Database Foundations

1-2

Introduction to Databases
Roadmap

You are here

About the Course

Introduction to Databases

Types of Database Models

Relational Databases

Database Storage Structures

Understanding Business Requirements
Objectives

This lesson covers the following objectives:

• Differentiate between data and information
• Define database
• Describe the elements of a database management system (DBMS)
• Identify the transformations in computing
• Identify business and industry examples where database applications are used
Case Scenario: Data Versus Information

What is the difference between data and information??

Data???

Information???
Data Versus Information

- **Data:**
  - Collected facts about a topic or item

- **Information:**
  - The result of combining, comparing, and performing calculations on data.
Data Versus Information: An Example

Data in ...
- 1997 $1,000,000
- 1998 $2,000,000
- "Article VI prohibits use of School property for ..."
- 312 graduates
- 98% of students pass the math exam ...
- Student test scores were ...

Information out ...
- ... Next year's budget
- Regulatory Implementation
- ... Where are they going?
- By how much?
- ... Class average or school average
Database Definition

A database:

• Is a centralized and structured set of data stored on a computer system.

• Provides facilities for retrieving, adding, modifying, and deleting the data when required.

• Provides facilities for transforming retrieved data into useful information.
Database Management System

A DBMS is software that controls the storage, organization, and retrieval of data.

Elements of a DBMS:
- Kernel code
- Repository of metadata
- Query language
Key Computing Terms

In the field of computing, these are some of the key terms:

• Hardware
• Software
• Operating system
• Application
• Client
• Server
Case Scenario: Transformation in Computing

There have been so many changes in the field of computing. What were they and when did they occur?
Transformation in Computing

1970s
Mainframe Computing

1980s
Desktop Computing

1990s
Client/Server Computing

2000s >
Grid Computing
1970s: Mainframe Computing

MAINFRAME

Database

Dumb Terminals
1980s: Desktop Computing

Server Computer: Software

Database

Smart Clients: GUI Interface and Software

Database

Smart Clients
1990s: Client/Server Computing

- Database
- Database Server: Software
- Application Server: Software
- Thin Clients: GUI Interface, Browser
Grid Computing

Database powers the web.

Database powers the web.
# History of the Database Timeline

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960s</td>
<td>Computers become cost-effective for private companies along with increased storage capability.</td>
</tr>
<tr>
<td>1970-72</td>
<td>E.F. Codd proposes the relational model for databases, disconnecting the logical organization from the physical storage.</td>
</tr>
<tr>
<td>1976</td>
<td>P. Chen proposes the entity relationship model (ERM) for database design.</td>
</tr>
<tr>
<td>Early 1980s</td>
<td>The first commercially available relational database systems start to appear at the beginning of the 1980s with Oracle Version 2.</td>
</tr>
<tr>
<td>Mid-1980s</td>
<td>SQL (structured query language) becomes widely used.</td>
</tr>
<tr>
<td>1990s</td>
<td>The large investment in Internet companies helps create a tools market boom for web/internet/DB connectors.</td>
</tr>
</tbody>
</table>
Examples
Summary

In this lesson, you should have learned how to:

• Differentiate between data and information
• Define database
• Describe the elements of a database management system (DBMS)
• Identify the transformations in computing
• Identify business and industry examples where database applications are used