Entities and Attributes

- Sometimes it is hard to tell if something should be an entity or an attribute
  - They both represent objects or facts about the world
  - They are both often represented by nouns in descriptions

- General guidelines
  - Entities can have attributes but attributes have no smaller parts
  - Entities can have relationships between them, but an attribute belongs to a single entity
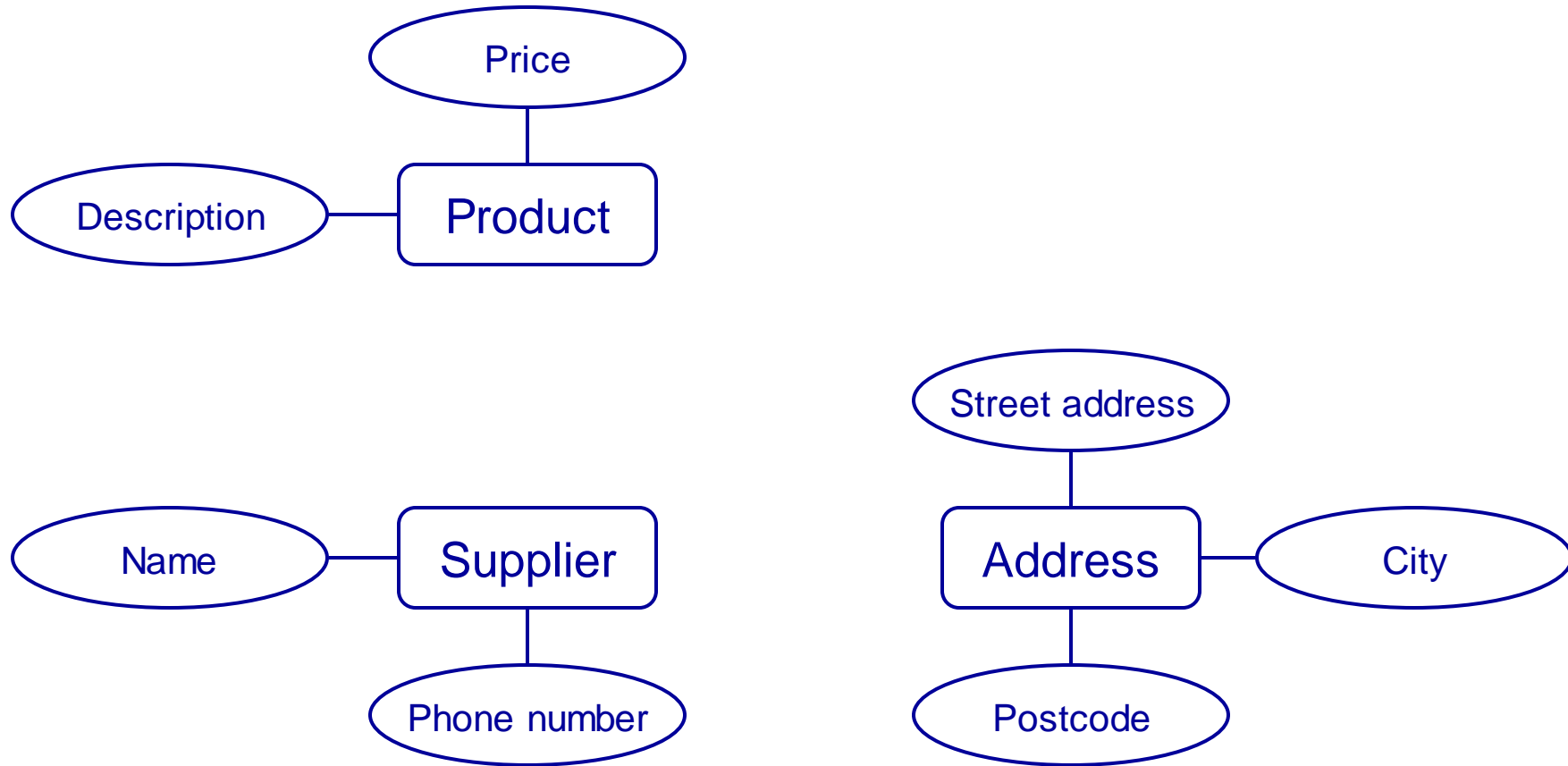
Entity Relationship Modelling

