**NEW PERSPECTIVES** 

## Chapter 11 Databases

### **Computer Concepts 2014**



# **11** Chapter Contents

- Section A: File and Database Concepts
- Section B: Data Management Tools
- Section C: Database Design
- Section D: SQL
- Section E: Database Security

#### 11 Section A: File and Database Concepts

- Database Basics
- Database Models

# <sup>11</sup> Database Basics

- A database is a collection of information
  - Typically stored as computer files
- The tasks associated with creating, maintaining, and accessing the information in databases are referred to as data management, file management, or database management

#### FIGURE 11-1

Database data that is no longer current is normally moved to an archive, which can be stored on a hard drive, secondary server, or tape. Many legacy data silos continue to store archival data on tape cartridges, which are accessed by a tape robot that pulls tapes out of the racks and loads them into a tape drive.



## **Database Basics**

- Databases can be used in a variety of ways
  - Collect and store data
  - > Update data
  - Organize and output data
  - Distribute data
  - Find data
  - Analyze data

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#### FIGURE 11-3

A query-by-example interface displays a form and formulates a query based on what the user enters.

# 11 What is a database?



## **Non-computer databases**

- Paper files in a Doctor's office
- Phone book
- Dictionary
- Cookbook (Multi-media!)
- Baseball cards (Multi-media!)
- Day Planner
- Sports team sign-up sheet

# **11** Databases

Definitions from the book:

- Collections of related data
- Easily stored, sorted, organized, and queried
- Turn data into information

#### A simplified definition:

A collection of information organized in a manner that allows for convenient retrieval.

# 11 My soccer team

PlayerID	Name	Address	Phone
1	Mark	London	555-1212
2	Bob	Waterloo	555-1234
3	Jeff	Guelph	555-4321

# **11** Their Uniforms



### The two tables are related...



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34	3
99	2

#### **1Some DB words...**

PlayerID	Name	Address	Phone
1	Mark	London	555-1212
2	Bob	Waterloo	555-1234
3	Jeff	Guelph	555-4321

Everything is stored in a 'table'

- > A 'record' is everything about the person (horizontal)
- A 'field' is a fact about the person (Example: The Address field for 'Mark' contains the word 'London'
- All records have the same fields, just different data stored in those fields.
- Fields are picky about what can be stored in them (data types)

#### Life Without Databases: Lists

Lists are often sufficient for simple tasks

Not appropriate for complex information

Multiple lists lead to

- Data redundancy
- Data inconsistency
- Duplicate data
- Sorting issues
- Incomplete data

	A	B	C	D	E	F	G	н	- I.	J	K	L
1	Class Regis	tration	List - Fal	1								
2												
3	SID #	Last Name	First Name	Home Address	City	State	Zip Code	Class Code	Class Name	# Of Credits	Meal Plan #	
4	234567891	Chan	Li	123 Main Street	Tuba City	NV	49874-7643	LAN 330	Japanese 1	3	2	
5	234567891	Chan	Li	123 Main Street	Tuba City	NV	49874-7643	<b>REL 216</b>	Early Buddhism	3	2	
6	234567891	Chan	Li	123 Main Street	Tuba City	NV	49874-7643	ENG 102	English Comp 2	3	2	
7	456789123	Coyle	Diane	745 Station Drive	Springfield	MA	18755-5555					
8	123456789	Evans	Jennifer	123 Oak Street	Gotham City	PA	19999-8888	CIS 111	Programming	3	1	
9	123456789	Evans	Jennifer	123 Oak Street	Gotham City	PA	19999-8888	ENG 101	English Comp 1	3	1	
10	123456789	Evans	Jennifer	123 Oak Street	Gotham City	PA	19999-8888	HIS 103	Western Civ	3	1	
11	123456789	Evans	Jennifer	123 Oak Street	Gotham City	PA	19999-8888	<b>CHE 140</b>	Chemistry	4	1	
12	123456789	Evans	Jennifer	124 Oak Street	Gotham City	PA	19999-8888	PSY 110	Intro to Psychology	3	1	
13	567891234	Lopez	Donald	3421 Lincoln Court	Spalding	ND	87564-2546	HIS 401	16th Century Europe	3	1	
14	567891234	Lopez	Donald	3421 Lincoln Court	Spalding	ND	87564-2546	SOC 310	Interpersonal Relationships	3	1	
15	567891234	Lopez	Donald	3421 Lincoln Court	Spalding	ND	87564-2546	PSY 110	Intro to Psych	3	1	
16	345670040	100			Glen	MI	67744-3584	HIS 204	Scottish History	3	3	-
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b										
1	A	В	C	D	E	F	G	Н	1	J
1	Residence I	all Assignm	ent List - Fal	11						
2										
3	SID #	Last Name	First Name	Home Address	City	State	Zip Code	Residence Hall Name	Room Number	_
4	234567891	Chan	Li	123 Main Street	Tuba City	NV	49874-7643	Wilson Hall	218	
5	456789123	Coyle	Diane	745 Station Drive	Springfield	MA	18755-5555	Montgomery Hall	231	
6	123456789	Evans	Jennifer	123 Oak Street	Gotham City	PA	19999-8888	Montgomery Hall	312	
7	567891234	Lopez	Donald	3421 Lincoln Court	Spalding	ND	87564-2546	Stone House	102	
8	345678912	Wallace	William	654 Front Street	Locust Glen	MI	67744-3584	Forsman Quad	124	
9		1							10000	

