

3.3

Using a Database

You will need
• a database program

▶ GOAL

Use a database to sort and locate data.

Learn about the Math

Marianne coaches a girls' softball team. She is using a **database** to store data about the players. She is looking at each player's **record** to determine who is the best batter on the team.

Player #	Last name	First name	Phone #	Position	Times at bat	Singles	Doubles	Triples	Home runs
1	Jones	Julia	555-9854	right field (RF)	22	5	4	2	1
2	Fernandez	Jose	555-3342	third base	18	1	0	1	0
3	Kang	Anita	555-9872	first base	18	5	2	0	0
4	Brown	Sally	555-9354	catcher (C)	18	3	3	0	0
5	Ali	Olivia	555-0032	pitcher (P)	23	4	1	0	0
6	Darrett	Marcie	555-9923	left field (LF)	10	0	2	1	0
7	Francis	Beth	555-7730	shortstop (SS)	20	2	2	1	0
8	Miller	Trina	555-7291	centre field (CF)	23	5	5	3	5
9	Miller	Pat	555-7291	second base	25	7	6	3	5

database

an organized set of information, often stored on a computer

record

all the data about one item in the database; for example, one player (see orange row)

- The orange row is a single record: all the data about one player.
- The yellow column is a single **field**: one type of data about all the players.
- The green cell is the position. The number in it is the **entry**. This entry is in a numeric field because it uses numbers.

field

a category used as part of a database; for example, last name (see yellow column)

entry

a single piece of data in a database; for example, home runs for one player (see green cell)

sort

order information from greatest (or first) to least (or last); a database can be sorted by fields

? How can you use this database to find the best batter on the team?

- In a database, each field should serve a particular purpose, or have a reason for being included. What fields are shown above?
- A field can be a text field, a numeric field, a date field, or a memo field. Which type of field is each field in Marianne's database?
- Which field has Marianne used to **sort** the information above?
- State the name that would appear first if you sorted the information in the database by each of the following.
 - last name
 - first name
 - times at bat
 - phone number
- Marianne wants her best batter to be up third. How should she sort the database to find her best batter? Which player should she choose to bat third? Why might someone disagree?

Reflecting

- 1. a) Why would it not make sense for Marianne to rank her players by sorting the database using “Phone #”? Why is it useful to have this field anyway?
b) What other fields might a coach find useful? Explain.
- 2. Marianne’s database contains information for only 9 players. Suppose it is changed to hold the data for all 15 players on the team. How might the revised database be used?
- 3. Who might have information about you or your family in a database? Give two examples.



Work with the Math

Example 1: Sorting a database for letter frequencies

Indira decides to create a database for the information about the QWERTY keyboard and letter frequencies in lesson 3.1. Her database is shown. How can Indira sort her database to find out how many of the 10 most frequent letters are typed with the left hand?

Letter	Frequency in 1000 Letters	Row on keyboard	Finger used to type	Hand used to type
Q		3 top	pinky (fifth)	left
W		16 top	ring (fourth)	left
E	130 top		middle	left
R	77 top		index	left
T	93 top		index	left
Y	19 top		index	right
U	27 top		index	right
I	74 top		middle	right
O	74 top		ring (fourth)	right
P	27 top		pinky (fifth)	right
A	73 home		pinky (fifth)	left
S	63 home		ring (fourth)	left
D	44 home		middle	left
F	28 home		index	left
G	16 home		index	left
H	35 home		index	right
J	2 home		index	right
K	3 home		middle	right
L	35 home		ring (fourth)	right
Z	1 bottom		pinky (fifth)	left
X	5 bottom		ring (fourth)	left
C	30 bottom		middle	left
V	13 bottom		index	left
B	9 bottom		index	left
N	78 bottom		index	right
M	25 bottom		index	right

Indira's Solution

Letter	Frequency in 1000 letters	Row on keyboard	Finger used to type	Hand used to type
E		130 top	middle	left
T		93 top	index	left
N		78 bottom	index	right
R		77 top	index	left
I		74 top	middle	right
O		74 top	ring (fourth)	right
A		73 home	pinky (fifth)	left
S		63 home	ring (fourth)	left
D		44 home	middle	left
H		35 home	index	right

I sorted by the field “Frequency in 1000 letters.” I used the “sort” button and chose “descending” instead of “ascending” to list the letters from greatest to least frequent. I see the letters in descending order of frequency. Six of these letters are typed with the left hand.



Example 2: Sorting a school database

Mrs. Cooper, the school secretary, keeps a student information database on the school computer. Part of her database is shown.

Student #	Last name	First name	Grade	Room	Home phone #	Emergency contact	Allergy	Bus #
4158	Brown	James	7	214	555-4411	555-2214	none	414
5532	Adams	Melissa	7	214	555-3392	555-9932	peanut	414
3327	Adams	Mark	5	118	555-3392	555-9932	none	414
7225	Choi	Frank	6	118	555-6248	555-8454	penicillin	walk
4233	Goring	Mandy	8	222	555-7302	555-9745	peanut	walk
3329	Hardy	Melissa	8	214	555-8780	555-4123	none	441
7764	Yan	Ye	5	118	555-9834	555-3381	none	414
7833	Walker	Mark	6	118	555-4487	555-2526	nuts	414

Mrs. Cooper wants to create a school phone directory of these eight names alphabetically by last name and then first name. If she sorts the database, which name will be third?

