

Database Structures

One
Record

Patient Id	Name	D.o.B	Gender	Phone	Doctor Id	Doctor	Room
134	Jeff	4-Jul-1993	Male	7876453	01	Dr Hyde	03
178	David	8-Feb-1987	Male	8635467	02	Dr Jekyll	06
198	Lisa	18-Dec-1979	Female	7498735	01	Dr Hyde	03
210	Frank	29-Apr-1983	Male	7943521	01	Dr Hyde	03
258	Rachel	8-Feb-1987	Female	8367242	02	Dr Jekyll	06

Key Words

The following words will crop up as part of the following presentation. You should use your notes sheet to log information about them when it is covered. You will be quizzed on these words later.

- Files
- Table
- Records
- Fields
- Data
- Organisation
- Database
- Structure
- Key Field
- Sorting

NOTE:

Sections of the presentation where you see the key symbol contain information about these keywords. This is your cue to make notes.



What is a Database?

What is a Database?



- A database is a **store of data** that has been **organised** in some way.
- Databases exist on **computers**.

Example of a database:

- The database below shows an example of a store of medical patients data. The database has been **organised in order of Id Number**.

Id	Name	D.o.B	Gender	Phone	Doctor	Room
034	Jeff	4-Jul-1993	Male	7876453	Dr Hyde	03
078	David	8-Feb-1987	Male	8635467	Dr Jekyll	06
098	Lisa	18-Dec-1979	Female	7498735	Dr Hyde	03
110	Frank	29-Apr-1983	Male	7943521	Dr Hyde	03
158	Rachel	8-Feb-1987	Female	8367242	Dr Jekyll	06

Breakdown of the Patients Database



- Medical centre, Doctors surgeries and Hospitals hold lots of data about patients.
- Lets take a look at the data they might hold:



Patient Id: 134
Name: Jeff
D.o.B: 4-Jul-1993
Gender: Male
Phone: 7876453
Doctor Id: 01
Doctor: Dr Hyde
Room: 03

Patient Id: 178
Name: David
D.o.B: 8-Feb-1987
Gender: Male
Phone: 8635467
Doctor Id: 02
Doctor: Dr Jekyll
Room: 06

Patient Id: 198
Name: Lisa
D.o.B: 18-Dec-1979
Gender: Female
Phone: 7498735
Doctor Id: 01
Doctor: Dr Hyde
Room: 03

Patient Id: 210
Name: Frank
D.o.B: 29-Apr-1983
Gender: Male
Phone: 7943521
Doctor Id: 01
Doctor: Dr Hyde
Room: 03

Patient Id: 258
Name: Rachel
D.o.B: 8-Feb-1987
Gender: Female
Phone: 8367242
Doctor Id: 02
Doctor: Dr Jekyll
Room: 06

- Each patient has information stored about them. Notice how the information is similar (**Name, Gender, D.o.B etc**).

REMEMBER:

Databases can store all of this data in an organised way. This makes searching, updating and outputting data very easy.

Database Structures

(Files/Tables, Records, Fields, Data)

