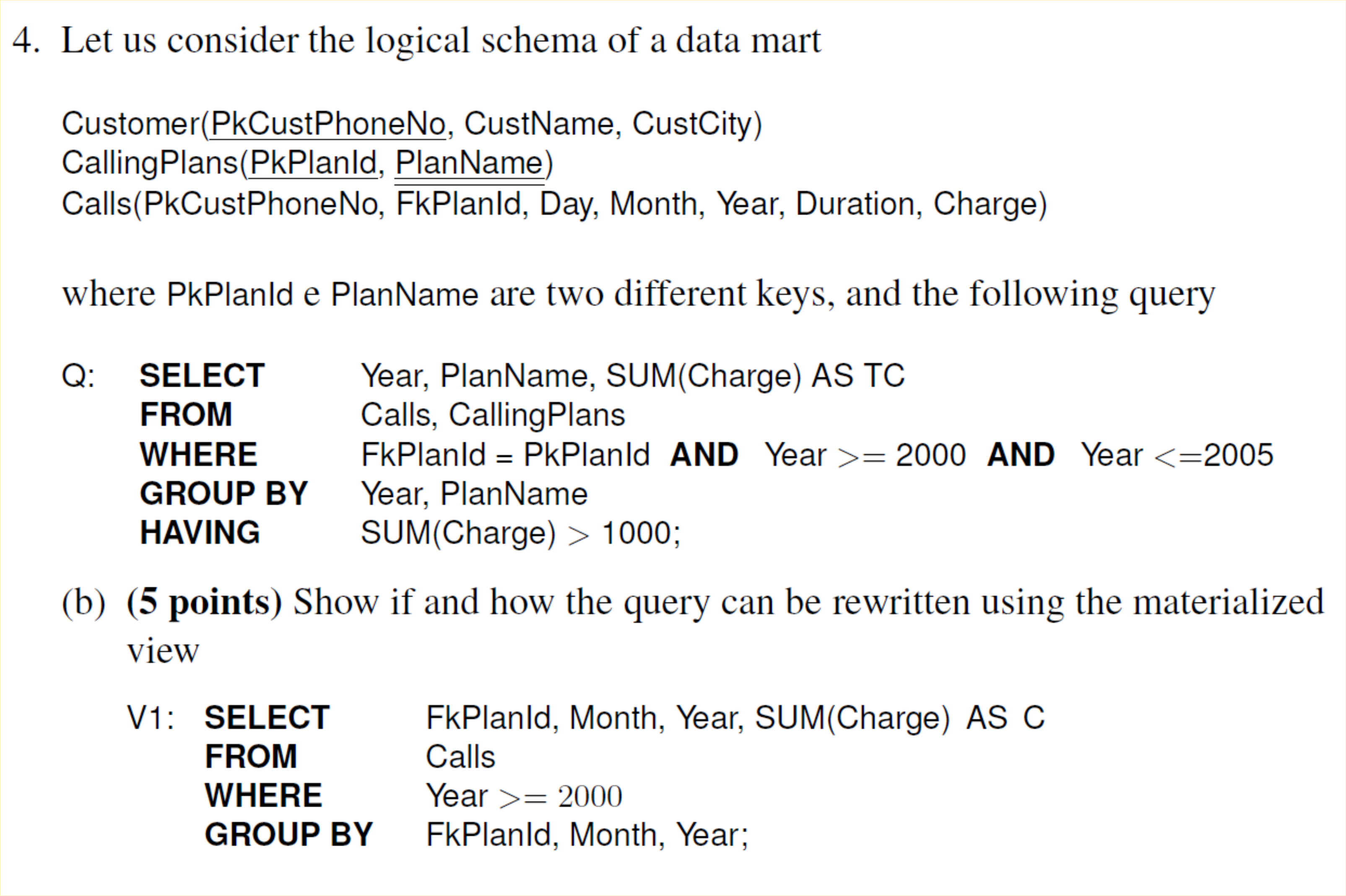
Exercise 1



4. Let us consider the logical schema of a data mart

   Customer(PkCustPhoneNo, CustName, CustCity)
   CallingPlans(PkPlanId, PlanName)
   Calls(PkCustPhoneNo, FkPlanId, Day, Month, Year, Duration, Charge)

