ASSIGNMENT ON E-R MODELING

1. (i) Define the following terms
   (a) Database
   (b) Database management system

   (ii) A certain newspaper publishing house wants to keep track of its customers, vendors and products (newspapers). The rules are as follows:
   - A vendor can sell one or many newspapers
   - Before becoming a customer, one must buy at least a newspaper
   - A customer must not necessarily buy only from one vendor

   From the above description, answer the following questions.
   (a) Give the THREE entities involved.
   (b) Give any two main relationships that may exist among the entities.
   (c) Draw and entity-relationship model for the situation, showing its cardinalities and primary keys.

   Assuming the relationship "Buys" is used in the above model (e.g. customer **Buys** newspaper)
   (d) What will the primary key of buys be?
   (e) What extra attribute(s) must be there to enable the publishing house know the customers that buy a certain newspaper for a particular year.

2. Given a library, you are asked to design a database such that in this library:
   - A customer may borrow a book or more
   - For every book, there is just one author
   - An author could have written many books
   - When borrowing a book, the code of the book, the borrower's code, the borrow date, and the return date must be recorded as well as the state of the book.
   - When the borrower returns the book, the same information as on the borrow date is recorded.

   Answer the following questions given that the entities Author, Book and Customer have attributes as shown below.

Author(Aut-code, Name) Book(B-code, Title, Edition) Customer(Reg-No, Name, Address)

Give an Entity-Relationship model for the library. Clearly show the relationship between entities including cardinalities.

(a) What is a primary key? State the primary keys of Author, Book and Customer.
(b) Write using the same notation as that for the entities given above, the following relations of obvious meanings: BorrowBook, WriteBook, and ReturnBook. Underline their primary keys.