Databases Manage Information

Be a Power Reader

Build on Previous Knowledge Before you begin to read, make a list of what you know about databases. What do they contain? What are they used for? Then, as you read this article, see if you can answer your questions. If you have questions after you have read the article, you may want to use the Internet to research the answers.

Introduction

Have you ever cataloged the CDs in your collection? Maybe you collect coins or stamps and keep information on them. For example, you might write down when you bought each one and the price you paid. If so, you've created a **database** without even realizing it.

In this article, we're going to talk about computer databases. Having a database on a computer is useful for many reasons. It is easy to update its contents. And you can easily retrieve the information in many ways.

A Personal Database

Let's say you have a computer database containing information on your friends and relatives. Once you get all the information into the database, you can:

- Print an alphabetized list of everyone
- Get the names of everyone who has a birthday in September
- Enter a friend's name and get his phone number
- Enter a phone number and get the corresponding name

What if you had this database on index cards rather than in a computer? If you had index cards for a hundred people, it would take a while to go through the stack to find everyone whose birthday is in September. In addition, you might make a mistake and miss somebody. Databases provide us with a quick, accurate way to get the information we need.

Updating a computerized database is also a snap. If somebody moves, you just delete the old address and enter the new one. With a database on index cards, you have two options: cross out the old address and write in the new one, or create a new card.

Now imagine a business that has thousands of customers in its database. What if they kept this customer information in paper files? How long would it take to go through those files to find all the customers who lived in a particular city? Or to make a list of customers who have placed orders in the last month? Businesses don't have time for this kind of work. For today's businesses, a database is essential.

The All Seasons Database

Jamal owns a small auto shop called All Seasons Auto Repair. Each day, he and his partner repair eight to ten cars. The first thing Jamal does when he arrives in the morning is start up the shop's computer. He looks at the jobs scheduled for that day. The shop has a database that contains a list of all its customers, the cars they own, and what work has been done on each car. As customers drop in to leave their cars, Jamal knows what work is to be done on each car. He looks it up in the database. He also quickly checks the database to make certain he has the customer's phone number so that he can later contact him or her. Jamal begins working on the first car. It needs a new radiator. A radiator keeps a car's engine from overheating. The shop

carries some repair parts, but not radiators. So, Jamal calls the local auto parts store. He is uncertain what type of radiator this car requires. Samantha, who works at the auto parts store, begins by asking Jamal the make, model, and year of the car. She then checks the store's **inventory** database to see whether they have the needed radiator in stock. Unfortunately, the parts store doesn't have the radiator. Next, Samantha goes online to check the warehouse's database. The warehouse carries parts for many auto parts stores in the area. Sure enough, the warehouse has the right radiator. Samantha immediately places an order for the radiator.

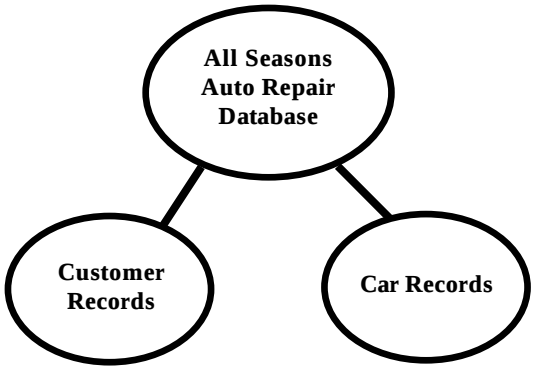
The warehouse will deliver the radiator to Jamal's shop later in the day. By then it will be too late for Jamal to fix the car today. He will have to look up the customer's phone number in the shop's database and give her a call. He will let her know that the car will not be fixed until tomorrow evening.

Records and Fields

All databases contain records. A **record** is a collection of related data on a single item. Spend a minute thinking about the auto repair shop database. It contains two different types of records:

- Customer records
- Car records

A diagram of the auto shop database looks like this:



All Seasons Auto Repair database has two types of records.

Each record is made up of **fields**. A field is a single data item. This is how a **Customer** record looks on Jamal's computer screen:

Notice that this record contains eight separate fields, starting with **First Name**.

