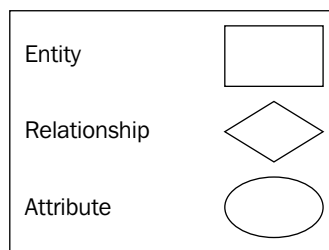
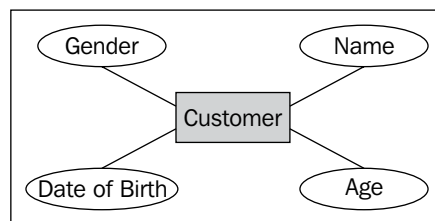


- **Product:** A Product is an object that can be purchased by a Customer.
- **Category:** Category of a Product. A Category can have multiple Products, and a Product can belong to many Categories. For example, a mixer-grinder can be under the Electronic Gadgets category as well as in Home Appliances.
- **OrderLineItem:** An Order can be for multiple Products. Each individual Product in an order will be encapsulated by an OrderLineItem. So an Order can have multiple OrderLineItems.

Now, let us picture the relationship between the core business entities is defined using an Entity-Relationship diagram. Our ER diagram will show the relational associations between the entities from a database's perspective. So it is more of a relational model and will not show any of the object-oriented associations (for which we will use the Domain Model in the later sections of this chapter). In an ER diagram, we show entities using rectangular boxes, the relationships between entities using diamond boxes and attributes using oval boxes, as shown below:

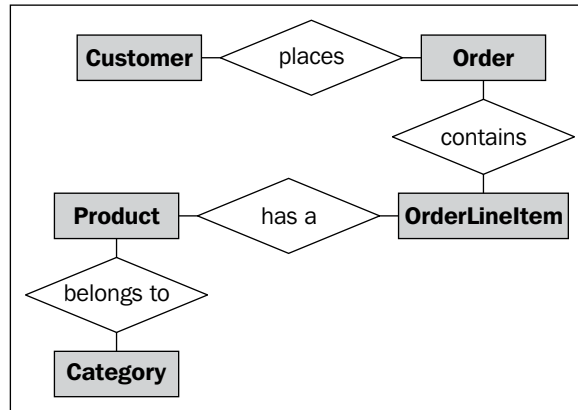


The purpose of using such shapes is to make the ER diagram clear and concise, depicting the relational model as closely as possible without using long sentences or text. So the Customer entity with some of the basic attributes can be depicted in an ER diagram as follows:



Now, let us create an ER diagram for our Order Management System. For the sake of simplicity, we will not list the attributes of the entities involved.

Here is how the ER diagram looks:



The above ER diagram depicts the relationships between the OMS entities but is still incomplete as the relationships do not show how the entities are quantitatively related to each other. We will now look at how to quantify relationships using degree and cardinality.

Degree and Cardinality of a Relationship

The relationships in an ER diagram can also have a *degree*. A degree specifies the multiplicity of a relationship. In simpler terms, it refers to the number of entities involved in a relationship. All relationships in an OMS ER diagram have a degree of two, also called binary relationships. For example, in Customer-Order relationships only two entities are involved – Customer and Order; so it's a two degree relationship. Most relationships you come across would be binary.

Another term associated with a relationship is cardinality. The cardinality of a relationship identifies the number of instances of entities involved in that particular relationship. For example, an Order can have multiple OrderLineItems, which means the cardinality of the relationship between Order and OrderLineItem is one-to-many. The three commonly-used cardinalities of a relationship are:

- **One-to-one:** Depicted as 1:1
Example: One OrderLineItem can have only one Product; so the OrderLineItem and Product entities share a one-to-one relationship
- **One-to-many:** Depicted as 1:n
Example: One customer can place multiple orders, so the Customer and Order entities share a one-to-many relationship