

LESSON 2.1

98-364 Database Administration Fundamentals

Choosing Data Types

Lesson Overview

2.1. Choose data types.

Understanding what data types are, why they are important, and how they affect storage requirements. (This lesson focuses on Microsoft® Access®, MySQL, and Microsoft SQL Server® data types.)

In this lesson, you will review:

- Data types—a definition of a set of data
- Why data types are important
- How data types affect storage requirements

Data type—a definition of a set of data

In programming, a definition of a set of data that specifies the possible range of values of the set, the operations that can be performed on the values, and the way in which the values are stored in memory.

Defining the data type allows a computer to manipulate the data appropriately. Data types are most often supported in high-level languages and often include types such as real, integer, floating point, character, Boolean, and pointer. How a database language handles data typing is one of its major characteristics.

- “Data type” refers to the form that the data will be in.
- For instance: Is “9” the word *nine* or the value 9?

Examples of data types:

- **Integer** type is any whole number.
 - 37; a positive number
 - -50; a negative number

- **Floating point** type is any real number.
 - 314,600,000 ; or 3146E5 in floating-point notation
 - 0.0000451; or 451E-7 in floating-point notation

• Examples of data types (continued)

- **Character** type is any number or letter that will not have math functions applied to it.
 - House address: 5230 S. Windows St.
 - Phone Number: 123-456-7890

- **Boolean** type is only On or Off
 - 1 or 0
 - True or False

Why data types are important

- Databases are made up of tables, and tables are made up of fields that are defined by their data types.
- Using the wrong data type can cause large performance degradation in the database and can lead to data corruption.
- Using the wrong data type can cause the database to use significantly more storage than needed, which is wasteful.

How data types affect storage requirements

Each data type has a set amount of memory or storage that it will take up. The storage for most data types are fixed amounts even if the maximum space is not used.

You want to choose the best data type for the necessary *function* and *size*.

Three examples of different whole-number data types:

- **Byte**—Holds whole numbers from 0 to 255 in 1 byte of storage
- **Integer** — Holds whole numbers between – 32,768 and 32,767 in 2 bytes of storage.
- **Long**—Holds whole numbers between – 2,147,483,648 and 2,147,483,647 in 4 bytes of storage.

If a database never held a whole number larger than 255 but you used the long data type, your database would take up to four times more storage space than needed.

Data type and storage (continued)

Three examples of character data types:

- **Char(size)**—Holds a fixed-length string. The fixed size is specified in parentheses. Holds a maximum of 8,000 characters.
- **Varchar(size)**—Holds a variable-length string. The maximum size is specified in parentheses. Holds a maximum of 8,000 characters.
- **Text**—Holds a variable-length character string. Maximum size is 2 GB of text data.

Pop Quiz

1. What data type should be used to hold a student's name, and why?
2. What data type should be used to hold a student ID, and why?
3. What data type should be used to hold a student's grade, and why?