

Entity Relationship Model

From records to relationships

Owners and Pets

Owner

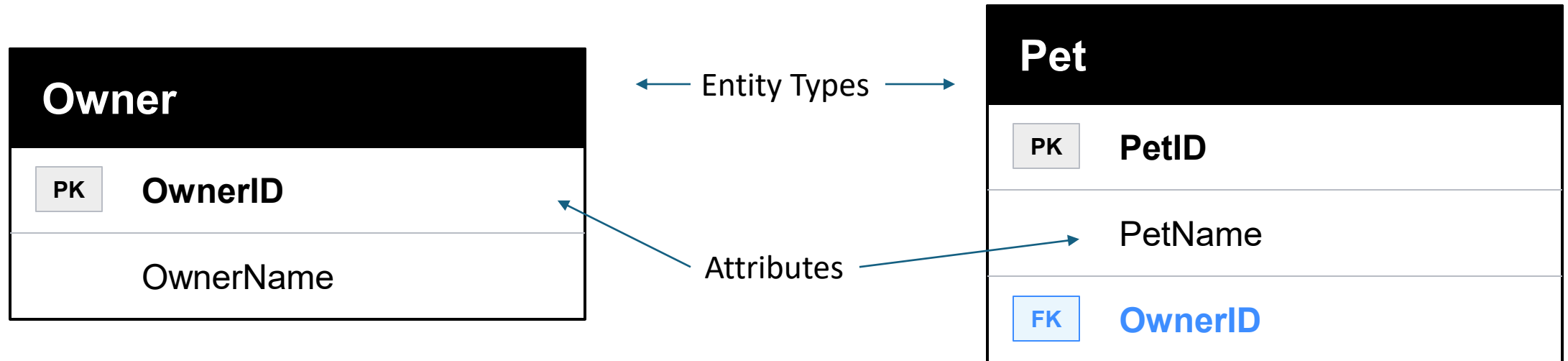
OwnerID	OwnerName
1	Maria Chen
2	Jamal Reed
3	Priya Shah

Pet

PetID	PetName	OwnerID
101	Luna	1
102	Milo	1
103	Pepper	2
104	Buster	3

An Entity Relationship Model

Graphically depicts database design



Owner and Pet denote sets of records (“entities”)

Owners are related to Pets

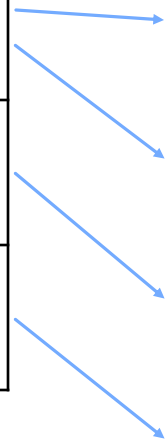
Relationships via foreign keys

Owner

OwnerID	OwnerName
1	Maria Chen
2	Jamal Reed
3	Priya Shah

Pet

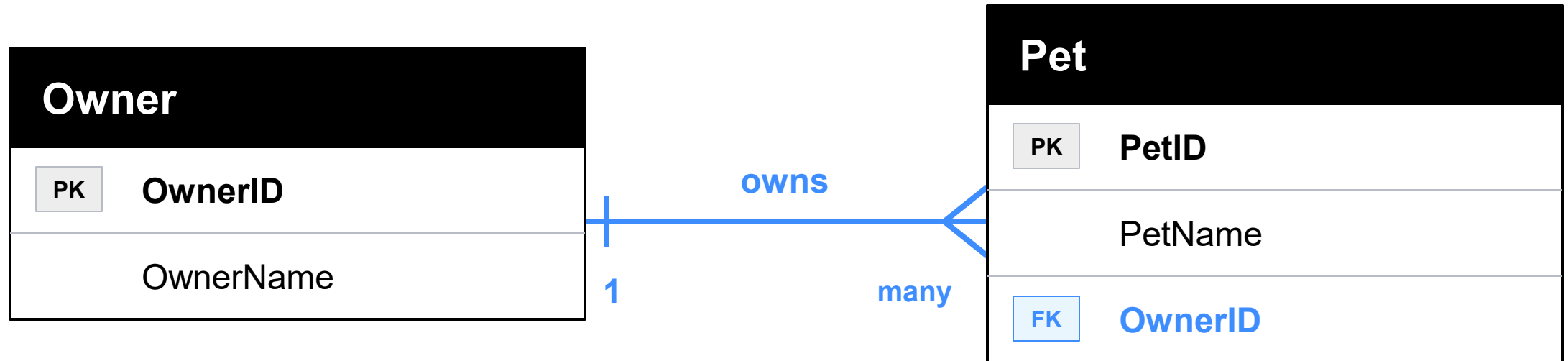
PetID	PetName	OwnerID
101	Luna	1
102	Milo	1
103	Pepper	2
104	Buster	3



