

Rosa will store members' details in a database. She will also store gym class bookings and appointments with fitness instructors.

Discuss the benefits and drawbacks of flat file databases and relational databases and which one would be the most suitable for Rosa.

- the features of flat file databases and relational databases
- the benefits and drawbacks of each type of database
- which type of database would be the most suitable for Rosa.

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[9]

2(a). State **two** benefits of using a relational database instead of a flat file database.

1 _____

2 _____

[2]

(b). OCRConfectionery is a sweet manufacturing company.

They want to use a relational database to store details of the orders their customers make.

One customer can order as many different products as they like in the same order. A customer can also place as many orders as they like.

One product can be ordered multiple times in the same order or ordered by multiple different customers.

Complete the entity relationship diagram to show the relationships between the Product, Customer and Order entities.



[2]

(c). The order table has these fields.

OrderID
OrderDate
OrderAmount
CustomerID
ProductID

- i. State the difference between a primary key and a foreign key.

[2]

- ii. State **one** foreign key in the order table.

[1]

- iii. State why CustomerID would not make a suitable primary key in the order table.

[1]

3. Details of all users that have accessed a robot are stored in a database table called `TblAccessLog`. This table stores the username and user type of each user. When a user accesses the robot, the current date is added to the `DateAccessed` field for that user.

A selection of the data from this table is shown here. Username is the key field.

Username	UserType	DateAccessed
Mrphy003	User	08/05/21, 07/06/21, 08/06/21
Lwis076	Admin	17/04/21, 19/07/21
Bbby412	NotNeeded	01/06/21, 02/07/21, 14/07/21

`TblAccessLog`

- i. Write an SQL statement to delete all records from the table `TblAccessLog` for users who have a `UserType` of "NotNeeded".

[2]

- ii. State **two** requirements for a database to be in First Normal Form (1NF).

1 _____

2 _____

-----[2]

- iii. Explain why the structure of `TblAccessLog` means that this database is **not** in First Normal Form (1NF).

-----[2]

4(a). A relational database supports ACID transactions. ACID stands for Atomicity, Consistency, Isolation and Durability.

- i. Describe what is meant by a transaction being durable.

-----[2]

- ii. Give **one** way that durability can be achieved for a completed transaction.

-----[1]

- iii. Explain how record locking can be used to ensure that the ACID principle of isolation is achieved when carrying out multiple transactions.

-----[3]

- iv. Give **one** disadvantage of using record locking.

[1]

(b). A video streaming service uses a relational database. An extract of the data from two tables from this database is shown in **Fig. 2**.

Membership contains data about current memberships that customers hold and package contains data about different streaming packages available.

Username	FirstName	StartDate	PackageType
User001	Amaya	08/05/2016	Premium
User002	Amit	06/06/2019	Basic
User003	Tom	17/08/2019	Free
User004	Kareem	08/08/2017	Basic
User005	Sarah	25/03/2020	Premium

Membership

PackageType	CostPerMonth (£)	Adverts
Premium	12.99	false
Basic	7.99	true
Free	0.00	true

Package

Fig. 2

- i. State what is meant by the term 'primary key'.

[1]

- ii. Identify the foreign key used in the database and the table name where this is a foreign key.

Foreign Key _____

Table Name _____

[2]

- iii. Identify the data type of the `CostPerMonth (£)` field.

[1]

- iv. Give the name of the field that could be stored using a Boolean data type.

[1]

(c). The `Adverts` field indicates if customers will be shown adverts. `true` indicates that customers will be shown adverts, and `false` indicates that adverts are not shown.

Write Structured Query Language (SQL) to return the `Username` and `FirstName` fields for all customers who see adverts.

[5]

(d). When new customers join the streaming service, their name, email address and contact details are captured so that they can be entered into the database.

- i. Identify **one** method of capturing a new customer's personal data, describing why this method is suitable.

Method

Suitability

[3]

- Identify **two** methods of exchanging data with other computer systems.

[2]

<u>CustomerID</u>	Surname	Title	Phone	CarReg
JJ178	James	Mr	(0121) 343223	DY51 KKY
HG876	Habbick	Miss	(01782) 659234	PG62 CRG
EV343	Elise	Mrs	(07834) 123998	HN59 GFR
PG127	Pleston	Mr	(07432) 234543	JB67 DSF

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[2]

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[4]

- [2]

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The hotel's computer network uses a client-server model.

