

# TOPICS

**Fundamentals**

**Structured and Object-Oriented Analysis**

**Formal and Automated Techniques**

# **Data Modeling**

## **Data Objects, Attributes and Relationships**

**OOA concepts arose out of data-intensive analysis techniques (called *data modeling* or *information modeling*) that have been in existence for years (especially in database systems).**

**Recent uses of data modeling are seen in defining data formats for interchanging data between CAD systems, computers, and manufacturing organizations.**

**Some terms:**

**schema - data model used in databases**

**protocol - data model used in digital communications**

**framework - data models used to interchange data between CAD systems and manufacturing organizations**

# Data Objects, Attributes, and Relationships

Objects

have

Attributes

Naming attributes

Descriptive attributes

Referential attributes

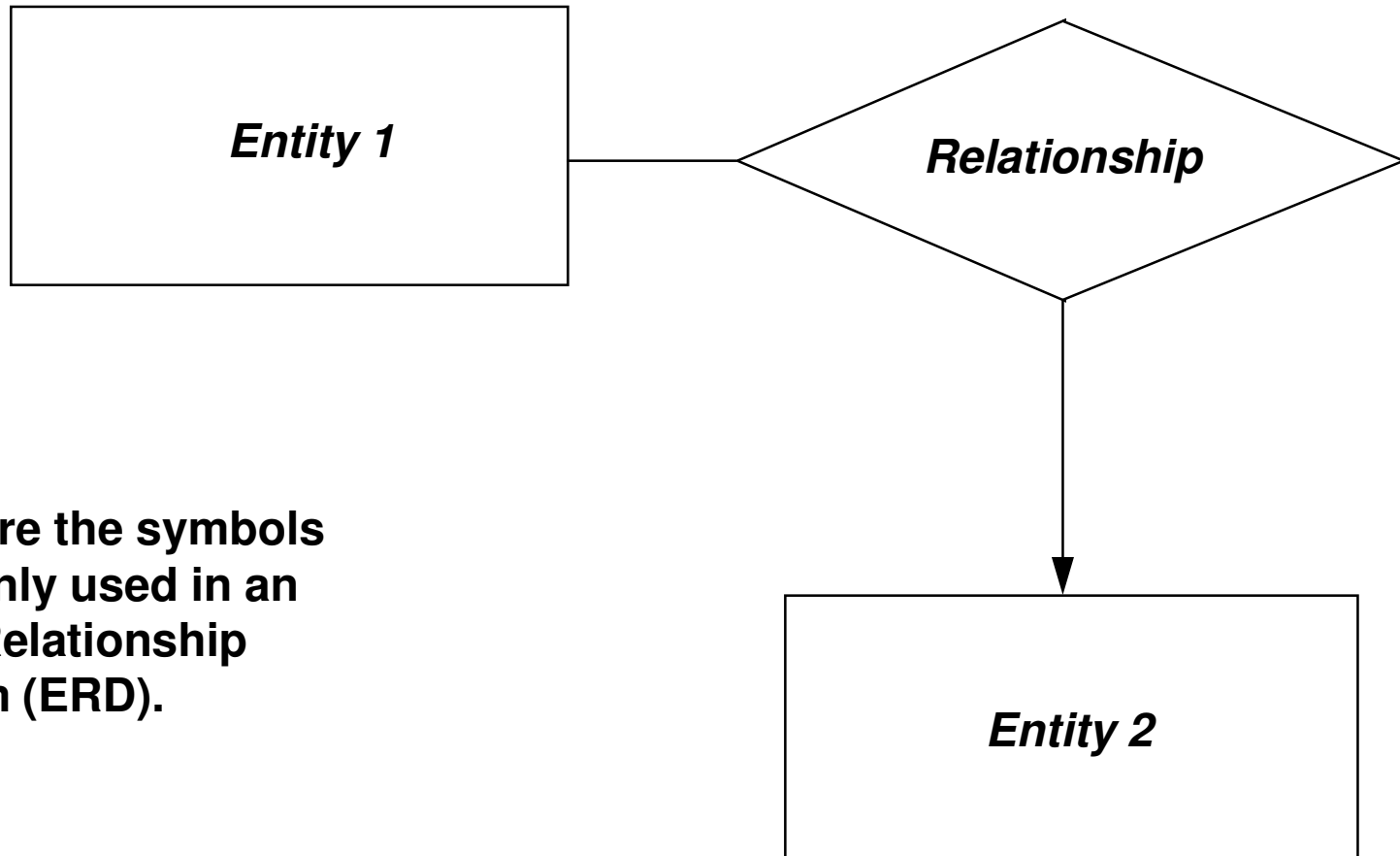
Objects

own

Objects

# Data Modeling

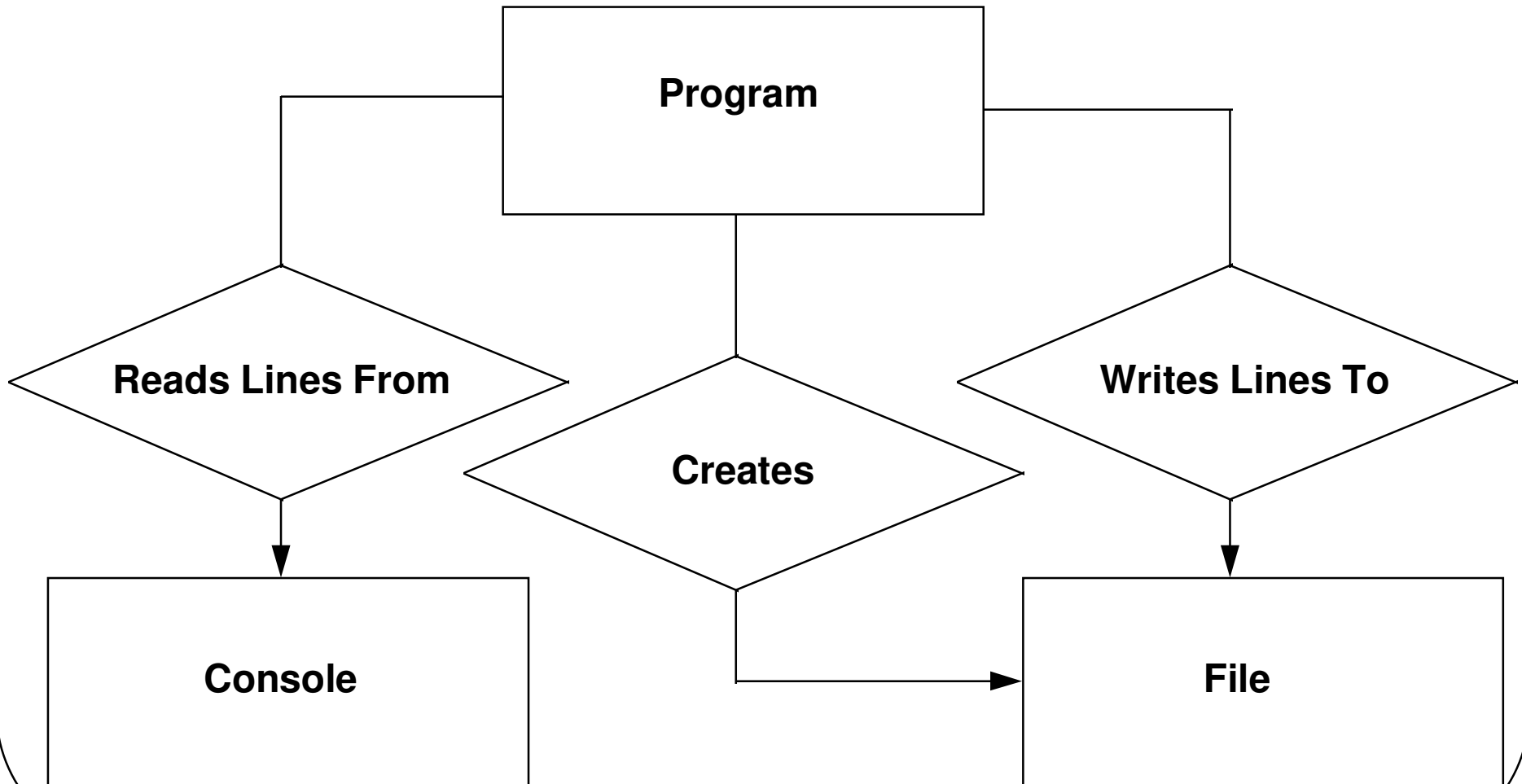
## Entity-Relationship Diagrams



These are the symbols commonly used in an Entity-Relationship Diagram (ERD).

# Data Modeling, Continued

## Entity-Relationship Diagrams - Example



## **Automated Tools**

- **are often graphically-oriented**
- **may provide consistency checking**
- **support the development of the data dictionary**
- **usually support the development of DoD-STD-2167A documentation**