An owner can own multiple pets. A pet is owned by one owner.

Relationships in E-R Model

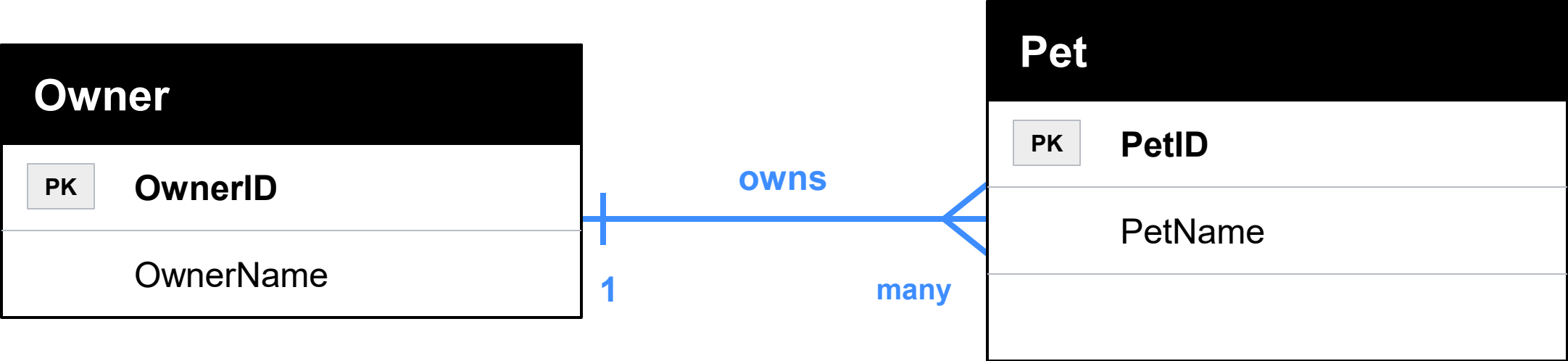
Depicted by lines between entity sets



**An owner can own many pets.
A pet is owned by one owner.**

Relationships Imply Foreign Keys

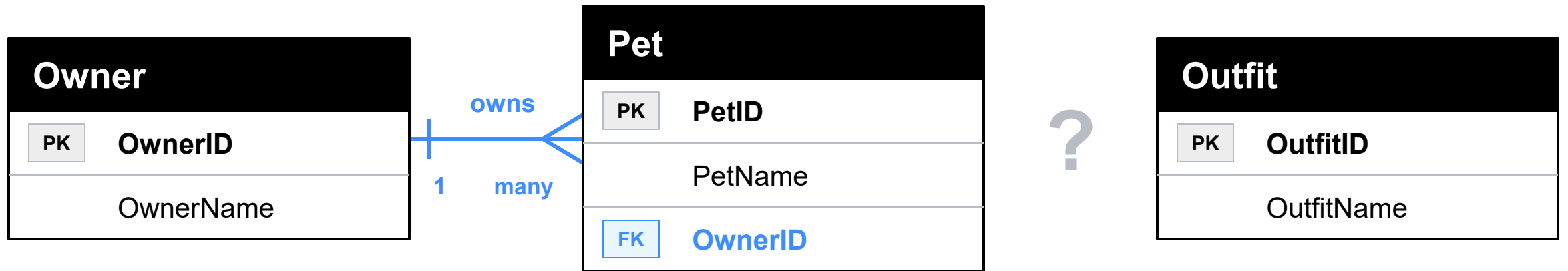
Foreign keys are omitted from the diagram when relationship lines are present



