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 Bay City Public Library (BCPL) has many book titles. For each title, the library stores an id and name. For each title, BCPL keeps zero or more copies. Each copy has its own id (called an acquisition number), purchase price and the date of purchase.

b BCPL categorizes title by subject. Each title could belong to one or several subjects and each subject could have zero or more titles. For a subject, BCPL keeps an id and the subject's name. Furthermore, one subject might have zero or many subjects under it. For example, "cooking" could be a subject and "Asian cooking","Italian cooking" and "vegetarian cooking" could all be under "cooking." Each subject could also be under zero or more other subjects.

c BCPL has many employees, and for each one MI stores an id, first name, last name and title. BCPL has many departments and each employee belongs to one department. Each department can have many employees or none. For each department, BCPL stores an id and the department's name. Each department has exactly one employee as its manager. An employee can be the manager of zero or one department.

d Every employee other than the CEO reports to a manager and every employee could have zero or many subordinates.

e BCPL has many patrons (or customers). Each patron has a patron id and BCPL stores the patron's first and last names and address. While visiting the library, a patron could borrow zero or more items (check out). BCPL stores the date of checkout and keeps a unique checkout number. For each book that a patron borrows as a part of a checkout, BCPL keeps the due date and the condition of the book at the time of borrowing.

f Patrons might return books that they borrowed, and BCPL keeps track of these returns. For each return, BCPL keeps track of the date of return and the condition of the book on return.

g BCPL purchases books from many vendors. Each vendor has an id, name and address. BCPL sends purchase orders to vendors. Each purchase order might be for one or more units of one or more titles. For a purchase order, BCPL keeps the date and a po number. For each title ordered, BCPL keeps the price, quantity and required date.

Question 1 continued on next page...

h Vendors send in shipments against the orders that BCPL placed with them. Each shipment has a number and date and includes the number of copies of the various titles ordered.

i When patrons return checked out books late, BCPL records the fines due. For each fine, BCPL records the amount and date. Each checkout could have several fines, but a fine is always related to a single checkout.

j Patrons could make zero or many payments. Each payment is by a specific patron and BCPL stores the date and the amount of the payment.