

**AQA Computer Science A-Level**  
**4.10.1 Conceptual data models and  
entity relationship modelling**  
Past Paper Questions

## June 2011 Comp 3

- 7 A company is building an e-commerce website. The website will display details of the products that the company sells and allow customers to place orders. Customers must register on the website before they can place an order and each order can be for one or more different products.

The product, customer and order details will be stored in a relational database. It was originally proposed that the following three relations were required:

Product(ProductNumber, ProductPrice, ProductDescription, QuantityInStock)

Order(OrderNumber, OrderDate, CustomerID, OrderingComputerIPAddress, ProductNumber, Quantity)

Customer(CustomerID, CustomerName, Address, Postcode, EmailAddress, PaymentCardNumber)

The computer programmer identified a problem with the Order relation and stated that it should be divided up into two separate relations:

Order(OrderNumber, OrderDate, CustomerID, OrderingComputerIPAddress)

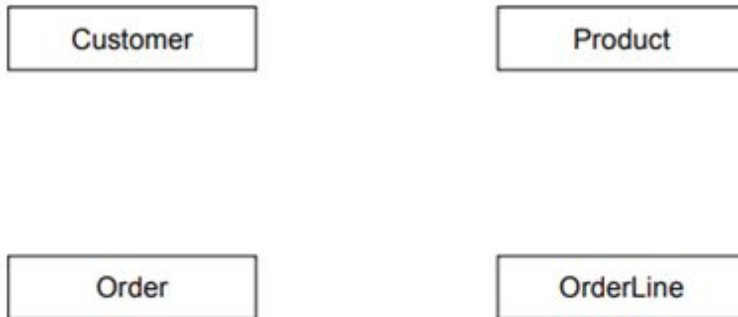
OrderLine(OrderNumber, ProductNumber, Quantity)

7 (a) Describe the problem that the programmer identified with the original Order relation and explain what the cause of this problem was.

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(2 marks)

7 (b) Complete the Entity-Relationship diagram below to show the degree of any **three** relationships that exist between the entities.



(3 marks)

### June 2012 Comp 3

9 A library uses a database management system (DBMS) to store details of the books that it stocks, its members and the loans that it has made. These details are stored in a database using the following three relations:

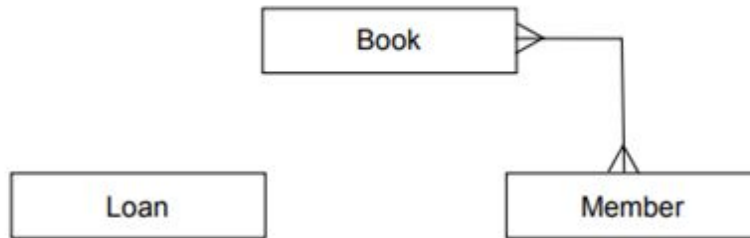
Book(BookID, Title, Author, Publisher)

Member(MemberID, Surname, Forename, HouseNumber, StreetName, Town, County, Postcode, DateOfBirth, EmailAddress)

Loan(MemberID, BookID, LoanDate, DueBackDate, Returned)

The library does not stock more than one copy of the same book.

- 9 (c) Complete the Entity-Relationship diagram below to show the degree of the **two** missing relationships between the entities.



(2 marks)

## June 2017 Paper 2

1 0

A garage services and repairs cars. It uses a relational database to keep track of the jobs that customers have booked for it to carry out. The database includes jobs that have been completed and jobs that are waiting to be done.

The details of the jobs that the garage does, together with the parts that it stocks and uses are stored in the database using the four relations shown in **Figure 7**.

**Figure 7**

Job (JobID, CarRegNo, JobDate, InGarage, JobDuration)  
 Car (CarRegNo, Make, Model, OwnerName, OwnerEmail, OwnerTelNo)  
 Part (PartID, Description, Price, QuantityInStock)  
 PartUsedForJob (JobID, PartID, QuantityUsed)