#### Databases

Collections of related data

- Easily stored, sorted, organized, and queried
- Turn data into information

Once again... my simplified definition:

A collection of information organized in a manner that allows for convenient retrieval.

## Life Without Databases

- Not every situation demands complexity of a database
- > For simple tasks, lists are adequate
  - Table created in Microsoft Word
  - Spreadsheet created in Microsoft Excel
- Lists are not appropriate for complex information

## Database Building Blocks

- Data that needs organization and analysis can be put into a database
  - eBay keeps track of millions of items
  - Netflix stores subscriber information
  - Amazon stores millions of items, seller & buyer information

## **11** Database Basics

- Data mining refers to the process of analyzing existing database information to discover previously unknown and potentially useful information, including relationships and patterns
  - Data warehouse
  - Predictive analytics

### **Database Basics**

- OLAP (online analytical processing) allows decision makers to quickly get answers to complex queries
  - Executive dashboard software
  - Big data



Executive dashboard software helps decision makers visualize data from complex data sets.



- An unstructured file has a unique structure and contains different kinds of data
- > A structured file uses a uniform format to store data
- The underlying structure of a database is referred to as a database model



The simplest model for storing data is a flat file that consists of a single, two-dimensional table of data elements **FIGURE 11-6** Records can be displayed as

rows in a table or as forms

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LIBRARY		✓ Name ▲	Time Artist	Album	Genre	contains the dat
🎵 Music	2	All I Care About	3:48 Musical Cast Recor	Chicago - The Musi	Classical	for one record in
Movies	3	✓ All My Loving	2:09 The Beatles	The Beatles 1962-1	Rock 🗲	the database
TV Shows	4	All That Jazz	5:05 Bebe Neuwirth & M	Chicago - The Musi	Classical	the dutubube.
🖾 Apps 🚺	5	✓ All You Need Is Love (LOVE Version)	3:40 The Beatles	LOVE	Soundtrack	
<sup>0</sup> ≩ <sup>0</sup> Radio	6	And I Love Her	2:31 The Beatles	The Beatles 1962-1	Rock	
STORE	7	And the Money Kept Rolling In (A	3:48 Antonio Banderas	Evita (Music from t	Soundtra A	A database
A T C	8	Andante Cantabile Op. 11	8:01 Alexander Kniazev	Bedtime Beats - Th	Classical r	ecord can also
I Tunes Store	9	✓ Another Suitcase In Another Hall	3:33 Madonna	Evita (Music from t	Soundtra b	e displayed
çQ Ping	10	Antiche Danze Ed Arie Per Liuto :	4:17 Claudio Scimone a	Bedtime Beats - Th	Classical a	is a form.
Purchased	11	Anyone for Tennis	2:41 Cream	The Very Best of Cr	Rock	
SHARED	12	✓ As Tears Go By	2:48 The Rolling Stones	Singles 1965-1967	Rock	
Home Sharing	13	✓ Bachianas Brasileiras No. 5 (for s	AND			
	14	✓ Back In the U.S.S.R (LOVE Version)				
St Casture	15	✓ Bad	Summary Info V	ideo Sortina Ontic	ons Lyrics	Artwork
allo Genius	16	✓ Badge	(Samuel)	inco sorting optic	ins cynes	
PLAYLISTS	17	✓ Beat It	Name			
🛞 iTunes DJ	18	✓ The Beatles 1962-1966 - iTu	All My Loving			
90's Music	19 ✓ Because (LOVE Version)		Artist	Year		
	20	✓ Being for the Benefit of Mr Kite! /	The Beatles			1973 Pa
Classical Music	21	✓ Being For the Benefit of Mr. Kite!	Album Artist			Track Number
亞 Classical Music 亞 Music Videos		✓ Ben (Live)	The Reatles			6 of 13
<ul> <li>Classical Music</li> <li>Music Videos</li> <li>My Top Rated</li> </ul>	22		The beaues			in the second se
춘 Classical Music 충 Music Videos 충 My Top Rated 충 Recently Added	22	✓ Billie Jean				Disc Number
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<ul> <li>☆ Classical Music</li> <li>☆ Music Videos</li> <li>☆ My Top Rated</li> <li>☆ Recently Added</li> <li>☆ Recently Played</li> </ul>	22 23 24	✓ Billie Jean ✓ Black or White	Album The Beatles 1962-1966 (T	he Red Album)		1 of 2
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- A field contains the smallest unit of meaningful information
- > Each field has a unique field name and data type.
- Variable-length field vs. fixed-length field



