**Problem 1:**This businessprovides hair services and sells hair products. Your ERD should document information requirements as described below:

* The database should record information about each customer (name, address, email, and phone). If the customer participates in the loyalty program, the loyalty card number should be stored. Each customer can have only one active loyalty card. Note that two customers can have the same phone number (e.g., home phone number of people from the same family) but they can’t have the same loyalty number. The database stores the total number of loyalty points for each loyalty account.
  + - T1: Database needs to store information about each Customer.
    - T2: Database needs to store name, address, email, and phone of each Customer.
    - T1: Database need to store information about loyalty Account.
    - T2:Database needs to store total number of loyalty points of each loyalty account.

Cardinality:

Each customer has one loyalty Account and Each loyalty Account can associate with one customer.

* Each customer can have only one loyalty account and each loyalty account is for one customer.
* The database should store a list of hair services that this salon can provide. For each service, the current price should be stored. All customers receiving a service pay the current price of the service.
  + - T1:Database needs to store information about each ServiceType.
    - T2: Database needs to store price for each ServiceType.
* A customer can receive multiple services during each session. The database should store what services were provided for the customer, the quantity of each service provided, and the price of each service provided.
  + - T1: Database needs to store information about each session.
    - T2: Database needs to store date/time of each session.
    - T3: For each Session, database needs to store customer details, quantity and price provided.
* A customer can also purchase hair products at the end of a session. The database should keep track of those purchases, together with the session dollar total and payment method. Quantity purchased and the unit price paid for each product should also be recorded.
  + - T1: Database needs to store information about each Product.
    - T3: For each Session, quantity and unit price paid should be stored.
* Information about each product should be stored (a unique product number, description, type of product, and price.)
  + - T3: Database needs to store productID, type and price for each product.
  + If the customer participates in the loyalty program, a total number of points earned is calculated for each session and added to the current total number of loyalty points for this customer, which is stored in the database. A customer earns one point for each whole dollar spent.
    - T2: Database needs to store total points earned for each Session.
    - T3: Database needs to store Lotalty Account is associated with each Session.
    - T2: Database needs to store TotalPoints for each loyalty account.

**Problem 2.**The database should track a health insurance company’s various plans offered, and insurance policies established under each health insurance plan. The following detailed information requirements should be documented by the ERD.

* The insurance company offers multiple health insurance plans. Each plan has a unique plan code name. Not all plans are offered in all states. The database needs to record states that a plan is offered in and the starting date that the plan is offered in each state. An ending date is also stored for those plans that were previously offered in a state but were terminated in that state at some point.
  + - T1: Database needs to store information about Insurance Plan.
    - T2: For each Insurance plan, database needs to store about unique CodeName.
    - T3: Database needs to store information about plan offered in each state.
    - T4: For each plan offered in each state, start date and end date should be stored.
* Each health plan has a set deductible (in $) and maximum benefits (in $), both should be stored in the database. (However, what services are covered in each health plan is not dealt with at this time.)
* T2: For each Insurance Plan, database needs to store deductible and benefits.
* Annual premiums for each health insurance plan are also stored. Each health insurance plan has three different annual premium amounts, one for individuals, one for couples without children, and the third for families.
  + - T3: Database needs to store premium for each insurance plan.
    - T2: For each Premium, database needs to store premium amount.
* When a subscriber purchases insurance from the company, he selects a health insurance plan for the insurance policy. Each insurance policy has a unique policy number and belongs to one health insurance plan.
  + - T3: Database needs to store which subscriber purchased which insurance policy.
    - T2: For each policy, database needs to store about unique policy#

Cardinality:

* + - Each insurance policy belongs to one insurance plan.
    - Each customer will purchase one insurance plan.
* Database stores the start date and end date for each policy.
  + - T4: Database needs to store start date and end date for each Poilcy and for each Custome.
* Each individual is covered by only one insurance policy.
  + - T1: Database needs to store information about Policy.
* The subscriber on a policy, i.e., the insured, can be an individual, a couple, or a family. The database stores the insured’s social security number, name, phone number, and address. If the subscriber is a couple or a family, the database stores the above information for each insured under the same policy number. One insured is designated in the database as the primary insured for each policy.
  + - T2: Database needs to store SSN#, name, phone number and address for Customer.
* The database stores the total premium for each insurance policy and the total premium amount paid so far for each insurance policy.
  + - T2: Database needs to store TotalPremium for each Policy.
    - T1: Database needs to information about amount paid.
    - T2: Database needs to store amount and paymentDate for each payment.