OwnerID	OwnerName
1	Maria Chen
2	Jamal Reed
3	Priya Shah

PetID	PetName	OwnerID
101	Luna	1
102	Milo	1
103	Pepper	2
104	Buster	3

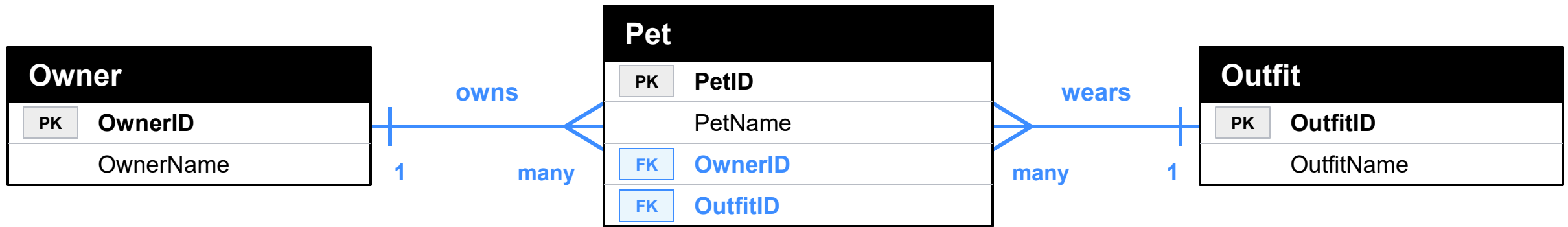
Pets need outfits



A pet can have one outfit, and an outfit can be worn by many pets.

Add OutfitID to Pet

Each Pet row references one Outfit; the same OutfitID can appear in many Pet rows.



Owner

OwnerID	OwnerName
1	Maria Chen
2	Jamal Reed
3	Priya Shah

Pet

PetID	PetName	OwnerID	OutfitID
101	Luna	1	201
102	Milo	1	202
103	Pepper	2	201

Outfit

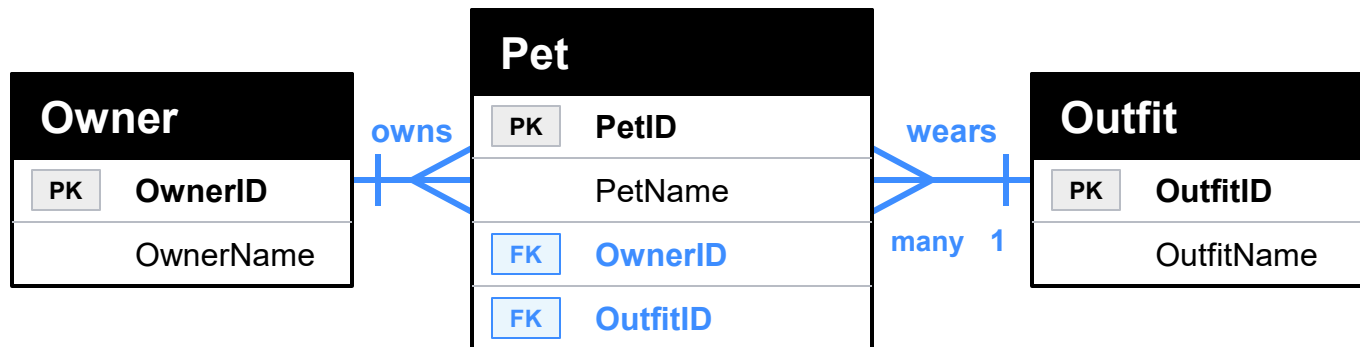
OutfitID	OutfitName
201	Red Sweater
202	Raincoat
203	Bow Tie

Outfit 201 is worn by Luna and Pepper—one outfit, many pets.

Start with a singular noun

Describe each relationship in both directions—one entity at a time.

E-R diagram



The same relationship can be read from either entity.

Relationship sentences

- 01 **An owner** owns many pets.
- 02 **A pet** is owned by one owner.
- 03 **A pet** wears one outfit.
- 04 **An outfit** is worn by many pets.

