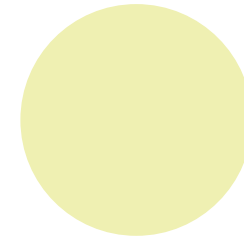
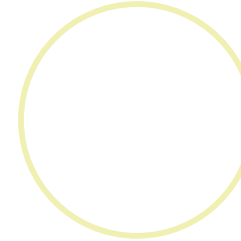
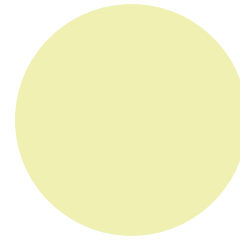
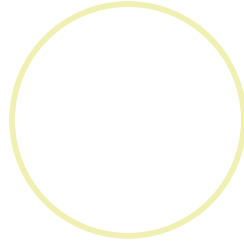


Week 2



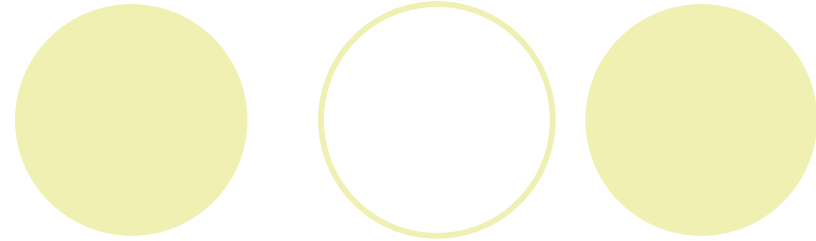
# **Data management, data center and business intelligence**

**Information Technology For Management 7<sup>th</sup> Edition**  
Turban, Volonino

**John Wiley & Sons, Inc.**

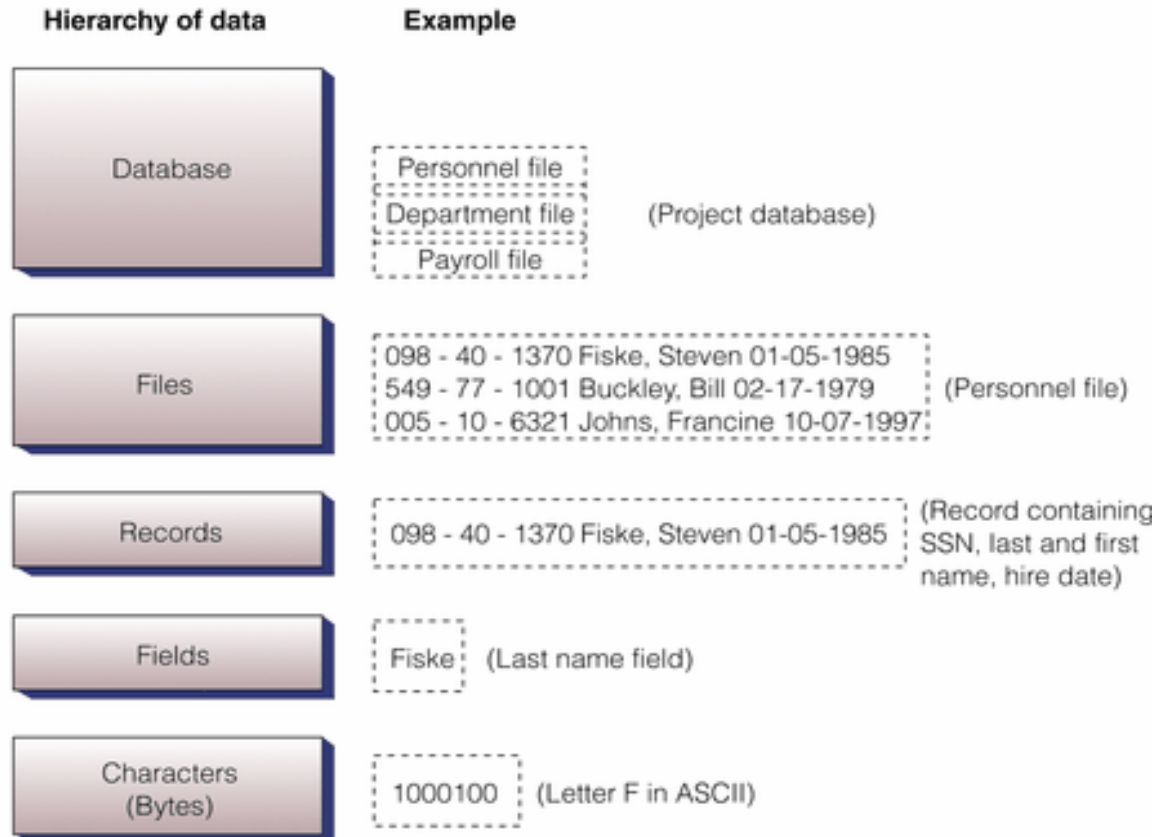
Week 2

# The Hierarchy of Data



**FIGURE 5 1**

*The Hierarchy of Data*



# Data Entities, Attributes, and Keys

**FIGURE 5 2**

## Keys and Attributes

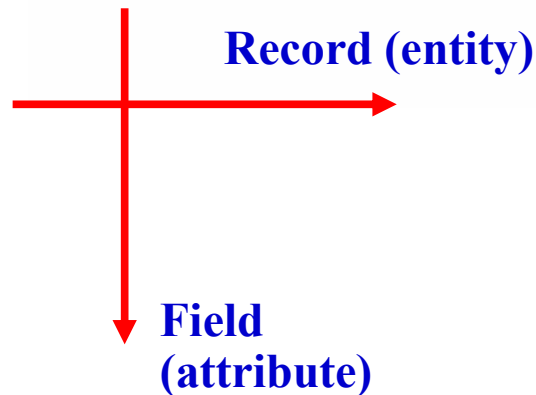
The key field is the employee number. The attributes include last name, first name, hire date, and department number.

