Databases – Relational Algebra

Petko Rutesic

WWI-18-DSA/WWI-18-DSB

DHBW
Duale Hochschule
Baden-Württemberg
Mannheim

Exercises 1

27. November 2019

1 Relational algebra

1.1 Basic queries

Considering the database COMPANY on page 72 of the textbook, write the following relation algebra expressions.

1. List the first and last names of all female employees.
2. List the names of all male employees whose salary greater than 30000.
3. Using the cross product operation, list the names (first and last names) of managers with names of departments they manage.
4. List the names of employees who have no dependents.
5. List the names of all female employee and the names of their dependents if they have them.
6. Extract the first and last names of each employee which has an dependent together with the name of his dependent.
7. List the names and addresses of all employees which are supervised by John Borg.
8. Retrieve the name and address of all employees who work for the Research department.
9. Retrieve average salary of all female employees.
10. For each employee, retrieve the employee's first and last name and the first and last name of his or her supervisor.
11. Retrieve the Social Security numbers of all employees who work for the Research department or supervise directly someone from the Research department.

1.2 Other queries

Write relational algebra expressions which satisfy the following requirements:

1. Retrieve Security Social Number of all employees which work in department 5(Dno=5) or are supervised by an employee which works in department 5.
2. Retrieve the of names of departments together with names of their managers.
3. Print the list of all employee names as well as the name of the departments they manage if they happen to manage a department.
4. List the names of managers who have at least one dependent.
5. Retrieve the names of all employees who work on every project.
6. List the last names of all department managers who have no dependents.

1.3 Relational Algebra operations

1. Suppose we have the following two relations P(A,B) and Q(B,C,D):

P(A,B)

A	B
1	a
7	t
2	g
4	d
9	t

Q(B, C, D)

B	C	D
d	5	6
a	7	8
t	8	9

If we compute of $P \bowtie_{P.B=Q.B \wedge P.A<Q.C} Q$. Resulting schema has attributes (A,P.B,Q.B,C,D). Which of the following tuples is in the result?

(a) (4, d, d, 7, b)

(b) (2, g, g, 7, 8)

(c) (2, g, t, 8, 9)

(d) (4, d, d, 5, 6)

(e) (1, a, a, 8, 9)