



Northeastern University

CS 5200 Homework 4

Conceptual design to logical design.

This assignment gives you an opportunity to create a conceptual design from a textual description. For each of the schemas below:

1. Create an entity relationship diagram for the conceptual design using UML notation. The diagram can be created by hand or via some modeling tool.
2. Convert the conceptual design to a collection of SQL CREATE statements. Make sure all primary and foreign keys are represented.

Schema 1 Pet clinic: (30)

A company called Perfect Pets runs a number of clinics. A clinic has many staff members who work at it. A staff member may only work at one clinic. One of the staff members at each clinic has additional responsibilities and is responsible for the management of the clinic. This staff member, known as the manager, can manage at most one clinic. Each clinic has a unique clinic number (clinicNo) and each member of staff has a unique staff number (staffNo). When a pet owner contacts a clinic, the owner's pet is registered with the clinic. An owner can own one or more pets, but a pet can only be owned by one owner and be registered with one clinic. Each owner has a unique owner number (ownerNo) and each pet has a unique pet number (petNo). When a pet is brought to a clinic, it undergoes an examination by a member of the staff. The examination may result in the pet being prescribed with zero or more treatments. Each examination has a unique examination number (examNo) and each **type of treatment** has a unique treatment number (treatNo).

Schema 2: Regional schools. (35)

A regional council requires the design of a database system that can provide information on all schools in the region. The requirements collection and analysis phase of the database design process has provided the following data requirements for the school database system.

- (a) Every school has many pupils and many teachers. Each pupil is assigned to one school and each teacher works for one school only.
- (b) Each teacher teaches more than one subject and a subject may be taught by more than one teacher. The database should store the number of hours a teacher spent teaching a subject. Data held on each teacher includes his/her national Insurance Number (NIN) name (first and last), sex, and qualifications. The data held on each subject includes subject title and subject type.
- (c) Each pupil can study more than one subject and a subject may be studied by more than one pupil. Data held on each pupil includes the pupil's identification number, name (first and last), sex, and date of birth.
- (d) Each school is managed by one of its teachers. The database should keep track of the date he/she started managing the school. Data stored on each school includes the school's identification number, name, address (town, street, and zip code) and phone.

Schema 3: Cleaning company (35)

The BusyBee Cleaning Company specializes in providing cleaning services for both domestic and commercial clients. Each type of client has a set of requirements. For example, The Cardboard Box Company requires cleaning services from Monday to Friday 7am until 9am and 5pm until 7pm each day, but P. Nuttall only requires cleaning services on a Wednesday from 10am until 1pm. These requirements are specific to a company and the simplest representation for them is free-form text.

Whenever a new client is taken on, a BusyBee administrator (a member of the administrative staff) assesses how many cleaning hours are required for the premises prior to assigning any staff to the job. Note that this is the ideal number, it may differ in practice. In addition, the administrator also assesses whether any specialist equipment is required and when. For example, three industrial floor cleaners may be needed on two out of five occasions for one commercial client.

There are two types of workers at the Busy Bee company: cleaning staff and administrative staff. The cleaning staff work in groups of six, with one of the six cleaners given additional supervisory responsibilities when on a job. The cleaning groups are assigned to complete specific cleaning jobs for clients. The cleaning supervisor oversees the quality of the cleaning work done for a client. The administrative staff manage the day-to-day office work including simple office work, answering phones, maintaining the cleaning schedule and ensuring the specialist equipment is properly maintained.

Assignment submission

Create a zip file named hwk4lastnamefi.zip that contains 2 files for each schema :

- hwk4problem[1..3]lastnamefi.pdf (picture of the conceptual model in UML notation).

- hw4problem[1..3]lastname.fi.sql (export of the created schema)

Submit the zip file to canvas.