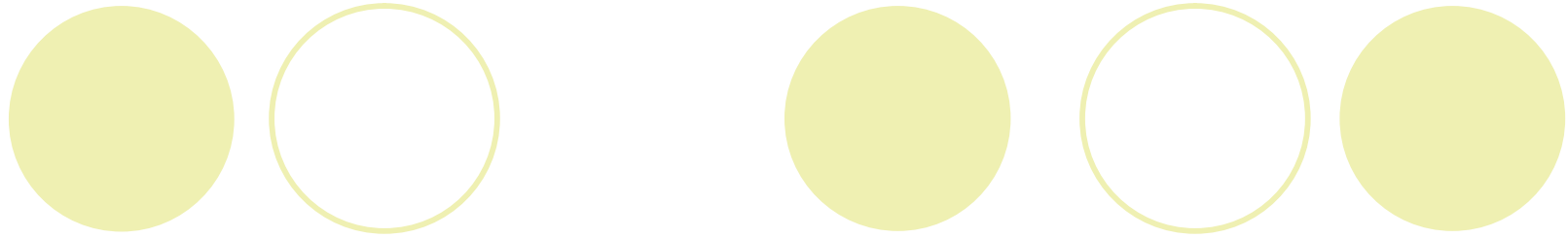
Employee #	Last name	First name	Hire date	Dept. number
005-10-6321	Johns	Francine	10-07-1997	257
549-77-1001	Buckley	Bill	02-17-1979	632
098-40-1370	Fiske	Steven	01-05-1985	598

Key field

Attributes (fields)

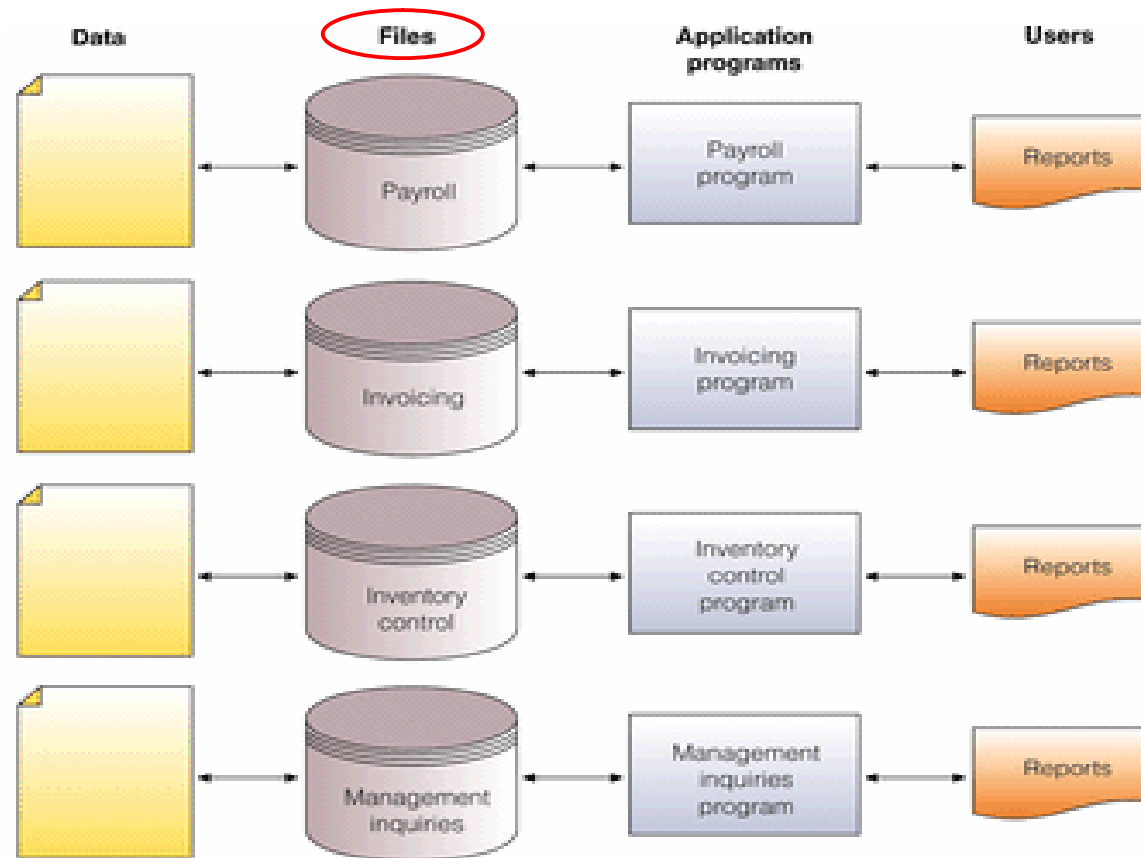
Entities (records)





# The Traditional versus the Database Approach to Data Management

# The Traditional Approach



**FIGURE 5-3**

## The Traditional Approach to Data Management

With the traditional approach, one or more data files is created and used for every application. For example, the inventory control program would have one or more files containing inventory data, such as the inventory item, number on hand, and item description. Likewise, the invoicing program can have files on customers, inventory items being shipped, and so on. With the traditional approach to data management, it is possible to have the same data, such as inventory items, in several different files used by different applications.

