

Xiaopan

1.1 what is an entity?

An entity is an object in the real world that is distinguishable from other objects.

1.2 Describe the difference between a weak entity and an entity

The owner entity set and the weak entity set must participate in a one-to-many relationship set (one owner entity is associated with one or more weak entities, but each weak entity has a single owner). This relationship set is called the identifying relationship set of the weak entity set.

The weak entity set must have total participation in the identifying relationship set.

1.3 What is a schema? What does it do?

A description of data in terms of a data model is called a schema. In the relational model, the schema for a relation specifies its name, the name of each field (or attribute or column), and the type of each field.

1.4 What are the properties of an ACID transaction? For each property, define it in your own words and explain why it is important.

- 1) Atomicity. Either all the changes are made or none of them are made.
- 2) Consistency. The state of the database is valid and consistent.
- 3) Isolation. Transactions are isolated to each other.
- 4) Durability. If a transaction is done, it won't be canceled.

1.5 What is a key?

A key is a minimal set of attributes whose values uniquely identify an entity in the set.

2

(a)

Entities: player, city, team, position. Position need an additional attribute: squad.

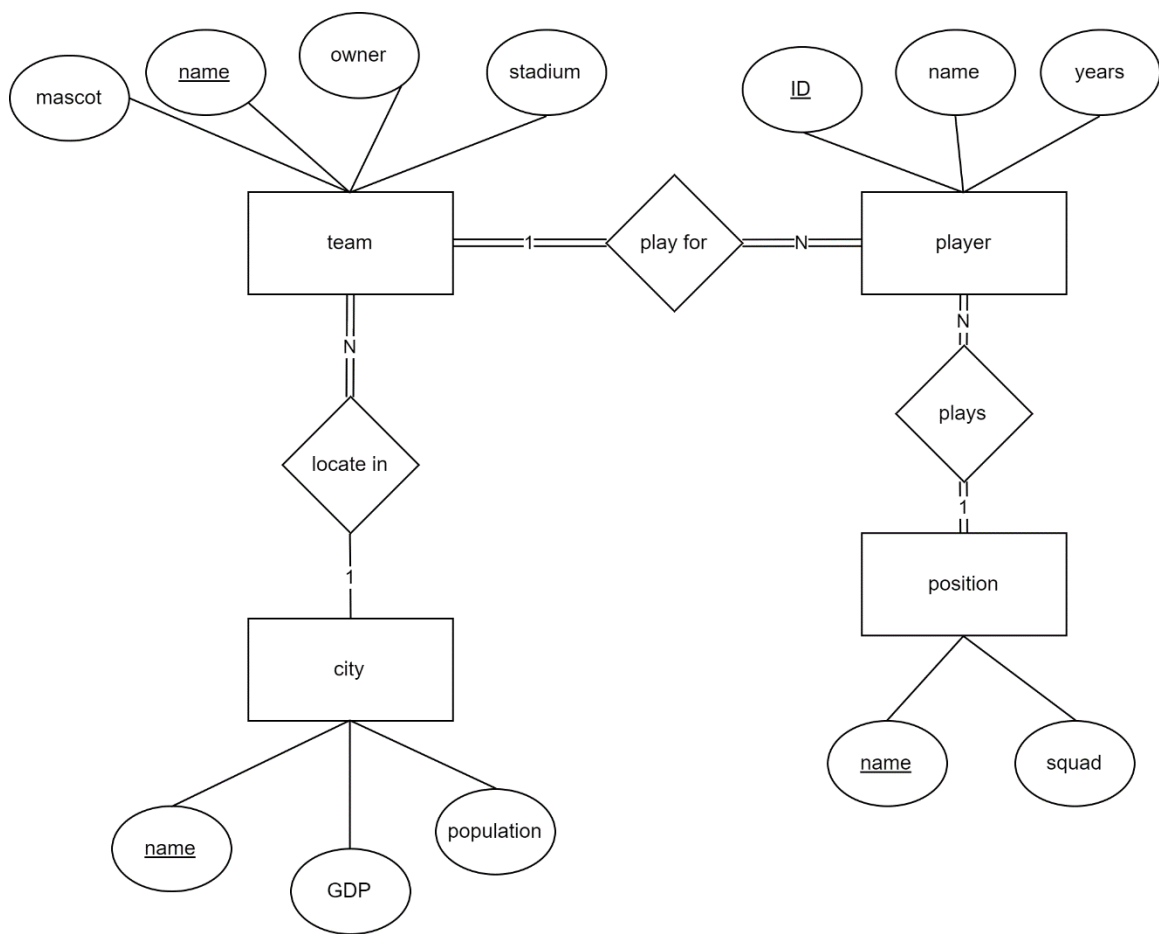
Relation set:

$(\text{player}, \text{team}) \in \text{play for}$

$(\text{player}, \text{position}) \in \text{play}$

$(\text{team}, \text{city}) \in \text{locate}$

(b)



(c)

Player(name, ID, years, team, position)

Position(name, squad, players)

Team(name, owner, mascot, stadium, city)

City(name, GDP, population, teams)

3.1 perils of not being normalization

Update: if need to update the pay for one-year service time in this unnormalized schema, must update the information in line 1 and line 5.

Insert: if need to add a new employee, but the employee doesn't have a favorite record, in such case, can not insert such information in to this unnormalized schema.

Delete: if need to delete the employee whose ID is 3 in this schema, when do the deleting, we also delete the "Jolene → Dolly Parton" and "3 years → \$12".

3.2 True/False

1. not valid for BCNF
2. valid for BCNF

3.3 BCNF

(a)

No. FDs are

location → distance
Fav.hamilton.track → fav.hamilton.artist

the KEY is {location, fav.hamilton.track }

so not all the left side of each FD is a superkey, so this schema is not BCNF

(b)

(1) FDs: location → distance, Fav.hamilton.track → fav.hamilton.artist

Use location→distance to decompose:

Friend1(location, distance), is valid for BCNF

Friend2(friendID, location, Fav.hamilton.track, fav.hamilton.artist), not satisfy BCNF

(2) for friend2: FDs: friendID → location, Fav.hamilton.track → fav.hamilton.artist

use friendID → location to decompose:

Friend2(friendID, location), valid for BCNF

Friend3(friendID, Fav.hamilton.track, fav.hamilton.artist), not satisfy BCNF

(3) for friend3: FDs: Fav.hamilton.track → fav.hamilton.artist

use Fav.hamilton.track → fav.hamilton.artist to decompose:

Friend3(Fav.hamilton.track, fav.hamilton.artist), valid for BCNF

Friend4(friendID, Fav.hamilton.track), valid for BCNF

Result is Friend1(location, distance), Friend2(friendID, location), Friend3(Fav.hamilton.track, fav.hamilton.artist), Friend4(friendID, Fav.hamilton.track)