

9 Databases

Name: _____ Class: _____ Date: _____

Total: 27 marks

KEY WORDS record • field • primary key • database • query

Objective

Build the skills to answer exam questions on a **single-table database** : records, fields, data types, a primary key, validation, and SQL queries using SELECT, FROM, WHERE, ORDER BY, AND, OR, SUM and COUNT.

You must be able to:

- choose a field, a data type and a primary key for a table
- write and read a single-table SQL query
- list the rows a query returns

1 Key knowledge and worked examples

■ The table

A **database** is an organised store of data. At IGCSE the data is in one table.

field (a column)
↓

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

record (a row) →

primary key
(unique)
↑

One row is one record; one column is one field

- A **record** is one row: all the data about one thing.
- A **field** is one column: one fact that every record has.

text	a name
number	an age
date/time	a birthday
boolean	yes / no

Choose the type that matches the data

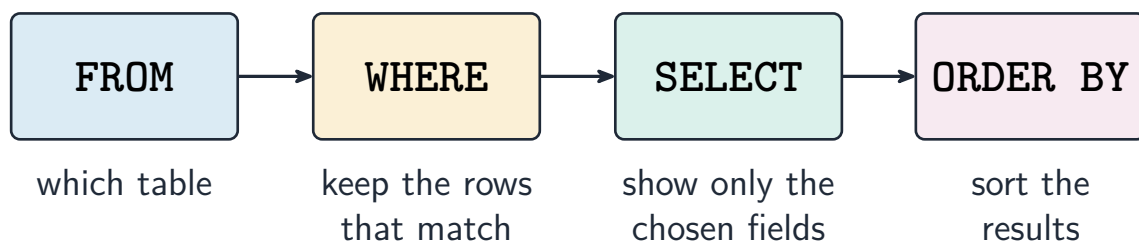
Data type	Used for	Example
text / alphanumeric character	letters, digits and symbols	10A
Boolean	one character	M
integer	one of two values	TRUE or FALSE
real	a whole number	42
date/time	a number with a decimal point	12.50
	a date or a time	14/03/2009

A **primary key** is a field whose value is **unique** in every record. No two rows share it. **BookID** can be a primary key. **Author** cannot, because one author can have many books.

Validation checks that a value is sensible before it is stored, for example a range check on a price.

■ SQL

SQL (Structured Query Language) picks rows out of the table. Read a query in this order: FROM, WHERE, SELECT, ORDER BY.



FROM chooses the table, WHERE keeps rows, SELECT chooses fields, ORDER BY sorts

Keyword	Job
SELECT	which fields to show; * means every field
FROM	which table
WHERE	which rows; join tests with AND or OR
ORDER BY ... ASC	sort smallest or A to Z first
ORDER BY ... DESC	sort largest or Z to A first
COUNT	how many rows match
SUM	add a numeric field

Worked example. Show the title and price of every Orwell book that is in stock, cheapest first.

```
SELECT Title, Price
FROM Book
WHERE Author = 'Orwell' AND InStock = TRUE
ORDER BY Price ASC
```

FROM names the table. WHERE keeps only rows that pass both tests. SELECT shows two fields. ORDER BY Price ASC puts the lowest price first.

2 Practice

Use this Book table.

BookID	Title	Author	Price	InStock
B1	Dune	Herbert	12.50	TRUE
B2	1984	Orwell	8.00	TRUE
B3	Emma	Austen	9.50	FALSE
B4	Animal Farm	Orwell	7.00	TRUE

2.1 State the difference between a record and a field. Use the table. [2]

2.2 Give a suitable data type for Title, Price, InStock and the number of copies of a book. [4]

2.3 Explain why **BookID** is a suitable primary key and **Author** is not. [2]

2.4 Complete the query so it shows the title of every book by Austen. [3]

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

2.5 State the difference between **ORDER BY Price ASC** and **ORDER BY Price DESC**. [2]

2.6 State the difference between **COUNT(BookID)** and **SUM(Price)**. [2]

3 Exam-style questions

3.1 The best primary key for the **Book** table is: [1]

- ☐ **A** Author
☐ **B** InStock
☐ **C** BookID
☐ **D** Price

3.2 Write an SQL query that shows the title and price of every book by Orwell that is in stock, with the cheapest book first. [4]

3.3 State the titles returned by this query, in the order shown.

[3]

```
SELECT Title
FROM Book
WHERE Price < 10 AND InStock = TRUE
ORDER BY Title ASC
```

3.4 A shop wants the number of books that are not in stock.

(a) Write the SQL query.

[3]

(b) State the number it returns for the table above.

[1]