Key Terms

CODASYL DBTG
column
concurrency
data
Data Language/I (DL/I)
data marts
data model
data warehouses
database
database administrator
database application
database design
database management system (DBMS)
database migration
database system
enterprise-class database system
entity-relationship (ER) data modeling
foreign key
information
instance
integrated tables
knowledge worker
metadata
normal forms
normalization
NoSQL movement
object-oriented DBMS (OODBMS or ODBMS)
object-oriented programming (OOP)
object-relational DBMS
personal database system
primary key
programmer
record
referential integrity constraints
relational database
relational model
relationship
row
self-describing
Structured Query Language (SQL)
surrogate key
table
user

Review Questions

1.1 What is the purpose of a database?

1.2 What is the most commonly used type of database?

1.3 Give an example of two related tables other than one in this book. Use the STUDENT and GRADE tables in Figure 1-3 as an example pattern for your tables. Name the tables and columns using the conventions in this book.

1.4 For the tables you created in Review Question 1.3, what are the primary keys of each table? Do you think that any of these primary keys be could be surrogate keys?

1.5 Explain how the two tables you provided in Review Question 1.3 are related. Which table contains the foreign key, and what is the foreign key?

1.6 Show your two tables from Review Question 1.3 without the columns that represent the relationships. Explain how the value of your two tables is diminished without the relationships.

1.7 Define the terms *data* and *information*. Explain how the two terms differ.

1.8 Give an example of information that could be determined using the two tables you provided in your answer to Review Question 1.3.

1.9 Give examples of a single-user database application and a multiuser database application other than the ones shown in Figure 1-5.

1.10 What problem can occur when a database is processed by more than one user?

1.11 Give an example of a database application that has hundreds of users and a very large and complicated database. Use an example other than one in Figure 1-5.

1.12 What is the purpose of the largest databases at e-commerce companies such as Amazon.com?

1.13 How do the e-commerce companies use these databases?

1.14 How do digital dashboard and data mining applications differ from transaction processing applications?

1.15 Explain why a small database is not necessarily simpler than a large one.

1.16 Explain the components in Figure 1-7.

1.17 What are the functions of application programs?

1.18 What is Structured Query Language (SQL), and why is it important?

1.19 What does DBMS stand for?

1.20 What are the functions of the DBMS?

1.21 Name three vendors of DBMS products.

1.22 Define the term *database.*

1.23 Why is a database considered to be self-describing?

1.24 What is metadata? How does this term pertain to a database?

1.25 What advantage is there in storing metadata in tables?

1.26 List the components of a database other than user tables and metadata.

1.27 Is Microsoft Access a DBMS? Why or why not?

1.28 Describe the components shown in Figure 1-15.

1.29 What is the function of the application generator in Microsoft Access?

1.30 What is the name of the DBMS engine within Microsoft Access? Why do we rarely hear about that engine?

1.31 Why does Microsoft Access hide important database technology?

1.32 Why would someone choose to replace the native Microsoft Access DBMS engine with SQL Server?

1.33 Name the components of an enterprise-class database system.

1.34 Name and describe the four categories of database applications that would use an enterprise-class database system.

1.35 How do database applications get and put database data?

1.36 Name the five DBMS products described in this chapter, and compare them in terms of power, features, and ease of use.

1.37 List several consequences of a poorly designed database.

1.38 Explain two ways that a database can be designed from existing data.

1.39 What is a data warehouse? What is a data mart?

1.40 Describe the general process of designing a database for a new information system.

1.41 Explain two ways that databases can be redesigned.

1.42 What does the term *database migration* mean?

1.43 Summarize the various ways that you might work with database technology.

1.44 What job functions does a knowledge worker perform?

1.45 What job functions does a database administrator perform?

1.46 Explain the meaning of the domains in Figure 1-23.

1.47 What need drove the development of the first database technology?

1.48 What are Data Language/I and CODASYL DBTG?

1.49 Who was E. F. Codd?

1.50 What were the early objections to the relational model?

1.51 Name two early relational DBMS products.

1.52 What are some of the reasons for the success of Oracle Database?

1.53 Name three early personal computer DBMS products.

1.54 What happened to the products in your answer to Review Question 1.53?

1.55 What was the purpose of OODBMS products? State two reasons that OODBMS products were not successful.

1.56 What characteristic of HTTP was a problem for database processing applications?

1.57 What is an open source DBMS product? Which of the five DBMS products that you named in answering Review Question 1.36 is historically an open source DBMS product?

1.58 What has been the response of companies that sell proprietary DBMS products to the open source DBMS products? Include two examples in your answer.

1.59 What is XML? What comment did Bill Gates make regarding XML?

1.60 What is the NoSQL movement? Name two applications that rely on NoSQL databases.

Project Questions

To perform the following projects, you will need a computer that has Microsoft Access installed. If you have no experience working with Microsoft Access, read Appendix A before you proceed.

For this set of project questions, we will create a Microsoft Access database for the Wedgewood Pacific Corporation (WPC). Founded in 1957 in Seattle, Washington, WPC has grown into an internationally recognized organization. The company is located in two buildings. One building houses the Administration, Accounting, Finance, and Human Resources departments, and the second houses the Production, Marketing, and Information Systems departments. The company database contains data about company employees, departments, company projects, company assets (for example, computer equipment), and other aspects of company operations.