#### FIGURE 11-7

When setting up a database, the length of text fields should be adequate to store the longest names or titles. The Time field can be short because the longest tracks are 60 minutes or less, which can be expressed in the format MM:SS, where MM is minutes and SS is seconds.

#### A record is a collection of data fields

Record	Туре
Name	
Time	
Artist	
Album	
Genre	

Record Occurrence				
Name	All My Loving			
Time	02:09			
Artist	Beatles			
Album	The Beatles 1962-1966			
Genre	Rock			

#### FIGURE 11-8

A record type (left) is simply a list of fields, whereas a record occurrence (right) contains data for a particular entity. In this case, the entity is a track called "All My Loving" on the album *The Beatles 1962-1966*.

- A relationship is an association between data that is stored in different tables
  - Cardinality
    - One-to-many relationship
    - Many-to-many relationship
    - One-to-one relationship

- Cardinality refers to the number of associations that can exist between two record types
- The relationship between record types can be depicted graphically with an entity-relationship diagram

#### FIGURE 11-9

An entity-relationship diagram depicts each record type as a rectangle. Relationships and cardinality are shown by connecting lines.



One-to-many relationship One customer can order many albums.



Many-to-many relationship One album contains many tracks, and a track can be included on several different albums.











#### Personal Info Table

Student ID	Name	Address	Phone
20078374	Mark	123 Burns St	555-5598
21164628	Pam	123 Burns St	555-5598
21294379	Mark	32 King St	555-7117
•••			

#### Tuition Payment Table

Student ID	<b>Tuition Amount</b>	Bank Account #	Payment Date
21164628	\$3420.90	00756498232	Sept10, 2011
21294379	\$3420.90	00463784785	Sept 9, 2011

#### Course Registration Table

Student ID	Course ID	Course Name
20078374	BU111	Intro to Business Organization
20078374	BU121	Fundamental Areas of Organization
20078374	CP102	Info Processing with Microcomputers

One-to-One: Personal Info Table and Tuition Payment Table by ID

One-to-Many: Personal Info Table and Course Registration by ID

#### A relational database stores data in a collection of related tables Figure 11-12 Vintage Music Shop stores data in six tables.

LEUM DESCRIPTION			TRA	TRACKS							
Cat# Description		tion	Cat#	Track	Title TrackLength			TrackSample			
ORDER DETAILS											
OrderNumber Ca			at#	#		Qty		Price			
0	RDERS										
	OrderNumber C		CustomerNumber		TotalPrice			OrderDate			
	CUSTOMERS										
	CustomerNumber Fir		FirstN	Name La		stName S		treet City			
	ALBUMS										
	Cat#	Album		Artist		Release Date		In Stock	Value	DiscountPrice	
	LPM-2256	G.I. BI	G.I. Blues Elvis		еу	y 10/01/1960		4	20.00	18.95	
	7499-2	Between the Buttons		Rolling Stones		02/06/1967		1	13.99	11.49	
	LSP-246	Blue Hawaii		Elvis Presley		10/01/1961		2 50.00		45.00	
	N16014	Surfin	Surfin' Safari Beach Bo		s	02/27/2001		8	18.95	17.99	

#### A dimensional database organizes relationships over three or more dimensions



#### FIGURE 11-14

This data cube represents data available for queries about the musical preferences of consumers based on their age and location.

## <sup>11</sup> Multidimensional Databases

Autos



28

An object database stores data as objects, which can be grouped into classes and defined by attributes and methods



store data about different types of orders. A class called Orders holds data and methods common to all types of orders. A

used to describe a variety of

The term object-relational database is

technologies that combine object-

oriented and relational concepts

FIGURE 11-16

A relational database sends a file name to an external player (top), but an object-relational database can store the song data and the routine to play it.

