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CMPT 308: Database Systems

Lab 9: Normalization Three

Design a database for the Belters Little League Sports Alliance on Ceres Station

- The league consists of many teams spread over three age groups.
- The three age groups are as follows: under 10, 10 through 14, over 14
- Each team plays in exactly one age group.
- A team consists of many players, one or more assistant coaches, and one head coach.
- We have first and last names, addresses, and phone numbers for all players and coaches.
- For all coaches we need know the number of years they have been coaching.
- A player can play on only one team.
- A coach can coach several teams as long as each team is in a different age group.

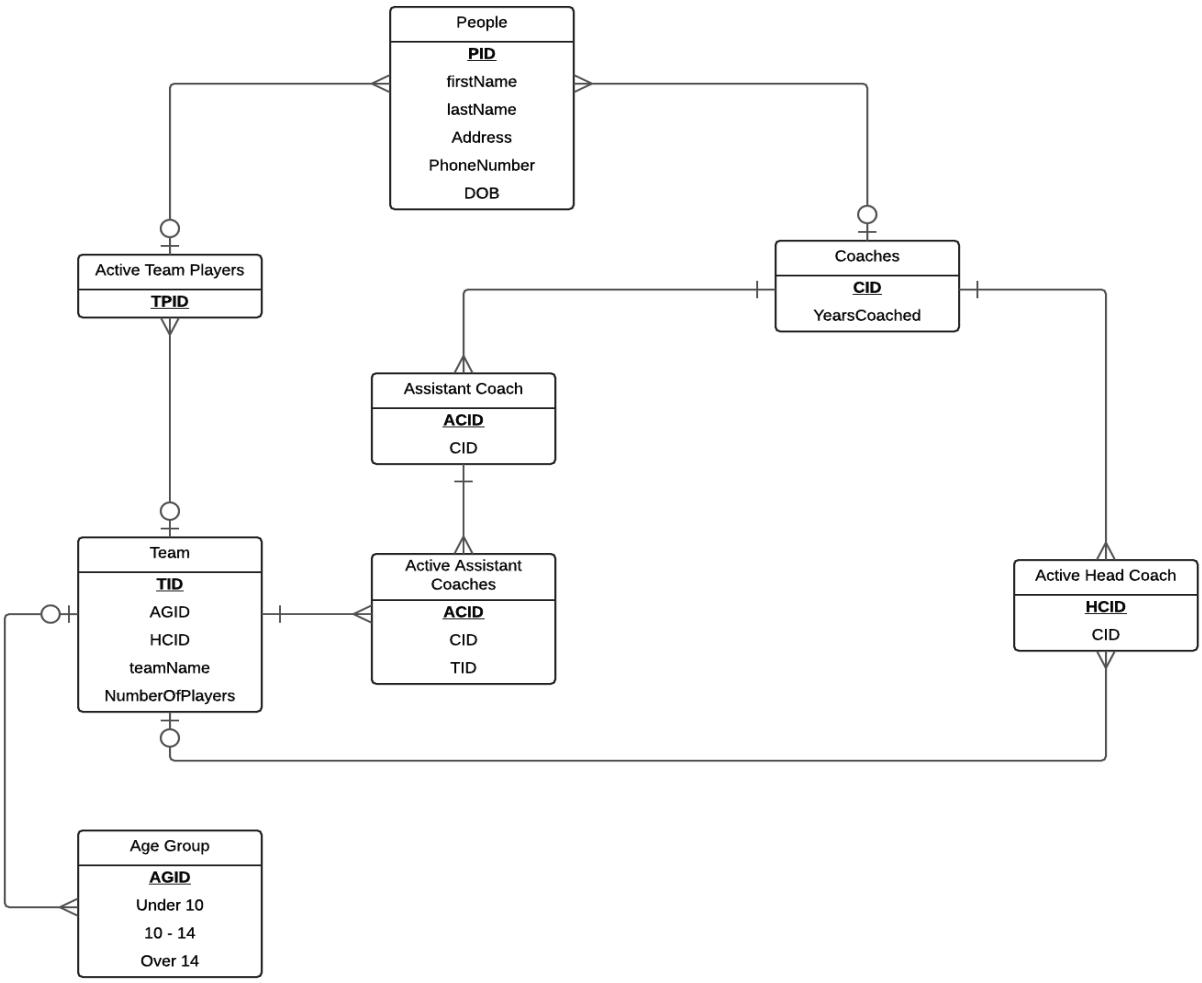
1. Identify and document all functional dependencies

**Note that all underline & bolded keys are Primary Keys

- People
  - **PID** → firstName, lastName, Address, PhoneNumber, DOB

- Active Team Players
  - **TPID**
- Coaches
  - **CID** → YearsCoached
- Assistant Coach
  - **ACID** → CID
- Active Assistant Coaches
  - **ACID** → CID, TID
- Active Head Coach
  - **HCID** → CID
- Team
  - **TID** → AGID, HCID, teamName, NumberOfPlayers
- Age Group
  - **AGID** → Under 10, 10-14, Over 14

2. ERD



3. Boyce-Codd Normal Form

In order for a database to be in Boyce-Codd Normal Form, it must first be in 1NF, 2NF, and 3NF. My Betlers Little League Sports Alliance ERD is in 1NF because all values are atomic and there are no partial dependencies. Each of my tables are separate with different data types and information with separate primary keys differentiating the separate tables. 2NF is established through my Team table, where all data of my subtype tables is identified. In my subtype tables (Active Assistant Coaches, Active Head Coach, and Age Group), foreign keys are connected to the Team table. 3NF eliminates fields that do not depend on keys. My database satisfies 3NF through separate primary keys for each table, even if they are composite keys. Lastly, Boyce Codd Normal Form says that for every attribute, a fact must be represented about the key, the whole key, and nothing but the key (So help me Codd!). This is true in that my primary keys and foreign keys in each table set represent the attributes of the table.