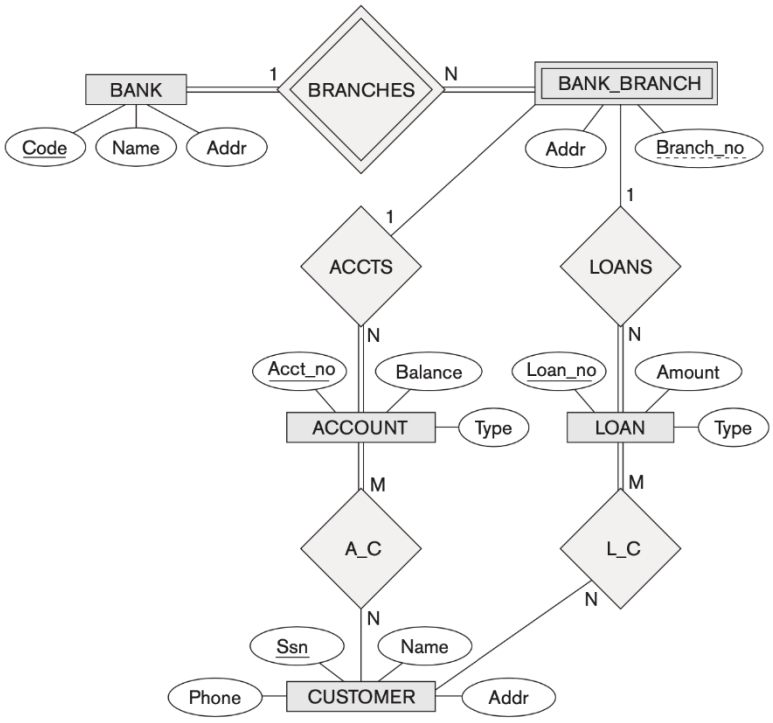
ICT 206 1.5 Database System and Administration

Tutorial 03

Submission: 25/06/2024 5.00pm

1. Define the following terms: superclass of a subclass, superclass/subclass relationship, IS-A relationship, specialization, generalization, category, specific (local) attributes, and specific relationships.
2. Discuss the two main types of constraints on specializations and generalizations.
3. What is the difference between a specialization hierarchy and a specialization lattice?
4. How does a category differ from a regular shared subclass? What is a category used for? Illustrate your answer with examples.
5. Consider the BANK ER schema in Figure, and suppose that it is necessary to keep track of different types of ACCOUNTS (SAVINGS_ACCTS, CHECKING_ACCTS & DEPOSIT_ACCTS) and LOANS (CAR_LOANS, HOME_LOANS & STUDENT_LOAN). Suppose that it is also desirable to keep track of each ACCOUNT's TRANSACTIONS (deposits, withdrawals, checks,) and each LOAN's PAYMENTS; both of these include the amount, date, and time. Modify the BANK schema, using ER and EER concepts of specialization and generalization. State any assumptions you make about the additional requirements.



6. Draw an EER schema diagram for the application given. Discuss any assumptions you make, and then justify your EER design choices.
   - The museum has a collection of ART_OBJECTS. Each ART_OBJECT has a unique Id_no, an Artist (if known), a Year (when it was created, if known), a Title, and a Description. The art objects are categorized in several ways, as discussed below.
   - ART_OBJECTS are categorized based on their type. There are three main types—PAINTING, SCULPTURE, and STATUE plus another type called OTHER to accommodate objects that do not fall into one of the three main types.
   - A PAINTING has a Paint_type (oil, watercolor, etc.), material on which it is Drawn_on (paper, canvas, wood, etc.), and Style (modern, abstract, etc.).
   - A SCULPTURE or a statue has a Material from which it was created (wood, stone, etc.), Height, Weight, and Style.
   - An art object in the OTHER category has a Type (print, photo, etc.) and Style.
   - ART_OBJECTs are categorized as either PERMANENT_COLLECTION (objects that are owned by the museum) and BORROWED. Information captured about objects in the PERMANENT_COLLECTION includes Date_acquired, Status (on display, on loan, or stored), and Cost. Information captured about BORROWED objects includes the Collection from which it was borrowed, Date_borrowed, and Date_returned.
   - Information describing the country or culture of Origin (Italian, Egyptian, American, Indian, and so forth) and Epoch (Renaissance, Modern, Ancient, and so forth) is captured for each ART_OBJECT.
   - The museum keeps track of ARTIST information, if known: Name, DateBorn (if known), Date_died (if not living), Country_of_origin, Epoch, Main_style, and Description. The Name is assumed to be unique.
   - Different EXHIBITIONS occur, each having a Name, Start_date, and End_date. EXHIBITIONS are related to all the art objects that were on display during the exhibition.

- Information is kept on other COLLECTIONS with which the museum interacts; this information includes Name (unique), Type (museum, ,museum, per- sonal, etc.), Description, Address, Phone, and current Contact_person.

7. Consider an ONLINE_AUCTION database system in which members (buyers and sellers) participate in the sale of items. The data requirements for this system are summarized as follows:
   - The online site has members, each of whom is identified by a unique member number and is described by an e-mail address, name, password, home address, and phone number.
   - A member may be a buyer or a seller. A buyer has a shipping address recorded in the database. A seller has a bank account number and routing number recorded in the database.
   - Items are placed by a seller for sale and are identified by a unique item number assigned by the system. Items are also described by an item title, a description, starting bid price, bidding increment, the start date of the auction, and the end date of the auction.
   - Items are also categorized based on a fixed classification hierarchy (for example, a modem may be classified as COMPUTER → HARDWARE → MODEM).
   - Buyers make bids for items they are interested in. Bid price and time of bid are recorded. The bidder at the end of the auction with the highest bid price is declared the winner, and a transaction between buyer and seller may then proceed.
   - The buyer and seller may record feedback regarding their completed transactions. Feedback contains a rating of the other party participating in the transaction (1–10) and a comment.

Design an enhanced entity–relationship diagram for the ONLINE_AUCTION.