



Πανεπιστήμιο Δυτικής Αττικής

Βάσεις Δεδομένων Μεταπτυχιακού Κύκλου Σπουδών (MSCICT101)

Ενότητα 5: Ερωτήματα σε γλώσσα SQL

JOIN πινάκων

Π. Ανδρίτσος - Α. Τσολακίδης



Το περιεχόμενο του μαθήματος
διατίθεται με άδεια Creative
Commons εκτός και αν αναφέρεται
διαφορετικά

Καρτεσιανό γινόμενο και συνδέσεις

Παράδειγμα σχεσιακής βάσης δεδομένων προσωπικού εταιρείας

Deptno	Dname	Loc
10	ACCOUNTING	ATHENS
20	SALES	LONDON
30	RESEARCH	ATHENS
40	PAYROLL	LONDON

dept (πίνακας τμημάτων)

emp (πίνακας υπαλλήλων)

Empno	Ename	Job	Hiredate	Mgr	Sal	Comm	Dept no
10	CODD	ANALYST	1989-01-01	15	3000		10
15	ELMASRI	ANALYST	1995-05-02	15	1200	150	10
20	NAVATHE	SALESMAN	1977-07-07	20	2000		20
30	DATE	PROGRAMMER	2004-05-04	15	1800	200	10

Καρτεσιανό γινόμενο

SELECT *

FROM dept, emp;

```
mysql> SELECT *  
-> FROM dept, emp;
```

DEPTNO	DNAME	LOC	EMPNO	ENAME	JOB	HIREDATE	MGR	SAL	COMM	DEPTNO
10	ACCOUNTING	NEW YORK	10	CODD	ANALYST	1989-01-01	15	3000.00	NULL	10
20	RESEARCH	DALLAS	10	CODD	ANALYST	1989-01-01	15	3000.00	NULL	10
30	SALES	CHICAGO	10	CODD	ANALYST	1989-01-01	15	3000.00	NULL	10
40	OPERATIONS	BOSTON	10	CODD	ANALYST	1989-01-01	15	3000.00	NULL	10
10	ACCOUNTING	NEW YORK	15	ELMASRI	ANALYST	1995-05-02	15	1200.00	150.00	10
20	RESEARCH	DALLAS	15	ELMASRI	ANALYST	1995-05-02	15	1200.00	150.00	10
30	SALES	CHICAGO	15	ELMASRI	ANALYST	1995-05-02	15	1200.00	150.00	10
40	OPERATIONS	BOSTON	15	ELMASRI	ANALYST	1995-05-02	15	1200.00	150.00	10
10	ACCOUNTING	NEW YORK	20	NAVATHE	SALESMAN	1977-07-07	20	2000.00	NULL	20
20	RESEARCH	DALLAS	20	NAVATHE	SALESMAN	1977-07-07	20	2000.00	NULL	20
30	SALES	CHICAGO	20	NAVATHE	SALESMAN	1977-07-07	20	2000.00	NULL	20
40	OPERATIONS	BOSTON	20	NAVATHE	SALESMAN	1977-07-07	20	2000.00	NULL	20
10	ACCOUNTING	NEW YORK	30	DATE	PROGRAMMER	2004-05-04	15	1800.00	200.00	10
20	RESEARCH	DALLAS	30	DATE	PROGRAMMER	2004-05-04	15	1800.00	200.00	10
30	SALES	CHICAGO	30	DATE	PROGRAMMER	2004-05-04	15	1800.00	200.00	10
40	OPERATIONS	BOSTON	30	DATE	PROGRAMMER	2004-05-04	15	1800.00	200.00	10

16 rows in set (0.03 sec)

Σύνδεση - join

SELECT *

FROM dept, emp

WHERE dept.deptno=emp.deptno;

```
mysql> SELECT *  
-> FROM dept, emp  
-> WHERE dept.deptno=emp.deptno;
```

DEPTNO	DNAME	LOC	EMPNO	ENAME	JOB	HIREDATE	MGR	SAL	COMM	DEPTNO
10	ACCOUNTING	NEW YORK	10	CODD	ANALYST	1989-01-01	15	3000.00	NULL	10
10	ACCOUNTING	NEW YORK	15	ELMASRI	ANALYST	1995-05-02	15	1200.00	150.00	10
20	RESEARCH	DALLAS	20	NAVATHE	SALESMAN	1977-07-07	20	2000.00	NULL	20
10	ACCOUNTING	NEW YORK	30	DATE	PROGRAMMER	2004-05-04	15	1800.00	200.00	10

