Lecture 26

THE NORTHCAP UNIVERSITY

Practice Queries -

Advanced RA

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COMPANY Database

EMPLOYEE

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno

DEPARTMENT

Dname	Dnumber	Mgr_ssn	Mgr_start_date

DEPT_LOCATIONS

Dnumber	Dlocation

PROJECT

Pname	Pnumber	Plocation	Dnum

WORKS_ON

Essn	Pno	Hours

DEPENDENT

Essn	Dependent_name	Sex	Bdate	Relationship

Practice Queries

- **Q1:** Retrieve the name and address of all employees who work for the 'Research' department.

- **Q2:** For every project located in 'Stafford', list the project number, the controlling department number and the department manager's last name, address, and birth date.

- **Q3:** Find the names of employees who work on *all* the projects controlled by department number 5.

Practice Queries Solution

- Q1:

$$\pi_{\text{Fname, Lname, Address}} (\sigma_{\text{Dname='Research'}} (\text{DEPARTMENT} \bowtie_{\text{Dnumber=Dno}} (\text{EMPLOYEE}))$$

- Q2:

$$\text{STAFFORD\_PROJS} \leftarrow \sigma_{\text{Plocation='Stafford'}} (\text{PROJECT})$$

$$\text{CONTR\_DEPTS} \leftarrow (\text{STAFFORD\_PROJS} \bowtie_{\text{Dnum=Dnumber}} \text{DEPARTMENT})$$

$$\text{PROJ\_DEPT\_MGRS} \leftarrow (\text{CONTR\_DEPTS} \bowtie_{\text{Mgr\_ssn=Ssn}} \text{EMPLOYEE})$$

$$\text{RESULT} \leftarrow \pi_{\text{Pnumber, Dnum, Lname, Address, Bdate}} (\text{PROJ\_DEPT\_MGRS})$$

Practice Queries Solution

- Q3:

$$DEPT5\_PROJS \leftarrow \rho_{(Pno)} (\pi_{Pnumber} (\sigma_{Dnum=5} (PROJECT)))$$

$$EMP\_PROJ \leftarrow \rho_{(Ssn, Pno)} (\pi_{Essn, Pno} (WORKS\_ON))$$

$$RESULT\_EMP\_SSNS \leftarrow EMP\_PROJ \div DEPT5\_PROJS$$

$$RESULT \leftarrow \pi_{Lname, Fname} (RESULT\_EMP\_SSNS * EMPLOYEE)$$

Practice Queries

- **Q4:** Make a list of project numbers for projects that involve an employee whose last name is 'Smith', either as a worker or as a manager of the department that controls the project.

- **Q5:** Retrieve the names of employees who have no dependents.

- **Q6:** List the names of managers who have at least one dependent.

Practice Queries Solution

- **Q4:**

$$\pi_{Pno}(WORKS\_ON \bowtie_{Essn=Ssn} (\pi_{Ssn}(\sigma_{Lname='Smith'}(EMPLOYEE))) \cup \pi_{Pno}((\pi_{Dnumber}(\sigma_{Lname='Smith'}(\pi_{Lname, Dnumber}(EMPLOYEE)))$$

$$\bowtie_{Ssn=Mgr\_ssn} DEPARTMENT)) \bowtie_{Dnumber=Dnum} PROJECT)$$

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$$SMITHS(Essn) \leftarrow \pi_{Ssn}(\sigma_{Lname='Smith'}(EMPLOYEE))$$

$$SMITH\_WORKER\_PROJS \leftarrow \pi_{Pno}(WORKS\_ON * SMITHS)$$

$$MGRS \leftarrow \pi_{Lname, Dnumber}(EMPLOYEE \bowtie_{Ssn=Mgr\_ssn} DEPARTMENT)$$

$$SMITH\_MANAGED\_DEPTS(Dnum) \leftarrow \pi_{Dnumber}(\sigma_{Lname='Smith'}(MGRS))$$

$$SMITH\_MGR\_PROJS(Pno) \leftarrow \pi_{Pnumber}(SMITH\_MANAGED\_DEPTS * PROJECT)$$

$$RESULT \leftarrow (SMITH\_WORKER\_PROJS \cup SMITH\_MGR\_PROJS)$$

Practice Queries Solution

- **Q5:**

$$ALL\_EMPS \leftarrow \pi_{Ssn}(EMPLOYEE)$$

$$EMPS\_WITH\_DEPS(Ssn) \leftarrow \pi_{Essn}(DEPENDENT)$$

$$EMPS\_WITHOUT\_DEPS \leftarrow (ALL\_EMPS - EMPS\_WITH\_DEPS)$$

$$RESULT \leftarrow \pi_{Lname, Fname}(EMPS\_WITHOUT\_DEPS * EMPLOYEE)$$

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$$\Pi_{Lname, Fname}((\pi_{Ssn}(EMPLOYEE) - \rho_{Ssn}(\pi_{Essn}(DEPENDENT))) * EMPLOYEE)$$

Practice Queries Solution

- **Q6:**

$$MGRS\ (Ssn) \leftarrow \pi_{Mgr\_ssn}\ (DEPARTMENT)$$

$$EMPS\_WITH\_DEPS\ (Ssn) \leftarrow \pi_{Essn}\ (DEPENDENT)$$

$$MGRS\_WITH\_DEPS \leftarrow (MGRS \cap EMPS\_WITH\_DEPS)$$

$$RESULT \leftarrow \pi_{Lname,\ Fname}\ (MGRS\_WITH\_DEPS * EMPLOYEE)$$

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Thanks!!

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