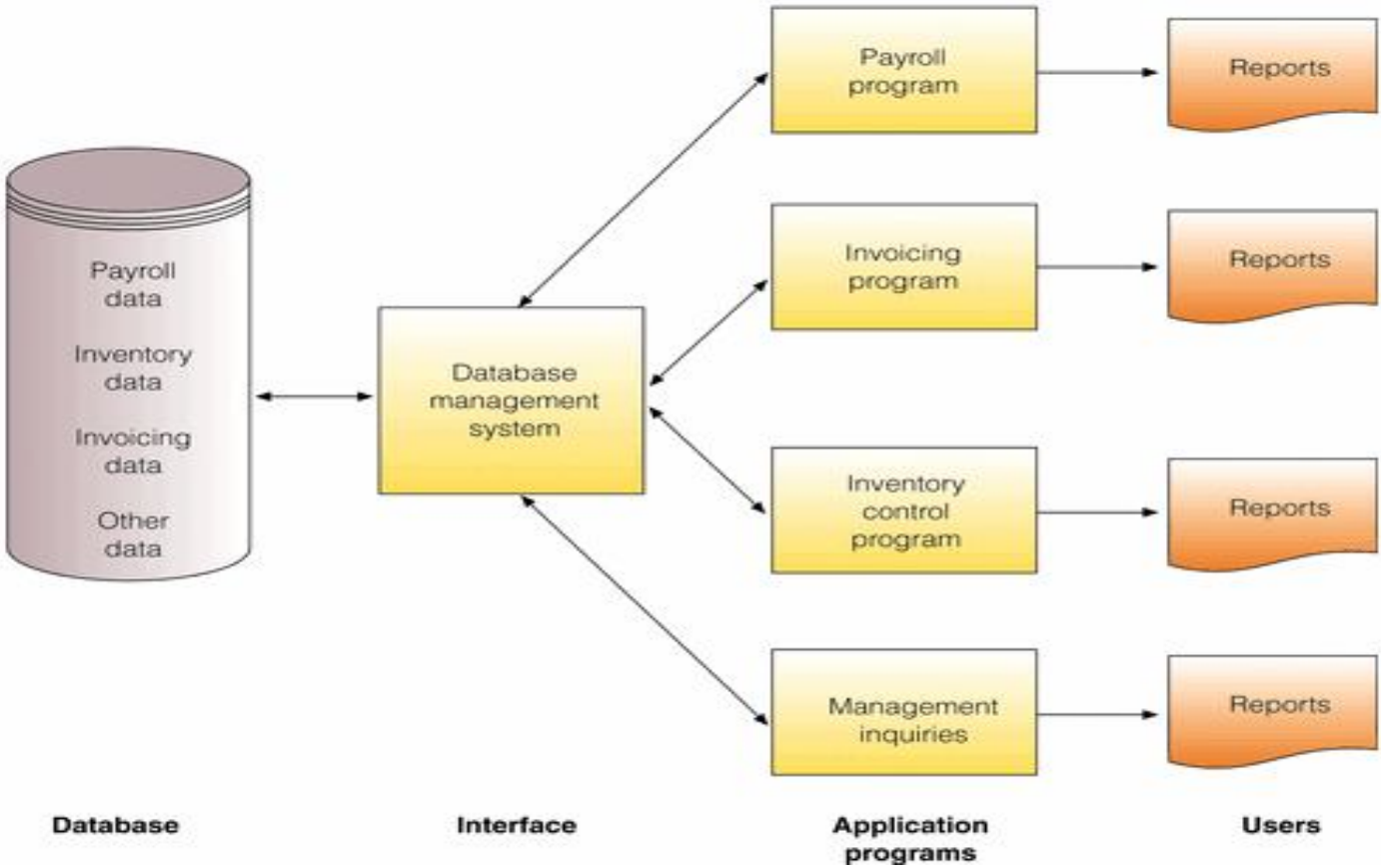


## Traditional Approach

- Data redundancy
- Program-data dependence
- Data integrity

# Database Approach

**FIGURE 5.4**  
*The Database Approach to Data Management*



# Advantages of the Database Approach

Advantages	Explanation
Improved strategic use of corporate data	Accurate, complete, up-to-date data can be made available to decision makers where, when, and in the form they need it.
Reduced data redundancy	The database approach can reduce or eliminate data redundancy. Data is organized by the DBMS and stored in only one location. This results in more efficient utilization of system storage space.
Improved data integrity	With the traditional approach, some changes to data were not reflected in all copies of the data kept in separate files. This is prevented with the database approach because there are no separate files that contain copies of the same piece of data.
Easier modification and updating	With the database approach, the DBMS coordinates updates and data modifications. Programmers and users do not have to know where the data is physically stored. Data is stored and modified once. Modification and updating is also easier because the data is stored at only one location in most cases.
Data and program independence	The DBMS organizes the data independently of the application program. With the database approach, the application program is not affected by the location or type of data. Introduction of new data types not relevant to a particular application does not require the rewriting of that application to maintain compatibility with the data file.



# Advantages of the Database Approach

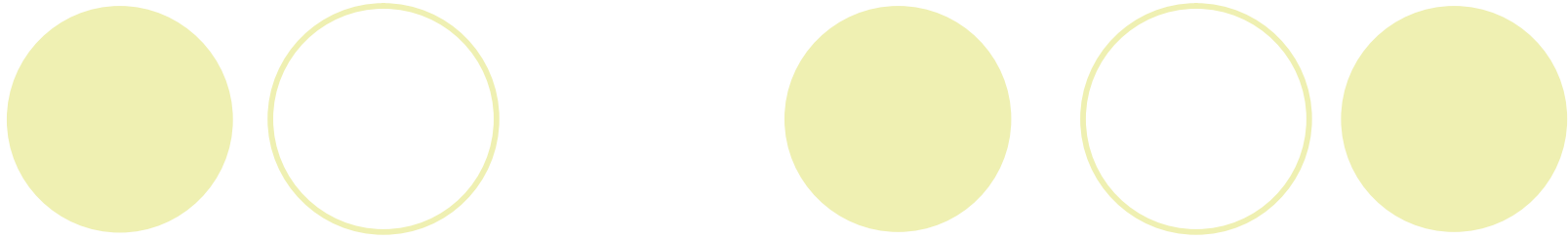
Better access to data and information	Most DBMSs have software that makes it easy to access and retrieve data from a database. In most cases, simple commands can be given to get important information. Relationships between records can be more easily investigated and exploited, and applications can be more easily combined.
Standardization of data access	A primary feature of the database approach is a standardized, uniform approach to database access. This means that the same overall procedures are used by all application programs to retrieve data and information.
A framework for program development	Standardized database access procedures can mean more standardization of program development. Because programs go through the DBMS to gain access to data in the database, standardized database access can provide a consistent framework for program development. In addition, each application program need address only the DBMS, not the actual data files, reducing application development time.
Better overall protection of the data	The use of and access to centrally located data are easier to monitor and control. Security codes and passwords can ensure that only authorized people have access to particular data and information in the database, thus ensuring privacy.
Shared data and information resources	The cost of hardware, software, and personnel can be spread over a large number of applications and users. This is a primary feature of a DBMS.

# Disadvantages of the Database Approach

Disadvantages	Explanation
Relatively high cost of purchasing and operating a DBMS in a mainframe operating environment	Some mainframe DBMSs can cost hundreds of thousands of dollars.
Increased cost of specialized staff	Additional specialized staff and operating personnel may be needed to implement and coordinate the use of the database. However, some organizations have been able to implement the database approach with no additional personnel.
Increased vulnerability	Even though databases offer better security because security measures can be concentrated on one system, they also make more data accessible to the trespasser if security is breached. In addition, if for some reason there is a failure in the DBMS, multiple application programs are affected.

**TABLE 5 2**

*Disadvantages of the Database Approach*



# Data Modeling & Database Models



# Data Modeling and Database Models

- **Content** - What data should be collected?
- **Access** - What data should be given to what users?
- **Logical structure** - How will the data be organized to make sense to a particular user?
- **Physical organization** - Where will the data actually be located?

A decorative graphic at the top of the slide consists of two groups of three circles. The left group has a solid light green circle on the left, a white circle with a light green outline in the middle, and a solid light green circle on the right. The right group has a solid light green circle on the left, a white circle with a light green outline in the middle, and a solid light green circle on the right. The text "Data Modeling" is positioned to the left of the first group of circles.