4 rows in set (0.02 sec)

Σύνδεση - join

```
mysql> SELECT empno, ename, emp.deptno, dname  
-> FROM dept, emp  
-> WHERE dept.deptno=emp.deptno;
```

empno	ename	deptno	dname
10	CODD	10	ACCOUNTING
15	ELMASRI	10	ACCOUNTING
20	NAVATHE	20	RESEARCH
30	DATE	10	ACCOUNTING

```
4 rows in set (0.01 sec)
```

```
mysql> SELECT empno, ename, emp.deptno, dname  
-> FROM dept  
-> JOIN emp ON dept.deptno=emp.deptno;
```

empno	ename	deptno	dname
10	CODD	10	ACCOUNTING
15	ELMASRI	10	ACCOUNTING
20	NAVATHE	20	RESEARCH
30	DATE	10	ACCOUNTING

```
4 rows in set (0.00 sec)
```



SELECT που βασίζονται
σε περισσότερους από
έναν πίνακες

Στην υποπρόταση **WHERE** γράφουμε
συνθήκη σύνδεσης (join) των πινάκων:

```
SELECT ... FROM emp, dept  
WHERE emp.deptno=dept.deptno;
```

Έστω βάση Διοίκησης Προσωπικού αποτελούμενη από τους παρακάτω πίνακες

```
SELECT * FROM emp;
```

Empno	Ename	Job	Mgr	Hiredate	Sal	Comm.	Deptno
7369	SMITH	CLERK	7902	17/12/00	800		20
7499	ALLEN	SALESMAN	7698	20/02/01	1600	300	30
7521	WARD	SALESMAN	7698	22/02/01	1250	500	30
7566	JONES	MANAGER	7839	02/04/01	2975		20
7654	MARTIN	SALESMAN	7698	28/09/01	1250	1400	30
7698	BLAKE	MANAGER	7839	01/05/01	2850		30
7782	CLARK	MANAGER	7839	09/06/01	2450		10
7788	SCOTT	ANALYST	7566	19/04/07	3000		20
7839	KING	PRESIDENT		17/11/01	5000		10
7844	TURNER	SALESMAN	7698	08/09/01	1500	0	30
7876	ADAMS	CLERK	7788	23/05/07	1100		20
7900	JAMES	CLERK	7698	03/12/01	950		30
7902	FORD	ANALYST	7566	03/12/01	3000		20
7934	MILLER	CLERK	7782	23/01/02	1300		10
7998	BATES	ANALYST	7566	17/11/07	1000		

```
SELECT * FROM dept;
```

Deptno	Dname	Loc
10	ACCOUNTING	NEW YORK
20	RESEARCH	DALLAS
30	SALES	CHICAGO
40	OPERATIONS	BOSTON

Σε λογικό επίπεδο γίνεται σύνδεση των δύο πινάκων: **Αντί της στήλης Deptno του σχήματος στην πραγματικότητα έχουμε δύο στήλες, τις στήλες Emp.deptno, Dept.deptno, όπου Emp.deptno=Dept.deptno**

Empno	Ename	Job	Mgr	Hiredate	Sal	Comm	Deptno	Dname	Loc
7369	SMITH	CLERK	7902	17/12/00	800		20	RESEARCH	DALLAS
7499	ALLEN	SALESMAN	7698	20/02/01	1600	300	30	SALES	CHICAGO
7521	WARD	SALESMAN	7698	22/02/01	1250	500	30	SALES	CHICAGO
7566	JONES	MANAGER	7839	02/04/01	2975		20	RESEARCH	DALLAS
7654	MARTIN	SALESMAN	7698	28/09/01	1250	1400	30	SALES	CHICAGO
7698	BLAKE	MANAGER	7839	01/05/01	2850		30	SALES	CHICAGO
7782	CLARK	MANAGER	7839	09/06/01	2450		10	ACCOUNTING	NEW YORK
7788	SCOTT	ANALYST	7566	19/04/07	3000		20	RESEARCH	DALLAS
7839	KING	PRESIDENT		17/11/01	5000		10	ACCOUNTING	NEW YORK
7844	TURNER	SALESMAN	7698	08/09/01	1500	0	30	SALES	CHICAGO
7876	ADAMS	CLERK	7788	23/05/07	1100		20	RESEARCH	DALLAS
7900	JAMES	CLERK	7698	03/12/01	950		30	SALES	CHICAGO
7902	FORD	ANALYST	7566	03/12/01	3000		20	RESEARCH	DALLAS
7934	MILLER	CLERK	7782	23/01/02	1300		10	ACCOUNTING	NEW YORK
7998	BATES	ANALYST	7566	17/11/07	1000				

