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## Normalization

Our relational schema originally contained 13 tables. Of those 13 tables, 6 were binary tables and as such are already in BCNF. These tables are the following: User, Can Be, Made Up Of, Participate In, Consist Of and Play In.

Further more, another 3 of our tables require all the attributes as the Primary Key and are in BCNF. These tables are the following: Watch, Replay, and Round

The table Player is in 1NF because all attributes are atomic. It is in 2NF because it has only a single attribute as its primary key and thus all attributes are dependent on the primary key. It is in 3NF as no functional dependencies exist between non-key attributes. It is in BCNF as the only determinant is the Player ID. It is important to note that Player\_Alias is NOT unique and can be changed from game to game and multiple players can have the same alias.

The table Team is in 1NF because all attributes are atomic. It is in 2NF because it has only a single attribute as its primary key and thus all attributes are dependent on the primary key. It is in 3NF as no functional dependencies exist between non-key attributes. It is in BCNF as the only determinant is the Team ID.

The table Match/Game is in 1NF because all attributes are atomic. It is in 2NF because it has only a single attribute as its primary key and thus all attributes are dependent on the primary key. It is in 3NF as no functional dependencies exist between non-key attributes. It is in BCNF as the only determinant is the Game ID.

The only table with which we had a normalization issue was the event/league table as this relation had a non-atomic attribute in teams partaking which would be a list of teams. As such, the table needed to be decomposed into two tables. However, we quickly realized we had another table namely participates in that already has the eventID along with the TeamID and thus provides what teams participated in which event. As such we realized that the teams partaking attribute was redundant and removed it. Once this normalization occurs, the event / league table is normalized as its attributes are atomic. Its in 2NF as it only has a single attribute for a primary key. It is in 3NF as it has no functional dependencies between non-key attributes. It is in BCNF as the eventID determines the rest of the attributes.

## List of Tables and Functional Dependencies

Table: User

Functional Dependencies: User\_ID --> Password

Table: Can Be

Functional Dependencies: User\_ID --> Player\_ID, Player\_ID --> User\_ID

Table: Made Up Of

Functional Dependencies: Player\_ID --> Team\_ID

Table: Participate In

Functional Dependencies: Team\_ID and Event\_ID --> Team\_ID and Event\_ID

Table: Consist Of

Functional Dependencies: Game\_ID --> Event\_ID, Event\_ID --> Game\_ID

Table: Play In

Functional Dependencies: Player\_ID and Game\_ID --> Player\_ID and Game\_ID

Table: Watch

Functional Dependencies: Game\_ID, Replay Name, Replay\_Tag, and User\_ID --> Game\_ID, Replay Name, Replay\_Tag, and User\_ID

Table: Replay

Functional Dependencies: Game\_ID, Replay Name, and Replay\_Tag --> Game\_ID, Replay Name and Replay\_Tag

Table: Round

Functional Dependencies: Game\_ID and Round\_Number --> Winning Team

Table: Match / Game

Functional Dependencies: Game\_ID --> Match\_team\_1, Match\_team\_2, Elapsed\_Time

Table: Team

Functional Dependencies: Team\_ID --> Team\_Name, Team\_Ranking, Team\_average\_age, Team\_Location

Table: Player

Functional Dependencies: Player\_ID -->

Player\_Alias, First\_Name, Last\_Name, Player\_age, Player\_nationality, Kills, deaths, Kill\_death\_average, Kills\_Per\_round, Kill\_death\_difference, Rifle\_kills, Grenade\_Kills, SMG\_kills, Pistol\_kills, Other\_weapons

Table: Event / League

Functional Dependencies: Event\_ID -->

Event\_Name, Event\_Prize, Event\_Date, Event\_location, Event\_team\_count, Winning\_team

# Relational Schema

