Modeling Data in the Organization

**LEARNING OBJECTIVES**

After studying this chapter,you should be able to:

Concisely define each of the following key terms:entity-relationship model(E-Rmodel),entity-relation diagram(E-R diagram,or ERD),business rule,entity,entity type,entityinstance,strong entity type,weak entity type,identifying owner,identifying relationship,attribute,required attribute,optional attribute,composite attribute,simple(or atomic)attribute,multivalued attribute,derived attribute,identifier,composite identifier,relationship type,relationship instance,relationship,cardinality constraint,minimum cardinality,maximum cardinality,and time stamp.

State reasons why many system developers believe that data modeling is the most important part of the systems development precess.

Write good names and definitions for entities,relationship,and attributes.

Distinguish unary,binary,andternary relationships andgive a common example of each

Model each of the following constructs in an E-R diagram:composite attribute,muktivalued attribute,derived attribute,associative entity,identifying relationship,and minimum and maximum cardinality constraints.

Draw an E-R diagram to represent common business situations.

Convert a many-to-many relationship to an associative entity type.

Model simple time-dependent data using time stamps and relationships in an E-R diagram

**INTRODUCTION**

You have already been introduced to modeling data and the entity-relationship(E-R) data model through simplified examples in Chapter 1.(You may want to review,for example,the E-R date modeling based on the powerful concept of business rules and describe the E-Rdata model in detail.This chapter begins your journey of learning how to design and use databases.It is exciting to create information systems that run organizations and help people do their jobs well.

Business rules,the foundation of data models,are derived from policies,procedures,events,functions,and other business objects,and they state constraints on the organization.Business rules represent the language and fundamental structure of an organization(Hay,2003).Business rules formalize the understanding of the organization by organization owners,managers,and leaders with that of information systems architects.

Business rules are important in data modeling because they govern how data are handled and stord,Examples of basic business rules are data names and definitions.This chapter explains guidelines for the clear naming and definition of data objects in a business,In terms of conceptual data modeling,names and definitions must be provided for the main data objects:etity types(e.g.,Customer),attributes(Customer Name),and ralationshios(Customer Places Orders).Other business rules may state constraints on these data object.these constraints can be captured in data requirements through other system documentation.

After decades of use,the E\_R model remains the mainstream approach for conceptual data modeling.Its popularity stems fron factors such as relative ease of use,widespread computer-aided software engineering(CASE)tool support,and the belief that entities and relationships are natural modeling concepts in the real world

The e-r model is most used as a tooi for communications between database designers and end users during the analysis phase of database development (described in chapter 1).the e-r model is used to construct a conceptual data model ,which is a representation of the structure and constraints of a database that is independent of software (such as a database management system ).

Some authors introduce terms and concepts peculiar to the relational data model when discussing e-r modeling ;the relationl data model is the basis for most database management systems in use today .in particular.they recommend that the e-r model becompletely normalized,with full resolution of primary and foreign keys,however,we believe that this forces a premature commitment to the relational data mobel.in today”as data base environment,the databasemaybe implemented with object-oriented technolojy or with a mixture of object-oriented and relational technoloty.there fore,we deferdiscussion of normalition concepts to chapter 4.

The E-R model continues to evolve,but unfortunately there is not yet a standard of 10 different E-R modeling notations,explaining the major advantages and disadvantages of each approach.because data modeling software tools are now commonly used by professional data modelers,we adopt for use in this text a variation of notation used in professional modeling tools.

In an actual work environment,you may not have to develop a data model from scratch.because of the increased acceptance of packaged software (for example,enterprise resource planning with a predefined data model) and purchased business area or industry data models(which we discuss in chapter 3),your job of data modeling has a jump start.This is good because such components and patterns give you a starting poing based on generally accepted practices.however,your job is not done for several reasons:

1. There are still many times when a new,custom-built application is being developed along with the associated database.The business rules for the business area supported by this application need to be modeled.
2. Purchased applications and data models need to be customized for your particular setting.Predefined data models tend to be very extensive and complex;hence,they require significant data modeling skill to tailor the models to be effective and efficient in a given organization.Although this effort can be much faster,thorough,and accurate than starting from scratch,the ability to understand a particular organization to match the data model to its business rules is an essential task.