Database Structures

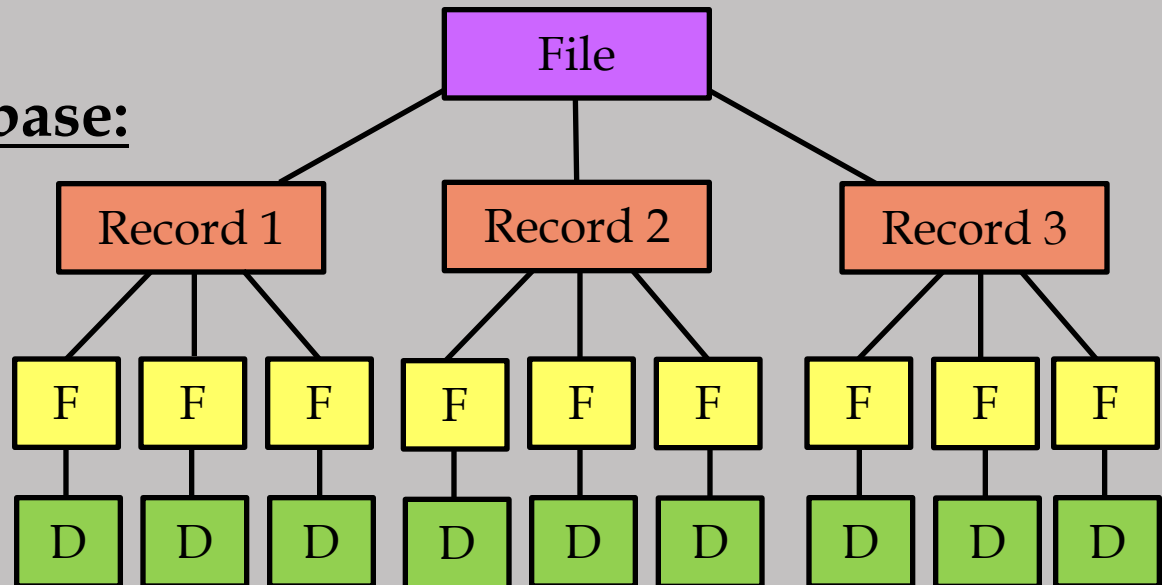


- Databases are so useful because they **store data in a structured way**.
- Once data has been structured it can **manipulated easily** and then **output**.
- Databases consist of the following:
 - + **Files / Tables**
 - + **Records**
 - + **Fields**
 - + **Data**

NOTE:

- Files/Tables hold Records
- Records consist of Fields
- Fields hold Data

Structure of a database:



Database Files/Tables



What is a Database File?

- **Records** and **Fields** are stored all together to create the **Database File**.
- The **contents of database files** are often viewed as **Tables**.
- Database Tables allow you to see the **records all at once** rather than individually.
- Database tables are made up of **columns** and **rows**.

NOTE: In the medical records database we have 8 columns and 5 rows:

Patient Id	Name	D.o.B	Gender	Phone	Doctor Id	Doctor	Room
134	Jeff	4-Jul-1993	Male	7876453	01	Dr Hyde	03
178	David	8-Feb-1987	Male	8635467	02	Dr Jekyll	06
198	Lisa	18-Dec-1979	Female	7498735	01	Dr Hyde	03
210	Frank	29-Apr-1983	Male	7943521	01	Dr Hyde	03
258	Rachel	8-Feb-1987	Female	8367242	02	Dr Jekyll	06

Records and Fields



- Each **Row** of the **Table** contains one **Record**:

Patient Id	Name	D.o.B	Gender	Phone	Doctor Id	Doctor	Room
134	Jeff	4-Jul-1993	Male	7876453	01	Dr Hyde	03
178	David	8-Feb-1987	Male	8635467	02	Dr Jekyll	06
198	Lisa	18-Dec-1979	Female	7498735	01	Dr Hyde	03
210	Frank	29-Apr-1983	Male	7943521	01	Dr Hyde	03
258	Rachel	8-Feb-1987	Female	8367242	02	Dr Jekyll	06

One
Record

- Each **cell** of a **table** indicates a **single field**. A single field can **hold one piece of data**
- Fields are given **field names**. These are found at the top of each column:

Field
Names

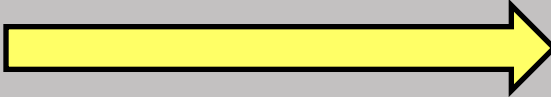
Patient Id	Name	D.o.B	Gender	Phone	Doctor Id	Doctor	Room
134	Jeff	4-Jul-1993	Male	7876453	01	Dr Hyde	03
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210	Frank	29-Apr-1983	Male	7943521	01	Dr Hyde	03
258	Rachel	8-Feb-1987	Female	8367242	02	Dr Jekyll	06

Field holding the Phone
Number of Patient 178

Database Records



What is a Record?

- **Records** are **sets of data** about a **single object or person**.
- For example: the data about each patient in our database is known as a record.
- Here is the record for David: 
- Each patient has their own record but it contains different data
- Even though the data is different, **records contain the same structure** (Each one has a Id, Name, Gender etc). This structure is made up of **Fields**.

