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# Database Design & Development: Revision Questions 3

1. GlenSki offers on-to-one skiing lessons at a number of ski resorts in Scotland. Instructors are based at a resort, and customers can book several lessons on one day. A relational database is used to store the data as follows.

| **Customer** | **Lesson** | **Resort** | **Instructor** |
|---|---|---|---|
| CustomerID | InstructorID* | ResortID | InstructorID |
| FirstName | StartTime | Name | FirstName |
| Surname | Date | Postcode | Surname |
| ContactNumber | Duration | Lifts | ResortID* |
| EmailAddress | CustomerID* | | |

a) Draw an entity relationship diagram to show the relationships that exist in this database. 3

b) State the primary key used to uniquely identify the Lesson table. 1

c) The following report was generated to show an instructor a list of the lessons that they will deliver on a specific date.

GlenSki 17/12/18 Instructor: 14

Daily Schedule Fred, your lessons today are:

Rafal Avila 9.00am

Martin Iskra 11.00am

Daniella Smith 12.15pm

Rafal Avila 3.00pm

Number of lessons: 4

The report was based on the result of a query. The report has also been used to display the "Number of lessons" using an aggregate function. Write an SQL operation used to select the data shown in the report. 5

d) State the aggregate function that has been used to display the "Number of Lessons" shown as part of this report. 1


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2. Lyndsay and Jindra attend St Andrew's Primary School and Kerry attends Hillview Primary School.

   (a) Draw an entity occurrence model to illustrate the relationship between primary school and pupil. 2

   (b) State the *cardinality* of the relationship between primary school and pupil. 1

3. Inverdon Electrical is a small company supplying electrical goods to a few shops in the local area. The structure of the data model they intend to use is shown below.

| **Customer** | **Order** | **Supplier** | **Item** |
|---|---|---|---|
| Customer number | Item number* | Supplier name | Item number |
| Customer name | Order date | Supplier address | Item name |
| Customer address | Customer number* | Supplier telephone | Price |
| Customer telephone | Number ordered | | Photo |
| | | | Supplier name* |

   (a) Draw an *entity relationship diagram* to represent this data model. 6

   (b) The following data dictionary represents the Item entity. It has a number of missing entries which are highlighted as A, B, C, D and E. State a suitable entry for each of the missing values. 5

| Attribute | Data Type | Validation | Unique | Index | Key |
|---|---|---|---|---|---|
| Item number | **A** | >=1000 and <=9999 | Y | Y | PK |
| Item name | Text | | N | Y | |
| Price | **B** | >0·50 and <1000·00 | N | N | |
| Photo | **C** | | N | N | |
| Supplier name | Text | **D** | **E** | Y | FK |

4. A health centre uses a single table database. Below is a record from this database. The primary key, Patient No, is created from the patient's initials and date of birth.

| | |
|---|---|
| **Patient No** | HR270985 |
| **Name** | Helen Robertson |
| **Address** | 23 Gordon Road<br>Perth<br>PG3 6TY |
| **Date of Birth** | 27/09/1985 |
| **Doctor's Name** | Dr Ritchie |
| **Doctor's Tel No** | 0845 5678348 |
| **Doctor's Room** | 5 |

(a) State two problems with using the meaningful identifier, Patient No, as a primary key. 2

(b) Explain why storing the address as a single attribute is not good database design. 2