* David M. Kroenke and David J. Auer  
  Database Processing:  
  Fundamentals, Design, and Implementation
* Chapter Objectives
* To understand the importance of databases in Internet Web applications and smartphone apps
* To understand the nature and characteristics of databases
* To survey some important and interesting database applications
* To gain a general understanding of tables and relationships
* To describe the components of a Microsoft Access database system and explain the functions they perform
* To describe the components of an enterprise-class database system and explain the functions they perform
* Chapter Objectives
* To define the term *database management system (DBMS)* and describe the functions of a DBMS
* To define the term *database* and describe what is contained within the database
* To define the term *metadata* and provide examples of metadata
* To define and understand database design from existing data
* To define and understand database design as new systems development
* To define and understand database design in database redesign
* Chapter Objectives
* To understand the history and development of database processing
* The Internet and Mobile Device World  
  Client-Server Architecture
* Databases in the  
   Internet and Mobile Device World
* Databases are important because they are everywhere and are used daily:
* Facebook
* Posts
* Likes
* Twitter
* Tweets
* Online shopping
* Amazon.com - [Do an actual search]
* How Did We Get Here?  
  The Internet World I
* Personal Computers
* 1977: Apple II
* 1981: IBM PC
* Local Area Networks
* Ethernet networking technology
* Early 1970s: Xerox Palo Alto Research Center
* 1893: US National Standard
* How Did We Get Here?  
  The Internet World II
* The Internet
* 1969: ARPANET
* World Wide Web (WWW)
* 1993: First Web browser (Netscape) available
* Mid 1990’s: Online retail sites
* 1995: Amazon.com
* Early 2000’s: Web 2.0
* How Did We Get Here?  
  The Smartphone World
* Mid 1970s: Mobile Phone (Cell Phone)
* Smartphone
* 2007: Apple iPhone
* 2008: Google Android Operating System
* Tablets
* 2010: Apple iPad
* Apps
* The Characteristics of Databases
* The purpose of a **database** is to help people track things of interest to them.
* Data is stored in **tables**, which have rows and columns like a spreadsheet. A database may have multiple tables, where each table stores data about a different thing.
* Each row in a table stores data about an occurrence or **instance** of the thing of interest.
* A database stores **data** and **relationships**.
* Data in Tables
* The Key Characteristic of Databases: Related Tables
* Microsoft Access 2013  
  Tables and Relationships
* Naming Conventions in this Textbook
* **Table names** are written with all capital letters:
* STUDENT, CLASS, GRADE, COURSE\_INFO
* **Column names** are written with an initial capital letter, and compound names are written with a capital letter on each word:
* Term, Section, ClassNumber, StudentName
* Databases Create Information
* **Data** = recorded facts and figures
* **Information** = knowledge derived from data
* Databases record data, but they do so in such a way that we can produce information from the data.
* The data on STUDENTs, CLASSes, and GRADEs could produce information about each student’s GPA.
* Database Examples
* Components of a Database System
* Components of a Database System with SQL
* Applications, the DBMS, and SQL
* **Applications** are the computer programs that users work with.
* The **Database Management System (DBMS)** creates, processes, and administers databases.
* **Structured Query Language (SQL)** is an internationally recognized standard database language that is used by all commercial DBMSs.
* Database Applications
* Database Applications—Forms
* Database Applications—Queries
* Database—Reports
* The DBMS
* The Database
* A **database** is a self-describing collection of integrated tables.
* The tables are called **integrated** because they store data about the relationships between the rows of data.
* A database is called **self-describing** because it stores a description of itself.
* The self-describing data is called **metadata**, which is data about data.
* Typical Metadata Tables
* Database Contents
* Personal Database Systems: Microsoft Access
* Microsoft Access
* **Microsoft Access** is a low-end product intended for individual users and small workgroups.
* Microsoft Access tries to hide much of the underlying database technology from the user.
* A good strategy for beginners, but not for database professionals.
* NOTE: Microsoft Access 2013 is discussed in detail in Appendix A.
* What Is Microsoft Access?
* Microsoft Access is a **DBMS plus an application generator**:
* The DBMS creates, processes, and administers Microsoft Access databases.
* The application generator includes query, form, and report components.
* The Microsoft Access DBMS engine is called the **Access Data Engine (ADE)**.
* Microsoft Access 2000 thru 2010 can be used as an application generator for the **Microsoft SQL Server DBMS**.
* Enterprise-Class Database Systems
* Prominent DBMS Products
* Microsoft Access 2013
* Microsoft SQL Server 2014
* Microsoft SQL Server 2014 Express
* Oracle Corporation Oracle Database 12c
* Oracle Database Express Edition 11g Release 2
* MySQL 5.6
* IBM DB2
* DBMS Power vs. Ease of Use
* Operating System (OS)
* Microsoft Windows
* Microsoft Access 2013
* Microsoft SQL Server 2014
* Oracle Database
* MySQL 5.6
* Linux
* Oracle Database
* MySQL
* Apple OS X
* MySQL 5.6
* Three Types of Database Design
* Database Design from Existing Data
* Data Import: One or Two Tables?

This is an important decision, and based on a set of rules known as normalization (which is covered in Chapter 3).

* Database Design from New Systems Development
* Database Design from Database Redesign
* What You Need To Learn
* Knowledge Priorities
* A Brief History of Database Processing  
  I
* A Brief History of Database Processing  
  II
* The Relational Database Model
* The dominant database model is the **relational database model**—all current major DBMS products are based on it.
* It was created by IBM engineer **E. F. Codd** in 1970.
* It was based on mathematics called **relational algebra**.
* This text examines and explains the relational database model.
* The NoSQL Movement and Big Data
* Recent developments in Internet and mobile computing have resulted in the development of non-relational DBMSs.
* NoSQL movement
* Big Data
* These do not replace the relational model, but rather complement it.
* These topics are discussed in Chapter 12 and Appendix K.
* David Kroenke and David Auer  
   Database Processing  
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  (14th Edition)

**End of Presentation:**

**Chapter One**