Patient Id: 178
Name: David
D.o.B: 8-Feb-1987
Gender: Male
Phone: 8635467
Doctor Id: 02
Doctor: Dr Jekyll
Room: 06

Record 1

Patient Id: 134
Name: Jeff
D.o.B: 4-Jul-1993
Gender: Male
Phone: 7876453
Doctor Id: 01
Doctor: Dr Hyde
Room: 03

Record 3

Patient Id: 198
Name: Lisa
D.o.B: 18-Dec-1979
Gender: Female
Phone: 7498735
Doctor Id: 01
Doctor: Dr Hyde
Room: 03

Record 4

Patient Id: 210
Name: Frank
D.o.B: 29-Apr-1983
Gender: Male
Phone: 7943521
Doctor Id: 01
Doctor: Dr Hyde
Room: 03

Record 5

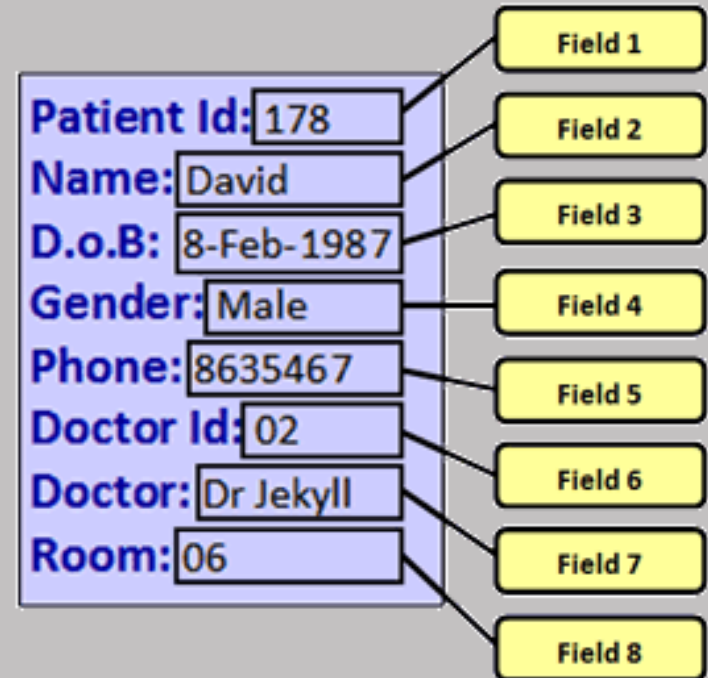
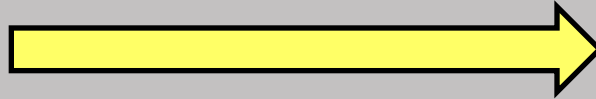
Patient Id: 258
Name: Rachel
D.o.B: 8-Feb-1987
Gender: Female
Phone: 8367242
Doctor Id: 02
Doctor: Dr Jekyll
Room: 06

Database Fields



What is a Field?

- **Fields** are the **items** that **make up a record**.
- For example, our records consists of **8 fields**:
 - ✚ **Patient Id**
 - ✚ **Name**
 - ✚ **D.o.B**
 - ✚ **Gender**
 - ✚ **Phone**
 - ✚ **Doctor Id, Doctor and Room**



- Each field has a **Field Name**. For example 'Name'. This describes what data needs to be entered into the field.
- So..... Fields are made up of:
 - ✚ **The Field**
 - ✚ **Field Names**

Database Data



What is Data?