Rule: Begin every relationship sentence with a singular noun.

A pet performs tricks

Each trick is performed by one pet

Pet	
PK	PetID
PetName	

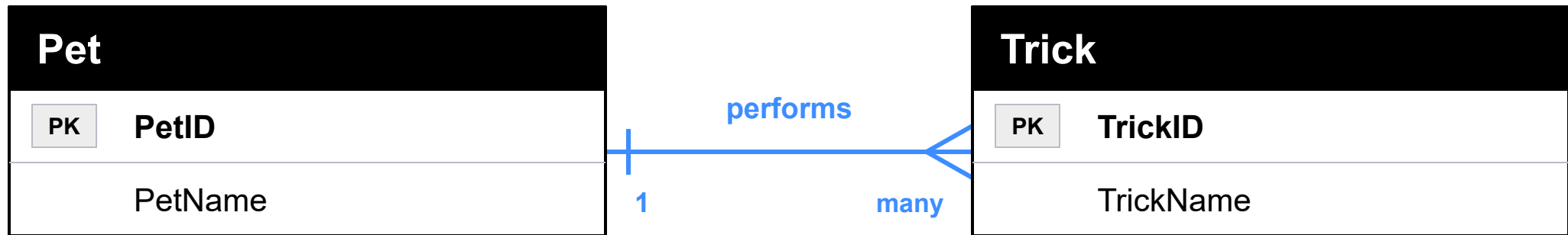
?

Trick	
PK	TrickID
TrickName	

What should the relationship look like?

One pet can perform many tricks

Each trick is performed by exactly one pet.

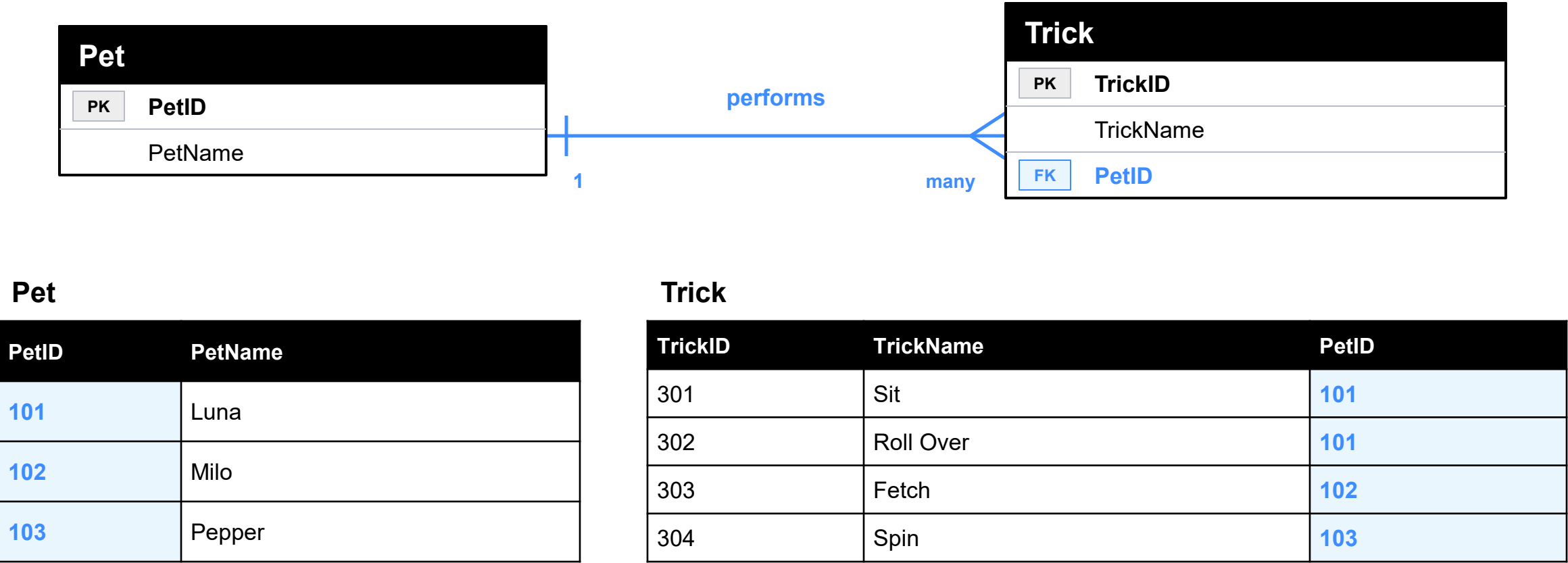


Read the relationship sentences for this diagram.

