

# Table of Contents

Introduction.....	1
Who should read this book?.....	1
Why this book?.....	3
Chapter Guide.....	4
Supplemental Files & Errata.....	6
Formatting Notes.....	6
I want to hear from YOU!.....	6
Databases - In Theory and Everyday Life.....	7
What is a Database?.....	7
Everyday Database Examples.....	7
Types of Databases.....	10
Text files - Data Exchange and Basic Storage.....	10
Mobile Databases - Smartphones, Tablets and the Web.....	14
Desktop Database Software - Local Analysis.....	16
Server Databases - Organizational Data and Enterprise Applications.....	18
Cloud Databases - Outsourced Data Storage.....	20
Chapter Summary.....	23
For Further Study.....	23
Review Questions.....	23
Exercises.....	24
Terms to Remember.....	24
Links.....	26
Choosing and Installing MySQL.....	27
Why Choose MySQL?.....	27
Notable Features of MySQL.....	28
GNU General Public License and Open Source Software.....	30
Installing MySQL in an AMP Environment.....	31

A Word on Virtual Machines.....	32
Installing MySQL on Linux.....	35
Installing MySQL on Windows.....	42
Installing MySQL on Mac OS X.....	47
Additional Resources.....	52
Exercises.....	59
Links.....	62
Database Design - The First Steps.....	63
Creating a Model.....	63
Formal vs. Informal Data Modeling.....	64
Example Database - Job Search Plus.....	65
Data Concepts and Relationships.....	66
Filling in the Details.....	69
Defining the Tables.....	74
Chapter Summary.....	77
For Further Study.....	77
Review Questions.....	77
Exercises.....	78
Terms to Remember.....	80
Database Normalization.....	82
From Design to Reality.....	82
Looking Back.....	82
The Normalization Process.....	83
First Normal Form (1NF).....	84
Second Normal Form (2NF).....	87
Third Normal Form (3NF).....	91
Boyce-Codd Normal Form (BCNF or 3.5NF).....	92
Additional Reasons for Normalization.....	95
Application Specific Reasons.....	96

Data or Database?	99
Chapter Summary.	102
For Further Study.....	102
Review Questions.....	102
Exercises.....	103
Terms to Remember.....	105
Servers and Databases.....	107
Building the Database.....	107
Accessing the Server.....	107
Creating Databases.....	122
Database Users and Security.....	129
For Further Study.....	138
Review Questions.....	138
Terms to Remember.....	140
Tables and Indexes.....	142
Introduction.....	142
Storage Engines.....	143
Models and Schemas.....	145
MySQL Workbench.....	146
Getting Started.....	147
Executing Queries.....	148
Creating the Tables.....	151
Linking the Tables.....	167
Documenting the Database.....	173
Reading and Writing the Data.....	185
Structured Query Language.....	185
Beginning Examples.....	186
Adding Data to the System.....	187
Executing Commands.....	189

Trying This At Home.....	190
SQL Basics.....	196
Selecting Data.....	196
Inserting Data.....	210
Updating Data.....	215
Deleting Data.....	216
Chapter Summary.....	219
For Further Study.....	219
Review Questions.....	219
Exercises.....	220
Terms to Remember.....	221
Design Overview: Human Resources and Training Database.....	223
Introduction.....	223
Modeling the Data.....	224
Conceptual.....	224
Adding Details.....	226
First Normal Form (1NF).....	227
Second Normal Form (2NF).....	228
Many-to-Many Relationships.....	233
Third Normal Form (3NF) and Boyce-Codd (BCNF).....	234
Design Notes.....	235
Expansions.....	236
Creating the Tables.....	239
Writing the SQL.....	245
Conclusion.....	255
For Further Study.....	255
Exercises.....	255
Design Overview: Recipe Database.....	257
Introduction.....	257

Modeling the Data.....	258
Design Notes.....	264
Working Diagram.....	265
Writing the SQL.....	268
Populating the Tables.....	268
Basic Queries.....	269
Custom Searches.....	273
For Further Study.....	275
Exercises.....	275
User Interfaces.....	277
Beyond the Database.....	277
Website Design Tools.....	278
WordPress and other Content Management Systems.....	278
CiviCRM.....	280
Desktop Interfaces.....	282
Connecting to MySQL from the Desktop.....	282
OpenOffice / LibreOffice.....	287
Microsoft Access.....	288
Designing From Scratch.....	290
PHP.....	291
ASP.NET (C# / Visual Basic).....	292
Java.....	294
Supplemental Languages.....	295
Chapter Summary.....	297
For Further Study.....	297
Review Questions.....	297
Terms to Remember.....	298