

# Database basics

The modern world relies on **data**

Businesses, shops, delivery companies, schools, sports teams - all of these use data

Modern life runs using data

# Database basics

Data needs to be organised.

We do this in **databases**.

A **database** is a structured (organised) collection of data. It's data that's organised in a designed way so that it can be used easily.

Data can be added, amended, deleted and retrieved from a database. We do all of this using a **query language**

# Database basics

Data needs to be organised.

We do this in **databases**.

When you think of a database, think of a set of files in a filing cabinet.  
Each file contains information about a person or thing.  
They are organised so it's easy to find things quickly.

# Database basics

Data in databases is stored in **tables**.

Simple databases might just have one table.

Complex ones might have lots.

A table stores data about one type of thing - products, people, songs, films etc...

Marg	Giraffe	12	F	4.7
Molly	Giraffe	6	F	4.4
Mike	Giraffe	14	M	5.1
Sammy	Giraffe	1	M	2.4
Rex	Lion	4	M	1.8
Leah	Lion	5	F	1.3
Luna	Lion	2	F	0.8
Andrea	Aardvark	7	F	0.54
Jawa	Python	3	M	3.2
Petra	Python	2	F	2.8

Marg	Giraffe	12	F	4.7
Molly	Giraffe	6	F	4.4
Mike	Giraffe	14	M	5.1
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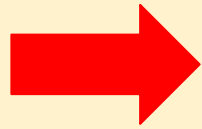
<b>name</b>	<b>species</b>	<b>age</b>	<b>gender</b>	<b>height</b>
Marg	Giraffe	12	F	4.7
Molly	Giraffe	6	F	4.4
Mike	Giraffe	14	M	5.1
Sammy	Giraffe	1	M	2.4
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name	species	age	gender	height
Marg	Giraffe	12	F	4.7
Molly	Giraffe	6	F	4.4
Mike	Giraffe	14	M	5.1
Sammy	Giraffe	1	M	2.4
Rex	Lion	4	M	1.8
Leah	Lion	5	F	1.3

Each column stores data on one feature of the animal. In the database, a column is called a **field**.

Jawa	Python	3	M	3.2
Petra	Python	2	F	2.8





name	species	age	gender	height
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The top row is the **field names** (or **attributes**)

Marg	Giraffe	12	F	4.7
olly	Giraffe	6	F	4.4
ike	Giraffe	14	M	5.1
Sammy	Giraffe	1	M	2.4
Rex	Lion	4	M	1.8
Leah	Lion	5	F	1.3
Luna	Lion	2	F	0.9

Each field uses the same **data type** - string, integer, floating point number, Boolean etc...

Data types can also include date and currency - both of which are really useful

name	species	age	gender	height
Marg	Giraffe	12	F	4.7
Molly	Giraffe	6	F	4.4
Mike	Giraffe	14	M	5.1
Sammy	Giraffe	1	M	2.4
Rex	Lion	4	M	1.8

Each row stores the data about one animal. If I add an animal, I need to add a row at the bottom.

The data in each row is called a **record**

Andrea	Aardvark	7	F	0.54
Jawa	Python	3	M	3.2
Petra	Python	2	F	2.8

# Database basics

- **Table** - a set of data organised together
- **Field** - a set of data values of the same data type
- **Field names / attributes** - the name given to each field
- **Record** - a number of related data items about the same thing.  
Each record in a data table has the same set of fields

name	species	age	gender	height
Marg	Giraffe	12	F	4.7
Molly	Giraffe	6	F	4.4
Molly	Giraffe	5	F	4.2
Mike	Giraffe	14	M	5.1
Sammy	Giraffe	1	M	2.4

A new giraffe is joining my zoo. Her name is also Molly.

What problem does this cause?

How can I resolve the problem?

Andrea	Aardvark	7	F	0.54
Jawa	Python	3	M	3.2
Petra	Python	2	F	2.8

id	name	species	age	gender	height
001	Marg	Giraffe	12	F	4.7
002	Molly	Giraffe	6	F	4.4
003	Molly	Giraffe	5	F	4.2
004	Mike	Giraffe	14	M	5.1
005	Sammy	Giraffe	1	M	2.4
006	Rex	Lion	4	M	1.8

By adding an ID field I can identify each **record** with a **unique identifier**.

This is a really important idea in database development. Each record **must** have a unique identifier. We call this the **Primary Key**

011	Petra	Python	2	F	2.8
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# Database basics

- **Primary key** - a field which uniquely identifies a record. This is often an ID code of some kind.

You can use the primary key by itself to get all the data related to a record.

It is important that the primary key is unique so that the right data is identified each time it is used.

id	name	species	age	gender	height
001	Marg	Giraffe	12	F	4.7
002	Molly	Giraffe	6	F	4.4
003	Molly	Giraffe	5	F	4.2
004	Mike	Giraffe	14	M	5.1
005	Sammy	Giraffe	1	M	2.4
006	Rex	Lion	4	M	1.8
007	Leah	Lion	5	F	1.3
008	Luna	Lion	2	F	0.8
009	Andrea	Aardvark	7	F	0.54
010	Jawa	Python	3	M	3.2
011	Petra	Python	2	F	2.8