

5 A company creates a relational database to store data about its customers.

The database, `REVIEWS`, stores data about the customers, products, complaints and staff.

The database has four tables:

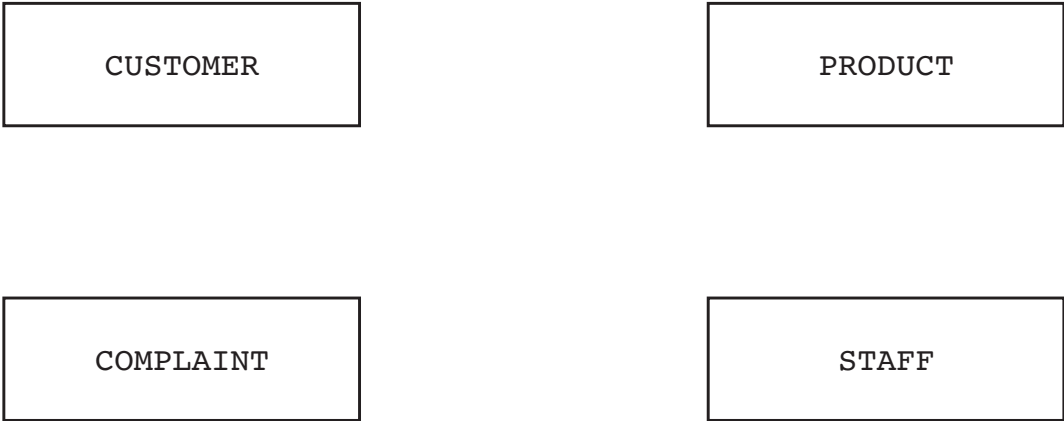
`CUSTOMER`(`CustomerID`, `CustomerFirstName`, `CustomerLastName`, `CustomerEmail`)

`PRODUCT`(`ProductID`, `ProductName`, `ProductDetail`, `Price`, `Rating`)

`COMPLAINT`(`ComplaintID`, `ProductID`, `CustomerID`, `ComplaintDetails`, `StaffID`)

`STAFF`(`StaffID`, `StaffFirstName`, `StaffLastName`, `Department`, `RemoteWorker`)

(a) Complete the entity-relationship (E-R) diagram for the database `REVIEWS`.



[3]

(b) Some example data from the `STAFF` table is shown.

StaffID	StaffFirstName	StaffLastName	Department	RemoteWorker
1	Ralph	Jura	E	Yes
2	Luca	Emcee	A	Yes
3	Darwin	Acula	F	No

Write a Structured Query Language (SQL) script to define the table `STAFF`.

[4]

(c) Products are given a rating between 1 and 10 inclusive.

Write an SQL script to return only the ProductID, ProductName and ComplaintDetails for all products with a rating of 5 or less. The results need to be displayed in descending order of rating.

[illegible]

(d) A Database Management System (DBMS) is used to maintain and manage the database.

Describe **two** ways in which the DBMS can be used to ensure the security of the customer data.

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[4]

Question 6 starts on the next page.

- 6 A shop sells pens to customers. Customers place an order with the shop and collect the items the next day. The shop uses a database to store the information about the orders.

The database contains the following tables:

CUSTOMER(CustomerID, CustomerName, Email)

ORDER(OrderID, CustomerID, Date, Collected)

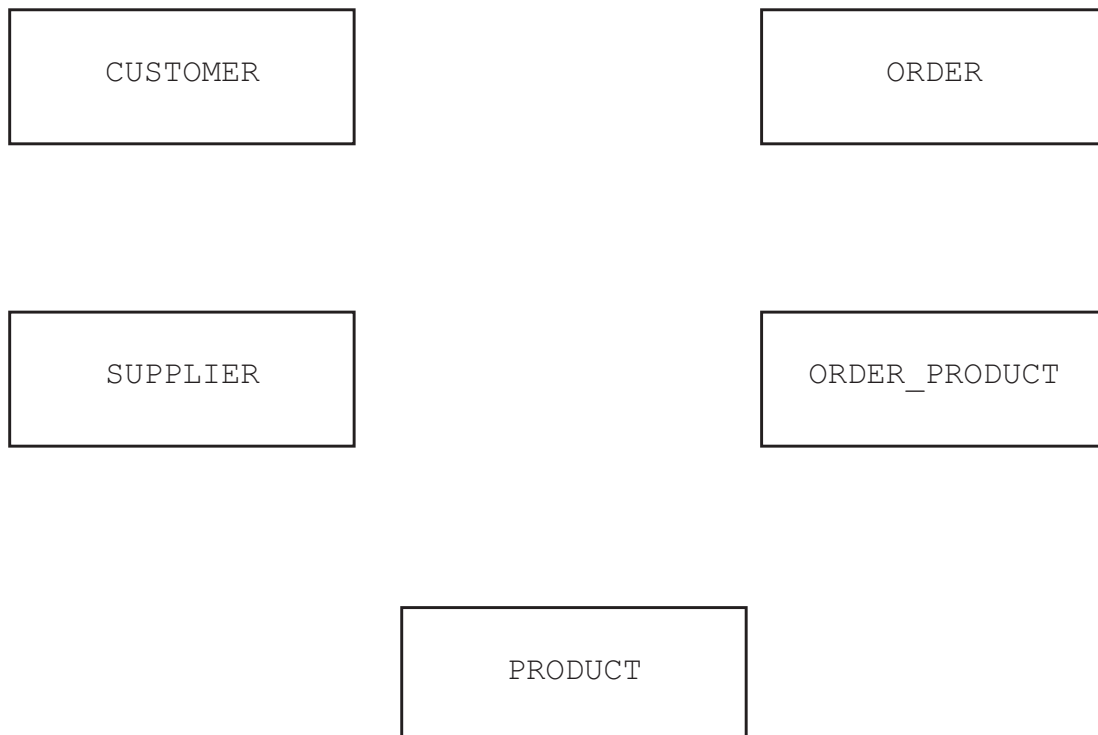
ORDER_PRODUCT(OrderID, ProductID, Quantity)

