

Exercise walk-through

9

Databases

IGCSE Computer Science

The field data types

text/alphabetic

letters, digits and symbols – 10A, Amy

integer

a whole number – 42

real

a number with a decimal point – 3.5

Boolean

two states only – TRUE/FALSE, or Yes/No

date/time

stored as a date so it can be sorted and compared correctly

the trap

a phone number is **text**, not an integer – it may start with a zero, and you never do arithmetic on it

Pick the type by **what you will do with the field**, not by what it looks like. That is the single most-tested judgement in this topic.

The primary key

A **primary key** 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.

Reading a SELECT query

SELECT

which **fields** (columns) to show

FROM

which **table** to take them from

WHERE

which **records** (rows) to include – the condition

ORDER BY

how to sort the result, ascending or descending

reading one

SELECT FirstName, Class FROM Students WHERE Paid = TRUE shows the first name and class of **every student who has paid the fees**

the order

work out FROM, then WHERE, then SELECT – rows first, columns second

SELECT chooses **columns**; WHERE chooses **rows**. Every query question is answered by keeping those two jobs apart.

Exercises 2.1-2.2

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]

Exercises 2.1-2.2

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

2.1

- a record is one row, such as all the data about Dune
- a field is one column, such as **Author**

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

2.2

- **Title**: **text**
- **Price**: **real**
- **InStock**: **Boolean**
- number of copies: **integer**

Exercises 2.3-2.4

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 .....
```

Exercises 2.3-2.4

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

2.3

- every BookID is different, so it identifies one record
- Author repeats, so it cannot identify one book

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

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

2.4

- SELECT Title
- FROM Book
- WHERE Author = 'Austen'

Exercises 2.5-2.6

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]

Exercises 2.5-2.6

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

2.5

- `ASC` puts the lowest price first
- `DESC` puts the highest price first

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

2.6

- `COUNT` counts the matching rows
- `SUM` adds the values in `Price`

Exercise 3.1

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

[1]

☐

A Author

B InStock

C BookID

D Price

Exercise 3.1

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

[1]

☐

A Author

B InStock

C BookID

D Price

3.1 C

- BookID is unique for every book
- Author, InStock and Price can repeat

Exercise 3.2

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]

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3.2

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

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

Exercise 3.3

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
```

Exercise 3.3

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
```

3.3

- WHERE keeps 1984 (price 8.00, in stock) and Animal Farm (price 7.00, in stock)
- Emma is under 10 but InStock is FALSE, so it is rejected; Dune is 12.50, so it is rejected
- ORDER BY Title ASC gives **1984**, then **Animal Farm**

Exercise 3.4 (a)

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

(a) Write the SQL query.

[3]

Exercise 3.4 (a)

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

(a) Write the SQL query.

[3]

(a)

- `SELECT COUNT(BookID)`
- `FROM Book`
- `WHERE InStock = FALSE`

```
SELECT COUNT(BookID)
FROM Book
WHERE InStock = FALSE
```

Exercise 3.4 (b)

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

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

[1]

Exercise 3.4 (b)

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

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

[1]

(b)

- only Emma is not in stock, so the result is **1**