Distributed Data Management
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Exercise 4 - Fragmentation

based on [1]

Given is the following database schema:

```
Employee (empNo, empName, , deptNo, address)
Department (deptNo, deptName, area, mgrEmpNo, budget)
Part (partNo, partDescr, suppNo, price)
Stock (partNo, stockNo)
Supplier (suppNo, suppName, town)
```

1. Horizontal Fragmentation

A company consists of three subsidiaries. Subsidiary I has departments 100-220 and department 250, subsidiary II has departments 221-370 (except for department 250), and subsidiary III has departments 371-430. The department relation should be fragmented accordingly.

2. Derived Horizontal Fragmentation

(a) The `Employee`-relation is to be fragmented to $\texttt{Emp}_1$ and $\texttt{Emp}_2$ so that $\texttt{Emp}_1$ contains only managers and $\texttt{Emp}_2$ all other employees.

(b) The `Part`-relation contains parts from internal (within the company) as well as from external suppliers. Internal suppliers are also stored in the suppliers relation, but the suppliers number is the department number and the supplier name in this case is „internal“. Define two fragments $\texttt{Part}_{\texttt{extern}}$ and $\texttt{Part}_{\texttt{intern}}$ which contain parts from external or internal suppliers, respectively.

3. Vertical Fragmentation

The `Employee`-relation should be vertically fragmented, so that one fragment contains the name and address of an employee, another fragment the department number, and a third fragment the name and the salary of the employee. What potential problems do exist in this case?

4. Hybrid Fragmentatation

The `Parts`-relation should be fragmented according to the `price` to cheap ($\leq$ EUR 10) and expensive ($>$ EUR 10) parts, and furthermore, the expensive parts should be fragmented to those produced internally and externally as described above.

Literatur

[1] Peter Dadam. Vetreilte Datenbanken und Client/Server-Systeme: Grundlagen, Konzepte, Realisierungsformen. Springer-Verlag Berlin Heidelberg, 1996