# Individual Assignment 4

DB 설계 및 디자인 2, 2023학년도 2학기

* 제출시한: 12월 05일 (화요일), 11:59 PM, (LMS를 통해 제출).
* 제출하는 파일명은 “숙제4\_본인이름.docx”와 같이 자신의 이름을 마지막에 붙이시오.
* 질문 있을 시 ijkim@mju.ac.kr으로 질문하시오.

Weights (비중): 5% of total grades.

For the relational database instance, shown in the supplemental material below (go to the next page), write relational algebra expressions for the following data retrieval requirements. Please refer to the slide and the in-class exercise we solved during the class to get reminded of the notations and the ways to solve the different relational algebra questions.

1. List all male employees, who do NOT work in department number 5 but have salary higher than $35,000

σ NOT(Dno=5)AND(Sex=M)AND(Salary>35000) (Employee)

1. List name, birth date and relationship for all dependents of employee John B. Smith.

Emp <- σ(FName=John)AND(LName=Smith)AND(Minit=B)(Employee)

Emp\_Dep <- Emp ⋈SSN=ESSN (Dependent)

Result <- 𝝅Dependent\_Name,BDate,Relationship(Emp\_Dep)

1. List name for all projects, which is NOT managed by department number 5 but is located in Houston. Use the DIFFERENCE operation for this data retrieval requirement.

PJ1 <- σPlocation=Houston (Project)

PJ2 <- σDNum=5 (Project)

Result <- 𝝅PName (PJ1-PJ2)

1. List name for all departments located in Houston. Use the NATURAL JOIN operation for this data retrieval requirement.

Dep <- Department \* Dept\_Location

Dep2 <- σDLocation=Houston (Dep)

Result <- 𝝅DName (Dep2)

1. List SSN for all employees, who work on project “ProjectJ”.

PJ <- σPName=ProjectJ (Project)

P\_W <- PJ ⋈PNumber=PNo (Works\_On)

P\_W\_E <- P\_W ⋈ESSN=SSN (Employee)

Result <- 𝝅SSN (P\_W\_E)

#### Supplemental Material

#### Table Name: Employee

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| FName | Minit | LName | SSN | BDate | Address | Sex | Salary | SuperSSN | DNo |
| Doug | E | Gilbert | 554433221 | 09-JUN-60 | 11 S 59 E, Salt Lake City, UT | M | 80000 | NULL | 3 |
| Joyce |  | PAN | 543216789 | 07-FEB-78 | 35 S 18 E, Salt Lake City, UT | F | 70000 | NULL | 2 |
| Frankin | T | Wong | 333445555 | 08-DEC-45 | 638 Voss, Houston, TX | M | 40000 | 554433221 | 5 |
| Jennifer | S | Wallace | 987654321 | 20-JUN-31 | 291 Berry, Bellaire, TX | F | 43000 | 554433221 | 4 |
| John | B | Smith | 123456789 | 09-JAN-55 | 731 Fondren, Houston, TX | M | 30000 | 333445555 | 5 |
| Ramesh | K | Narayan | 666884444 | 15-SEP-52 | 975 Fire Oak, Humble, TX | M | 38000 | 333445555 | 5 |
| Joyce | A | English | 453453453 | 31-JUL-62 | 5631 Rice, Houston, TX | F | 25000 | 333445555 | 5 |
| James | E | Borg | 888665555 | 10-NOV-27 | 450 Stone, Houston, TX | M | 55000 | 543216789 | 1 |
| Alicia | J | Zelaya | 999887777 | 19-JUL-58 | 3321 Castle, Spring, TX | F | 25000 | 987654321 | 4 |
| Ahmad | V | Jabbar | 987987987 | 29-MAR-59 | 980 Dallas, Houston, TX | M | 25000 | 987654321 | 4 |

#### Table Name: Department

|  |  |  |  |
| --- | --- | --- | --- |
| DName | DNumber | MgrSSN | MgrStartDate |
| Manufacture | 1 | 888665555 | 19-JUN-71 |
| Administration | 2 | 543216789 | 04-JAL-99 |
| Headquarter | 3 | 554433221 | 22-SEP-55 |
| Finance | 4 | 987654321 | 01-JAN-85 |
| Research | 5 | 333445555 | 22-MAY-78 |

#### Table Name: Dept\_Locations

|  |  |
| --- | --- |
| DNumber | DLocation |
| 1 | Houston |
| 1 | Chicago |
| 2 | New York |
| 2 | San Francisco |
| 3 | Salt Lake City |
| 4 | Stafford |
| 4 | Bellaire |
| 5 | Sugarland |
| 5 | Houston |

#### Table Name: Project

|  |  |  |  |
| --- | --- | --- | --- |
| PName | PNumber | Plocation | DNum |
| ProjectA | 3388 | Houston | 1 |
| ProjectB | 1945 | Salt Lake City | 3 |
| ProjectC | 6688 | Houston | 5 |
| ProjectD | 24 | Bellaire | 4 |
| ProjectE | 77 | Sugarland | 5 |
| ProjectF | 1 | Salt Lake City | 3 |
| ProjectG | 12 | New York | 2 |
| ProjectH | 34 | Stafford | 4 |
| ProjectI | 43 | Chicago | 1 |
| ProjectJ | 22 | San Francisco | 2 |

#### Table Name: Works\_On

|  |  |  |
| --- | --- | --- |
| ESSN | PNo | Hours |
| 123456789 | 3388 | 32.5 |
| 123456789 | 1945 | 7.5 |
| 666884444 | 3388 | 40.0 |
| 453453453 | 77 | 20.0 |
| 453453453 | 22 | 20.0 |
| 333445555 | 77 | 10.0 |
| 333445555 | 6688 | 10.0 |
| 333445555 | 43 | 35.0 |
| 333445555 | 22 | 28.5 |
| 999887777 | 1 | 11.5 |
| 999887777 | 12 | 13.0 |
| 543216789 | 22 | 17.0 |
| 554433221 | 1945 | 21.5 |

#### Table Name: Dependent

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ESSN | Dependent\_Name | Sex | BDate | Relationship |
| 333445555 | Alice | F | 05-APR-76 | Daughter |
| 333445555 | Theodore | M | 25-OCT-73 | Son |
| 333445555 | Joy | F | 03-MAY-48 | Spouse |
| 987654321 | Abner | M | 29-FEB-32 | Spouse |
| 123456789 | Michael | M | 01-JAN-78 | Son |
| 123456789 | Alice | F | 31-DEC-78 | Daughter |
| 123456789 | Elizabeth | F | 05-MAY-57 | Spouse |

A relational database instance, shown in the tables above, has the following relations.

**EMPLOYEE**:

Primary key (SSN)

Foreign key (SUPERSSN) references EMPLOYEE (SSN)

Foreign key (DNO) references DEPARTMENT (DNUMBER)

**DEPARTMENT**:

Primary key (DNUMBER)

Foreign key (MGRSSN) references EMPLOYEE (SSN)

**DEPT\_LOCATIONS**:

Primary key (DNUMBER, DLOCATION)

Foreign key (DNUMBER) references DEPARTMENT (DNUMBER)

**PROJECT**:

Primary key (PNUMBER)

Foreign key (DNUM) references DEPARTMENT (DNUMBER)

**WORKS\_ON**:

Primary key (ESSN, PNO)

Foreign key (ESSN) references EMPLOYEE (SSN)

Foreign key (PNO) references PROJECT(PNUMBER)

**DEPENDENT**:

Primary key (ESSN, DEPENDENT\_NAME)

Foreign key (ESSN) references EMPLOYEE (SSN)