Where does the foreign key go?

Put PetID in Trick

Each Trick row references the one Pet that performs it.

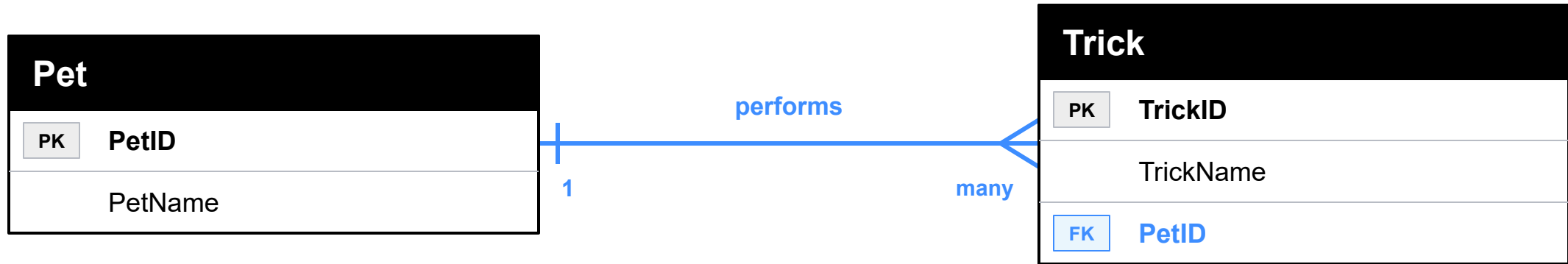


Pet 101 appears twice in Trick—one pet performs many tricks.

What if Luna and Milo can both roll over?

A pet can perform many tricks, and a trick can be performed by many pets.

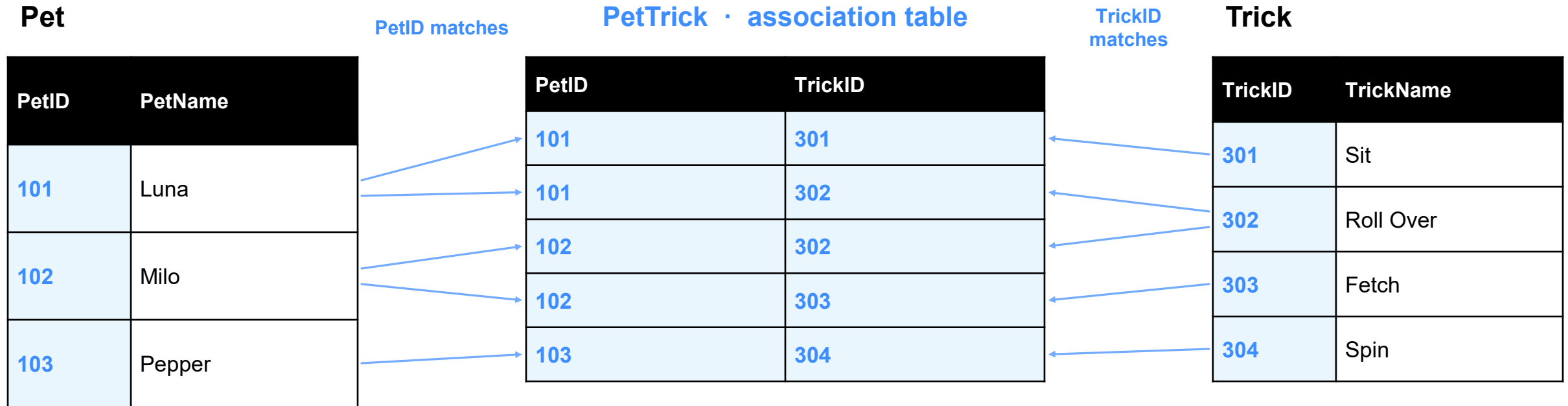
Current model



What is wrong here? How do we fix it?

