Flat file database issues

GCSE

P P

Amelie provides a dog walking service and keeps all of the details of her customers in a flat file database. A sample of the data she holds is below:

CustomerName	Address	TelephoneNumber	DogName
Frank Zanetti	18 Goodboy Terrace, Chorley	07700900380	Bobby
Bella Talbot	89 Collar Road, Chorley	07700900609	Ant
Bella Talbot	89 Collar Road, Chorley	07700900754	Dec
Jenna Alexander	10 Bark Street, Leyland	07700900521	Bruno
Jenna Alexander	10 Bark Street, Leyland	07700900201	Bridget
Jenna Alexander	10 Bark Street, Leyland	07700900998	Rover

From the choices below, choose the term that best describes the problem with the data shown from this flat file database.

○ Data integrity

○ Data redundancy

○ Data inconsistency

Database definitions 2

GCSE A Level

C C P P

Drag and drop the most appropriate term into each row of the table below to correctly label the definitions. Each term can only be used once.

Definition	Term
A collection of organised data where the data is held in more than one table.	
A collection of related data made up of fields and records.	
A collection of data for one item, person, or thing.	
A single piece of information which is stored within a row. For example: first name, email, date of birth.	
A single field that acts as a unique identifier for each record in a table.	
A set of two or more fields that together uniquely identify each record in a table.	
A field in one table that is a primary key in another table, and is used to create a link between these tables.	

Items:

foreign key record relational database field composite key

primary key table

Identify primary key 2

GCSE

P P

A second-hand car dealership has a database table which is used to store the details of cars currently in stock:

0005146	Ford	Fiesta	71,300	White	£4,372
0005199	Mini	Cooper D	85,000	Grey	£3,995
0004686	Audi	A5	49,332	Black	£21,624
0005102	Skoda	Fabia	79,600	Blue	£4,200

Which would be the most appropriate field for a **primary key** in this database table?

○ Car_ID

○ Make

○ Model

○ Mileage

○ Colour

○ Price

Foreign key 1

A Level

P P

Which of the following options provides the correct definition of a foreign key?

○ An attribute that uniquely identifies a record in a table

○ An attribute that is used to link to another table through a matching value in a primary key field

○ An attribute that is part of a composite primary key

Identify foreign keys 2

A Level

P P

Kate is developing an application that will distribute a quiz that her fellow college students can attempt each month. The students will access the quiz via the school portal. For October, the theme of the quiz is Black History Month.

Kate has written down the requirements for her application:

- A quiz consists of a number of unique multiple choice questions
- Each question has at least three choices, only one of them is correct
- A question can appear in only one quiz
- A choice belongs to only one question
- A student can attempt the same quiz more than once

Kate wants to use a relational database to store information about the quizzes. This includes details about the quizzes that have been published, the questions that belong to each quiz, and the choices that are available for each question. Also, the details of the students that participate in each quiz, when they attempted each quiz and what choice they submitted for each of the questions.

The information is modelled using six entities `Quiz`, `Question`, `Choice`, `Student`, `Attempt` and `AttemptAnswer`. The description in standard notation for the entities is as follows:

```
Quiz(QuizId, Name, PublishedDate)
Question(QuestionId, QuizId, Description, QuestionOrder)
Choice(ChoiceId, QuestionId, Description, ChoiceOrder, IsCorrect)
Student(StudentId, FirstName, LastName, YearGroup, Email)
Attempt(AttemptId, StudentId, QuizId, SubmittedDate, SubmittedTime)
AttemptAnswer(AttemptId, ChoiceId)
```

Each entity is implemented in the database using a table. Which field in the `Choice` table is a **foreign key** to another table?

○ `Description`

○ `ChoiceId`

○ `QuestionId`

Home > Entity relationships 4

Entity relationships 4

A Level

P P

Kate is developing an application that will distribute a quiz that her fellow college students can attempt each month. The students will access the monthly quiz via the school portal. For October, the theme of the quiz is Black History Month.

Kate has written down the requirements for her application:

- A quiz consists of a number of unique multiple choice questions
- Each question has at least three choices, only one of them is correct
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Kate wants to use a relational database to store information about the quizzes. This includes details about the quizzes that have been published, the questions that belong to each quiz, and the choices that are available for each question. Also, the details of the students that attempt each quiz, when they attempted each quiz and what choice they submitted for each of the questions.