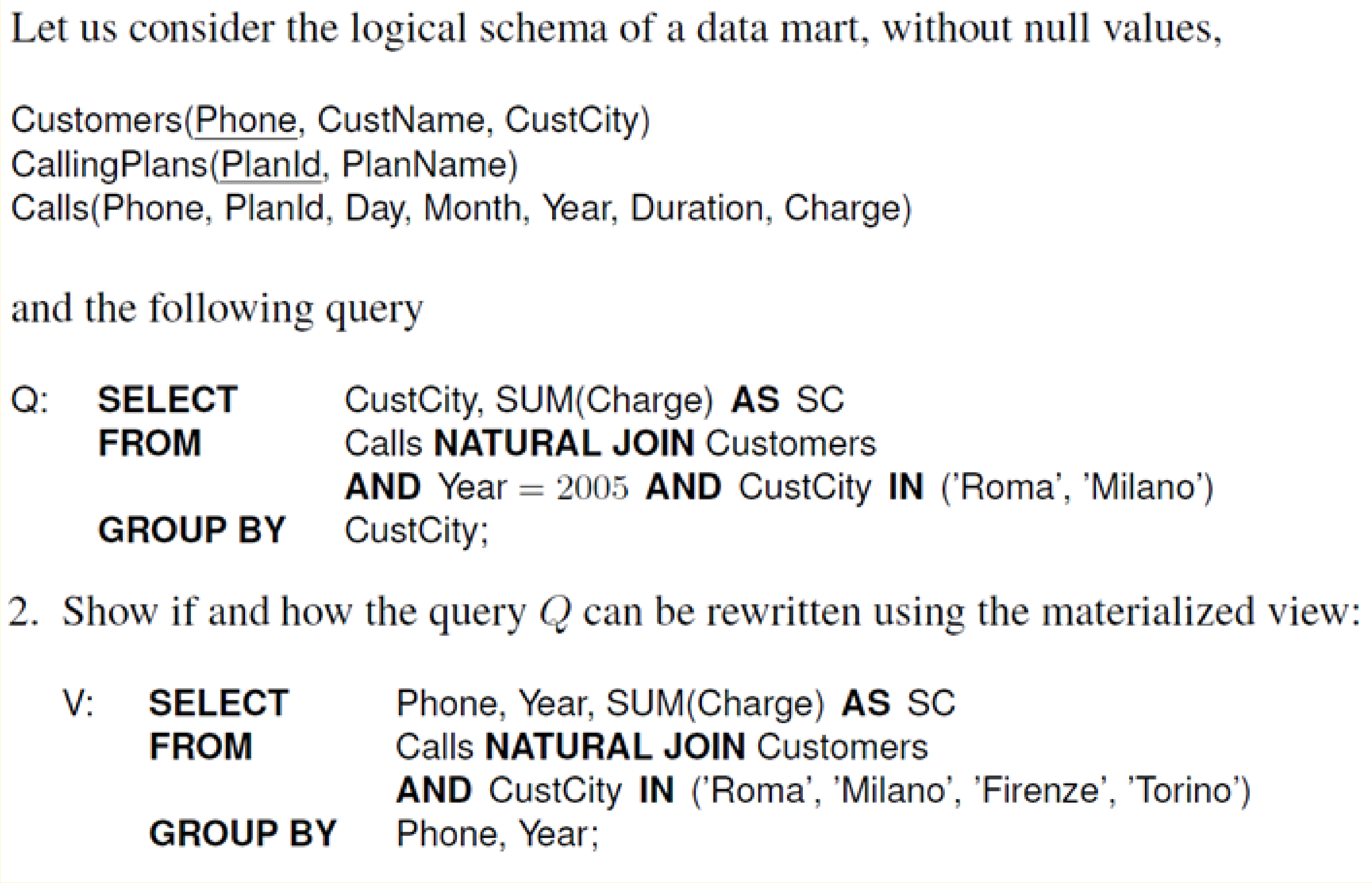
   where PkPlanId e PlanName are two different keys, and the following query

```
Q:   SELECT      Year, PlanName, SUM(Charge) AS TC
     FROM        Calls, CallingPlans
     WHERE       FkPlanId = PkPlanId  AND  Year >= 2000  AND  Year <=2005
     GROUP BY    Year, PlanName
     HAVING      SUM(Charge) > 1000;
```

   (b) **(5 points)** Show if and how the query can be rewritten using the materialized view

```
V1:  SELECT      FkPlanId, Month, Year, SUM(Charge)  AS  C
     FROM        Calls
     WHERE       Year >= 2000
     GROUP BY    FkPlanId, Month, Year;
```

Exercise 2



Let us consider the logical schema of a data mart, without null values,

Customers(Phone, CustName, CustCity)
CallingPlans(PlanId, PlanName)
Calls(Phone, PlanId, Day, Month, Year, Duration, Charge)