Relational Database TRACKS Title TrackName Yesterday Yesterday.m4p Vesterday.m4p iTunes Jukebox

#### Object-relational Database



#### 11 Section B: Data Management Tools

- Data Management Software
- Database Management Systems
- Databases and the Web
- > XML

# <sup>11</sup> Data Management Software

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FirstName	LastName	Company	Street	City	State	ZipCo
Wincheta	Daisy	MountainTech	499 Table Mesa	Boulder	СО	80:
Venkata	Patel	Range Telecommunications	872 Old York Way	Durango	со	81:
Wong	Joy	Verizon	822 Park Place	New York	NY	100
Helwig	Nathaniel	Wimett Technology	5 Winsome Drive	Cheyenne	WY	82(
Chen	Lu-Chi	FarSide Productions	2235 Overview Trail	San Francisco	CA	94:
Walton	William	NM Vision	500 Vista Mesa Blvd	Santa Fe	NM	87!
Bolduc	Luc	New Reality Inc.	41 Rue Ste. Germaine	Detroit	МІ	48:
PAGE 1 OF 1 255 WOR	rds CP		90 🗎	16	- 1	+ 108%
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#### FIGURE 11-17

Microsoft Word allows you to create a table of information, such as a mailing list, which you can edit, sort, search, and print. In addition, you can merge data from the table with a template letter to create form letters, mailing labels, and envelopes. Access your digital textbook to learn how to use Microsoft Word to create mailing lists and mail merges.

### **Data Management Software**

#### **FIGURE 11-18**

Spreadsheet software usually provides tools for working with flat files. Learn how to use the data features within Microsoft Excel.

III → S · C · III · Medical History.xlsx - Microsoft Excel TABLE TOOLS ? II - II ×								
FILE HOME INSER	T PAGELSYOUT FOR	RMULAS DATA REVI	EW VIEW D	ESIGN Sarah Ma	🎮 😊 📗			
Excel stores data in a table, where each row can be treated as a record and each column as a field.							to displaying a table, Excel y one record at orm view.	
A	B C	D	E	F				
1 Family Member J 2 Brenda	Date Doctor	Reason      Tre     Fractured tibia X-r	eatment	Insurance State				
3 Brenda	12/1/2007 Griggs	Check on fractu Re	move cast		Docto	or Visits	? ×	
4 Brenda	12/2/2007 Marcus	Physical therapy						
5 Brenda	12/9/2012 Marcus	Physical therapy		Family Member:	Brenda	^	1 of 17	
6 Jason	6/12/2007 Bonetti	Checkup No	ne	Data	10/17/2007		New	
7 Jason	6/1/2009 Bonetti	Checkup Me	asles booster	Da <u>t</u> e:	10/17/2007		inc <u>n</u>	
8 Jill	3/20/2010 Sulaya	First checkup No	ne	Doctor:	Griggs		Delete	
9 Jill	7/3/2010 Sulaya	Immunization DT	P shot		E			
10 Jill	11/9/2010 Sulaya	Rash An	tibiotic cream	R <u>e</u> ason:	Fractured tibia		Restore	
11 Jill	6/20/2013 Sulaya	Checkup No	ne	Treatment:	X-ray and cast			
12 Martha	12/10/2009 Martin	Pre-natal check Vit	amin supplemen				Find Prev	
13 Martha	1/15/2010 Martin	Pre-natal check No	ne	Insurance Status:	Cleared		Fired Mark	
14 Martha	2/15/2010 Martin	Delivery! Ho	spitalized three				Find Next	
15 Martha	2/3/2011 Hartson	Annual Checkur No	ne				Criteria	
Doctor V	isits (+)							
READY		COUNT	:6 🌐 🗐				Close	
							close	
						Y		

#### 11 Database Management Systems

- Software designed to manage data stored in a database
  - > XML DBMS
  - > OODBMS
  - > RDBMS