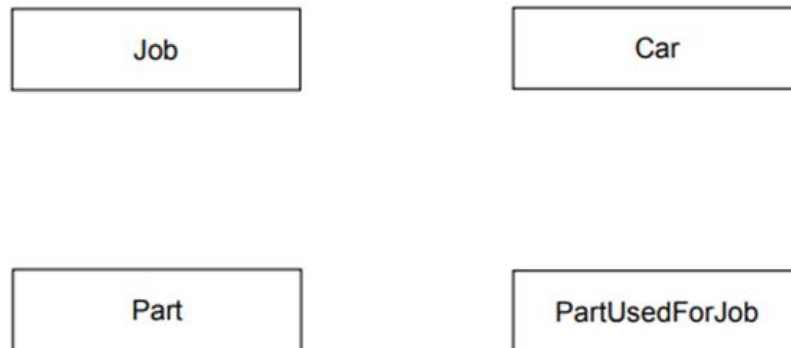
- Each car has a unique CarRegNo.
- A type of car can be uniquely identified by the combination of its Make and Model. Different Makes may use the same Model name and a particular manufacturer (Make) will produce several different car Models.
- A booking made for a car on a particular date counts as one job, regardless of how many different tasks are completed upon it.
- A job might require the use of any number of parts, including zero.
- Some of the details are stored in the database as soon as a booking is made and others are only added when a job has been completed.

The attribute JobID is the Entity Identifier (Primary Key) of the Job relation.

1 0 . 3

On the incomplete Entity-Relationship diagram below show the degree of any **three** relationships that exist between the entities.

[2 marks]



### June 2013 Comp 3

- 9 A company sells furniture to customers of its store. The store does not keep the furniture in stock. Instead, a customer places an order at the store and the company then orders the furniture required from its suppliers. When the ordered furniture arrives at the store a member of staff telephones or e-mails the customer to inform them that it is ready for collection. Customers often order more than one type of furniture on the same order, for example a sofa and two chairs.

Details of the furniture, customers and orders are to be stored in a relational database using the following four relations:

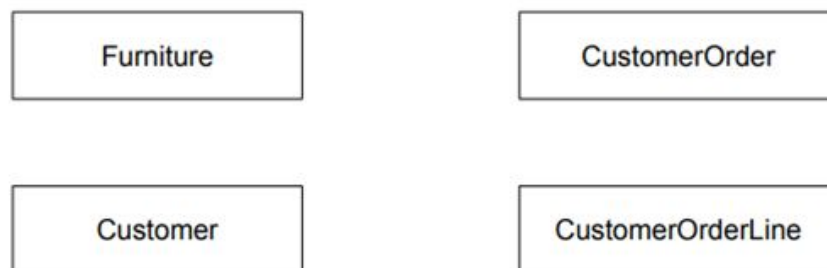
Furniture(FurnitureID, FurnitureName, Category, Price, SupplierName)

CustomerOrder(OrderID, CustomerID, Date)

CustomerOrderLine(OrderID, FurnitureID, Quantity)

Customer(CustomerID, CustomerName, EmailAddress, TelephoneNumber)

- 9 (b) On the incomplete Entity-Relationship diagram below show the degree of any **three** relationships that exist between the entities.



(3 marks)



## Specimen Paper 2

0 9

A school stores information about its sports day in a relational database.

The details of the track events are stored using the three relations in **Figure 7**.

**Figure 7**

Athlete (AthleteNumber, Forename, Surname, Class, Gender, DateOfBirth)

Race (RaceNumber, Gender, Distance, Type, StartTime)

RaceEntryAndResult (RaceNumber, AthleteNumber, TimeSet)

Each athlete who takes part in a race is given a unique AthleteNumber. Athletes can run in more than one race. If they do, they keep the same AthleteNumber for the entire day.

Many races are run throughout the day. An example race would be the boys 80m hurdles, the third race of the day, which starts at 13:30. The entry in the Race table for this race is shown in **Table 4**:

**Table 4**

RaceNumber	Gender	Distance	Type	StartTime
3	Boys	80	Hurdles	13:30

When an athlete is entered into a race, a record of the entry is created in the RaceEntryAndResult table. Initially, the TimeSet is recorded as 00:00.00 (meaning 0 minutes, 0 seconds, 0 hundredths of a second) to indicate that the race has not yet been run. After the race has been run, if the athlete successfully completes it, then their TimeSet value is updated to record the time that they achieved in minutes, seconds and hundredths of a second. The TimeSet value remains at 00:00.00 for athletes who fail to complete the race.

The primary keys in the Athlete and Race relations have been identified in **Figure 7** by underlining them. The correct primary key for the RaceEntryAndResult relation has not been identified.

09 . 3 On the incomplete Entity-Relationship diagram below show the degree of the **three** relationships that exist between the entities.

[2 marks]

