



College of Sciences & Liberal Arts
Department of Computer Science

**CS 461 Database Systems
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Final Report For

FRC DATABASE

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OVERVIEW

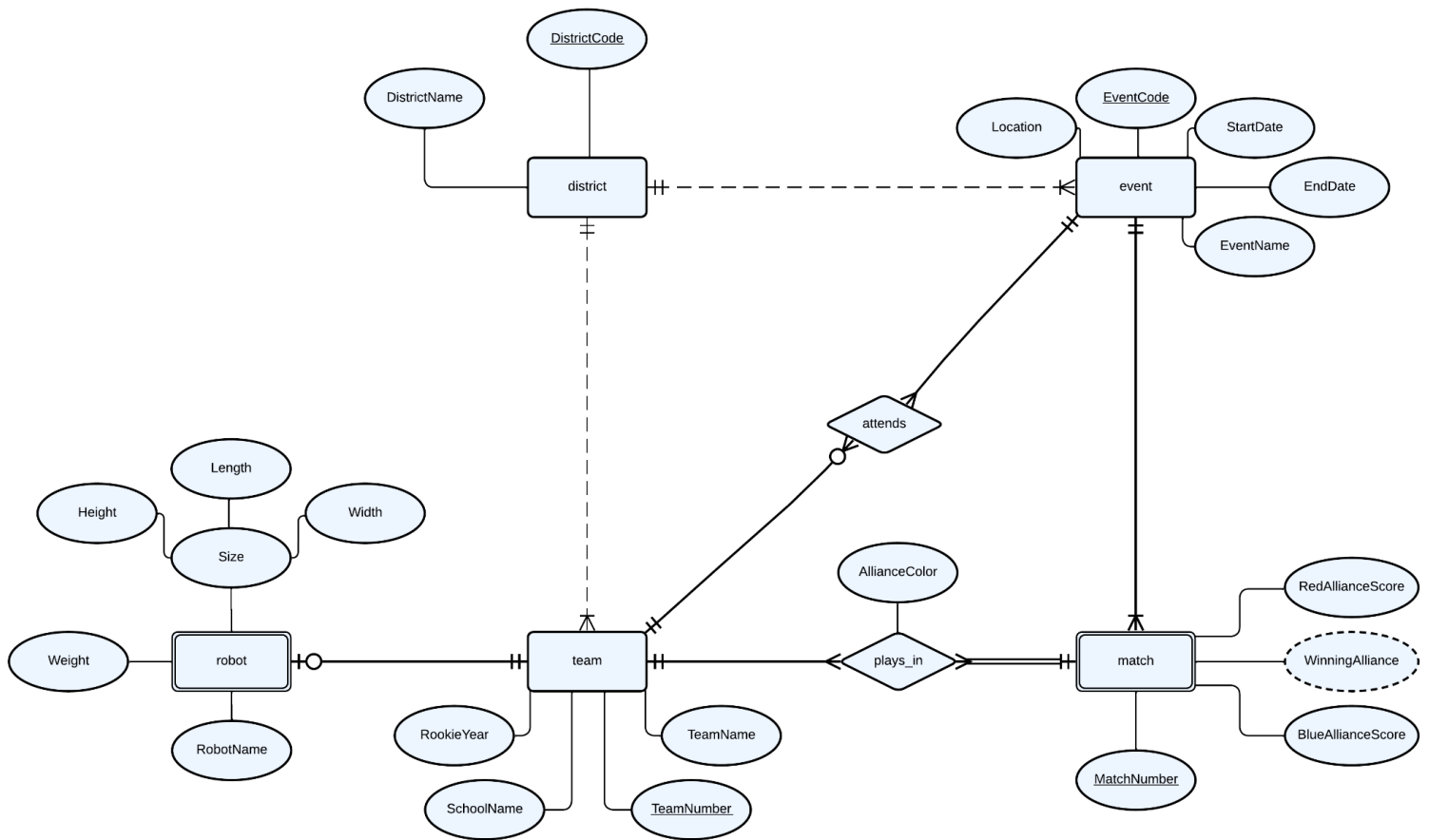
FRC stands for FIRST Robotics Competition, a program that challenges high school students to design, build, and compete with large robots. It's an international competition founded by inventor Dean Kamen and is part of a larger organization called FIRST (For Inspiration and Recognition of Science and Technology).

In FRC, teams of students, typically consisting of around 20-30 members, collaborate with adult mentors to construct robots within a limited time frame. Each year, a new game is announced, featuring a specific objective and set of rules. Teams then strategize, brainstorm, and utilize their engineering skills to construct robots capable of completing game tasks.

FRC STRUCTURE

- District
 - Districts are a way of splitting FRC into smaller leagues.
 - For example, FIM is First In Michigan, and provides a way of grouping the teams in MI.
 - To qualify for large events like the world championship, you will need to be near the top of your district.
- Team
 - A team is assigned a number and is allowed to choose a name.
 - Each high school participating in FRC typically has a single team. However, some large schools have multiple teams.
- Event
 - An event is a two-to-three day long competition where ~40 teams are typically in attendance.
 - Over the course of a typical event, there will be ~80 matches played.
- Match
 - A match is a single game being played.
 - A match is played by a red and a blue alliance. The alliance with the higher score wins the match.
 - Exactly 6 teams participate in any given match.
- Alliance
 - An alliance is made up of exactly three teams playing as either red or blue.