#### 11 Database Management Systems

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Views Clipboard 🖙	Sort & Filter	Records	Find	Ter	t Formatting	G ^
All Acce 🖻 « 💻	Albums Album Fo	orm View				×
Tables 🛠 📥	ID +1 SKU +	Album Title	*1	Artist	Release Dati	Price _
Albums	1 RCA	Hard Day's Night		Beatles	6/13/1964	\$60.
Customars	2 AR-34001	Let It Be		Beatles	5/18/1970	\$15.
Ountiers A	3 SMAL-2835	Magical Mystery Tour	1	Beatles	11/27/1967	\$9.
Queries x	4 SMAS 2653	Sgt. Pepper's Lonely H	earts Cl	Beatles	6/7/1967	\$20.
Albums Query	5 LSP-2426	Blue Hawaii		Elvis Presley	10/1/1961	\$18.
Forms *	G.I.Blues	1	Elvis Presley	10/1/1960	\$20.	
Album Form View	7 7499-2	Between the Buttons		Rolling Stones	2/6/1967	\$13.
Reports	8 EKS-9002	Strange Days		Doors	10/1/1967	\$18.
eBay Albums	9 LSP-3766	Surrealistic Pillow		Jefferson Airplan	e 2/1/1967	\$10.
	10 KCS-9700	Cheap Thrills		Janis Joplin	8/1/1968	\$10.
T T	11 LPM-3553	Frankie and Johnny	1	Elvis Presley	4/1/1966	\$45.
	12 SO-383	Abbey Road		Beatles	10/1/1969	\$15.
	13 CS-9189	Highway 61 Revisited	1	Bob Dylan	8/30/1965	\$30.
Microsoft Access	provides tools	Woodstock		Hendrix/Baez	7/1/1970	\$20.
MICIOSOIL ACCESS	provides tools	Are You Experienced		Jimi Hendrix	8/1/1967	\$38.
for working with ta	ables and for	In the Wee Small Hours		Frank Sinatra	1/1/1955	\$18.
creating queries,	forms, reports,	Yellow Submarine		Beatles	1/13/1969	\$25
and Web pages.		I 👀 🏹 No Filter Sear	ch	4		Þ
Datasheet View			1999			
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#### FIGURE 11-21

An entry-level DBMS usually includes all the tools you need to manipulate data in a database. Learn how to work with tables in a Microsoft Access database.

#### 11 Database Management Systems

Database client software allows any remote computer or network workstation to access data in a database



#### FIGURE 11-22

Multiple users can access a database using client software.
#### 11 Database Management Systems

#### Multiple users can interact with the same database





#### FIGURE 11-24

Many entry-level DBMSs include an easy way to turn a report into an HTML document that you can post as a Web page. Learn how to generate an HTML report from a Microsoft Access database.

#### **FIGURE 11-25**

Dynamic Web publishing requires several components, including a browser, a Web server, database server software, and a database.



#### HTML forms can collect data, as well as specifications for a query

The storms tog opposi		FIGURE 11-26
fies how to treat the		An HTML document (top) pro-
form—in this case, by		duces a form (bottom) when
a server-side program.		displayed by a browser.
<pre>File Eds Format View View View &lt;1DOTTYPE htm The <input each field <body> <form action="demo_for&lt;br&gt;First name: &lt;input type&lt;br&gt;Last name: &lt;input type&lt;br&gt;E-mail address: &lt;input&lt;/pre&gt;&lt;/td&gt;&lt;td&gt;Untitled - Notepad - C ×&lt;br&gt;&gt; tags define&lt;br&gt;of the form.&lt;br&gt;pm.asp"> pe="text" name="FirstName"&gt; e="text" name="LastName"&gt; type="text" name="eMailAddress"&gt;</form></body></input </pre>		
<input type="submit" v<br=""/>	/alue="Send">	
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		R 100% 👻
		- 😥 🔝 🕪

#### The process of sending data to a database requires several data handoffs

Server-side script

#### FIGURE 11-27

A server-side script can collect user input, send data to a database, and create an HTML page containing data from the database.



## 11 XML

#### Markup language that allows field tags, data, and tables to be incorporated into a Web document



#### FIGURE 11-28

A document with XML tags allows you to make a targeted search for author = Martin Luther King, Jr. and document\_type = SPEECH.

# 11 XML

- Language used to specify a standard structure of fields and records
- > Data in an XML document is searchable
- XML is portable, but not optimized for many common database operations
  - Consider storing data in a relational database, managing it with RDBMS software, and generating XML documents for exchanging data over the Web

#### Section C: Database Design

- Defining Fields
- Normalization
- > Organizing Records
- Designing the Interface
- Designing Report Templates
- Loading Data

## **11 Defining Fields**

- The term database structure refers to the arrangement of fields, tables, and relationships in a database
- Break data into fields just by using common sense and considering how people might want to access the data
- Use a primary key field to make each record unique
   Use appropriate data types for each field