SELECT * FROM dept, emp WHERE dept.deptno=emp.deptno;

SELECT * FROM emp, dept WHERE emp.deptno=dept.deptno;

Προσοχή η υπάλληλος 7998 δεν συμπεριλαμβάνεται στη σύνδεση.

```
mysql> SELECT * FROM dept, emp WHERE emp.deptno=dept.deptno;
```

DEPTNO	DNAME	LOC	EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
10	ACCOUNTING	NEW YORK	7782	CLARK	MANAGER	7839	1981-11-27	2450.00	NULL	10
10	ACCOUNTING	NEW YORK	7839	KING	PRESIDENT	NULL	1987-11-12	5000.00	NULL	10
10	ACCOUNTING	NEW YORK	7934	MILLER	CLERK	7782	2003-01-19	1300.00	NULL	10
20	RESEARCH	DALLAS	7369	SMITH	CLERK	7902	1980-12-17	800.00	NULL	20
20	RESEARCH	DALLAS	7566	JONES	MANAGER	7839	1981-12-24	2975.00	NULL	20
20	RESEARCH	DALLAS	7788	SCOTT	ANALYST	7566	1987-04-29	3000.00	NULL	20
20	RESEARCH	DALLAS	7876	ADAMS	CLERK	7788	2003-05-07	1100.00	NULL	20
20	RESEARCH	DALLAS	7902	FORD	ANALYST	7566	2003-12-19	3000.00	NULL	20
30	SALES	CHICAGO	7499	ALLEN	SALESMAN	7698	1981-02-20	1600.00	300.00	30
30	SALES	CHICAGO	7521	WARD	SALESMAN	7698	2002-02-01	1250.00	500.00	30
30	SALES	CHICAGO	7654	MARTIN	SALESMAN	7698	1981-10-28	1250.00	1400.00	30
30	SALES	CHICAGO	7698	BLAKE	MANAGER	7839	2001-05-02	2850.00	NULL	30
30	SALES	CHICAGO	7844	TURNER	SALESMAN	7698	2007-10-19	1500.00	0.00	30
30	SALES	CHICAGO	7900	JAMES	CLERK	7698	2003-12-12	950.00	NULL	30

```
14 rows in set (0.00 sec)
```

```
mysql> SELECT * FROM emp, dept WHERE emp.deptno=dept.deptno;
```

EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO	DEPTNO	DNAME	LOC
7782	CLARK	MANAGER	7839	1981-11-27	2450.00	NULL	10	10	ACCOUNTING	NEW YORK
7839	KING	PRESIDENT	NULL	1987-11-12	5000.00	NULL	10	10	ACCOUNTING	NEW YORK
7934	MILLER	CLERK	7782	2003-01-19	1300.00	NULL	10	10	ACCOUNTING	NEW YORK
7369	SMITH	CLERK	7902	1980-12-17	800.00	NULL	20	20	RESEARCH	DALLAS
7566	JONES	MANAGER	7839	1981-12-24	2975.00	NULL	20	20	RESEARCH	DALLAS
7788	SCOTT	ANALYST	7566	1987-04-29	3000.00	NULL	20	20	RESEARCH	DALLAS
7876	ADAMS	CLERK	7788	2003-05-07	1100.00	NULL	20	20	RESEARCH	DALLAS
7902	FORD	ANALYST	7566	2003-12-19	3000.00	NULL	20	20	RESEARCH	DALLAS
7499	ALLEN	SALESMAN	7698	1981-02-20	1600.00	300.00	30	30	SALES	CHICAGO
7521	WARD	SALESMAN	7698	2002-02-01	1250.00	500.00	30	30	SALES	CHICAGO
7654	MARTIN	SALESMAN	7698	1981-10-28	1250.00	1400.00	30	30	SALES	CHICAGO
7698	BLAKE	MANAGER	7839	2001-05-02	2850.00	NULL	30	30	SALES	CHICAGO
7844	TURNER	SALESMAN	7698	2007-10-19	1500.00	0.00	30	30	SALES	CHICAGO
7900	JAMES	CLERK	7698	2003-12-12	950.00	NULL	30	30	SALES	CHICAGO

```
14 rows in set (0.00 sec)
```

