Notation in Chapter 1)。The notation in Figure 2-2 combines most of the desirable features of the different notations that are commonly used in E-R drawing tools today and also allows us to model accurately most situations that are encountered in practice.We introduce additional notation for enhanced entity-relationship models (including class-subclass relationships) in Chapter 3.

In many situations,however,a simpler E-R notation is sufficient.Most drawing tools,either stand-alone ones such as Microsoft Visio or SmartDraw (Which we use in the video associated with this chapter) or those in CASE tools such as Oracle Designer,CAERwin,or PowerDesigner,do not show all the entity and attribute types we use.It is important to note that any notation requires special annotations,not always present in a diagramming tool,to show all the business rules of the organizational situation you are modeling.We will use the Visio notation for a few examples throughout the chapter and at the end of the chapter so that you can see the differences.

**Modeling the rules of the organization**

Now that you have an example of a date model in mind, let’s step back and consider more generally what a date model is representing. We will see in this and the next chapter how to use date model ,in particular the entity-relationship notation , to document rules and policies of an organization. In fact, documenting rules and policies of an organization that govern date is exactly what data modeling is all about. Business rules and policies system; thus, they must be described along with the data to which they are related. For data(in a database) about each student to be associated with data about some student adviser. Also, the statement ‘a student is any person who has applied for admission or taken a course or training program from any credit or noncredit unit of the university’ policy of that university (e.g. , implicitly alumni are student, and a high school student who attended a college fair but has not applied is not a student, assuming the college fair is not a noncredit training program).

Your job as a database analyst is to

·Identify and understand those rules that govern data

·Represent those rules so that they can be unambiguously understood by information system developers and users

·Implement those rules in database technology

More formally, **a business rule** is “a statement that defines or constrains some aspect of the business. It is intended to assert business structure or to control or influence the behavior of the business…rules prevent, cause, or suggest things to happen”(GUIDE Business Rules Project, 1997). For example, the following two statements are common expressions of business rules that affect data processing and storage:

·“A student may register for a section of a course only if he or she has successfully completed the prerequisites for that course.”

·“A preferred customer qualifies for a 10 percent discount, unless he has an overdue account balance.”

There are various kinds of business rules that an E-R model can represent, and many it cannot. We will indicate throughout this and the following chapter where business rules are being represented in an E-R model.

**Data Names and Definitions**

Fundamental to understanding and modeling data are naming and defining data objects. Data objects must be named and defined before they can be used unambiguously in a model of organizational data. In the entity-relationship notation you will learn in this chapter, you have to give entities, relationships, and attributes clear and distinct names and definitions.

**DATA NAMES**　We will provide specific guidelines for naming entities,relationships,and attributes as we develop the entity-relationship data model,but there are some general guidelines about naming any data object.Data names should (Salin,1990;ISO/IEC,2005)

***·Relate to business,not technical (hardware or software),characteristics;*** so,Customer is a good name,but File10,Bit7,and Payroll Report Sort Key are not good names.

***·Be meaningful,*** almost to the point of being self-documenting(i.e.,the definition will refine and explain the name without having to state the essence of the object’s meaning);you should avoid using generic words such as *has,is,person,*or *it.*

***·Be unique,*** from the name used for every other distinct data object;words should be included in a data name if they distinguish the data object from other similar data objects(e.g.,Home Address versus Campus Address).

***·Be readable,*** so that the name is structured as the concept would most naturally be said(e.g.,Grade Point Average is a good name,whereas Average Grade Relative To A,although possibly accurate,is an awkward name).

***·Be composed of words taken from an approved list;*** each organization often chooses a vocabulary from which significant words in data names must be chosen (e.g.,maximum is preferred,never upper limit,ceiling,or highest);alternative,or alias names,also can be used as can approved abbreviations(e.g.,CUST for CUSTOMER),and you may be encouraged to use the abbreviations so that data names are short enough to meet maximum length limits of database technology.

***·Be repeatable,*** meaning that different people or the same person at different times should develop exactly or almost the same name ;this often means that there is a standard hierarchy or pattern for names (e.g.,the birth date of a student would be Student Birth Date and the birth date of an employee would be Employee Birth Date).

***·Follow a standard syntax,*** meaning that the parts of the name should follow a standard arrangement adopted by the organization.

Salin (1990) suggests that you develop data names by

1. Preparing a definition of the data. (We talk about definitions next.)
2. Removing insignificant or illegal words (words not on the approved list for names);note that the presence of AND and OR in the definition may imply that two or more data objects are combined,and you may want to separate the objects and assign different names.
3. Arranging the words in a meaningful,repeatable way.
4. Assigning a standard abbreviation for each word.
5. Determining whether the name already exists,and if so,adding other qualifiers that make the name unique.

We will see examples of good data name as we develop a data modeling notation in　this　chapter.

**DATA DEFINITIONS**  A definition (sometimes called a structural assertion) is considered a type of business rule.(GUIDE Business Rules Project,1997).A definition is an explanation of a concept or association between concepts.Examples of concepts are course,section,rental car,flight,reservation,and passenger.A definition can relate several concepts,such as:

* ”A course is a module of instruction in a particular subject area.”This definition associates two concepts:module of instruction and subject area.We assume that these are common terms that do not need to be further defined.

**GOOD DATA DEFINITIONS**  We will illustrate good definitions for entities,relationships,and attributes as we develop the entity-relationship notation in this and next chapters.There are,however,some general guidelines to follow (Aranow,1989;ISO/IEC,2004);