The information is modelled using six entities `Quiz`, `Question`, `Choice`, `Student`, `Attempt` and `AttemptAnswer`. The description in standard notation for the entities is as follows:

```
Quiz(QuizId, Name, PublishedDate)
Question(QuestionId, QuizId, Description, QuestionOrder)
Choice(ChoiceId, QuestionId, Description, ChoiceOrder, IsCorrect)
Student(StudentId, FirstName, LastName, YearGroup, Email)
Attempt(AttemptId, StudentId, QuizId, SubmittedDate, SubmittedTime)
AttemptAnswer(AttemptId, ChoiceId)
```

Part A Student - Quiz

Kate wants to produce the entity–relationship diagram for the database. What is the relationship between the entities `Student` and `Quiz`?

○ Many-to-many

○ One-to-one

○ One-to-many

Part B Student - Attempt

What is the relationship between the `Student` and `Attempt` entities?

○ One-to-many

○ Many-to-many

○ One-to-one

Part C Quiz - Attempt

What is the relationship between the `Quiz` and `Attempt` entities?

○ Many-to-many

○ One-to-many

○ One-to-one

Entity relationships 2

A Level

P P

Suhreena wants to create a program for her A level project. The program will allow her to run polls that the students can participate in using the school portal.

- Each poll consists of one question and any number of response options. Each response option belongs to a specific poll.
- Each student can only vote for one option in each poll. Once a vote is submitted, it can't be changed.
- When a poll is over, it can be set as inactive.

Suhreena wants to use a relational database to store information about the polls. This includes details about the students that participate in the polls, the portal account for each student, the polls that have been set as active, the options that are available for each poll, and which option each student has voted for.

The information is modelled using four entities `Student`, `Poll`, `Option`, and `Vote`. The description in standard notation for the entities is as follows:

```
Student(StudentId, FirstName, LastName, YearGroup)
Poll(PollId, QuestionText, IsActive, PublishedDate)
Option(OptionId, PollId, OptionText)
Vote(StudentId, OptionId, SubmittedDate, SubmittedTime)
```

Part A

Suhreena wants to produce the entity–relationship diagram for the database. What is the relationship between the entities `Poll` and `Option`?

○ Many-to-many

○ One-to-many

○ One-to-one

Part B

What is the relationship between the entities `Student` and `Vote`?

○ Many-to-many

○ One-to-many

○ One-to-one

Benefits of a database

A Level

P P

There are many benefits of using a database system to store data. Identify which **three** statements, from those given below, correctly specify benefits of using a well-defined, normalised database.

□ Elimination of duplicated data

□ Elimination of redundant data

□ Elimination of deletion anomalies

□ Elimination of update anomalies

Identify DB design problems 1

A Level

C C

Charlie runs a dog training club that offers a range of different training classes:

- Some classes, such as obedience training, run only once a week; other classes, such as puppy training, run several times a week.
- There is only one room available, so only one class can run at any given time.

Dog owners must register their dog(s) before they can make bookings:

- An owner can own more than one dog
- An owner can book a dog into many classes

Charlie has set up a system to manage his business. He has designed a relational database to hold the information that he needs. This includes details about the dog owners, the type of dog(s) that are registered for each owner, the classes that are offered in the club, and the bookings that each owner has made. The initial database design is as follows:

```
Owner (OwnerId, Name, Phone, Email)
Dog (DogName, OwnerId, Breed, Colour)
Class (Day, Time, ClassType, MaxPlaces)
Booking (OwnerId, ClassType, DogName)
```

Charlie tries to use his new system, but encounters some problems. Because of the **incorrect database design**, there are some tasks that he is unable to do.

Select the **three** tasks from the list that Charlie **can** do with the current system design.

□ Book a dog into the same class the following week.

□ Sort his reports by the surname of the owner.

□ Target emails at owners of a specific breed of dog.

□ Add two dogs with the same name.

□ Register many dogs with the same owner.

□ Add two owners with the same name.

Database: concurrent access

A Level
P P

Client-server databases can have many users so should allow concurrent access to data. Concurrent access allows two or more users to access the same record at the same time.

However, concurrent access can cause problems if not carefully controlled. Which **three** of the following situations could cause a problem?

- □ Two users trying to update the same record
- □ One user trying to read a record while someone else is updating it
- □ Two users trying to read the same record
- □ One user trying to delete a record while someone else is reading it