## Data Modeling

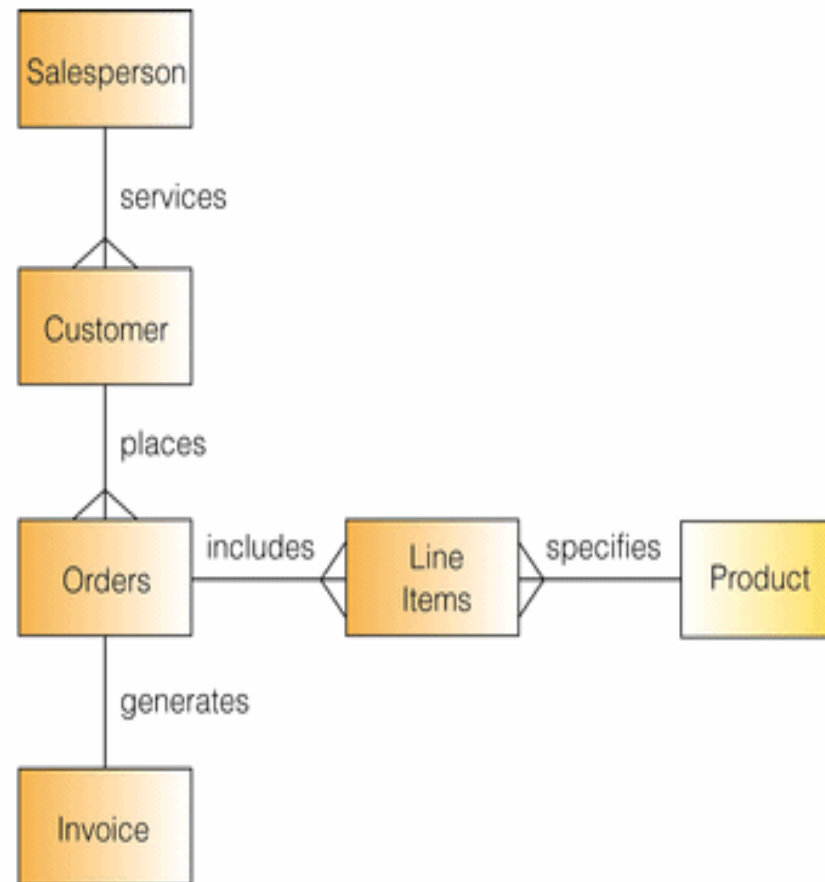
- Enterprise data modeling
- Planned data redundancy
- Data model
- Entity-relationship diagrams

# Entity-Relationship (ER) Diagrams

**FIGURE 5 5**

*An Entity-Relationship (ER) Diagram for a Customer Order Database*

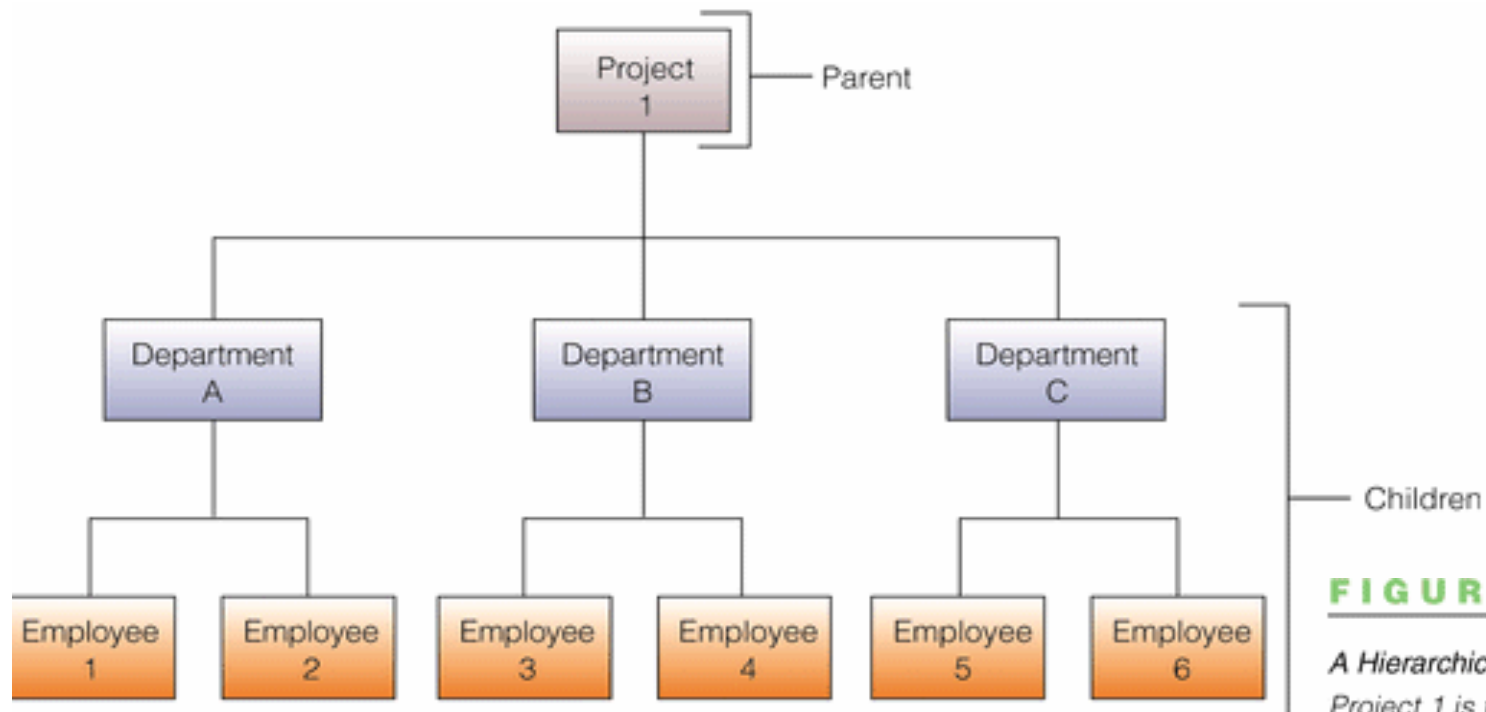
*Development of this type of diagram helps ensure the logical structuring of application programs that are able to serve users' needs and are consistent with the data relationships in the database.*



# Data Models

- Hierarchical models
- Network models
- Relational models

# Hierarchical (Tree) Models



**FIGURE 5.6**

*A Hierarchical Database Model*  
Project 1 is the top, or root, element. Departments A, B, and C are under this element, with Employees 1 through 6 beneath them as follows: Employees 1 and 2 under Department A, Employees 3 and 4 under Department B, and Employees 5 and 6 under Department C. Thus, there is a one-to-many relationship among the elements of this model.

