**Q1: Using UML notation draw an example of:**

1. A relationship type that has an attribute.
2. A Binary relationship.
3. A Unary Relationship.
4. Strong-Weak relationship and define the PK of each entity?

Q2: What is the error in the following ER?



Q3: Draw the ER Diagram for each of the following scenario.

a)

Consider the database of an online bookstore. Every book has a title, isbn, year and price. The book might be written by multiple authors and published by a publisher.

For authors, the database keeps the name, address, date of birth, age and the url of their homepage. For publishers, the database keeps the name, address, phone numbers and the url of their website.

The store has several warehouses, each of which has a code, address and phone number. The warehouse stocks several books. A book may be stocked at multiple warehouses.

The database records the number of copies of a book stocked at various warehouses. The bookstore keeps the name, address, email-id, and phone number of its customers.

A customer owns several shopping basket. A shopping basket is identified by a basketID and contains several books. Some shopping baskets may contain more than one copy of same book. The database records the number of copies of each book in any shopping basket.

b)

Consider a Database for prescription monitoring based on the given data:

* Patients are defined by an identity number, a name and a surname, and by a birth-date.
* Doctors are defined as well by an identity number, a name, a surname, and a birth-date, while additionally they will be characterized by a work start date and a specialty.
* Pharmaceutical companies will be defined by a name, and a telephone number.
* Medicines will be defined by a commercial name, their manufacturer, and their active ingredient.
* Pharmacies will be defined by a name, an address and a telephone number.

***Additionally you should take into account the following:***

* Each patient has one doctor
* Each doctor has at least one patient
* A doctor can prescribe certain medicines to his patients
* Each pharmacy sells several medicines, each at a specific price
* Each medicine can be sold by several pharmacies possibly at a different price
* Pharmaceutical companies have contracts with pharmacies
* Each pharmaceutical company may have contracts with several pharmacies
* Each pharmacy may have contracts with several pharmaceutical companies
* For each contract there is a start date, an end date and the contract contents.
* For each contract there is always a person responsible for it, which may change at any point while the contract is still in effect.
* Each doctor will prescribe at least 1 medicine to some patient
* While each pharmacy must sell at least one type of medicine it is not necessary for a medicine to have a pharmacy that sells it.
* A company must have at least one contract with a pharmacy in order for it to be viable.
* A pharmacy must have at least 1 contract with a company in order to be able to sell medicine.
* A medicine's name uniquely identifies it due to the fact that it is required to be a registered trademark.