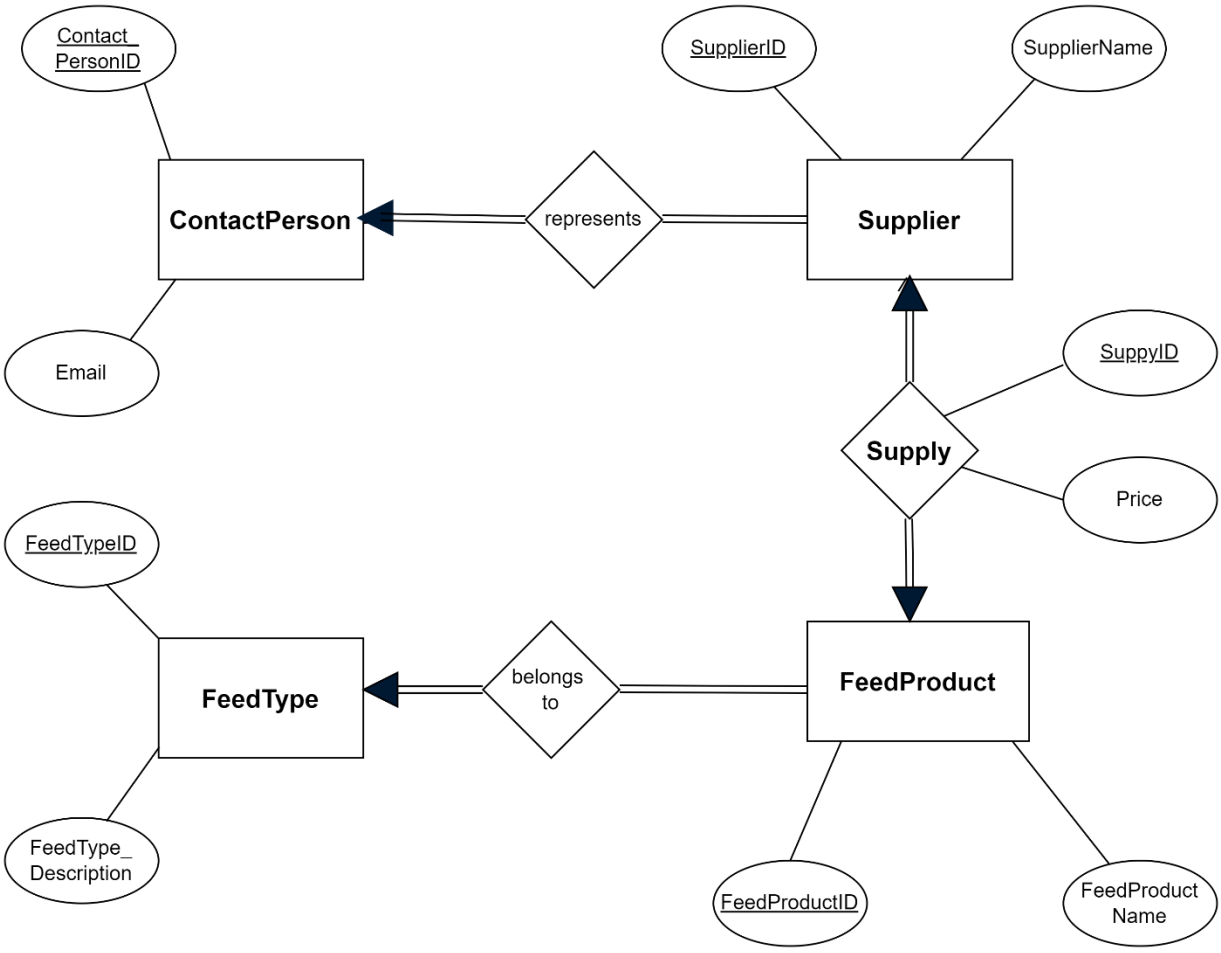
Business rules, ERDs and Relation Schemas examples and solutions

- Using Chen's notation, draw an ERD according to the business rules below. Translate the ERD to a logical level showing the relation schemas – include primary and foreign key fields.
  - **Sheep farm feed supplier business rules:**
    1. All entities must have surrogate primary keys.
    2. A contact person represents one or more suppliers, and each supplier has exactly one contact person.
    3. A supplier supplies many feed products, and every feed product can be supplied by many suppliers.
    4. Each feed product belongs to a specific feed type, and many feed products can have the same feed type.

ERD from the Sheep farm business rules.



