

18.1.1 Database Structure

Syllabus 2026 - 2028

WHAT YOU NEED TO KNOW

- Import data from existing files (.csv, .txt) using specified field names to create tables
- Set appropriate data types and sub-types; set display formats of Boolean and date/time fields
- Create and edit primary and foreign keys; create relationships between tables
- Characteristics, uses, advantages and disadvantages of a flat file and a relational database
- Characteristics of primary and foreign keys

What a database is

A **database** is an organised collection of data, stored so that it can be searched, sorted and updated. Data is held in **tables** made of **fields** (columns) and **records** (rows).

Figure 97: Parts of a database table

Field names
↓

StudentID	Name	Class	Fee
1001	Thandi	4A	E250.00
1002	Sipho	4B	E250.00
1003	Lindiwe	4A	E200.00

← Record (one row)

Table: Student

Key words

Table: data about one subject

Field: a column (one kind of data)

Record: a row (all data about one item)

Primary key (yellow): a field that uniquely identifies each record

Importing data to create a table

Figure 98: Importing data from a file

ID,Name,Class
1001,Thandi,4A
1002,Sipho,4B
1003,Lindiwe,4A

students.csv (text file)

Import

first row = field names

ID	Name	Class
1001	Thandi	4A
1002	Sipho	4B
1003	Lindiwe	4A

Formats: .csv, .txt

Choose the delimiter (comma)

Use the specified field names

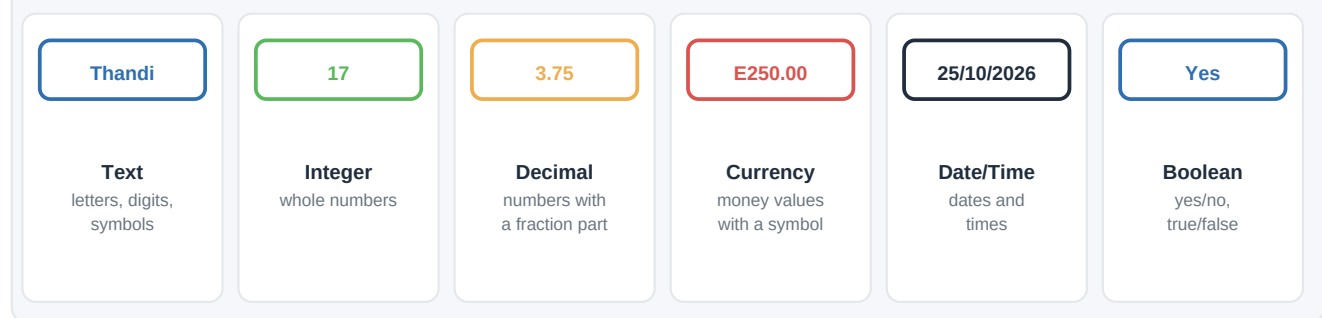
Set a primary key

Set the data types

- Data can be **imported** from existing files such as **.csv** (comma-separated values) and **.txt** (text) files
- Choose the **delimiter** (such as a comma) and whether the first row holds the **field names**
- Use the **specified field names**, and check that each field's data type is correct after the import

Data types

Figure 99: Data types



Data type	Use	Example
Text	Letters, digits and symbols that are not used in calculations	Name, phone number
Numeric: integer	Whole numbers	Age: 15
Numeric: decimal	Numbers with a fractional part; set the number of decimal places	Height: 1.65
Currency	Money values, shown with a currency symbol	Fee: E250.00
Date/Time	Dates and times; set the display format (for example dd/mm/yyyy)	25/10/2026
Boolean/logical	Two values only; display as yes/no, true/false or a check box	Fees paid: Yes

- **Sub-types of numeric data:** percentage, and the number of decimal places
- Choosing the correct data type reduces errors, saves space and allows correct sorting and calculation

Keys and relationships

Figure 100: Primary key, foreign key and a relationship

Class			Student		
ClassID (PK)	Teacher		StudentID (PK)	Name	ClassID (FK)
4A	Mr Dlamini	1	1001	Thandi	4A
4B	Ms Nkosi	many	1002	Sipho	4B

one-to-many

Primary key (PK): unique, never empty, never repeated. Foreign key (FK): a field that matches the primary key of another table.

- **Primary key:** a field (or fields) that uniquely identifies every record; it cannot be empty or repeated, for example StudentID
- **Foreign key:** a field in one table that matches the primary key in another table, which creates a **relationship** (link) between them
- A relationship can be one-to-one, one-to-many or many-to-many, and a one-to-many link is the most common
- To create one: set the primary key in the first table, add the matching foreign key field in the second table, and link them in the relationships window

Flat file and relational databases

Figure 101: Flat file and relational database

Flat file: one table

ID	Name	Class	Teacher	Fee
1	Thandi	4A	Mr Dlamini	250
2	Sipho	4B	Ms Nkosi	250
3	Lindiwe	4A	Mr Dlamini	200

Teacher repeated for every learner (redundant data)

Relational: linked tables

ID	Name	Class	Class	Teacher
1	Thandi	4A	4A	Mr Dlamini
2	Sipho	4B	4B	Ms Nkosi

Each fact stored once; tables linked by keys

	Flat file	Relational database
Structure	A single table	Two or more linked tables
Data	Repeats the same data (redundancy)	Each fact stored once
Advantages	Simple to set up and use; suits small amounts of data	Less duplication; fewer errors; easy to update; can search across tables
Disadvantages	Wastes space; errors and inconsistency; changes made in many places	More complex to design; needs more skill; keys must be set up correctly

EXAM TIP

Primary key: **unique** and identifies each record. Foreign key: a field that **links** to the primary key of another table. For data types, always say **why** a type suits the data, for example 'a phone number is text because it is not used in calculations and may start with 0'.

Key terms

Term	Meaning
Database	An organised collection of data.
Field	A column that holds one kind of data.
Record	A row of data about one item.
Data type	The kind of data a field can hold.
Primary key	A field that uniquely identifies each record.
Foreign key	A field that links to another table's primary key.
Flat file	A database made of one table.
Relational database	A database of linked tables.

Practice questions

Answer each question in full sentences. Command words used: State (give a short answer), Describe (say what it is like), Explain (give reasons), Analyse (break it down and examine it), Suggest (apply your knowledge to a situation), Compare and contrast (similarities and differences), Evaluate (weigh up and reach a judgement).

No.	Question	Marks
1	State two data types that could be used in a database.	[2]
2	State the purpose of a primary key.	[1]
3	Describe how data can be imported from a .csv file to create a table.	[3]
4	Explain why a telephone number is stored as text and not as a numeric data type.	[2]
5	Describe the role of a foreign key in a relationship between two tables.	[3]
6	Suggest suitable data types for the fields: name, date of birth, fees paid, mark (as a percentage).	[4]
7	Compare and contrast a flat file database with a relational database.	[4]
8	Evaluate the use of a relational database, rather than a flat file, to store learner and class information.	[6]

Total: 25 marks