Example

We want to represent information about products in a database. Each product has a description, a price and a supplier. Suppliers have addresses, phone numbers, and names. Each address is made up of a street address, a city, and a postcode.

Example - Entities/Attributes

- Entities or attributes:
  - product
  - description
  - price
  - supplier
  - address
  - phone number
  - name
  - street address
  - city
  - postcode

- Products, suppliers, and addresses all have smaller parts so we can make them entities

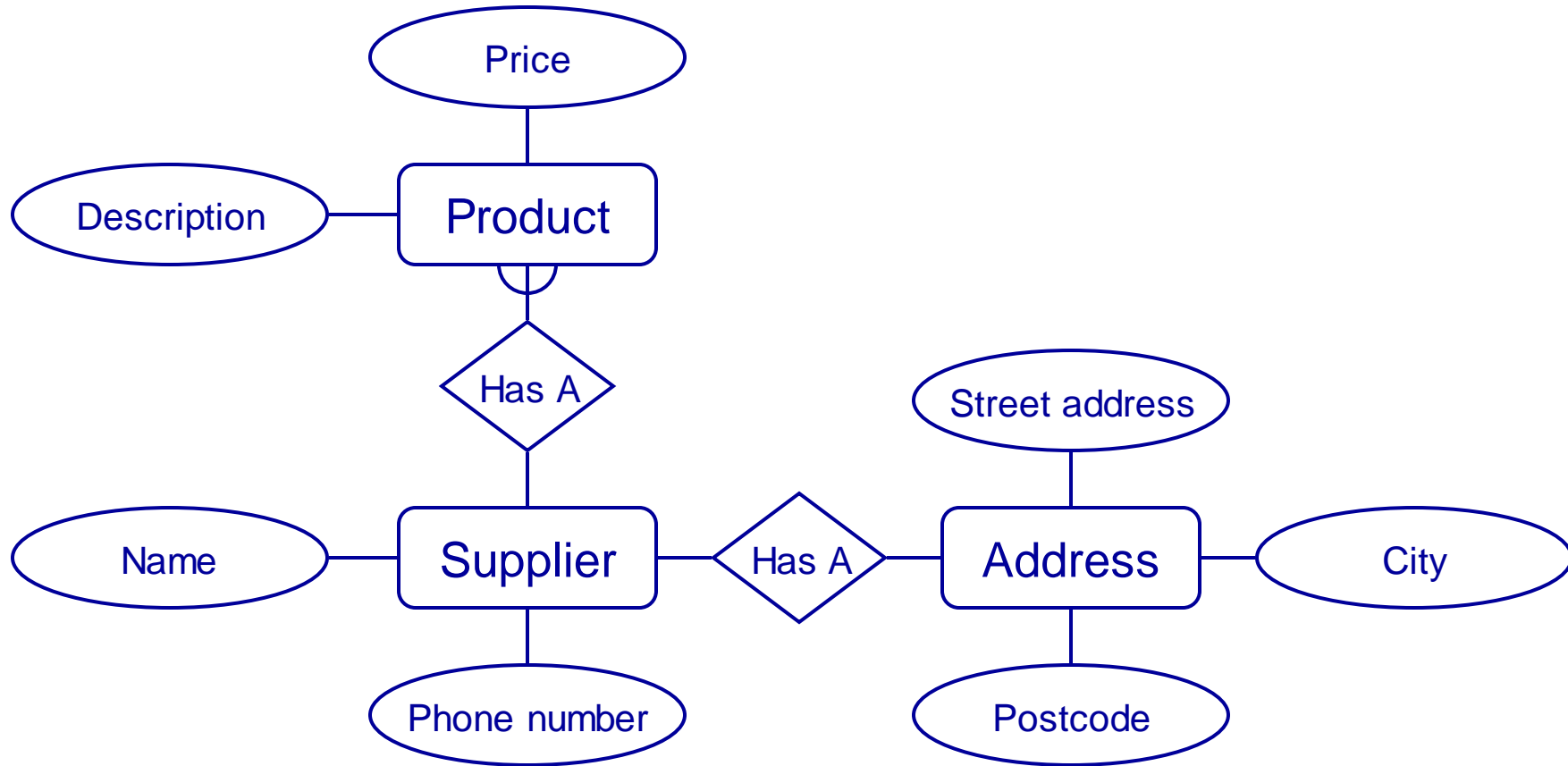- The others have no smaller parts and belong to a single entity