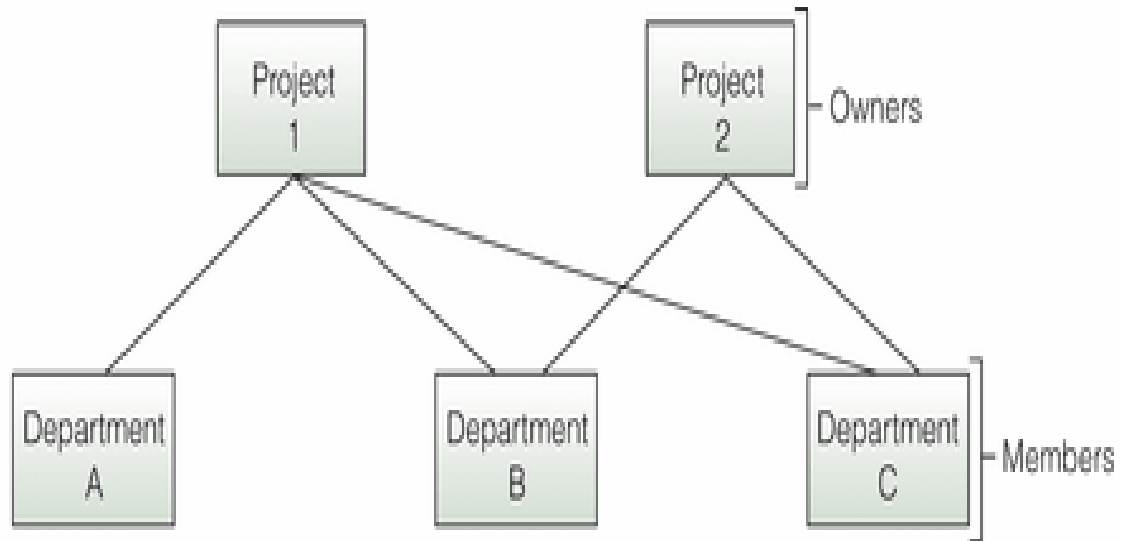


# Network Models

**FIGURE 5 7**

*A Network Database Model*

*In this network model, two projects are at the top. Departments A, B, and C are under Project 1; Departments B and C are under Project 2. Thus, the elements of this model represent a many-to-many relationship.*



# Relational Models

Data table 1: Project table

Project number	Description	Dept. number
155	Payroll	257
498	Widgets	632
226	Sales Manual	598

Data table 2: Department table

Dept. number	Dept. name	Manager SSN
257	Accounting	005-10-6321
632	Manufacturing	549-77-1001
598	Marketing	098-40-1370

Data table 3: Manager table

SSN	Last name	First name	Hire date	Dept. number
005-10-6321	Johns	Francine	10-07-1997	257
549-77-1001	Buckley	Bill	02-17-1979	632
098-40-1370	Fiske	Steven	01-05-1985	598

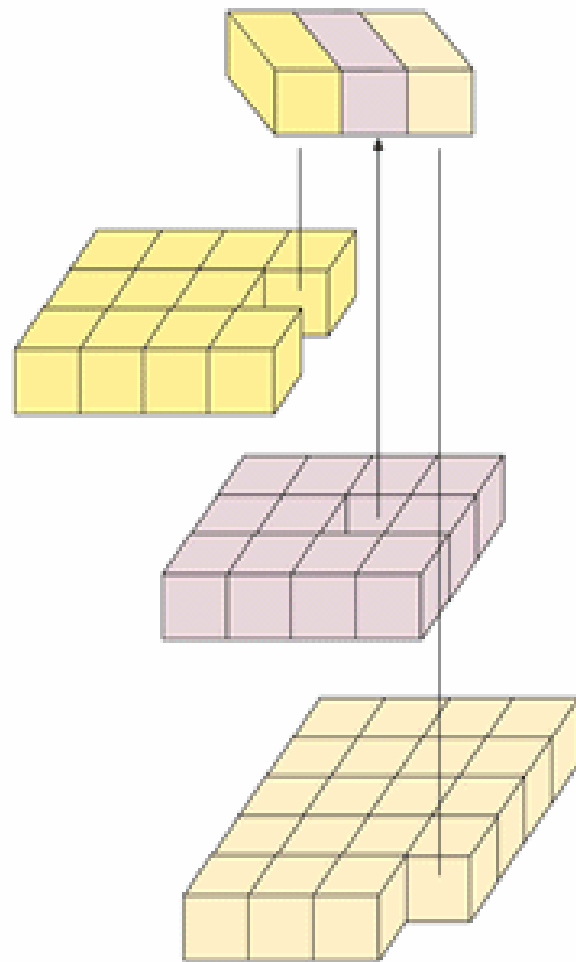
Who is in-charge manager of “Widget” project?

FIGURE 5.8

## A Relational Database Model

In the relational model, all data elements are placed in two-dimensional tables, or relations. As long as they share at least one common element, these relations can be linked to output useful information.

# Relational Models



Data table 1: Project table

Project number	Description	Dept. number
155	Payroll	257
498	Widgets	632
226	Sales Manual	598

Data table 2: Department table

Dept. number	Dept. name	Manager SSN
257	Accounting	005-10-6321
632	Manufacturing	549-77-1001
598	Marketing	098-40-1370

Data table 3: Manager table

SSN	Last name	First name	Hire date	Dept. number
005-10-6321	Johns	Francine	10-07-1907	257
549-77-1001	Buckley	Bill	02-17-1979	632
098-40-1370	Fiske	Steven	01-05-1985	598

FIGURE 5.9

### Linking Data Tables to Answer an Inquiry

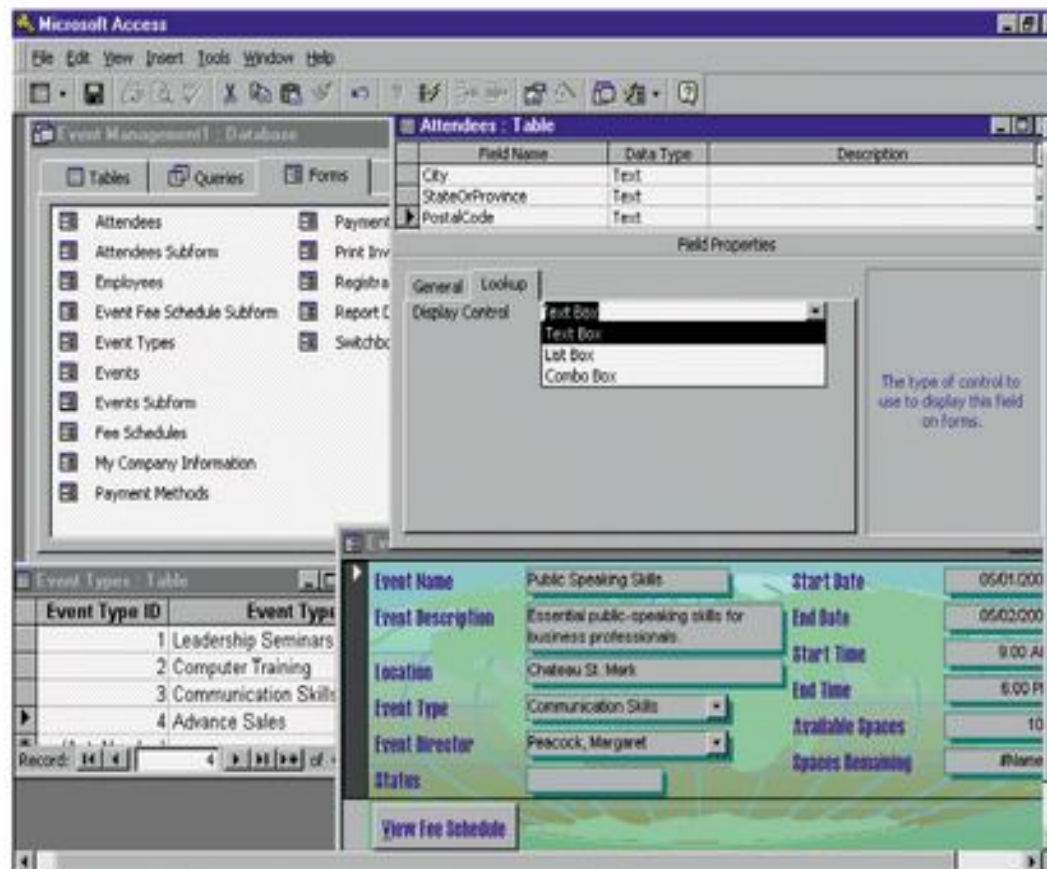
In finding the name and hire date of the manager working on the sales manual project, the president needs three tables: project, department, and manager. The project description (Sales Manual) leads to the department number (598) in the project table, which leads to the manager's SSN (098-40-1370) in the department table, which leads to the manager's name (Fiske) and hire date (01-05-1985) in the manager table.

