

10.1

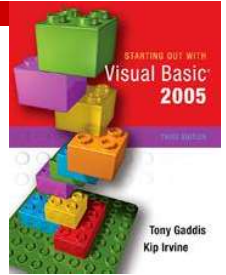
What Is a Database?

A Database is a Collection of
Data Organized in Tables,
Rows, and Columns



Terminology

- **Database**: a collection of interrelated tables
- **Table**: a logical grouping of related data
 - A category of people, places, or things
 - For example, employees or departments
 - Organized into rows and columns
- **Field**: an individual piece of data pertaining to an item, an employee name for instance
- **Record**: the complete data about a single item such as all information about an employee
 - A record is a row of a table



Database Table

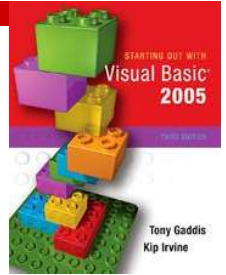
- Each table has a *primary key*
 - Uniquely identifies that row of the table
 - PartNumber is the primary key in this example
- Columns also called *fields* or *attributes*
- Each column has a particular data type

Row (Record) →

Inventory : Table				
PartNumber	Description	Price	QuantityOnHand	
14789	Power Supply	\$24.95	24	
14768	80G Hard Drive	\$89.95	18	
14732	Keyboard	\$29.95	32	
14785	Mouse	\$9.95	49	

↑ Column

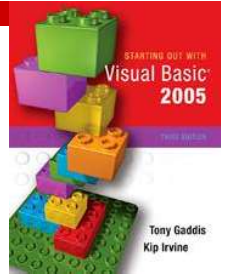
↘ Field



VB and Access Data Types

- VB data types must match table data types
- MS Access and VB have similar data types

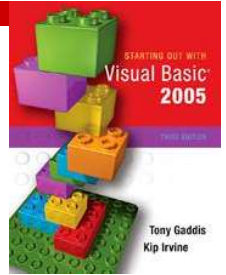
<u>Access Data Type</u>	<u>Visual Basic Data Type</u>
AutoNumber	Long
Date/Time	Date, DateTime
Number, Integer	Integer
Number, long integer	Long Integer
Number, single	Single
Number, double	Double
Text	String
Yes/No	Boolean



Database Design

- A *database schema* is the design of tables, columns, and relationships between tables
- Define a column for each piece of data
- Allow plenty of space for text fields
- For the members of an organization:

<u>Column Name</u>	<u>Type</u>	<u>Size</u>
First_Name	Text	40
Last_Name	Text	40
Phone	Text	30
Email	Text	40
Date_Joined	Date/Time	
Officer	Yes/No	1

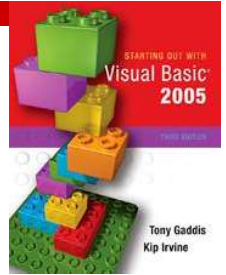


Issues with Redundant Data

- Database design minimizes redundant data
- In the following employee table:

<u>ID</u>	<u>First Name</u>	<u>Last Name</u>	<u>Department</u>
001234	Ignacio	Fleta	Accounting
002000	Christian	Martin	Computer Support
002122	Orville	Gibson	Human Resources
00300	Jose	Ramirez	Research & Devel
003400	Ben	Smith	Accounting
003780	Allison	Chong	Computer Support

- Same dept name appears multiple times
 - Requires additional storage space
 - Causes problems if misspelled
 - What if a department needs to be renamed?



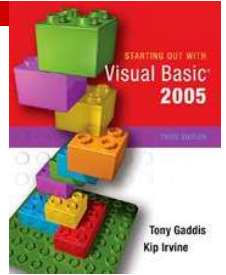
Eliminating Redundant Data

- Create a department table

<u>Dept ID</u>	<u>Dept Name</u>	<u>Num Employees</u>
1	Human Resources	10
2	Accounting	5
3	Computer Support	30
4	Research & Development	15

- Reference department table in employee table

<u>ID</u>	<u>First Name</u>	<u>Last Name</u>	<u>Dept ID</u>
001234	Ignacio	Fleta	2
002000	Christian	Martin	3
002122	Orville	Gibson	1
003000	Jose	Ramirez	4
003400	Ben	Smith	2
003780	Allison	Chong	3



One-to-Many Relationships

- The previous changes created a *one-to-many relationship*
 - Every employee has one and only one dept
 - Every department has many employees
 - DeptID in department table is a *primary key*
 - DeptID in employee table is a *foreign key*
- In general, a one-to-many relationship is created when the primary key of one table is specified as a field of a another table