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[3]

ii. Give **two** advantages of client-server compared to peer-to-peer.

1

2

[2]

(b). The hotel's network uses multiple switches.

Explain the purpose of a network switch.

[3]

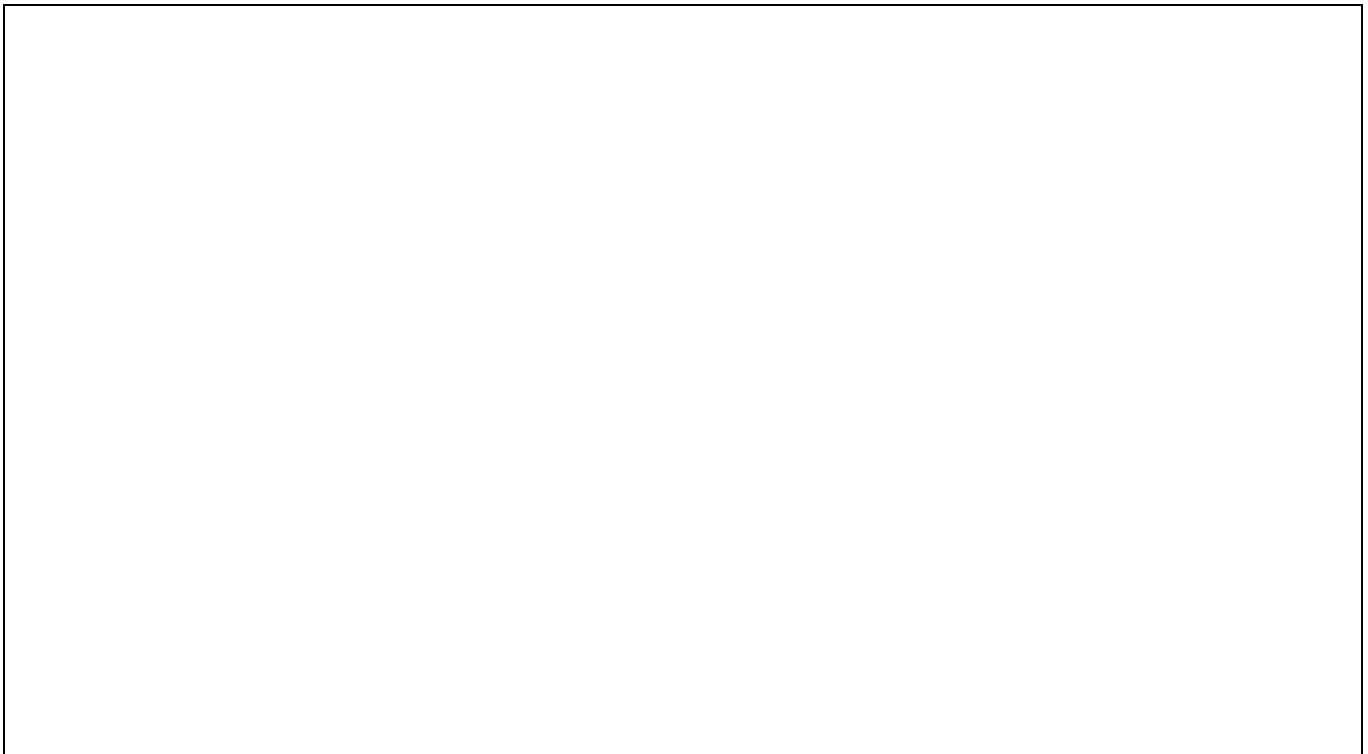
(c). * The hotel is concerned about the security of its computer network.

Discuss the threats which potentially exist to the hotel's computer network and how these threats could be eliminated or reduced.

[9]

(d). The hotel stores data about rooms, customers and bookings in a database. Each customer can book multiple rooms and each room can be booked multiple times.

- i. Draw an Entity Relationship Diagram for this database.

**[4]**

- ii. Define what is meant by the term 'foreign key', giving **one** example of where a foreign key would be used in the hotel booking database.

Definition

Example

[3]

- iii. Describe **two** different ways that hashing could be used in this database.

1

2

[4]

- (e). The hotel booking database enforces referential integrity.

Explain what is meant by the term 'referential integrity' and how this could potentially be broken.

[2]

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