# **11 Defining Fields**

#### **FIGURE 11-33**

Commonly Used Data Types

Data Type	Description	Sample Field	Sample Data
Real	Numbers that include decimal places	DiscountPrice	9.99
Integer	Whole numbers	Qty	5
Date	Month, day, and year	OrderDate	9/30/2014
Text	Letters or numerals not used for calculations	Name ZipCode	Gilbert 49866
Logical	Data that can have one of two values	InStock	Y
Memo	Variable length comment field	Condition	Some wear on album cover
BLOB	Binary data	SampleTrack	[An MP3 file]
Hyperlink	URLs	MusicianWebSite	www.bobdylan.com

## <sup>11</sup> Defining Fields

- A computed field is a calculation that a DBMS performs during processing and temporarily stores in a memory location
- Uppercase and lowercase are not always treated the same
  - Case sensitive database
- Use field formats to show what the data is supposed to look like when it's entered
- Use field validation rules to filter data

## **11** Normalization

- Process that helps save storage space and increase processing efficiency
  - Minimizes data redundancy

#### CUSTOMERS

CustomerNumber FirstName LastName Street City State ZipCode EmailAddress PhoneNumber

#### ORDERS

OrderNumber CustomerNumber TotalPrice OrderDate Qty Cat# Price

#### FIGURE 11-38

Fields for each order are separated into two tables: one for customer information and one for order information. Information in these two tables can be linked using the CustomerNumber field. This field makes it easy to find all the orders for a specific customer.

## **Organizing Records**

- Records can be organized in different ways, depending on use
- Sorting
  - A table's sort order refers to the order in which records are stored on disk
  - Sort key
- Database index
  - Similar to the index in a book

# **Organizing Records**



#### **FIGURE 11-40**

When arranged by date, Blue Hawaii is the second record in the index. The index file contains a list of keys and the R# that ing more information about the album released on that date. To see how indexing works, click this figure in your digital

## **Designing the Interface**

- > Arrange fields in a logical order
- Provide visual clues to the entry areas
- Entry areas should appear in a consistent position relative to their labels
- Provide a quick way to move through the fields in order

## **Designing the Interface**

- Use scrolling or create multiple screens, if necessary
- Provide buttons or other easy-to-use controls for moving from one record to another
- Supply on-screen instructions

# **11 Designing the Interface**

A http://www.viptagom	uusiashan com 0 – R - )	- 1		FIGURE 11-42 A well-designed data
Fields are arranged in logical order.	Data entry areas are clear delineated as white space	Porder processing X V rly es.		input screen should be easy to use.
Last Name	First Name			
Title	Organization Name			
Address				
City	State	Postal Code		
Country/Region	Home Phone	Work Phone		
Enter the date of your first orde	er or enter your password in th	ne space below:	n-screen ir sers enter o	nstructions help data correctly.
Help		Page 1	2	site © Media lechnics
G		Buttons mak to get to the page of this	e it easy second record.	Webs

## Designing Report Templates

- Report generators are used to specify the content and format for a database report
- A report template contains the outline or general specifications for a report

FIGURE 11-43 A report template contains the specifications to produce this report.

Report Date: 8/21/2014

#### Vintage Music Shop Albums by Price

Discount Price	Album	Artist	Qty in Stock	
\$9.00	Magical Mystery Tour	Beatles	3	
\$10.00	Surfin' Safari	Beach Boys	3	
	Cheap Thrills	Janis Joplin	12	
	Surrealistic Pillow	Jefferson Airplane	1	
	One Day at a Time	Joan Baez	2	
Between the Buttons		Rolling Stones	1	
\$15.00	Let It Be	Beatles	2	
	Abbey Road	Beatles	4	
	Joan Baez	Joan Baez	1	
\$18.00	Chuck Berry's Golden Hits	Chuck Berry	1	
	Strange Days	Doors	9	

## **Designing Report Templates**

- Supply only the information required
- Present information in a usable format
- Information should be timely
- Information should be presented in a clear, unambiguous format
- Present information in the most appropriate format for the audience

## <sup>11</sup> Loading Data

#### > Data can be loaded into a database by:

- Using generic data entry tools
- Using a customized data entry module
- A conversion routine converts the data from its current format into a format that can be automatically incorporated into the new database

## <sup>11</sup> Section D: SQL

- SQL Basics
- > Adding Records
- Searching for Information
- Updating Fields
- Joining Tables

# **11 SQL Basics**

Intermediary between the database client software and the database itself

	SQL commands inter- act directly with the database to locate data. update records, and perform other functions the user requests.	t U
Client software converts the entries in a form into SQL commands.	SELECT Album FROM Albums WHERE Artist = 'Beatles' and Format = 'LP'	f i f
Search Artist: Beatles Title: Label: Format: @LP C Cassette of Search Now Clear t	C Single he Form	



Database

Database client software provides database users with simple forms that can be used to enter search specifications or update data. Here, a customer uses an online form to search for vintage Beatles albums in LP (long-playing 33% rpm) format.

