

2 A relational database, WORKEXPERIENCE, stores data about students and the companies where they complete work experience.

Students can complete multiple work experience placements but can only complete one placement at a time.

Students can complete more than one placement at the same company.

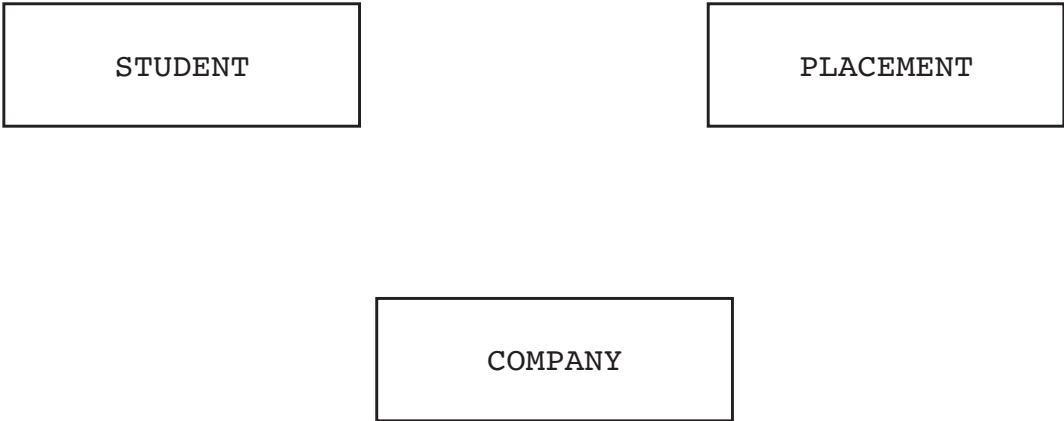
Part of the database is shown:

STUDENT(StudentID, FirstName, TelephoneNumber, UniversityName)

PLACEMENT(PlacementID, StudentID, CompanyID, StartDate, EndDate, Complete)

COMPANY(CompanyID, CompanyName, MaxStudentsPerPlacement)

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



[2]

(b) Explain why the database WORKEXPERIENCE is in Third Normal Form (3NF).

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(c) Some example data from the `PLACEMENT` table is shown:

PlacementID	StudentID	CompanyID	StartDate	EndDate	Complete
PC001	LDEA01	MSCM	01/01/2023	12/07/2023	TRUE
PC002	LDEA01	MSCM	01/04/2024	08/05/2024	FALSE
PC003	ALAU02	NEAM	09/03/2020	10/03/2021	FALSE
PC004	LOLI75	GOUZ	07/06/2018	11/09/2018	TRUE

(i) Write a Structured Query Language (SQL) script to delete all placements that have been completed.

[2]

(ii) Write an SQL script to return the total number of placements completed by the student with ID `LDEA01` at the company with ID `NEAM`. The total should be given an appropriate name.

[4]

(d) The database tables are repeated here:

STUDENT(StudentID, FirstName, TelephoneNumber, UniversityName)

PLACEMENT(PlacementID, StudentID, CompanyID, StartDate, EndDate,
Complete)

COMPANY(CompanyID, CompanyName, MaxStudentsPerPlacement)

Explain what is meant by referential integrity, and how it applies to this database.

[3]

4 A relational database, SHIPPING, stores data about the ships in a company and the containers that are carried on the ships.

The database has the following tables:

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CONTAINER(ContainerID, Type, Weight, OwnerName, ShipID)

SHIP(ShipID, Type, Capacity, ShipName)
```

(a) Describe the relationship between the two tables. Refer to the primary and foreign keys in your answer.

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(b) The table CONTAINER needs an additional field to store the data for the last inspection date.

Write a Structured Query Language (SQL) script to add **one** field to the table CONTAINER to store the date of last inspection of the container, for example 08/07/2019.

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(c) Write an SQL script to return the number of containers stored in the database for the ship with the name Caledonia.

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(d) Describe the purpose of a developer interface in a Database Management System (DBMS).

[2]

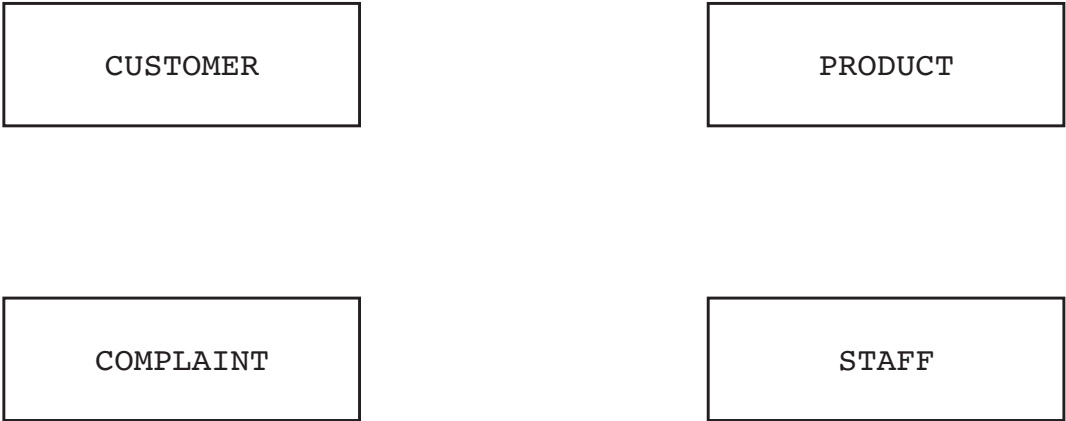
5 A company creates a relational database to store data about its customers.

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.