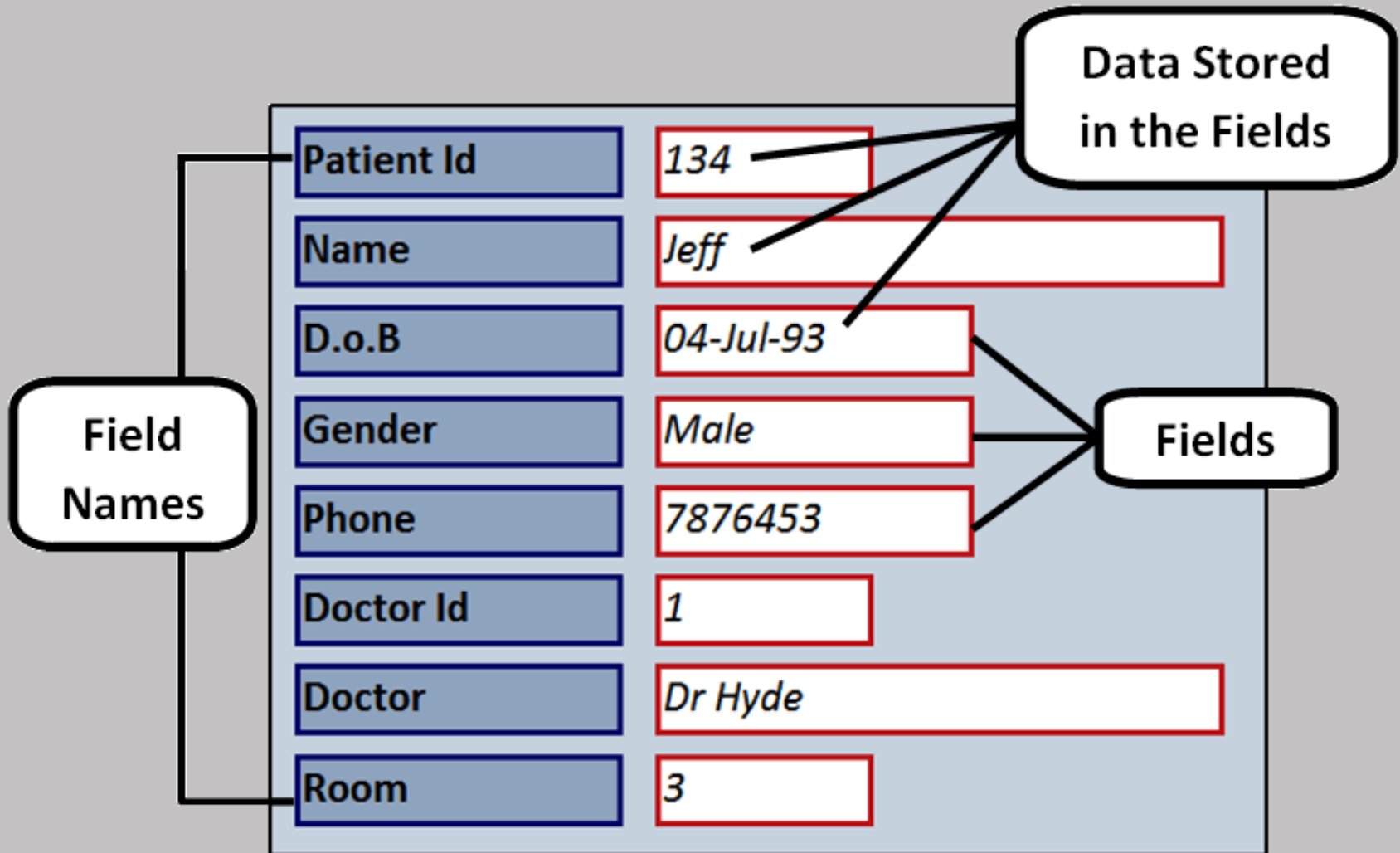
- Data is the **individual pieces of information** that are **held/stored in a field**.
- The image below shows an example of the patient database fields and the data that each field could hold:

Patient Id:	178
Name:	David
D.o.B:	8-Feb-1987
Gender:	Male
Phone:	8635467
Doctor Id:	02
Doctor:	Dr Jekyll
Room:	06

REMEMBER:

The data that is stored inside fields can change from record to record. For example: The **names** 'David', 'Lisa', 'Frank', 'Jeff' and 'Rachel' can all be stored in the Name Field.

