

Databases
IGCSE Computer Science • Topic 9

IGCSE Computer Science

Databases
What we will cover

1

Tables, records & fields

2

Data types for fields

3

The primary key

4

Validation

5

SQL

6

Recap

1
Structure

Databases
Structure

Records and fields

field (a column)

record (a row)

StudentID	FirstName	DateOfBirth	FormClass	FeePaid
1	Amy	14/03/2009	10A	TRUE
2	Ben	02/11/2008	10B	FALSE

primary key (unique)

■ A **record** 记录 is one row in the table – all the data about one thing (for example one student).

■ A **field** 字段 is one column in the table – one piece of data that every record has (for example "First name").

Databases
Structure

Field data types

text

a name

number

an age

date/time

a birthday

boolean

yes / no

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Databases
Structure

The primary key

A **primary key** 主键 is the field that **uniquely** identifies each record – no two rows share it.

■ a StudentID, an ISBN, an order number

■ never blank, never repeated

A name is a **poor** key – two people share "Li Wei". The key must be something guaranteed unique, which is why databases invent an ID field.

2 Checking and querying

Validation in a database

age field: range check 0–120

enter 16 → accepted

enter 200 → rejected

The database can **reject** bad data as it is entered:

- **range** 范围 – a mark 0–100
- **type** 类型 – a number, not letters
- **presence** 存在性 – not left blank
- **format** 格式 – a date as dd/mm/yyyy

Validation stops **impossible** data at the door – but it cannot tell whether a *valid* value is the *right* one.

Structured Query Language

SQL 结构化查询语言 asks a database questions:

SELECT ... FROM ... WHERE ...



- SELECT the fields (columns)
- FROM the table
- WHERE a condition is met
- ORDER BY to sort

Read it in that order: pick columns, from a table, keeping only rows the WHERE allows.

Worked example – a query

List the name and mark of every student who scored above 80, best first.

```
SELECT Name, Mark
FROM Students
WHERE Mark > 80
ORDER BY Mark DESC
```

WHERE filters **rows**; SELECT picks **columns**. DESC sorts high-to-low – leave it off and you get low-to-high.

3 Recap

Topic 9 – key takeaways

1 Structure

record = row (item); field = column (attribute)

2 Key

primary key uniquely identifies each record

3 Validation

range, type, presence, format at entry

4 SQL

SELECT columns FROM table WHERE rows

Check yourself

- 1 Is a record a row or a column?
- 2 Why is a name a poor primary key?
- 3 Which SQL clause filters rows?
- 4 Best data type for a phone number?

Answers 1. a row 2. names repeat 3. WHERE 4. TEXT