Mrs. Cooper's Solution

Student #	Last name	First name	Grade	Room	Home phone #	Emergency contact	Allergy	Bus #
3327	Adams	Mark	5	118	555-3392	555-9932	none	414
5532	Adams	Melissa	7	214	555-3392	555-9932	peanut	414
4158	Brown	James	7	214	555-4411	555-2214	none	441
7225	Choi	Frank	6	118	555-6248	555-8454	penicillin	walk
4233	Goring	Mandy	8	222	555-7302	555-9745	peanut	walk
3329	Hardy	Melissa	8	214	555-8780	555-4123	none	441
7833	Walker	Mark	6	118	555-4487	555-2526	nuts	414
7764	Yan	Ye	5	118	555-9834	555-3381	none	414

First I sorted the last names alphabetically. Then I sorted the first names alphabetically.

Now the third name is James Brown.

A Checking

- State which name will appear last if Mrs. Cooper sorts the database by the following information.
 - grade, from highest to lowest
 - grade, from lowest to highest
 - room number, from greatest to least
 - room number, from least to greatest
- Which kind of field (text, numeric, date, or memo) should you choose if you want to sort the following data?
 - e-mail addresses
 - math marks
 - shoe sizes
 - comments about student effort
 - days when deliveries are expected
 - ingredients in cereal

B Practising

- So far, Anthony has input the following data in a database of all the videos his family owns.

Code	Title	Studio	Year released	Running time (min)	Notes
1	Grease	Paramount	1977		110 has interviews with the stars.
2	Shrek	Dreamworks	2001		93 features Mike Myers doing Shrek's voice.
3	The Little Mermaid	Disney	1989		83 was my first video.
4	Casper	Universal	1995		101 produced by Steven Spielberg.
5	Agent Cody Banks	MGM Studios	2003		103 stars Frankie Muniz.

- Identify which fields are numeric, text, date, or memo.
- If Anthony sorts his database by "Year released" (from most recent to least recent), which movie will be third?

7. The following database lists information about different countries in the world.

Country	Continent	Area (square km)	Population (millions)	Population density (people per square km)
Australia	Australia	7 692 808	18.4	2.7
Brazil	S. America	8 512 808	174.4	20.4
CANADA	N. America	9 976 808	31.0	3.1
China	Asia	9 597 808	1273	132.7
Congo	Africa	342 008	53.6	157.7
Denmark	Europe	430 008	5.3	12.7
France	N. America	11 000	2.7	248.2
Japan	Asia	377 808	124.4	32.7
South Africa	Africa	1 219 808	4.3	3.5
U.S.A.	N. America	9 529 808	278.1	29.7

- How is the data sorted in this database?
 - If you sorted this database by population, which country would appear first?
 - If Iceland appeared last, which field would you have used to sort?
 - If Singapore appeared first, which field would you have used to sort?
 - If you sorted this database in increasing order by area, what would be the first five countries?
8. As a school fundraiser, students are selling chocolates. This is a sample order form.

The ABC Chocolate Bar Company Order Form								
Student's name:		Homework:		Phone number:				
Customer's name:	Chocolate Almond Bars @ \$2.50 each	Chocolate Mint Wafers @ \$1.50	Milk Chocolate MegaBars @ \$2.00	Sales summary				
	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	
Jennifer Jones	4	\$ 10	2	\$ 3	4	\$ 8	10	\$ 21

- How is an order form the same as a record in a database?
- Explain how you could use the information in the order form to create a database for the school.
- Use a computer to create a sample database from the order form.

9. Not all databases are computerized. You use a database every time you look up a phone number in the phone book. What databases would you use to find the following information?

- what to order in a restaurant
- how to spell a word
- tomorrow's weather conditions
- an alternate word for "good"
- the area of a country

10. Katya wants to get some information for a project on probability. She goes to the school library and uses the library's database to find the following information.

Call #	Author	Title	Publisher	Date published	Status	Description	Category
519.2 Cee	Cushman, Jean	Do You Wanna Bet?	Clarion Books	1991	checked out	story about two boys who find out that the most ordinary events are dependent on probability	probability
123.302 Rip	Ripley, Robert	Book of Chance	Collins	1982	checked in	Thousands of extraordinary facts about winners and losers	probability
519.2 Hal	Holland, Bart	What Are the Chances?	John Hopkins University Library	2002	checked in	random deaths, office gossip, and other adventures in probability	probability

Identify which field Katya should use for each situation.

- if she wants the most recent book
- before she looks for the book on the shelves
- when she is trying to find the book on the shelves
- if she wants to find other books by the same author

C Extending

11. Describe how each worker might use a database.
- a family doctor
 - a veterinarian
 - a police officer
 - a real estate agent