Instructions

- Build your model using Oracle Data Modeler SQL Developer (ODM).

- Every entity type other than associative entity types must have at least one non-key attribute. If the situation description does not provide one, you should make one up.

- Your model must include **all attributes mentioned** in the situation description.

- Convert all many:many relationships to associative entity types.

- For all entity types – including associative – give them their own primary key. Do not use key migration

- Use proper cardinality notation for relationship degree and participation rules.

- In your completed design, you should name at least two relationships from both directions. All in all, you should therefore have at least four relationship names.

Question 1

Draw an ER diagram for the situation described below.

a CharlesRiver.com (CRC) has many employees. For each employee, CRC stores an id, first name and last name. Each employee reports to one other employee or none, and each employee has many others (or none) reporting to her/him.

b CRC has many customers, sells many products. Customers place sales orders for various items. Each sales sales order specifies several items and the quantity, unit price and required delivery date for each item ordered. The same item can appear several times in the same order but with different delivery dates. For each customer CRC stores an id and a name. For each product CRC stores an id, name and weight. Each CRC employee could be responsible for many customers or none and each customer has one CRC employee assigned to it. Each sales order is approved by one CRC employee or none and each CRC employee might approve several sales orders or none.

c Each product belongs to a product line and a product line might have several products or none. For each product line CRC stores an id, name and an importance rating.

d Every product line belongs to a department. Each department can have one or many product lines.

e Departments in CRC are hierarchically organized, and one department can have many other departments (or none) under it. Each department belongs to one other department or to none.

f CRC orders products from vendors by sending them purchase orders. For each vendor, CRC stores an id and a name. Each purchase order can be for certain quantities of one or more products, each at a specific unit price. Clearly, each product can appear in many purchase orders or none.

g Vendors send in shipments against purchase orders from CRC. One purchase order could result in several shipments or none, but each shipment is for a specific purchase order. Each shipment has a shipment number and a shipment date.

h CRC makes payments to vendors (vendor payments) and each payment could be for one or many shipments and indicates a payment date and amount paid.

i CRC receives payments from its customers (customer payments). Each customer payment is against one or several sales orders and each sales order can have no more than one payment. For each payment, CRC stores the date and the amount.

j CRC has many sales regions and each customer belongs to one sales region. Each sales region could have many customers or none.