Επιλογή στηλών (ή πράξεων μεταξύ των στηλών) για προβολή

Empno	Ename	Job	Sal	Sal+IFNULL(Comm,0)	Emp.Deptno	Dname
7902	FORD	ANALYST	3000	3000	20	RESEARCH
7788	SCOTT	ANALYST	3000	3000	20	RESEARCH

Να και μία παραλλαγή της προηγούμενης δήλωσης.

```
SELECT empno, ename, job, sal, sal+IFNULL(comm,0),  
emp.deptno, dname  
FROM dept , emp  
WHERE dept.deptno= emp.deptno  
AND job IN ('ANALYST', 'PROGRAMMER')  
ORDER BY ename;
```

MySQL: IFNULL, ORACLE: NVL-Null Value

```
mysql>
mysql> SELECT * FROM dept, emp WHERE dept.deptno=emp.deptno;
```

DEPTNO	DNAME	LOC	EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
10	ACCOUNTING	NEW YORK	7782	CLARK	MANAGER	7839	1981-11-27	2450.00	NULL	10
10	ACCOUNTING	NEW YORK	7839	KING	PRESIDENT	NULL	1987-11-12	5000.00	NULL	10
10	ACCOUNTING	NEW YORK	7934	MILLER	CLERK	7782	2003-01-19	1300.00	NULL	10
20	RESEARCH	DALLAS	7369	SMITH	CLERK	7902	1980-12-17	800.00	NULL	20
20	RESEARCH	DALLAS	7566	JONES	MANAGER	7839	1981-12-24	2975.00	NULL	20
20	RESEARCH	DALLAS	7788	SCOTT	ANALYST	7566	1987-04-29	3000.00	NULL	20
20	RESEARCH	DALLAS	7876	ADAMS	CLERK	7788	2003-05-07	1100.00	NULL	20
20	RESEARCH	DALLAS	7902	FORD	ANALYST	7566	2003-12-19	3000.00	NULL	20
30	SALES	CHICAGO	7499	ALLEN	SALESMAN	7698	1981-02-20	1600.00	300.00	30
30	SALES	CHICAGO	7521	WARD	SALESMAN	7698	2002-02-01	1250.00	500.00	30
30	SALES	CHICAGO	7654	MARTIN	SALESMAN	7698	1981-10-28	1250.00	1400.00	30
30	SALES	CHICAGO	7698	BLAKE	MANAGER	7839	2001-05-02	2850.00	NULL	30
30	SALES	CHICAGO	7844	TURNER	SALESMAN	7698	2007-10-19	1500.00	0.00	30
30	SALES	CHICAGO	7900	JAMES	CLERK	7698	2003-12-12	950.00	NULL	30

14 rows in set (0.00 sec)

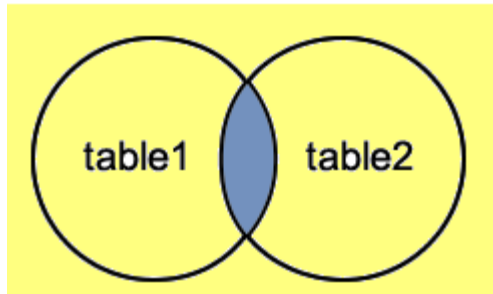
```
mysql>
mysql>
mysql> SELECT empno, ename, job, sal, sal+IFNULL(comm,0), emp.deptno, dname
-> FROM dept , emp
-> WHERE dept.deptno= emp.deptno
-> AND job IN ('ANALYST', 'PROGRAMMER')
-> ORDER BY ename;
```

empno	ename	job	sal	sal+IFNULL(comm,0)	deptno	dname
7902	FORD	ANALYST	3000.00	3000.00	20	RESEARCH
7788	SCOTT	ANALYST	3000.00	3000.00	20	RESEARCH

