# Database Design III

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

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

- Salons are divided into thermal spas and solariums. Thermal spas are characterized by the types of thermal pools they comprise. For each pool type available in a given 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. 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 the solariums, the number of available high- and low-pressure sunbeds is known. A variety of sun care products are available for sale in the solariums. Each product is identified by a unique code and is characterized by its name, sun protection factor (SPF) and brand.

- Several beauticians work in the beauty farm. Each beautician is identified by his/her social security number (SSN) and is characterized by his/her 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 he/she 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 is characterized by a name and a short description. For each beauty treatment purchased by a customer, the date on which it is given, the start and end time, the beautician performing the treatment and the social security number of the customer are stored. Please note that the same beautician may perform several different treatments or the same treatment multiple times, but he/she may not perform two treatments at the same time.

(a) *Mandatory* exercise (9 points): Describe the conceptual schema of a database for the above application by means of an ER diagram.

(b) *Mandatory* exercise (4 points): Derive a normalized relational logical schema for the same database.

(c) *Optional* exercise (1 point): Define referential integrity constraints for 3 relations of your choice among those defined in the conceptual schema.