Information System - Lab work 2

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Database

- employees (emp_no, birth_date, first_name, last_name, gender)
- departments (dept_no, dept_name)
- dept_emp (emp_no, dept_no, from_date, to_date)
- dept_manager (dept_no, emp_no, from_date, to_date)
- titles (emp_no, title, from_date, to_date)
- salaries (emp_no, salary, from_date, to_date)

Relational Algebra

1. All info of all employees.

$$\sigma(employees)$$

2. All info of all departments.

$$\sigma(department)$$

3. Full names of all employees.

$$\pi_{first\_name,last\_name}(employees)$$

4. Names of all departments

$$\pi_{dept\_name}(departments)$$

5. Full names of employees working in "ICT" department.

$\pi_{first\_name,last\_name}(employees \bowtie (\sigma_{dept\_name="ICT"}(departments \bowtie dept\_emp))$

6. Full names of male employees working in "BIO" department.

$\pi_{first\_name,last\_name}(\sigma_{gender="M"} employees \bowtie (dept\_emp \bowtie \sigma_{dept\_name="BIO"} departments))$

7. Salaries of female employees working in "WEO" department.

$$\pi_{salary}((\sigma_{gender="F"} employees \bowtie salaries) \bowtie (dept\_emp \bowtie \sigma_{dept\_name="WEO"} departments))$$

8. Full names of employees who have the same last name as their manager.

$$R_1 := \pi_{first\_name,last\_name,dept\_name}(dept\_manager \bowtie employees \bowtie departments)$$

$$R_2 := \rho_{first\_name1,last\_name1,dept\_name1/first\_name,last\_name,dept\_name}(R_1)$$

$$R_3 := \pi_{firt\_name,last\_name,dept\_name}(dept\_emp \bowtie employees \bowtie departments)$$

$$R_4 := \sigma_{last_name=last_name1 and dept_name=dept_name1}(R_3 \bowtie R_2)$$

9. Full names of managers who have been doing the job at least twice.

$$\pi_{first\_name,last\_name}(\sigma_{count(emp\_no>2)}(dept\_manager \bowtie employees \bowtie departments))$$

10. Full names of employees who was paid more than $1000000.

$$\pi_{first\_name,last\_name}(\sigma_{salary>1000000}(salaries \bowtie employees)$$

11. Names of all departments that have employees paid more than $1000000.

$$\pi_{dept\_name}(\sigma_{salary>1000000}(salaries \bowtie (dept_emp \bowtie deparments)$$