**Boyce Codd Normal Form**

**(BCNF)**

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**What is the Boyce Codd Normal Form?**

The Boyce Codd Normal Form (or BCNF for short), is a step in the normalization process to eliminate the possibility of redundant data from a database. It only allows for functional dependencies where X Y, where X is a Super Key of the table. Even though it is a normalization form in theory, it doesn’t really add any new features to the normalization process; It is really just an extension of the 3rd Normal Form. Therefore, people refer to it as the 3.5NF instead of 4NF.

**Rules of the BCNF**

For a database to be said to be in BCNF, it must satisfy just two conditions:

* The tables must be in the 3NF
* The tables must not have any field or column that depends on any other key but a Super Key.

If the database tables do not follow these conditions, then it would not be considered to be in BCNF.

**NB \* A Super Key is any field or group of fields that can be used to find all the other information for a record, in a table.**

**Example of BCNF**

Problem Statement:

A company needs a login system to keep a track of the employees in the company as well as the hours that they work per day. The system should allow users to login and check on the hours that they have logged since the pay period. Managers Also have the ability to view all members of their teams as well as approve any hours that the employees clock as well as their overtime.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Employees** | | | | | | | |
| **Emp\_ID** | **fname** | **lname** | **email** | **password** | **address ID** | **Date\_joined** | **Manager\_ID** |
|  |  |  |  |  |  |  |  |

The Employees Table above has the primary key **Emp\_ID** which is used to uniquely identify the records in the table. The table above is in 3NF because it has no transitive dependencies, as well as the fact that all dependencies depend on the primary key(2NF) and there is no multi-value data in the fields(1NF).

This table is also in BCNF as its in third normal form and the functional dependencies all have dependants that are candidate keys.

|  |  |  |  |
| --- | --- | --- | --- |
| **TimeCard** | | | |
| **Emp\_ID** | **loginTime** | **logoutTime** | **status** |
|  |  |  |  |

This is another table from the database which is also in third normal form and does not violate the BCNF principle. There is only one candidate key in this table which is the primary key in this table (**Emp\_ID, loginTime**) and all fields in the table depends on this key, therefore it follows the BCNF principle. However, for the sake of easy access, the project will have this table with the id property to easily identify each unique record.