Fields with Data Example



Sorting Data in a Database

Sorting Data

- One of the uses of a database is that they allow data to be **sorted very easily**.
- Data can be sorted in 2 ways:
 1. **Ascending sorting**
 2. **Descending sorting**

Ascending Sorting - lowest to highest

- Sorting data in **ascending order** means to start with the **lowest value** and move through it **until you reach the highest value**.
- Look at the patients database again to see how I have sorted **Patient Id** in ascending order:

Ascending Order Example

Patient Id	Name	D.o.B	Gender	Phone	Doctor Id	Doctor	Room
134	Jeff	4-Jul-1993	Male	7876453	01	Dr Hyde	03
178	David	8-Feb-1987	Male	8635467	02	Dr Jekyll	06
198	Lisa	18-Dec-1979	Female	7498735	01	Dr Hyde	03
210	Frank	29-Apr-1983	Male	7943521	01	Dr Hyde	03
258	Rachel	8-Feb-1987	Female	8367242	02	Dr Jekyll	06

Lowest number at the top

Highest number at the bottom

Sorting Data

Descending Sorting - highest to lowest

- Sorting data in **descending order** means to start with the **highest value** and move through it **until you reach the lowest value**.
- Now **Patient Id** is sorted in descending order:

Descending Order Example

Patient Id	Name	D.o.B	Gender	Phone	Doctor Id	Doctor	Room
258	Rachel	8-Feb-1987	Female	8367242	02	Dr Jekyll	06
210	Frank	29-Apr-1983	Male	7943521	01	Dr Hyde	03
198	Lisa	18-Dec-1979	Female	7498735	01	Dr Hyde	03
178	David	8-Feb-1987	Male	8635467	02	Dr Jekyll	06
134	Jeff	4-Jul-1993	Male	7876453	01	Dr Hyde	03

Highest number at the top

Lowest number at the bottom

Other examples of ascending and descending sorting

Ascending	Descending
Text data would be sorted from A to Z	Text data would be sorted from Z to A
Number data would sorted from 0 - 1000	Number data would sorted from 1000 - 0
Dates sorted by earliest to most recent	Dates sorted by most recent to earliest

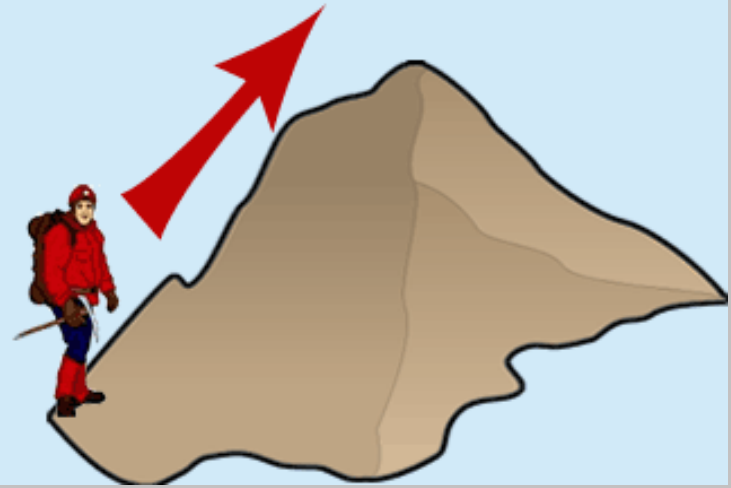
Way to remember the difference between ascending and descending

- Climbers who 'ascend' a mountain start from the bottom and climb to the top.
- Climbers who 'descend' a mountain start at the top and climb to the bottom.

'Descending' a mountain
(high point to the low point)



'Ascending' a mountain
(low point to the high point)



Key Field

Key Fields

- Every **record** in a database needs to be **uniquely identified** (one of a kind data).

Unique data makes sure that when we are accessing a record, we are **accessing the right one**.

- Take another look at our student database. Which item of data uniquely identifies students from each other?

Patient Id	Name	D.o.B	Gender	Phone	Doctor Id	Doctor	Room
134	Jeff	4-Jul-1993	Male	7876453	01	Dr Hyde	03
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Name? ❌ D.o.B? ❌ Gender? ❌

Phone? ❌ Doctor? ❌ Patient Id? ✅

The **ID Number** Field contains unique data that identifies individual records. We call this the **Primary Key** or **Key Field**.

Task Time!

Hopefully now you understand Data Organisation well enough to answer the questions found in:

Task 3 – Database Structures