Each car has its own record. A single customer may have many **Car** records—one for each car he or she owns. Each **Car** record contains the following fields:

License Plate Number
Make
Model
Year

Work Done

The **Work Done** field is a "Note" field. A "Note" field is a field that can vary in length. Jamal enters notes into this field each time he works on the car. He includes the date and a description of the work he did.

Jamal created this database himself when the auto repair shop first opened. He used a **database application** called Microsoft Access. Whenever he needs to, he adds new customers to the database. If a customer gets rid of a car and buys a new one, Jamal updates the database with the new information.

Jamal also can **query** the database. If he wants to examine a particular car's record, he enters its license number or the owner's name. A record can be pulled up by any of its fields. In some cases, however, this

could result in many records being displayed. For example, if Jamal were to enter "Ford," many records would be displayed on the screen. This is because many of his customers own Fords.

Characteristics of a Good Database

Creating a well-designed database takes planning. There are four characteristics that a good database should have:

1. **It must be complete.** The more complete the database is, the more useful it will be. If Jamal forgets to add a new customer to his database, the database won't be useful the next time that customer comes in.
2. **It should be easy to access records in a variety of ways.** Jamal can locate a car in several ways, for example by entering its license plate number or the owner's name.
3. **It must be kept up-to-date.** No matter how busy Jamal is, he must enter notes on the work he has done every day. He also must make any changes concerning the cars his customers own.
4. **It must be efficient to use.** Jamal must be able to quickly get to the information he needs.

Some Other Examples

Have you ever ordered something from an online store? These stores depend heavily on databases. For example, let's say you want to buy the Spider-Man DVD. You decide to purchase it from Amazon.com.

You go to the Web site, choose DVD for the type of item, and enter "Spider-Man." Amazon.com searches its database to locate the needed record, and up it comes. You tell the database that you want one copy of this DVD.

Next, you click the "Proceed to Checkout" button. Because you have purchased items from Amazon.com before, the database is able to access your ordering information. It displays your name, address, and even your credit card information. You check the information to make sure that it is correct. Then, you click the "Order" button, and your DVD is soon on its way.

If you want to "track" your order later on, you can go to back to the Web site and enter the order number. The Amazon.com database will tell you whether your DVD has been shipped and when it should arrive. All of this information is at your fingertips whenever a computer with Internet access is available.

Databases have also revolutionized the way grocery stores and discount stores work. Did you know that not very long ago, every item in a grocery store had a price stamped on it? Can you imagine how long this took? Today, items have **barcodes**. At the checkout, **barcode scanners** read these codes into a computer. The computer looks up the item's price in a database. This amount is added to the customer's total bill. The name of each item purchased is also printed on the bill. Without barcode technology, it would not be possible to print an itemized customer bill.

However, the database isn't used only to determine prices. It also keeps track of product inventory. When an item is sold, the database is updated. When the quantity of that item on-hand gets to a certain point, an order is automatically placed.

The information in grocery store databases can be retrieved in many ways. For example, let's say that sugar was put on sale last week. A store manager can compare the number of bags of sugar sold last week to the week before. This tells her whether placing the item on sale affected the number of bags sold.

Review Questions

1. Use your own words to explain how fields are related to records.
2. What two types of records did the All Seasons Auto Repair database contain? Why did it need two different types of records?
3. Describe how databases help Jamal accomplish his work.
4. Why are databases essential to grocery stores?

What Do You Think?

1. Think of a database you might want to create. Perhaps it would store information on items that you collect, such as baseball cards. Or maybe it would keep track of the classes you are taking or the books you are reading. Would your database have more than one type of record? What fields would be contained in the records? Give examples of how you might query the database.
2. How do you think your school might use a database? What kinds of records might this database contain? How might teachers and other school employees use the database?

Glossary

barcode A series of vertical black stripes of varying widths widely used for identification purposes.

barcode scanner A device that can capture barcodes for processing.

database A collection of data organized into records for easy access. Each record contains a collection of fields, such as all the available information on a particular individual.

database application An application used to create databases.

field A single data item within a record. It is the smallest unit of information in a database.

inventory An itemized list of the items currently on-hand or in stock.

query To ask a question of a database.

record A collection of related fields.