Normalization

.NET CORE

Database normalization is the process of structuring a relational database in order to reduce data redundancy and improve data integrity.

HTTPS://EN.WIKIPEDIA.ORG/WIKI/DATABASE_NORMALIZATION

Normalization Assignment (Pt. 1)

- Create an unnormalized table.
- List the information of your family members.
- There must be at least 5 attributes to each tuple and at least 5 entities.

Databases – Normalization

https://www.tutorialspoint.com/dbms/database_normalization.htm
https://www.c-sharpcorner.com/UploadFile/0146e3/database-normalization/

Normalization is a method to prevent ***anomalies*** and keep the database in a consistent state. ***Fields*** and ***tables*** of a relational DB are organized to minimize redundancy and dependency.

Normalization involves dividing large ***tables*** into smaller (and less redundant) ***tables*** and defining relationships among their ***atomic*** data.

There are many normal forms but *1NF*, *2NF*, and *3NF* are primarily used.

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This table is not normalized. All the information is stored in one table.

SALUTATION	CUSTOMER NAME	CITY	BOOK ISSUED
MR.	RAJ	BANGALORE	LET US C,ORACLE DATABSE,
MISS.	PRIYA	CHENNAI	PROGRAMMING WITH JAVA,C++ PROGRAMMING
MR.	RAJ	DELHI	DBA FUNDAMENTALS, ORACLE PROGRAMMING

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1st Normal Form (1NF) –

- each table cell should contain a single value.
- Each record needs to be unique.
- It contains atomic values only.

SALUTATION	CUSTOMER NAME	CITY	Book Issued
MR.	Raj	BANGALORE	LET US C
MR.	Raj	BANGALORE	ORACLE DATABSE
Miss	Priya	CHENNAI	PROGRAMMING WITH JAVA
Miss	Priya	CHENNAI	C++ PROGRAMMING
MR.	Raj	DELHI	DBA FUNDAMENTALS
MR.	Raj	DELHI	ORACLE PROGRAMMING

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2nd Normal Form (2NF) –

- First, be in *1NF*.
- Have a single *Primary Key*.
- Remove subsets of data that apply to multiple rows of a *table* and place them in separate *tables* with *PK → FK* relationships among the new tables.
- If the table is in *1NF* and every non-key attribute is dependent on the *Primary Key*. then *2NF* is achieved.

1

MEMBERSHIP ID	SALUTATION	CUSTOMER NAME	CITY
1	MR.	RAJ	BANGALORE
2	MISS.	PRIYA	CHENNAI
3	MR.	RAJ	DELHI

Actions Taken:
The *1NF* table is divided into two tables.
Table 1 contains only member information.
Membership_id is created as the *Primary Key (PK)* for Table 1.
Table 2 contains the information for each book.
Table 2's new *PK* column is *BOOK_ID*.

2

BOOK ID	MEMBERSHIP ID	BOOK ISSUED
1	1	LET US C
2	1	ORACLE DATABSE
3	2	PROGRAMMING WITH JAVA
4	2	C++ PROGRAMMING
5	3	ORACLE PROGRAMMING
6	3	DBA FUNDAMENTALS

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To achieve ***3NF***, there must be no dependencies between fields in a single row.

"Given a value for column B, do we then have only one possible value for column C?"

If yes, B and C should be put into a new table, with one of them becoming the ***Primary Key (PK)***. A reference to the new table should be left in the original table and marked as a ***Foreign Key***.

1

MEMBERSHIP ID	SALUTATION	CUSTOMER NAME	CITY
1	MR.	RAJ	BANGALORE
2	MISS.	PRIYA	CHENNAI
3	MR.	RAJ	DELHI

A ***Transitive Functional Dependency*** occurs when the change of one ***Candidate Key*** column might cause any other ***Candidate Key*** column to change. In table 1, changing the non-key column '*Customer Name*' may change '*Salutation*'.

2

BOOK ID	MEMBERSHIP ID	BOOK ISSUED
1	1	LET US C
2	1	ORACLE DATABSE
3	2	PROGRAMMING WITH JAVA
4	2	C++ PROGRAMMING
5	3	ORACLE PROGRAMMING
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A ***Transitive Functional Dependency*** occurs when the change of one ***Candidate Key*** column might cause any other ***Candidate Key*** column to change. In table 1, changing the Candidate Key column '*Customer Name*' may change '*Salutation*'.

Table 1

MEMBERSHIP ID	SALUTATION ID	CUSTOMER NAME	CITY
1	1	RAJ	BANGALORE
2	2	PRIYA	CHENNAI
3	1	RAJ	DELHI

Table 2

BOOK ID	MEMBERSHIP ID	BOOK ISSUED
1	1	LET US C
2	1	ORACLE DATABSE
3	2	PROGRAMMING WITH JAVA
4	2	C++ PROGRAMMING
5	3	ORACLE PROGRAMMING
6	3	DBA FUNDAMENTALS

Table 3

ID	SALUTATION NAME
1	MR.
2	MISS
3	MRS.
4	DR.

Actions Taken:

The table is divided again, and a new table is created that stores Salutation only. The database is now in ***3NF***.

Assignment (Pt. 2)

- Convert your Pt. 1 table to a 3NF table.