# **11 SQL Basics**

#### FIGURE 11-46

#### SQL Commands

Command	Description	Example
CREATE	Create a database or table	CREATE TABLE Album
DELETE	Remove a record from a table	DELETE FROM Tracks WHERE TrackTitle = 'Blue Suede Shoes'
INSERT	Add a record	INSERT INTO AlbumDescription (Cat#, Condition) VALUES ('LPM- 2256', 'Mint condition; no visible scratches; original album cover')
JOIN	Use the data from two tables	SELECT FROM Albums JOIN Tracks ON Albums.Cat# = Tracks.Cat#
SELECT	Search for records	SELECT FROM Albums WHERE Artist = 'Beatles'
UPDATE	Change data in a field	UPDATE Albums SET DiscountPrice = 15.95 WHERE Cat# = 'LPM- 2256'

# 11 Adding Records

#### **FIGURE 11-47**

Data from the Customer form is added to the database.

SQL statement

Last Name: Rodriguez
101 Las Vegas Court
ſ
Taos
NM
87571
5055553412

#### **INSERT INTO Customers** (LastName, FirstName, Street, City, State, ZipCode, PhoneNumber)

VALUES ('Rodriguez', 'Jorge', '101 Las Vegas Court', 'Taos', 'NM', **'87571'**, **'5055553412'**)

#### Customers table

LastName	FirstName	Street	City	State	ZipCode	PhoneNumber
Rodriquez	Jorge	101 Las Vegas Court	Taos	NM	87571	505-555-3412
Bleuman	Jonathan	5022 Lake St.	Negaunee	M	49066	906-555-2131
Wincheta	Daisy	499 Table Mesa	Boulder	CO	80301	303-555-6902
Venkata	Patel	872 Old York Way	Durango	CO	81301	970-555-4438
Wong	Joy	822 Park Place	New York	NY	10023	212-555-9903
Helwig	Nathaniel	5 Winsome Drive	Cheyenne	WY	82003	303-555-3223
Chen	Lu-Chi	2235 Overview Trail	San Francisco	CA	94118	415555-9001
Walton	William	500 Vista Mesa 🖻 👘		NM	87504	505-555-1111
Bolduc	Luc	41 Rue 🕾	and the second sec	· *		10 FTT 9487
	Kallie					

### **Searching for Information**

SELECT Album, AlbumCover FROM Albums WHERE Artist = 'Jefferson Airplane'

- The AND, OR, and NOT Boolean operators are used to perform complex queries
- The use of parentheses indicates the part of the query to perform first

## <sup>11</sup> Updating Fields

UPDATE Albums SET InStock = InStock – 1 WHERE Album = 'G.I. Blues'

Global updates change the data in more than one record at a time

> Works only for records with similar characteristics

## <sup>11</sup> Joining Tables

#### Joining tables in SQL allows you to create relationships between tables

#### FIGURE 11-50

Records in the Albums table and Tracks table both include a Cat# field. When the data in these fields is the same, the records refer to the same entity—in this case, an Elvis Presley album called *G.I. Blues*.

ALBUMS	รี นี้นี้รู้สุดคลามรู้ สารระบบกลาย การสารระบบการ					tion of the second s					1977 - 197 (Marine Marine M
Cat#	Album		Artist		Release Date		In Stock	Va	lue	Discount	Price
LPM-2256	G.I. Blu	es	Elvis Pr	esley	10/01/196	60	4	20	.00	18.95	
7499-2	Betwee Button	TRACKS		Stones	02/06/196	67	1	13	.99	11.49	
LSP-246	Blue	Cat#		TrackT	ītle	Tr Le	ack Ingth		Trac	ckSample	
N16014	Surfin'	LPM-2256	5	Blue S Shoes	uede	10	)4		Blue mp3	eSuede. 3	
		LPM-2256	5	Frankf	ort Special	13	32		Fram mp3	nkSpec. 3	
		LPM-2256	;	Woode	en Heart	16	3		Woo mp3	odenHE. 3	
		7499-2		Ruby 1	luesday	19	)7		Rub	yT.mp3	

# **11** Joining Tables



The JOIN command links the



### **Section E: Database Security**

- Database Vulnerabilities
- Database Security Measures
- Database Security Regulations
- What Individuals Can Do