In the following project questions, we will start by creating the WPC.accdb database with the following two tables:

DEPARTMENT (DepartmentName, BudgetCode, OfficeNumber, Phone)

EMPLOYEE (EmployeeNumber, FirstName, LastName, *Department*, Phone, Email)

DEPARTMENT

Column Name	Type	Key	Required	Remarks
DepartmentName	Text (35)	Primary Key	Yes	
BudgetCode	Text (30)	No	Yes	
OfficeNumber	Text (15)	No	Yes	
Phone	Text (12)	No	Yes	

Figure 1-26

Column Characteristics for the DEPARTMENT Table

1.61 Create a Microsoft Access database named WPC.accdb.

1.62 Figure 1-26 shows the column characteristics for the WPC DEPARTMENT table. Using the column characteristics, create the DEPARTMENT table in the WPC.accdb database.

1.63 Figure 1-27 shows the data for the WPC DEPARTMENT table. Using Datasheet view, enter the data shown in Figure 1-27 into your DEPARTMENT table.

1.64 Figure 1-28 shows the column characteristics for the WPC EMPLOYEE table. Using the column characteristics, create the EMPLOYEE table in the WPC.accdb database.

1.65 Create the relationship and referential integrity constraint between DEPARTMENT and EMPLOYEE. Enable enforcing of referential integrity and cascading of data updates, but do *not* enable cascading of data from deleted records.

1.66 Figure 1-29 shows the data for the WPC EMPLOYEE table. Using Datasheet view, enter the first three rows of the data shown in Figure 1-29 into your EMPLOYEE table.

1.67 Using the Microsoft Access form wizard, create a data input form for the EMPLOYEE table and name it WPC Employee Data Form. Make any adjustments necessary to the form so that all data display properly. Use this form to enter the rest of the data in the EMPLOYEE table shown in Figure 1-29 into your EMPLOYEE table.

1.68 Using the Microsoft Access report wizard, create a report named Wedgewood Pacific Corporation Employee Report that presents the data contained in your EMPLOYEE table sorted first by employee last name and then by employee first name. Make any adjustments necessary to the report so that all headings and data display properly. Print a copy of this report.

Figure 1-27

WPC DEPARTMENT Data

DepartmentName	BudgetCode	OfficeNumber	Phone
Administration	BC-100-10	BLDG01-300	360-285-8100
Legal	BC-200-10	BLDG01-200	360-285-8200
Accounting	BC-300-10	BLDG01-100	360-285-8300
Finance	BC-400-10	BLDG01-140	360-285-8400
Human Resources	BC-500-10	BLDG01-180	360-285-8500
Production	BC-600-10	BLDG02-100	360-287-8600
Marketing	BC-700-10	BLDG02-200	360-287-8700
InfoSystems	BC-800-10	BLDG02-270	360-287-8800

EMPLOYEE

Column Name	Type	Key	Required	Remarks
EmployeeNumber	AutoNumber	Primary Key	Yes	Surrogate Key
FirstName	Text (25)	No	Yes	
LastName	Text (25)	No	Yes	
Department	Text (35)	No	Yes	
Phone	Text (12)	No	No	
Email	Text (100)	No	Yes	

Figure 1-28
Column Characteristics for the EMPLOYEE Table

1.69 Using the Microsoft Access form wizard, create a form that has all of the data from both tables. When asked how you want to view your data, select *by DEPARTMENT*. Choose the default options for other questions that the wizard asks. Open your form and page through your departments.

1.70 Using the Microsoft Access report wizard, create a report that has all of the data from both tables. When asked how you want to view your data, select *by DEPARTMENT*. For the data contained in your EMPLOYEE table in the report, specify that it will be sorted first by employee last name and then by employee first name. Make any adjustments necessary to the report so that all headings and data display properly. Print a copy of this report.

1.71 Explain, to the level of detail in this chapter, what is going on within Microsoft Access in Project Questions 1.67, 1.68, 1.69, and 1.70. What subcomponent created the form and report? Where is the data stored? What role do you think SQL is playing?

Figure 1-29
WPC EMPLOYEE Data

EmployeeNumber	FirstName	LastName	Department	Phone	Email
[AutoNumber]	Mary	Jacobs	Administration	360-285-8110	Mary.Jacobs@WPC.com
[AutoNumber]	Rosalie	Jackson	Administration	360-285-8120	Rosalie.Jackson@WPC.com
[AutoNumber]	Richard	Bandalone	Legal	360-285-8210	Richard.Bandalone@WPC.com
[AutoNumber]	Tom	Caruthers	Accounting	360-285-8310	Tom.Caruthers@WPC.com
[AutoNumber]	Heather	Jones	Accounting	360-285-8320	Heather.Jones@WPC.com
[AutoNumber]	Mary	Abernathy	Finance	360-285-8410	Mary.Abernathy@WPC.com
[AutoNumber]	George	Smith	Human Resources	360-285-8510	George.Smith@WPC.com
[AutoNumber]	Tom	Jackson	Production	360-287-8610	Tom.Jackson@WPC.com
[AutoNumber]	George	Jones	Production	360-287-8620	George.Jones@WPC.com
[AutoNumber]	Ken	Numoto	Marketing	360-287-8710	Ken.Numoto@WPC.com
[AutoNumber]	James	Nestor	InfoSystems		James.Nestor@WPC.com
[AutoNumber]	Rick	Brown	InfoSystems	360-287-8820	Rick.Brown@WPC.com