Exercise on database design

A beauty farm wishes to design a database to manage its activities.

Part 1

- The beauty farm has several beauty salons. Each beauty salon is characterized by a unique identifier, the name of the salon, the name of the manager and the list of phone numbers.

- Several beauticians work in the beauty farm. Each beautician is identified by her/his social security number (SSN) and is characterized by her/his name, the type of employment contract (e.g., fixed-term contract) and the phone number, if any. For each beautician, we wish to keep track of the list of beauty salons where she/he has worked.

- Beauty salons offer beauty treatments to their customers. Each beauty treatment is identified by a unique code within the beauty salon by which it is offered, and it is characterized by a name and a short description. For each beautician, we wish to keep track of the list of beauty treatments she/he is qualified to perform.
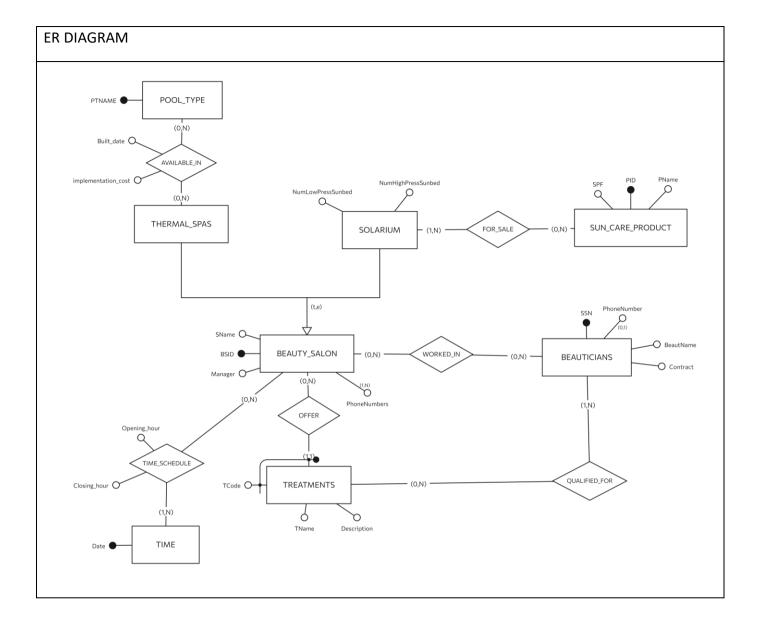
Part 2

- We wish to record the days of the week on which each salon is open, along with its opening and closing times (e.g., from 10am to 10pm). Assume that each salon is open during a single time frame on a given day.

Part 3

- Beauty salons are divided into thermal spas and solariums.

  o For the solariums, the number of available high- and low-pressure sunbeds is known. For each solarium the list of sun care products available for sale is known. Each product is identified by a unique code and is characterized by its name, sun protection factor (SPF) and brand.

  o Thermal spas are characterized by the types of thermal pools they comprise. The same pool type may be available in different spas, and each spa may have different types of pools, but at most one pool for each type. For each pool type available in a given thermal spa, the pool type name (e.g., hot-water, cold-water, or chromotherapy pool), the date when the pool was built in the spa and the cost to realize the pool are known.

(a) Describe the conceptual schema of a database for the above application by means of an ER diagram.

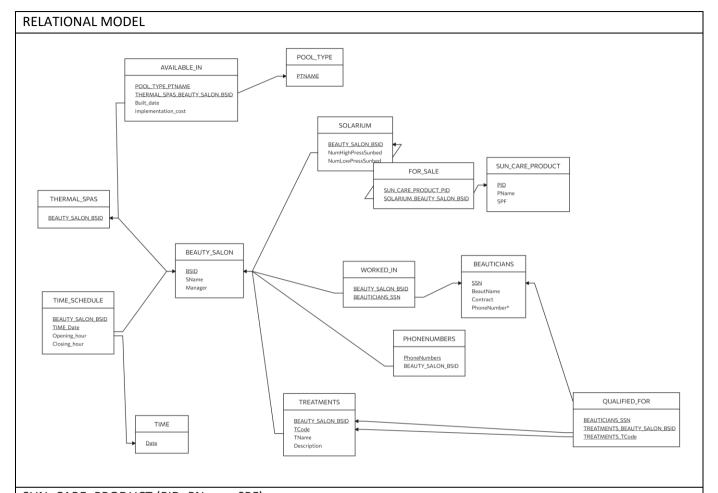(b) Derive a normalized relational logical schema for the same database.

ER DIAGRAM

RELATIONAL MODEL

SUN_CARE_PRODUCT (PID, PName, SPF)

POOL_TYPE (PName)

BEAUTICIANS (SSN, BeautName, Contract, PhoneNumber*)

TIME (Date)

BEAUTY_SALON (BSID, Sname, Manager,

THERMAL_SPA (BSID_ThermalSpa)

SOLARIUM (BSID_Solarium, NumLowPressSunBed, NumHighPressSunBed)

PHONE_NUMBER (Phone_number, BSID)

TREATMENTS (BSID, TCode, TName, Description)

TIME_SCHEDULE (BSID, Date, Closing_Hour, Opening_Hour)

QUALIFIED_FOR (SSN, BSID, TCode)

WORKED_IN (BSID, SSN)

FOR_SALE (BSID_Solarium, PID)

AVALABLE_IN (BSID_ThermalSpa, PTName, Built_Date, Cost)