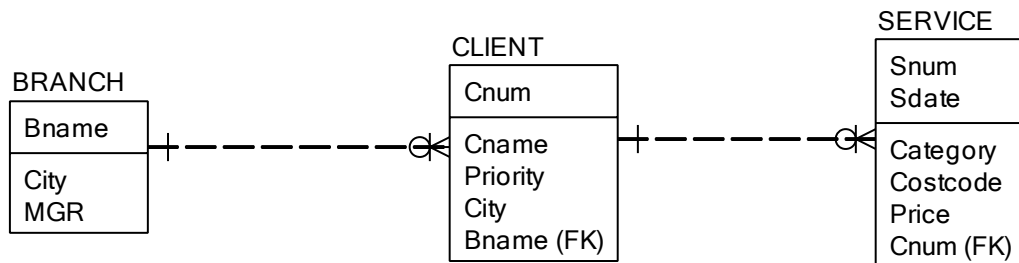


Homework Assignment 7

A professional services company provides a range of services to its clients. Each client is associated with a particular branch of the company. Each branch is managed by a particular MGR and is in a particular city. Clients have different priorities indicated by a priority number, and are based in a particular city, not necessarily in the city of the branch they use. Service categories include Financial, Evaluation, Taxation and IT. Here is part of their ERD.



The basic sets are [IDS, Names, Numbers, Dates, Money]

Q1 Based on these, introduce the following Domains: **Cities, Bnames, CIDS, SIDS, Codes, Priorities**

Q2 Using the domains and the basic sets, write the record schemas for the specification.

Q3 Write the declaration part of the State schema, to include the three record schemas introduced in Q2

Q4 Complete the following constraints:

- a) $\# \{b:\text{Branches} \bullet b.\text{Bname}\} =$
- b) $\# \{c:\text{Clients} \bullet c.\text{Cnum}\} =$
- c) $\# \{s:\text{Services} \bullet \dots\}$

Q5 Correct the **mistakes** in the following constraints:

- a) $\{b:\text{Branches} \bullet b.\text{Bname}\} \subseteq \{c:\text{Clients} \bullet c.\text{Bname}\}$
- b) $\{s:\text{Services} \bullet s.\text{Sdate}\} \subseteq \{c:\text{Clients} \bullet c.\text{Cnum}\}$

Q6 Write the following queries in **Relational Calculus**:

- a) How many Branches are there?
- b) How many Branches have Clients?
- c) For each Client, name the city and also the city in which their branch is located.
- d) For each service that cost more than €1000, Get the Cname and priority of the client
- e) For each client who has availed of 'IT' category services, list their city and Bname
- f) List the prices charged for each service to a 'High' Priority client. Include the Sdate in the result
- g) How many services have been provided to clients based in Galway or Limerick?
- h) How many categories of service have been provided to Clients based in Belfast?
- i) List the MGR for each branch whose clients have received 'Financial' services
- j) List the category and Cost code for each provided to Clients in the Cork branch.

Q7

- a) Write the SQL for Q6g with the join condition in the Where clause
- b) Write the SQL for Q6g with the Join condition in the From clause.