Relation schema from the Sheep farm ERD

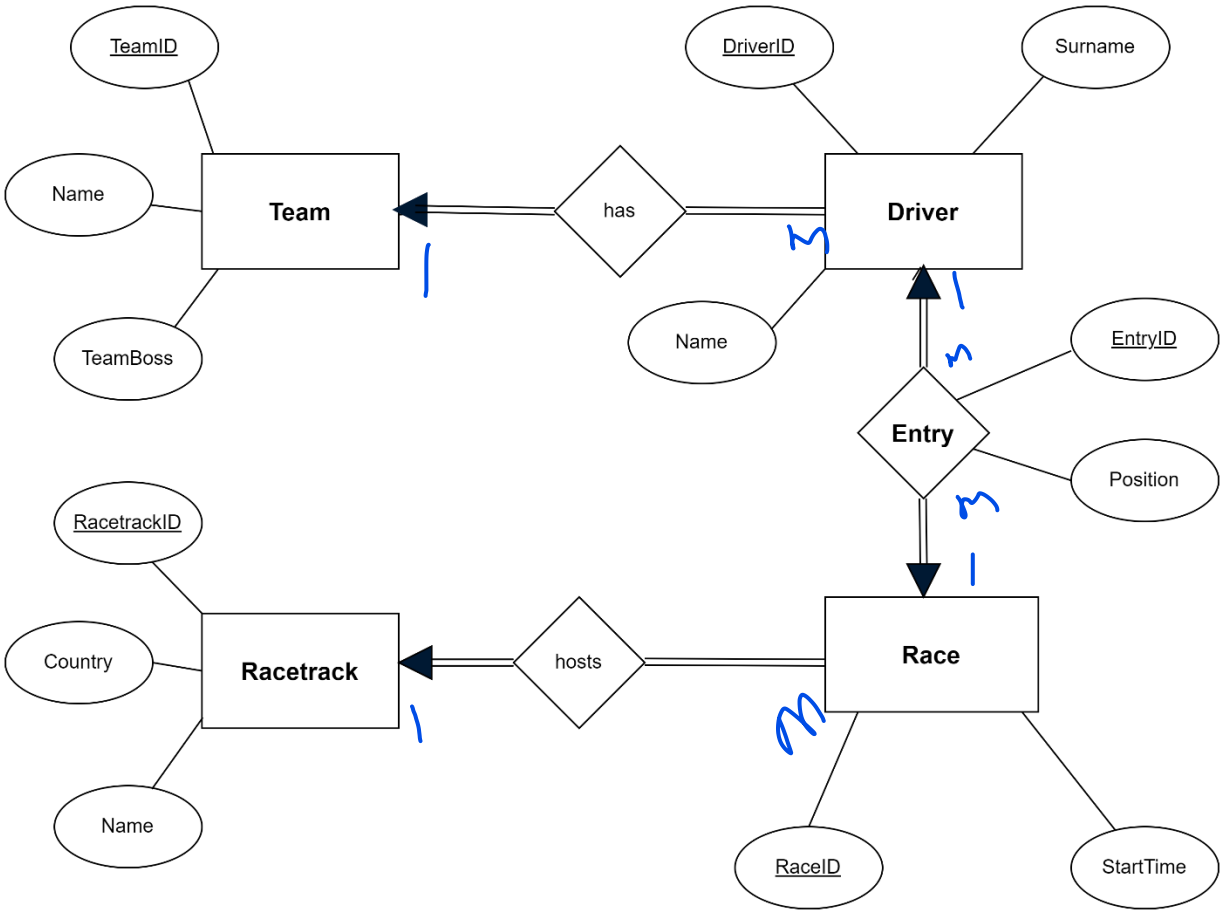
- ContactPerson (**ContactPersonID,** Email)
- Supplier (**SupplierID**, SupplierName, ContactPersonID)
- Supply (**SupplyID**, Price, SupplierID, FeedProductID)
    - *(Note: Supply is a bridge entity with **SupplyID** as surrogate PK as it is indicated in the business rules. Otherwise, if surrogate keys are not required, the PK would be **SupplierID + FeedProductID**)*
- FeedPoduct (**FeedProductID**, FeedProductName, FeedTypeID)
- FeedType (**FeedTypeID**, FeedTypeDescription)

More examples on business rule, ERD and Relation schemas

Formula One racing – business rules:

- For each team that takes part in Formula One races, you need to store the team name and the name of the team boss.
- A team has exactly two drivers, and a driver can only be part of one team.
- The name and surname of each driver needs to be stored in the database.
- Each racetrack that is used for Formula One racing has a name and country that needs to be recorded.
- Every race that takes place is hosted by exactly one racetrack, and a race has a start time (which should include the date).
- Drivers can enter many races during their careers, and the position that they place in each race needs to be stored for statistical purposes.
- Many drivers enter the same race.

ERD from Formula One racing business rules.



Relation schema from Formula One racing business rules.