Entity Relationship Modelling

Example - E/R Diagram

Price

Description — Product

Street address

Name — Supplier

Phone number

Address — City

Postcode

Entity Relationship Modelling

Example - Relationships

- Each product has a supplier
  - Each product has a single supplier but there is nothing to stop a supplier supplying many products
  - A many to one relationship

- Each supplier has an address
  - A supplier has a single address
  - It does not seem sensible for two different suppliers to have the same address
  - A one to one relationship

Entity Relationship Modelling

Example - E/R Diagram

Price

Product

Description

Has A

Name Supplier Has A Address City

Street address

Phone number Postcode

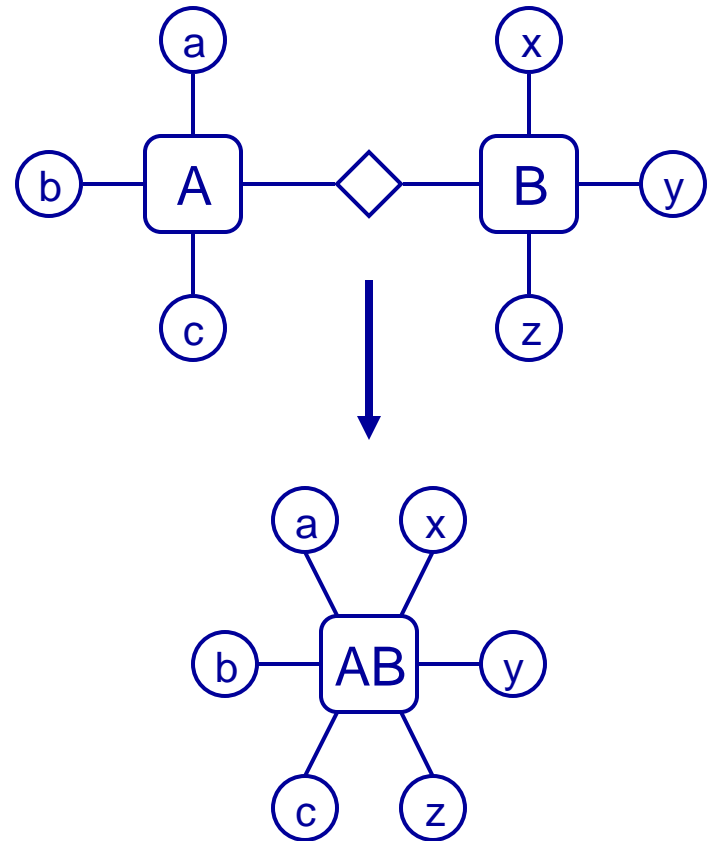Entity Relationship Modelling
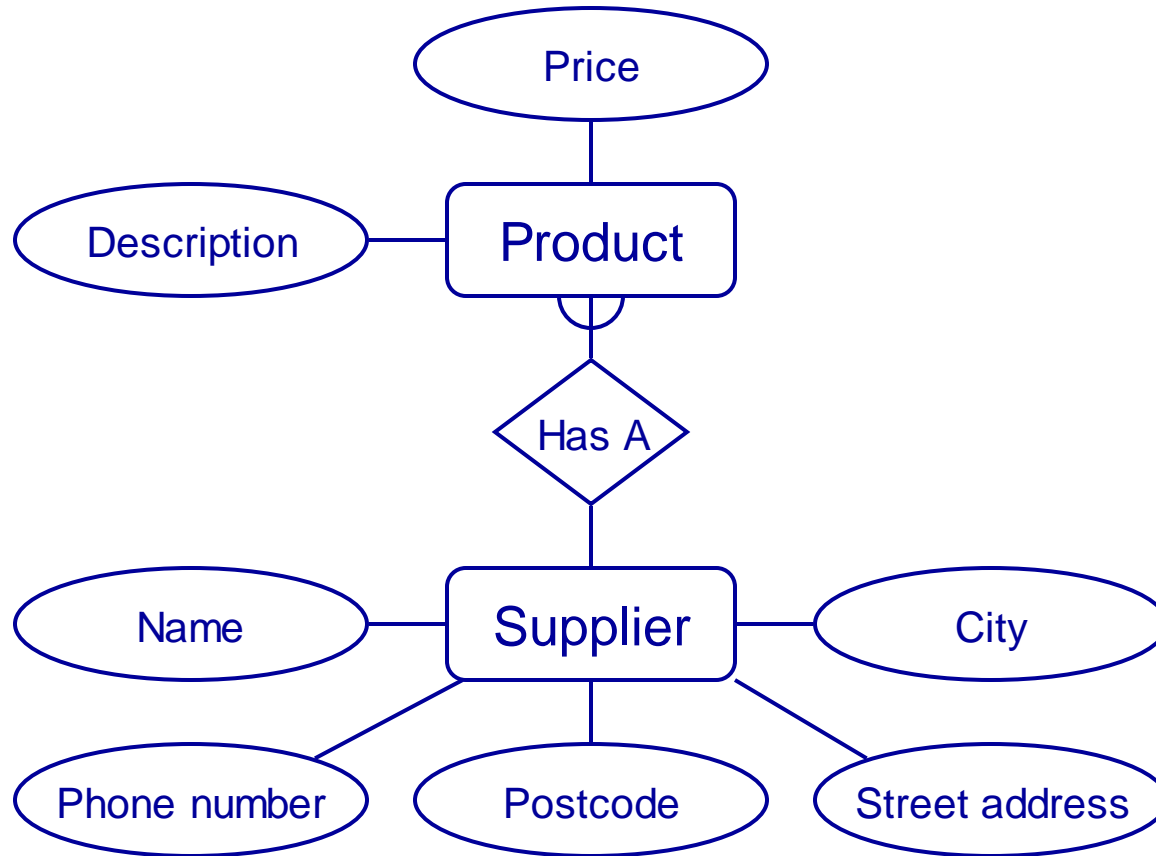
One to One Relationships

- **Some** relationships between entities, A and B, **might** be redundant if
  - It is a 1:1 relationship between A and B
  - Every A is related to a B and every B is related to an A

- Example - the supplier-address relationship
  - Is one to one
  - Every supplier has an address
  - We don't need addresses that are not related to a supplier

Entity Relationship Modelling

Redundant Relationships

- We can merge the two entities that take part in a redundant relationship together
  - They become a single entity
  - The new entity has all the attributes of the old one

Entity Relationship Modelling

Example - E/R Diagram

Entity Relationship Modelling

Making E/R Diagrams

- From a description of the requirements identify the
  - Entities
  - Attributes
  - Relationships
  - Cardinality ratios of the relationships

- Draw the E/R diagram and then
  - Look at one to one relationships as they might be redundant
  - Look at many to many relationships as they might need to be split into two one to many links