Introduce an association table

PetTrick stores one row for every pet–trick pairing.

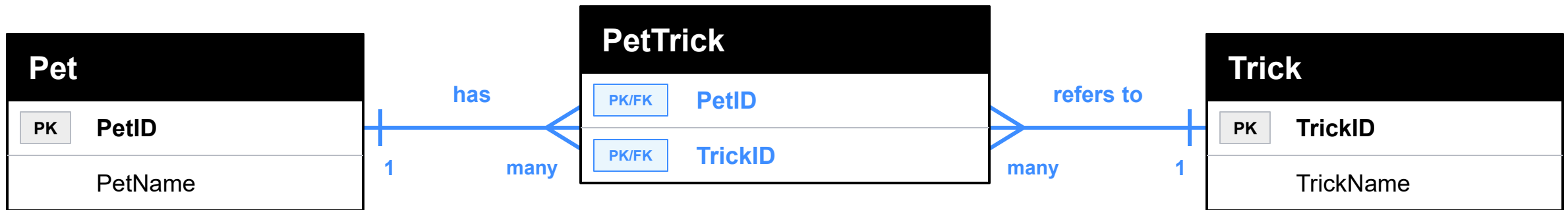


TrickID 302 appears twice: once for Luna and once for Milo.

Connect the association table

PetTrick turns many-to-many into two one-to-many relationships.

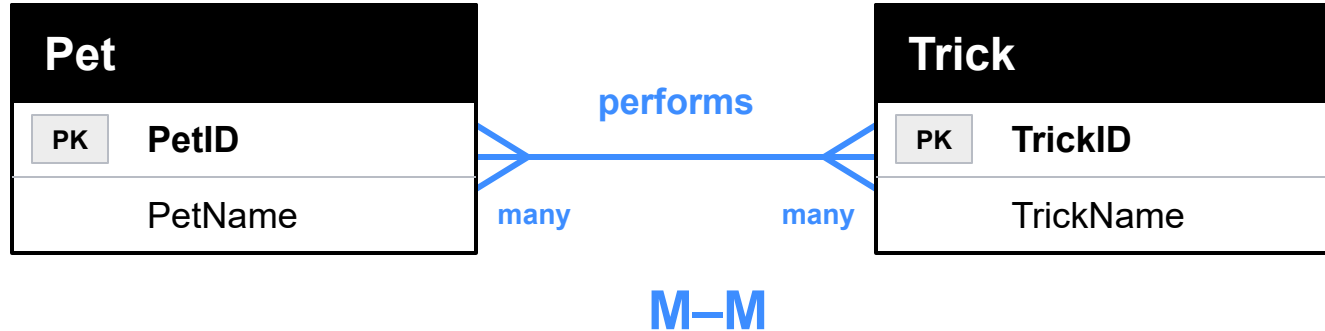
[CLICK TO REVEAL RELATIONSHIPS](#)



What should the relationships be?

A many-to-many relationship

Both sides can participate many times.



Relationship sentences

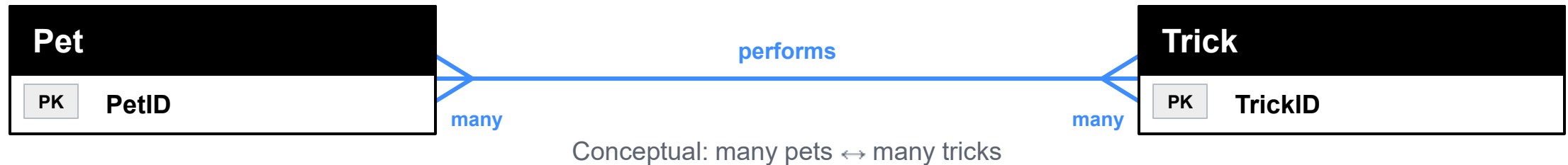
- 1 **A pet** performs many tricks.
- 2 **A trick** is performed by many pets.