ER DIAGRAM



[LUCIDCHART LINK](#)

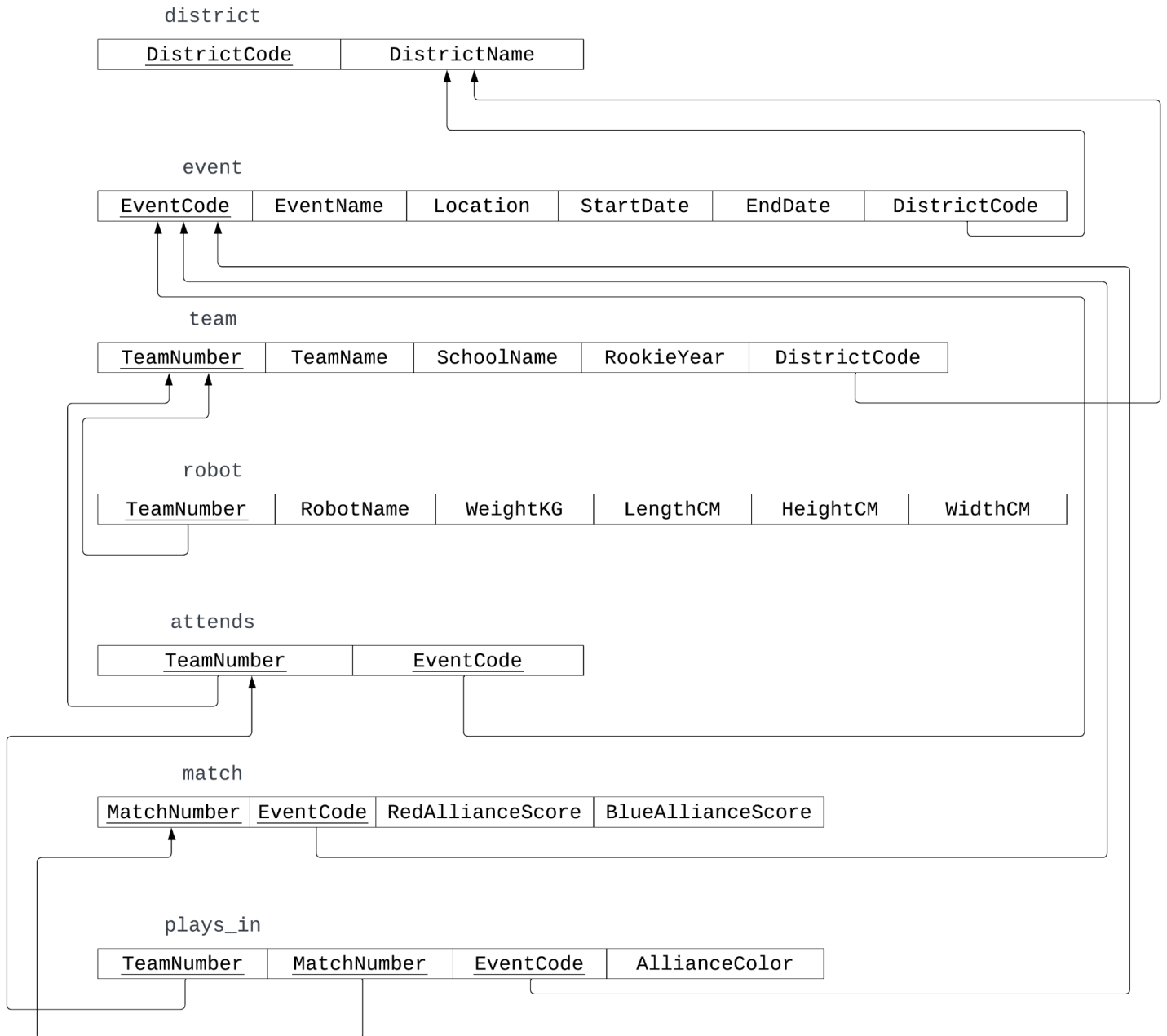
Zero or more

One or more

1 and Only 1

Zero or 1

RELATIONAL SCHEMA



[LUCIDCHART LINK](#)

DESIGN CHOICES

For starters, I'd like to note that there is no table for alliances. At first, I created an alliance table that would use a match's primary keys, as well as requiring three valid, non-null team numbers. The problem with this was that you would have a hard time scheduling matches ahead of time if you didn't know who would be playing. The alliance table I had originally ended up being a weird sort of relationship between match and team, so I decided to just use a simple plays_in relationship instead. This approach felt more modular, easier to understand, and quite simply, I liked it better. The main drawback to this approach is that there are no longer exactly 3 teams to an alliance, so I used a trigger to enforce some constraints.

Another thing is that technically the district table is not required by anything. This means that technically you can fill the entire database with valid data, and not have a single district. This is important because some teams are in areas too small to have their own district, and thus, they are districtless. This is also important because some large events like the world championship do not have a specific district, and because some events take place in the off-season. Off-season events are not explicitly sanctioned by FIRST, and do not have districts. However, I think it is important to still support these events in this database.

The last thing I want to talk about is the attends relationship. Originally, if you wanted to see which teams were at a specific event, you would have to query their matches and see which events the matches were played at. This had several major issues, but generally speaking it was A) less efficient, B) harder to read and write, and C) less accurate. This is information that is queried often, and as a result, it was much better to bridge the gap using a relationship.