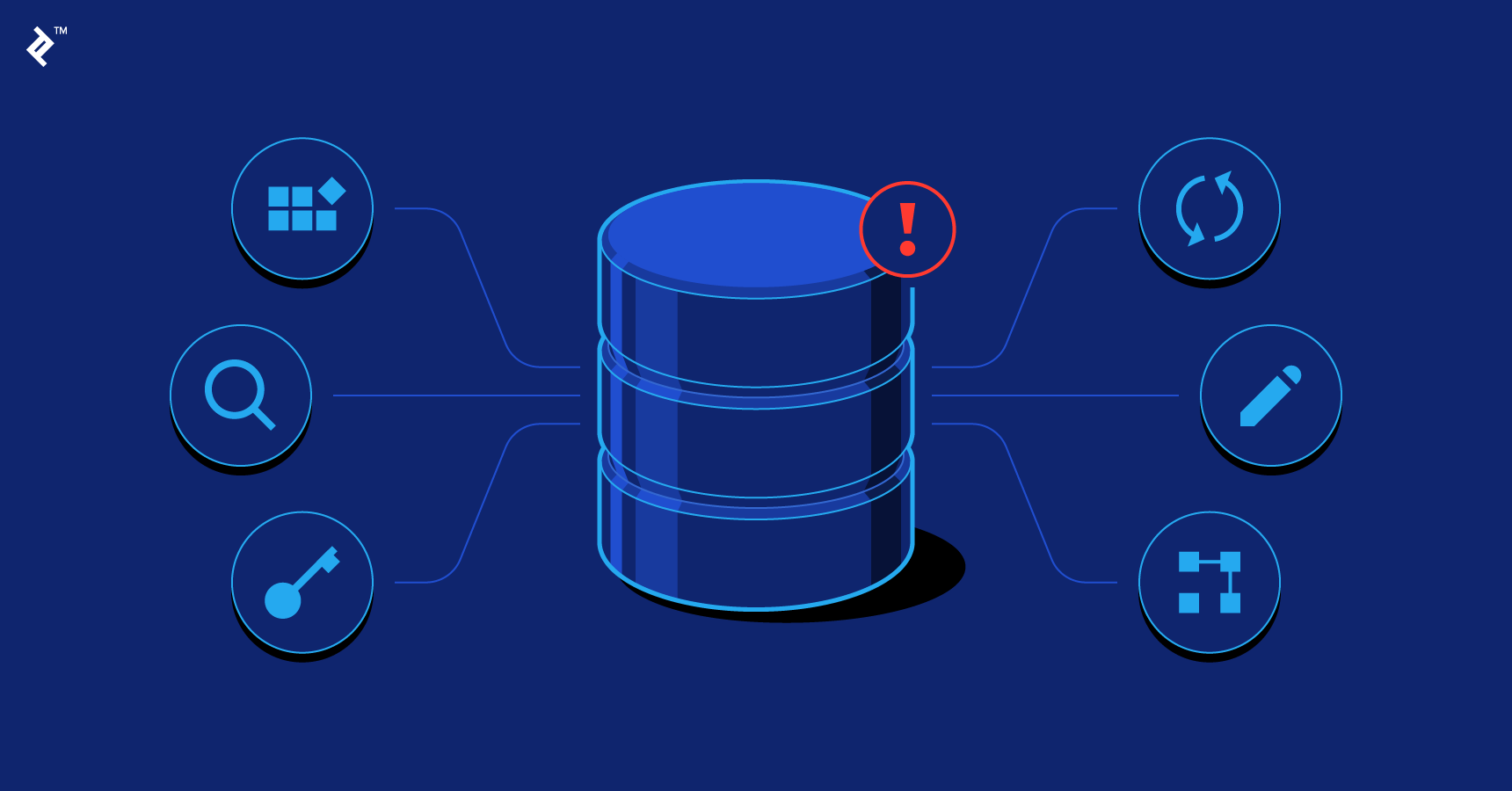
# BOYCE-CODD NORMAL FORM



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Cohort: #2

Introduction

This is a short research paper that looks into the Boyce-Codd Normal form, also known as BCNF. By reading this, you should know what BCNF is, and how to make your database tables into BCNF standards.

Boyce-Codd Normal Form (BCNF)

Boyce-Codd Normal Form or BCNF also known as 3.5 Normal Form is an extension to the third Normal Form. It can be applied to a database that obeys two conditions; it should be in 3NF stage and when at least one of the reference tables consists of a primary key.

Decomposition into BCNF

When a table is in 3NF, it may or may not be in the Boyce-Codd Normal Form. Each table/relation will have a set of functional dependencies. If the FD does not satisfy the second condition of BCNF, the table is decomposed (breaking into smaller tables) recursively until all the functional dependency meets the super key criteria.

The algorithm to be followed for decomposition is,

1. Determine the functional dependency that violates the BCNF.
2. For every functional dependency X->Y which violates, decompose the relation into R-Y and XY. Here R is a relation.
3. Repeat until all the relations satisfy BCNF

|  |  |  |
| --- | --- | --- |
| Student | Teacher | Subject |
| Jerome | Mr. Patterson | C++ |
| Jerome | Ms. Simons | Python |
| Daryl | Mr. Patterson | C++ |
| Daryl | Mr. Brown | Python |

Candidate keys are (student, teacher) and (student, subject).

The above relation is in 3NF [since there is no transitive dependency]. A relation R is in BCNF if for every non-trivial FD X->Y, X must be a key.

The above relation is not in BCNF, because in the FD (teacher->subject), teacher is not a key. This relation suffers with anomalies.

## Decomposition for BCNF

Since Teacher-> subject violates BCNF [teacher is not a candidate key]; then are to divide R into R1(Teacher, Subject) and R2(Student, Teacher).

R1

|  |  |
| --- | --- |
| Teacher | Subject |
| Mr. Patterson | C++ |
| Ms. Simons | Python |
| Mr. Brown | Python |

R2

|  |  |
| --- | --- |
| Student | Teacher |
| Jerome | Mr. Patterson |
| Jerome | Ms. Simons |
| Daryl | Mr. Brown |
| Daryl | Mr. Patterson |