A many-to-many relationship implies an association table—even when the table is not drawn.

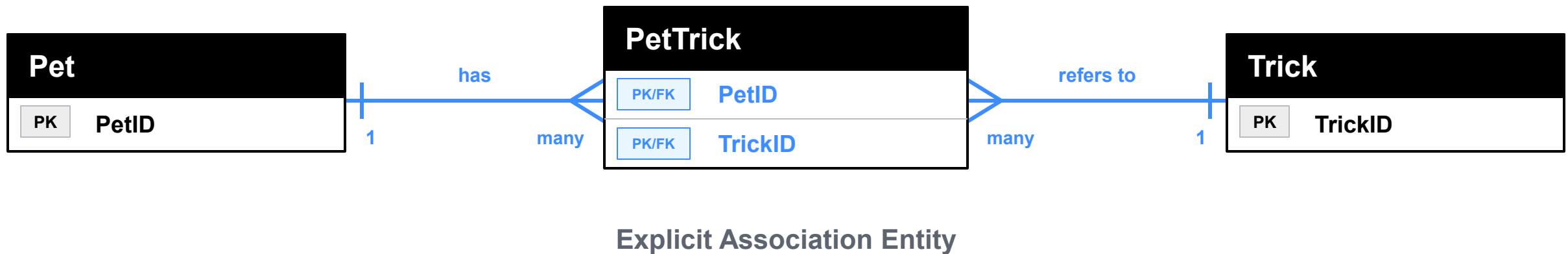
Two diagrams, one many-to-many relationship

The conceptual view is compact; the explicit view exposes PetTrick.

DIRECT M-M RELATIONSHIP



EXPLICIT ASSOCIATION ENTITY



Add Rating to PetTrick

Rating describes one pet performing one trick.

Pet

PetID	PetName
101	Luna
102	Milo
103	Pepper

PetTrick · association table

PetID	TrickID	Rating
101	301	Good
101	302	Good
102	302	Fair
102	303	Good
103	304	Poor

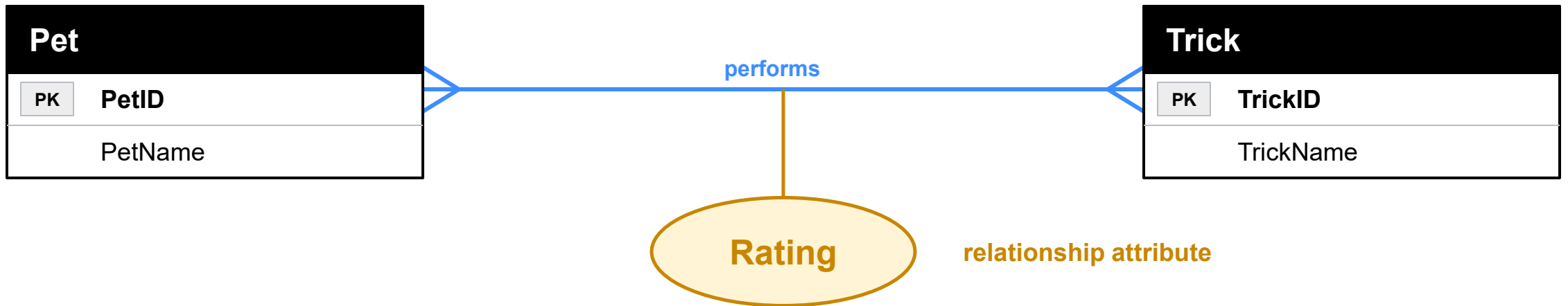
Trick

TrickID	TrickName
301	Sit
302	Roll Over
303	Fetch
304	Spin

Rating belongs to the pairing, so each PetTrick row can have its own value.
What does this look like in a diagram?

Rating is an attribute of performs

Its value depends on both the pet and the trick.



Rating describes how well this pet performs this trick.