Note: I have created new entity called Amount Paid, which stores each payment made by a customer, table will have the history like details payment Id, amount, and payment date.

**Problem 3**: The database should track residential properties listed for sale, showings of properties, and offers.  The following detailed information requirements should be documented by the ERD.

* Information to be stored about a property includes the unique listingid, address, year built, number of bedrooms, number of bathrooms, and number of square feet.
  + - T1: Database needs to store information about the property.
    - T2: Database needs to store the unique listingid, address, year built, number of bedrooms, number of bathrooms, and number of square feet for each property.
* The database should allow users to search properties based on the owner name. A property may have multiple owners. An owner can own multiple properties.

Cardinality:

* + - A property may have multiple owners.
    - An Owner can own multiple properties.
* The owners have the property listed for sale with only one agent at one time. A listing is effective from date/time1 to date/time2, which should be recorded in the database. If a property changes the seller’s agent, the property will get a new listingId.
  + - T2: Database needs to store FromDate, EndDate for each property listed.
    - Cardinality: Each property will be assigned one agent
* The database should allow users to find the name and phone number of the listing agent.
* The database should store the current listing price of a property.
  + - T2: Database needs to store current price for each property listed.
* For the purpose of this database (mostly for keeping track of listing, showings of listings, and offers for listings), a buyer should be recorded as one individual (as opposed to two or more individuals). A buyer is assigned a unique buyer Id. For simplicity, if two or more people buy together, the database needs to only store the name of the primary buyer in the group. The total number of participating individuals should also be stored for each buyer. Names of other buyers in the same buyer party need not be stored. (For example, if a couple buys together, only one name is stored. The total number of participating individuals for this buyer is recorded as 2.)
  + - T1: Database needs to store information about buys.
    - T2: Database needs to store unique BuyerID, name and number of individuals participated for each buyer.
* A buyer works with only one buyer agent at one time. A buyer’s Agent Agreement is signed for each buyer-agent relationship. The database stores the agreement number, start date, and end date of this agreement. Each agreement is signed between one buyer and one buyer’s agent.
  + - T1: Database needs to store information about Agreements.
    - T2: Database needs to store, agreement#, startDate, EndDate for each agreement.
    - Cardinality – Buyer can have only one agent at a time.
* The database should store information about each showing for each listing. It records the scheduled date/time of the showing, the buyer, and the buyer’s agent for the showing.
  + - T1: Database needs to store information each showing.
    - T3: For each showing in each listing, Database needs to store scheduled data/time.
* The database should also allow users to search offers made on a listing. The database should store offer price, offer date/time, expiration date/time, proposed closing date, and the name of the buyer submitting the offer. An offer is made by only one buyer.
  + - T1: Database needs to store information about offers.
    - T2: Database needs to store Price, Date/Time, expiration DateTime, Closing Date for each offer.
* A buyer may submit multiple offers for the same listing (not at the same time). If a buyer modifies an existing offer before it is accepted or rejected, the new information replaces the old. If a buyer modifies an existing offer after it is rejected, it will be considered a new offer. If the seller counters the offer, the database stores the final offer information (price, effective date, expiration, and closing) proposed by the buyer. Those final offer terms will replace the original offer terms. This also means that, if a seller counters the offer but the buyer is not willing to budge at all, no change will be recorded in the database. When an offer is accepted or rejected, the database records such and the date of acceptance/rejection.
  + - A buyer can submit multiple offer for the same listing.

**Problem 4:**

Committee: CID, CName, Description

Department: Dname, Location

Professor: Pid, Pname, phone, office, DName, StartDate (DName – Foreign Key )

Program: pname, Desc

Student: Sid, sname, Phone, addr

Studies: Sid, pname, CurrentStanding

CommitteeMember: Pid, Cid, From, To