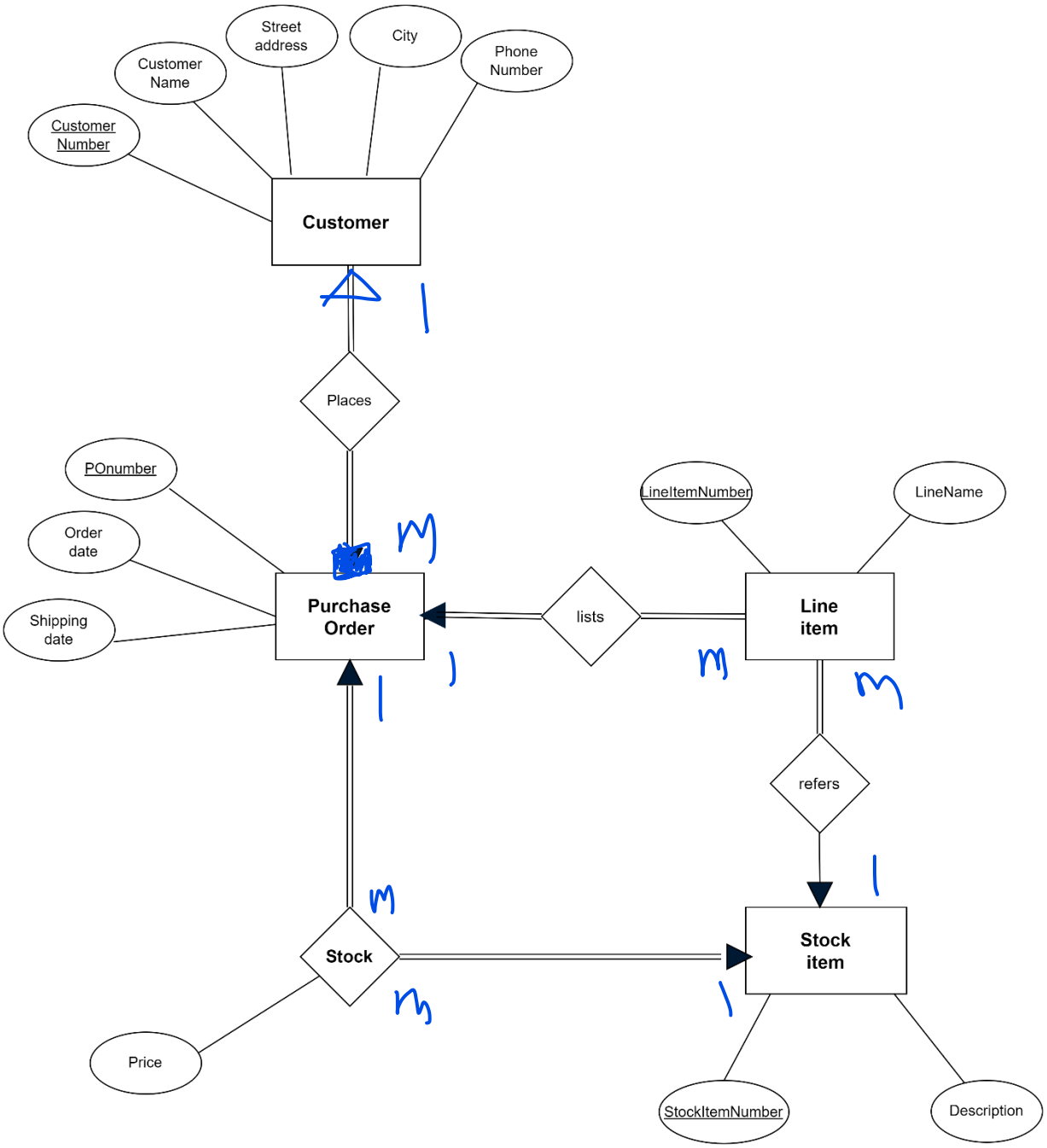
- Team (**TeamID**, Name, TeamBoss)
- Driver (**DriverID**, Surname, Name, TeamID)
- Entry (**EntryID**, Position, DriverID, RaceID)
- Race (**RaceID**, StartTime, RacetrackID)
- Racetrack (**RacetrackID**, Name, Country)

More examples on business rule, ERD and Relation schemas

Purchase order business rules:

- A purchase order can list many line items, but a given line item can be listed by only one purchase order.
- Purchases order details that can be considers are purchase order number, customer number, order date, shipping date, street address, city.
- A line item can refer to only one stock item, but a given stock item can be referred to by many line items. The relationship is optional because zero line items might refer to a given stock item.
- Line item details can be as follows line item number, purchase order number, quantity and discount.
- Purchase order can contain many stock items, and a stock item can be contained in many purchase orders.
- Stock can be stock item number, description and price.
- Customer can place many orders, but a given purchase order can be placed by only one customer.
- Customer details will contain the following, customer number, customer name , street address, city and phone number.

ERD from Purchase order business rules.



Relation schema from Purchase order business rules

- Customer (**CustomerNumber**, CustomerName, StreetAddress, City, PhoneNumber, PONumber)
- PurchaseOrder (**PONumber**, OrderDate, ShippingDate)
- LineItem (**LineItemNumber**, LineName, PONumber, StockItemNumber)
- StockItem (**StockItemNumber**, Description)

- Stock (**PONumber, StockITemNumber,** Price)
    - (Stock is the bridge entity between Purchase order and Stock item. In this case: the PK is **PONumber, StockITemNumber**, while we have two FKs i.e., FK1: **PONumber** and FK2: **StockITemNumber**).