# Data Cleanup

**FIGURE 5 10**

## *Building and Modifying a Relational Database*

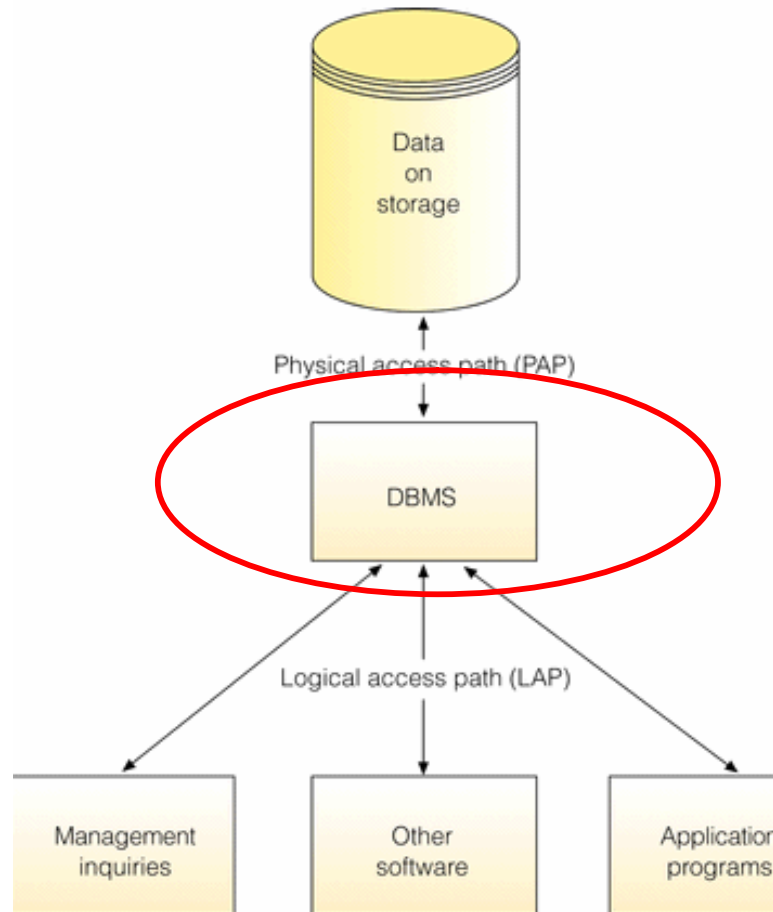
*Relational databases provide many tools, tips, and tricks to simplify the process of creating and modifying a database.*



# Database Management Systems (**DBMS**)

- Provide a user view
- Create and modify the database
- Store and retrieve data
- Manipulate data
- Produce reports

# Storing and Retrieving Data



**FIGURE 5 14**  
*Logical and Physical Access Paths*

# Structured Query Language

**FIGURE 5 15**

## Structured Query Language

SQL has become an integral part of most relational database packages, as shown by this screen from Microsoft Access.

The screenshot shows the Microsoft Access interface. The main window displays the 'Event Management1' database. The 'Tables' tab is selected, showing a list of tables including 'Attendee Count by Event', 'Sum Of Payments Query', and 'Total Registrations by Atten'. The 'Attendees' table is selected, showing a list of attendees with columns for AttendeeID, First Name, Last Name, Title, and Company Name. The 'Attendee Count by Event : Select Query' window is open, displaying the following SQL query:

```
SELECT DISTINCTROW Registration.EventID, Count(Registration.RegistrationID) AS [Number of Registered Attendees]
FROM Registration
GROUP BY Registration.EventID;
```

AttendeeID	First Name	Last Name	Title	Company Name
1	Elizabeth	Brown	Sales Represen	Consolidated Holdings
2	Jaime	Yorres	Owner	Let's Stop N Shep
3	Jean	Fresniere	Marketing Assis	Mire Pailarde

# Database Output

FIGURE 5 16

## Database Output

A database application offers sophisticated formatting and organization options to produce the right information in the right format.

The screenshot shows two windows from Microsoft Access. The top window, titled 'Attendees', displays a table with the following data:

Event Name	Start Date	Sale Amount	Total Payments	Amount Due
Negotiating Excellence	4/01/2001	\$1,095.00	\$1,095.00	\$0.00
Sales, Sales, Sales	6/01/2001	\$550.00	\$550.00	\$0.00
Computer Basics for Business	6/12/2001	\$950.00		\$950.00
Maximizing Excellence	4/01/2001	\$1,095.00	\$1,095.00	\$0.00

The bottom window, titled 'Attendee Listing', displays a formatted report with the following data:

Attendee Name	Company Name	City/State/Province	Phone Number	Fax Number
Brown, Elizabeth	Consolidated Holdings	London,	(171) 555-2282	(171) 555-9199
Frensière, Jean	Mim Paillette	Montréal, Québec	(514) 555-8054	(514) 555-8055
Kumar, Hari	Seven Seas Imports	London,	(171) 555-1717	(171) 555-5646
Phillips, Rene	Old World Delicatessen	Anchorage, AK	(907) 555-7584	(907) 555-2880
Yozes, Juane	Let's Stop N Shop	San Francisco, CA	(415) 555-5938	