PRODUCT(ProductID, ProductName, QuantityInBox, Cost, SupplierID)

SUPPLIER(SupplierID, SupplierName, SupplierEmail)

The primary keys are underlined.

- (a) Complete the entity-relationship (E-R) diagram for the database.



[4]

- (b)** A new product needs to be entered into the database. The product has the ID 002323, the product name 'Blue ball point 2mm', there are 50 in a box, the product costs \$5.00 and the supplier has the ID SFX223.

Write a Structured Query Language (SQL) script to enter the new product into the table PRODUCT.

[4]

- (c)** The attribute `Collected` in the table `ORDER` stores the Boolean value `TRUE` if the order has been collected and `FALSE` if the order has not been collected.

Write an SQL script to return the customer name for each customer that has orders they have not collected. Include the number of orders each customer has not collected with an appropriate title.

An example output might be:

CustomerName	NotCollected
Jack Wright	2
Lin Cho	1
Santaya Yui	1

(d) The shop uses a Database Management System (DBMS).

(i) One feature provided by a DBMS is a data dictionary.

The data dictionary stores the attribute names, table names, foreign keys and primary keys in the database.

Identify **three** other items stored in a data dictionary.

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[3]

(ii) The DBMS provides a developer interface.

Explain how a database designer can make use of the developer interface.

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..... [3]

4 A company makes ice cream and sells it to shops.

The ice cream is made in batches: a large quantity of one type and flavour of ice cream that is then split into smaller quantities for sale.

The company’s owner has designed a relational database, ICECREAM, to store data about their ice cream and customers.

Some of the tables in the database are given. The database is not normalised.

```
BATCH(BatchID, Type, Flavour, Size, SellingPrice, EndDate)

CUSTOMER(CustomerID, CompanyName, EmailAddress, TelephoneNumber)

SALE(SaleID, BatchID, CustomerID, Quantity, Date)
```

(a) Identify **two** foreign keys in the table SALE **and** the table that each foreign key references.

Foreign key 1

Table name 1

Foreign key 2

Table name 2

[2]

(b) Write an SQL script to return the total quantity of ice cream sold to the customer with the ID of 0034E in the year 2023.

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[3]

(c) The table definition for `BATCH` is repeated here:

BATCH (BatchID, Type, Flavour, Size, SellingPrice, EndDate)

Sample data for the table BATCH is given:

BatchID	Type	Flavour	Size	SellingPrice	EndDate
KIV12	Plain	Vanilla	1	2.20	12/12/2024
RIC14	Plain	Chocolate	0.5	1.80	12/12/2024
TYL1	Non-dairy	Lemon	0.5	2.10	01/02/2025
FYV2	Non-dairy	Vanilla	0.25	1.50	02/02/2025
BIV13	Plain	Vanilla	1	2.20	02/02/2024

(i) Write an SQL script to define the table `BATCH`.

Include constraints (restrictions) on the data that can be entered into each field where appropriate.

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(ii) The table BATCH is not normalised.

Normalise the database table BATCH.

Write the table definitions for your new tables.

Identify any primary and foreign keys in your tables.

Do **not** change or include the tables CUSTOMER and SALE.

[4]

(d) Complete the following table by defining each database term.

Database term	Definition
Entity	
Attribute	

[2]

(e) A Database Management System (DBMS) supports data integrity.

Explain how a DBMS supports data integrity.

[3]