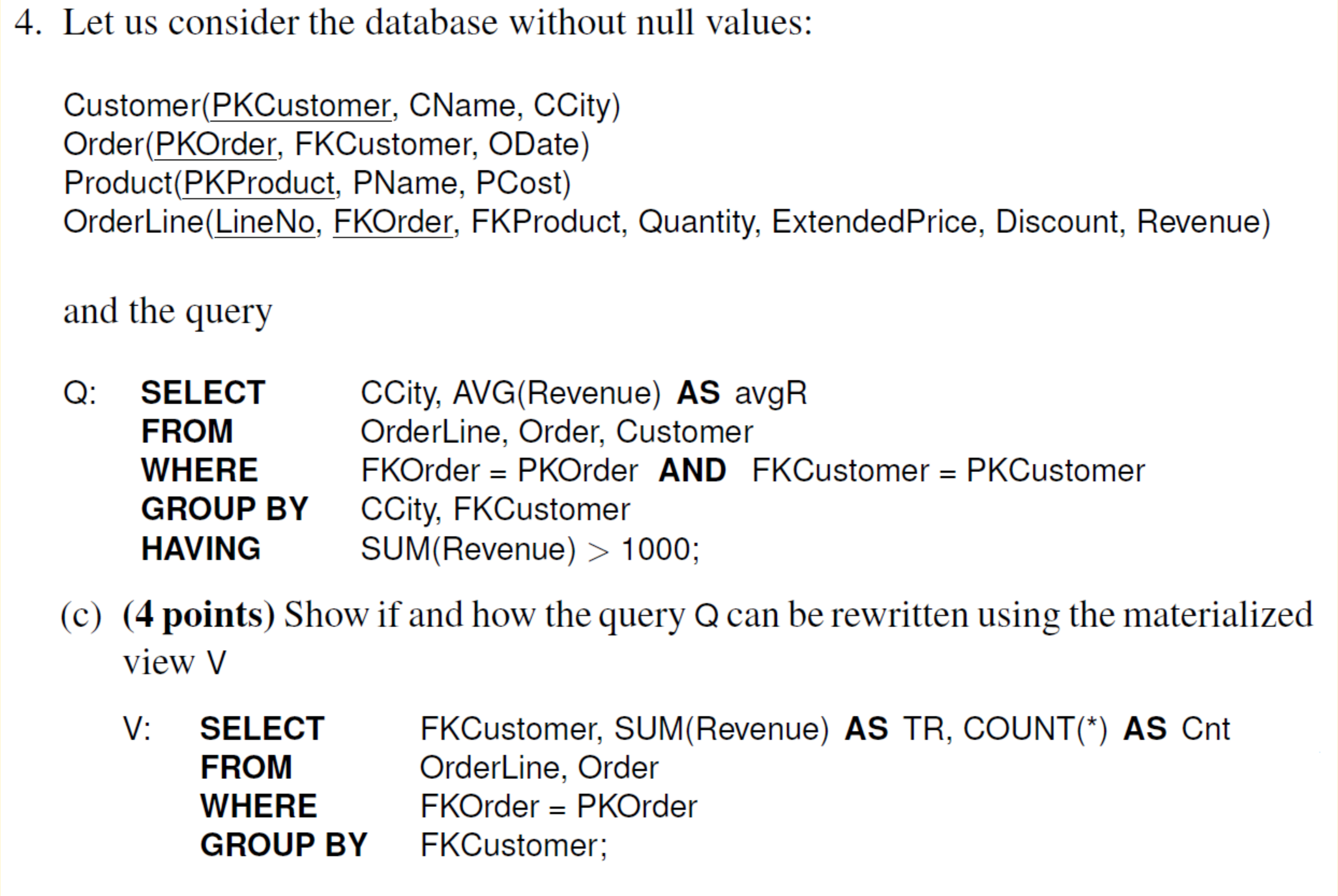
and the following query

```
Q:   SELECT      CustCity, SUM(Charge) AS SC
     FROM        Calls NATURAL JOIN Customers
                 AND Year = 2005 AND CustCity IN ('Roma', 'Milano')
     GROUP BY    CustCity;
```

2. Show if and how the query Q can be rewritten using the materialized view:

```
V:   SELECT      Phone, Year, SUM(Charge) AS SC
     FROM        Calls NATURAL JOIN Customers
                 AND CustCity IN ('Roma', 'Milano', 'Firenze', 'Torino')
     GROUP BY    Phone, Year;
```

Exercise 3



4. Let us consider the database without null values:

```
Customer(PKCustomer, CName, CCity)
Order(PKOrder, FKCustomer, ODate)
Product(PKProduct, PName, PCost)
OrderLine(LineNo, FKOrder, FKProduct, Quantity, ExtendedPrice, Discount, Revenue)
```

and the query

```
Q:   SELECT      CCity, AVG(Revenue) AS avgR
     FROM        OrderLine, Order, Customer
     WHERE       FKOrder = PKOrder  AND  FKCustomer = PKCustomer
     GROUP BY    CCity, FKCustomer
     HAVING      SUM(Revenue) > 1000;
```

(c) **(4 points)** Show if and how the query Q can be rewritten using the materialized view V

```
V:   SELECT      FKCustomer, SUM(Revenue) AS TR, COUNT(*) AS Cnt
     FROM        OrderLine, Order
     WHERE       FKOrder = PKOrder
     GROUP BY    FKCustomer;
```