#### **Database Vulnerabilities**

- Databases are vulnerable to physical theft, hacking, and unauthorized access
  - > Databases can be stolen without going missing
- There is hardly a person in America who is not in at least one computer database
  - Privacy is viewed as an inherent right
  - Importance of data accuracy
  - Data should be kept secure

#### **Database Security Measures**

- Today's computers are under assault from hackers and natural disasters
- Security measures include encryption, access controls, data security policies, and intrusion monitoring
- Encryption can make data in a database unintelligible to a hacker
- The process of decrypting database information in response to a query typically increases the amount of time necessary to process each query

#### **Database Security Measures**

- An access control limits access to systems, such as computer databases
  Internal limits access to systems, such as
  - Control who accesses the database
  - Control how users interact with the database
    - User privileges
    - Data view

An alarmingly high phone bill arrives in your e-mail Inbox and you immediately want to clear up the error. The message is addressed to you personally and contains part of your phone number. You might read this message and think, "If they have my phone number, it must be a legitimate site," and proceed to click the Log In button and enter your User ID and password. Bad idea. That link goes directly to a hacker's site.

ct: Your AT te: August 2 fo: Sarah S	<b>&amp;T bill i</b> 2, 2014 9 mith <sa< th=""><th>s ready to be pai :48:20 AM EDT rahmaesmith@gr</th><th>d now. nail.com&gt;</th><th></th><th></th><th></th><th></th></sa<>	s ready to be pai :48:20 AM EDT rahmaesmith@gr	d now. nail.com>				
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Dea You	r Sarah, <mark>ur onl</mark> i	ine bill is re	ady to b	e viewe	d		
A new Any ; direct	v bill for y payments tly below.	our AT&T account is made after your bill If you have made a	ready. period expire recent paym	s will not be r ent, please re	eflected in the fer to the curre	bill amount li nt balance or	sted 5 the
S	ervice ne Phone	Account ending in	Bill Amount \$882.69	Due Date 08/06/2014			
Log in accou must Log in paym	n to online unt or mail do so to v n to online ient.	account managem e a payment. If your riew and print your is account managem	ent to view ye u are not regi full bill and bil ent to view ye	ur bill and bill stered for onli I notices at we ur bill, mainta	notices, maintu ne account mai w.att.com/mai in your email a	in your emai agement, yo agemyaccou ccount or ma	l u int. ke a
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Than Than AT&T	k you for k you, Online Se att.com	choosing AT&T. We	value your bu	siness and loc	k forward to se	trving you!	
Conta	ect Us			24/2			

### **Database Security Measures**

- To minimize vulnerabilities caused by employee inattention, organizations can formulate database use policies
- A database audit is a procedure that monitors and records user activity within a database

#### FIGURE 11-54

A database administrator can limit the way individuals or groups access data. In this example, library patrons are given permission to read data in the Books table, but they cannot update data, insert data, or delete data from it.

Change Owner	
User/Group Name:	Object Name:
Admin	<new queries="" tables=""></new>
Patrons	Books
	Authors Patrons
List: 🖲 Users 🔘 Groups	Object Type: Table 💌
Permissions	
Open/Run	🔽 Read Data
Read Design	🔲 Update Data
Modify Design	Insert Data
Administer	🕅 Delete Data
Current User: Admin	

#### **Database Security Regulations**

- International e-commerce makes database security a global concern; many countries have enacted laws to protect personal data stored on databases
  - European Union's Privacy Directive
  - Canada's Personal Information Protection and Electronics Document Act
  - > U.S. Privacy Act of 1974
  - USA PATRIOT Act
  - Video Privacy Protection Act
  - Health Insurance Portability and Accountability Act 1996
  - Gramm-Leach-Bliley Act 1999

### What Individuals Can Do

- The key to minimizing your risk is to be vigilant about the information you divulge
  - Know when data is being collected
  - Find out how data is being used
  - Find out what data is retained
  - Supply only the data that is required
  - Opt-out when possible
  - Protect your passwords
  - Don't trade your privacy
  - Use antivirus software
  - Do not reply to spam
  - Before registering, check the site's privacy policy

### <sup>11</sup> What Individuals Can Do

#### FIGURE 11-56

Portable password managers that you can use from a USB flash drive include:

- Siber Systems RoboForm2Go
- Open source KeePass
- Open source Password Safe



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#### FIGURE 11-57

Investigate a site's privacy policy before you provide personal information.
NEW PERSPECTIVES

## **Chapter 11 Complete**

## **Computer Concepts 2014**