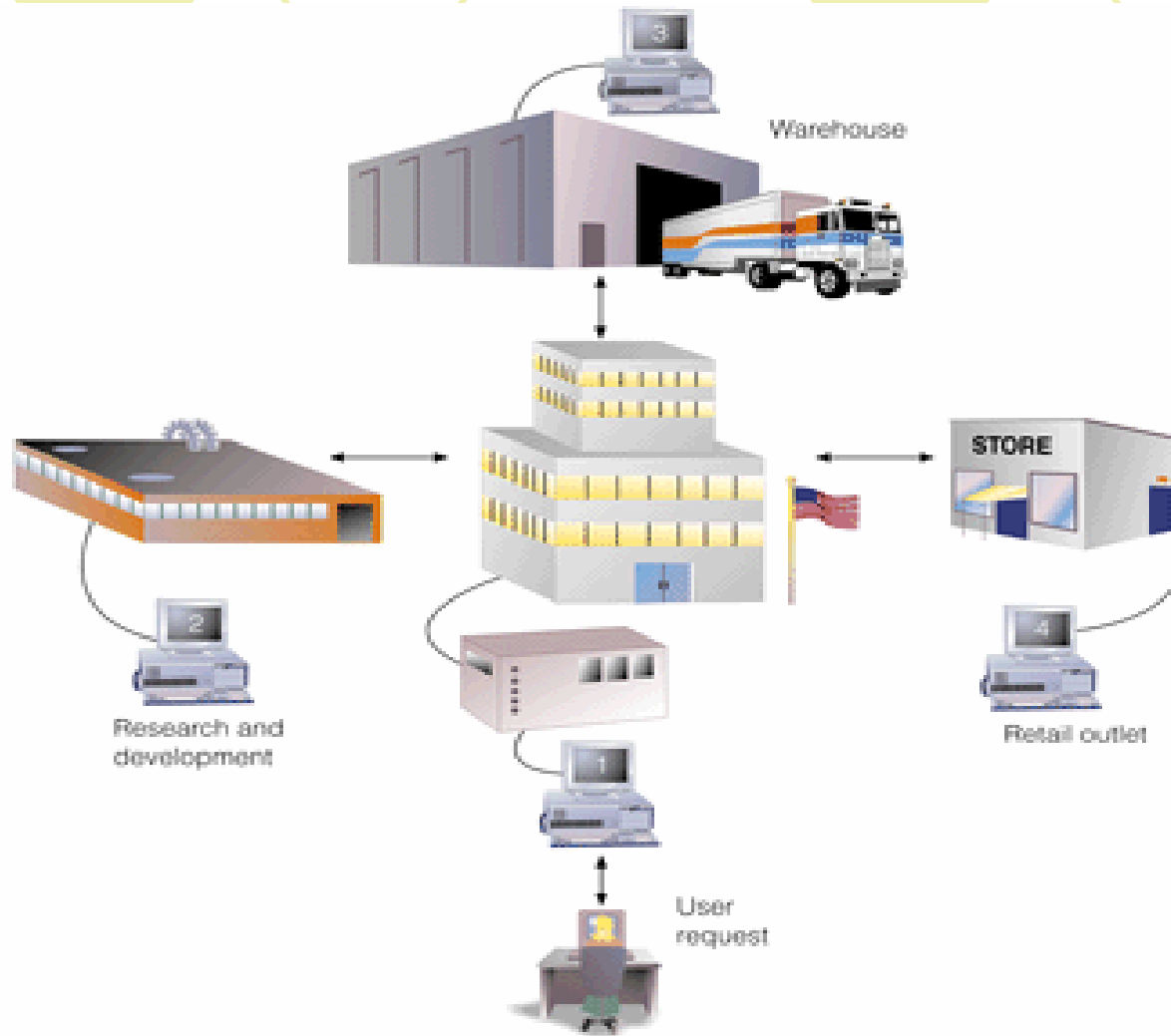


A decorative graphic consisting of six circles arranged in two groups of three. The left group has a solid light green circle on the left, a white circle with a light green outline in the middle, and a solid light green circle on the right. The right group has a solid light green circle on the left, a white circle with a light green outline in the middle, and a solid light green circle on the right.

## Selecting a DBMS

- Database size
- Number of concurrent users
- Performance
- Integration
- Features
- Vendor
- Cost

# Distributed Databases



**FIGURE 5-19**

*The Use of a Distributed Database*  
For a clothing manufacturer, computers may be located at corporate headquarters, in the research and development center, in the warehouse, and in a company-owned retail store. Telecommunications systems link the computers so that users at all locations can access the same distributed database no matter where the data is actually stored.



# **Enterprise Resource Planning**



# Enterprise Resource Planning (ERP)

- Real-time monitoring of business functions
- Supports human resources, sales, and distribution
- Supports the different ways each company runs business



## Advantages of ERP

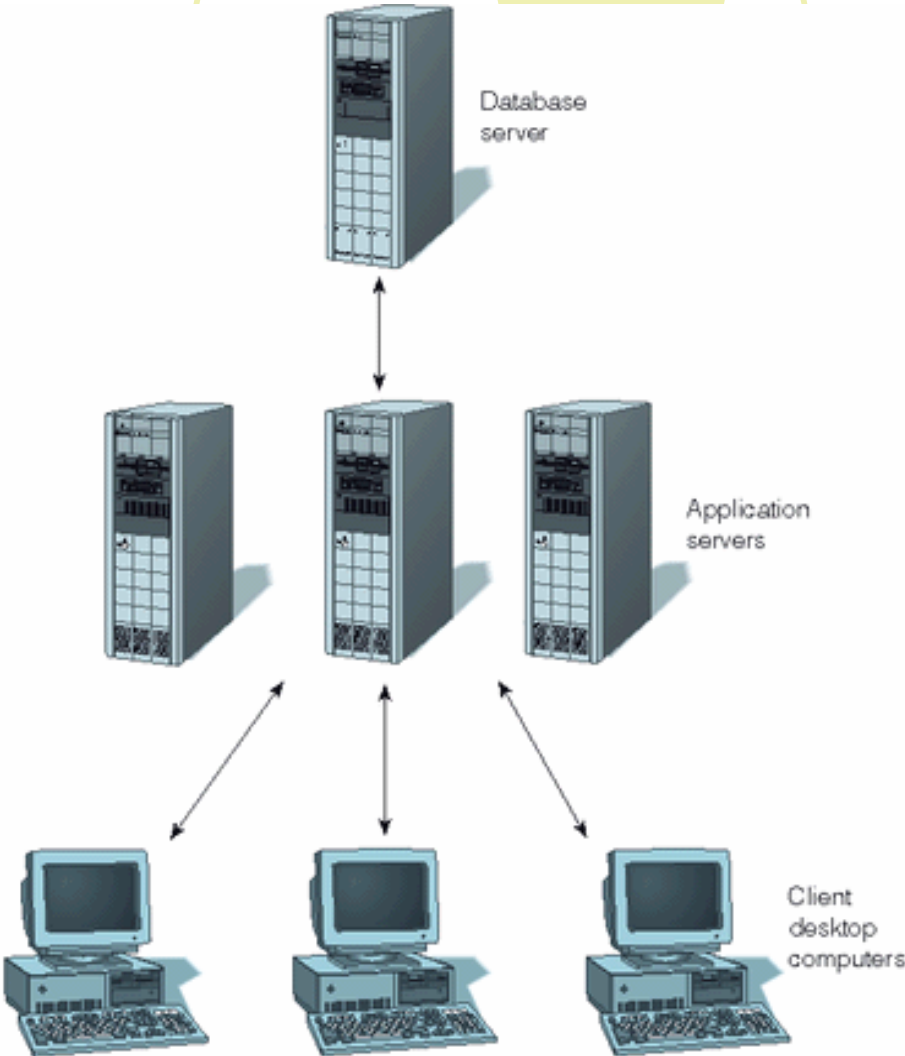
- Eliminates costly, inflexible legacy systems
- Improved technology infrastructure
- Improved work processes
- Increased data access for decision making



