Exam IIS/Databases
April 20th, 2011
9-12 AM

Remarks:

-Write readably and clear, using a black or blue pen.

-You may offer your answers in Dutch or in English.

-Write at the top of the first page all relevant data, such as your name, student number, affiliation (TM, TBK, or INF), and the total number of pages.

-Number all of your pages!

-The exam is "closed book".

Question1 (ORM modelling, R-Map; 70 pts)

Our Universe of Discourse (UoD) pertains to an information system (IS) used by a bank to maintain details about its branches, the customers, and the services offered to them by each branch.

- The bank is organized in a collection of branches. Each branch is identified by a unique number, and is located in a city (referred to by a name), and each branch offers one or more services.
- Persons in our UoD are either customers or employees, and are referred to by a number. (Employees are allowed to be customers.)
- A Person has a name, at most two telephone numbers, and has an address; an address is uniquely determined by a city, a street name, and a house number
- Customers have one or more accounts (referred to by a number), and an account is either a savings or a checking account
- Customers may borrow any number of loans, and a loan is of some amount
- Loans are managed by some employee (called a loan officer), and if an employee is a customer of the bank, then he is not allowed to manage his own loan
- Loans have payments (referred to by a number) and each payments has an amount, and we also keep track of the total amount that has been paid back on each loan

(i) Construct an ORM model of the UoD as described above. Make systematic use of the CSDP method for constructing the model. Make sure that you capture all relevant constraints, and describe them accurately in the model.

(ii) Map the ORM model to a relational schema by using the R-Map procedure.

Question 2 (SQL; 30 pts)

Consider the following relational schema

Product(maker, <u>model</u>)

PC(<u>model</u>, price)   Laptop(<u>model</u>, framesize, price)
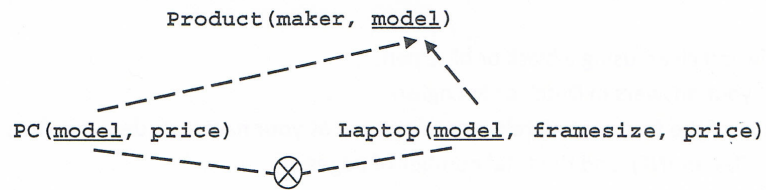
Keys are underlined, and the dashed arrows indicate foreign key constraints. We also have the constraint that PC model values must always be different from Laptop model values. Prices are in euro's, and frame size is in inches.

Specify in SQL the following query statements
- "List all makers that make only PC's and no Laptops"
- "For each maker of PC's that also makes Laptops, but only makes Laptops with a frame size larger than 15 inches, give the average price of their PC's"