loss of data.