## Disadvantages of ERP

- Expense & time
- Radical change
- Integrating with other systems
- One vendor risks

# ERP System



Week 2

**FIGURE 9 22**  
*SAP Three-Tier Client/Server Architecture*

# Customer Relationship Management (**CRM**)

**CRM** recognizes that customers are the core of a business and that a company's success depends on effectively managing relationships with them. It focuses on building long-term and sustainable customer relationships that add value both for the customer and the company.



# Customer Relationship Management (CRM)

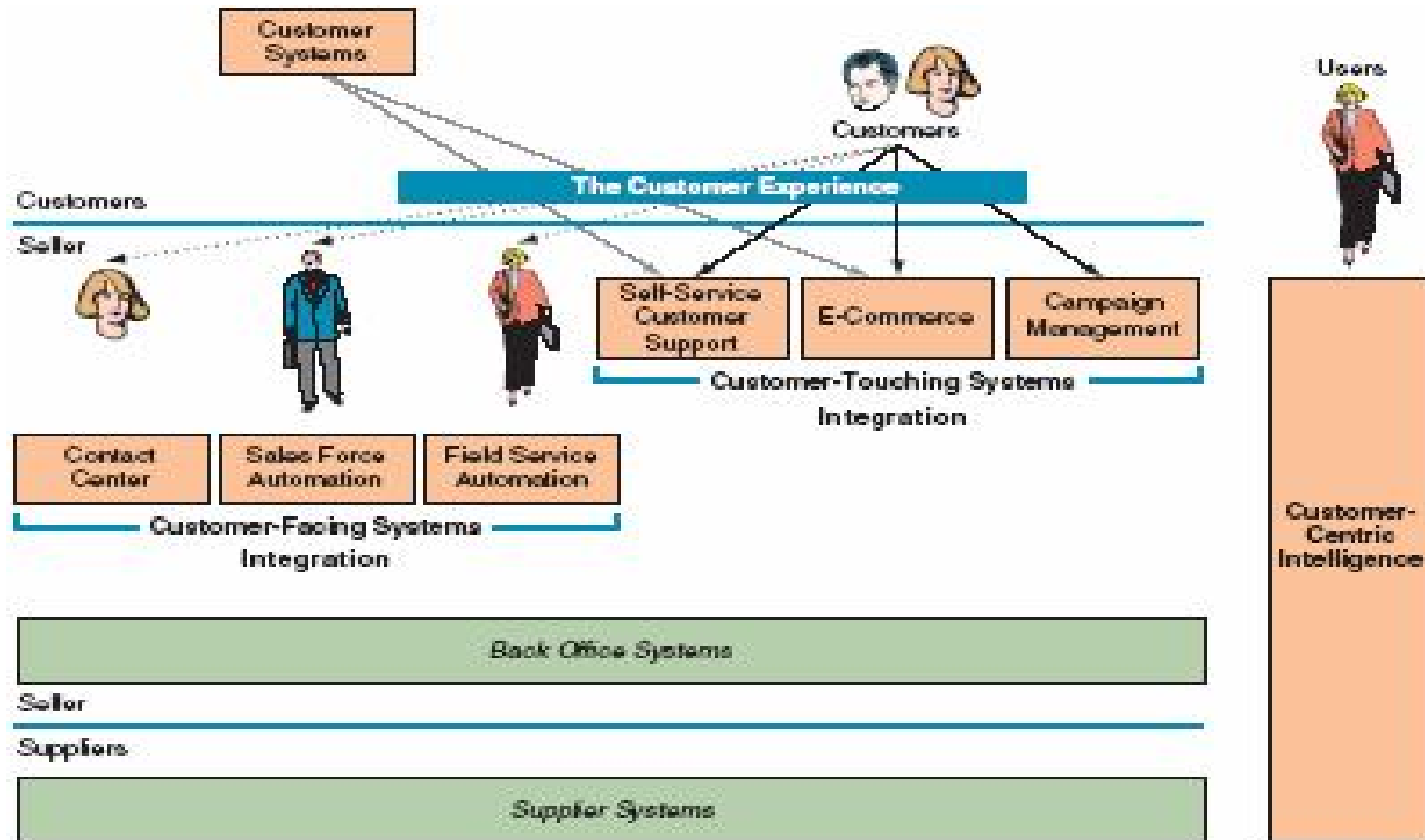


FIGURE 7.5 CRM applications. (Source: Patricia Seybold Group. *An Executive Guide to CRM*. March 21, 2002.)



## e-CRM

- CRM has been practiced manually by corporations for generations. However, **e-CRM** (electronic CRM) started since 90's ,when customers began using Web browsers, the Internet and other electronic gadgets.

A decorative graphic at the top of the slide consists of six circles. The first two circles on the left are partially overlapping and contain the text 'eCRM Activities'. The first circle is solid light green, and the second is a white circle with a light green outline. To the right of these are three more circles: a solid light green circle, a white circle with a light green outline, and another solid light green circle.

# eCRM Activities

- **Customer Service on the Web**
  - Search and Comparison Capabilities
  - Free Products and Services
  - Technical and Other Information and Service
  - Allowing Customers to Order Products and Services Online
  - Letting Customers Track Accounts or Order Status
- **Tools for Customer Service**
  - Personalized Web Pages
  - FAQs
  - Chat Rooms
  - E-Mail and Automated Response
  - Call Centers
  - Troubleshooting Tools
  - Wireless CRM (for mobile application)



## Summary

- **Data** - one of the most valuable resources a firm possesses
- **Entity** - a generalized class of objects for which data is collected, stored, and maintained
- **DBMS** - a group of programs used as an interface between a database and application programs
- **Enterprise resource planning (ERP) software** - a set of integrated programs that manage a company's business operations for an entire multi-site, global organization (such as SAP- **S**ystems, **A**pplications and **P**roducts)