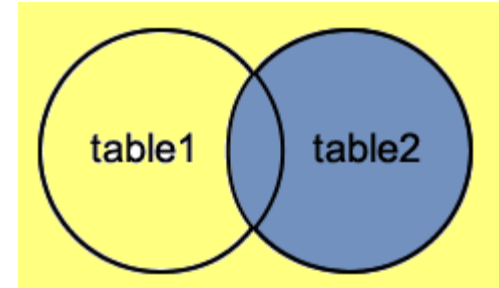
2 rows in set (0.00 sec)

SELECT που περιλαμβάνουν σύνδεση πινάκων. Τελεστής JOIN

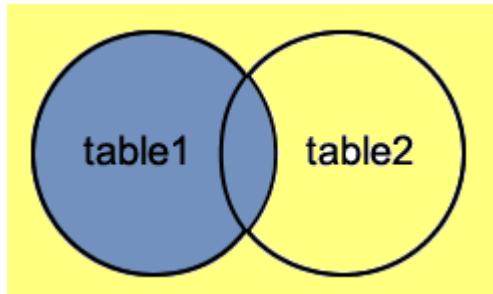
JOIN:



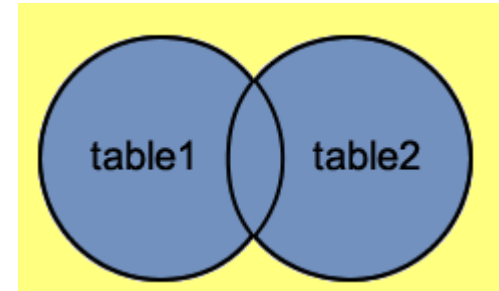
RIGHT JOIN:



LEFT JOIN:



FULL JOIN:



JOIN

Χρήση τελεστή join

```
SELECT empno, ename, job, emp.deptno, dname  
FROM dept, emp  
WHERE dept.deptno=emp.deptno;
```

```
SELECT empno, ename, job, emp.deptno, dname  
FROM dept  
INNER JOIN emp ON dept.deptno=emp.deptno;
```

```
SELECT empno, ename, job, emp.deptno, dname  
FROM dept  
JOIN emp ON dept.deptno=emp.deptno;
```

```
mysql> SELECT empno, ename, job, emp.deptno, dname
-> FROM dept
-> JOIN emp ON dept.deptno=emp.deptno;
```

empno	ename	job	deptno	dname
7782	CLARK	MANAGER	10	ACCOUNTING
7839	KING	PRESIDENT	10	ACCOUNTING
7934	MILLER	CLERK	10	ACCOUNTING
7369	SMITH	CLERK	20	RESEARCH
7566	JONES	MANAGER	20	RESEARCH
7788	SCOTT	ANALYST	20	RESEARCH
7876	ADAMS	CLERK	20	RESEARCH
7902	FORD	ANALYST	20	RESEARCH
7499	ALLEN	SALESMAN	30	SALES
7521	WARD	SALESMAN	30	SALES
7654	MARTIN	SALESMAN	30	SALES
7698	BLAKE	MANAGER	30	SALES
7844	TURNER	SALESMAN	30	SALES
7900	JAMES	CLERK	30	SALES

```
14 rows in set (0.00 sec)
```

```
mysql>
```

SELECT ... SELECT vs JOIN

```
SELECT empno, ename, job, sal, deptno
FROM EMP
WHERE deptno IN (SELECT deptno FROM DEPT
                 WHERE dname='SALES')
ORDER BY deptno, ename;
```

```
SELECT empno, ename, job, sal, emp.deptno
FROM EMP
JOIN DEPT ON EMP.DEPTNO=DEPT.DEPTNO
WHERE dname='SALES'
ORDER BY emp.deptno, ename;
```

```

SELECT EMPNO, ENAME, EMP.DEPTNO, DEPT.DNAME, SAL, COMM
FROM emp
INNER JOIN dept ON emp.deptno=dept.deptno
ORDER BY ename;

```

```

mysql> SELECT EMPNO, ENAME, EMP.DEPTNO, DEPT.DNAME, SAL, COMM
-> FROM emp
-> INNER JOIN dept
-> ON emp.deptno=dept.deptno
-> ORDER BY ename;

```

EMPNO	ENAME	DEPTNO	DNAME	SAL	COMM
11	CODD	10	ACCOUNTING	2900.00	NULL
21	CODD	10	ACCOUNTING	2000.00	NULL
22	CODD	20	RESEARCH	1200.00	150.00
12	CODD	10	ACCOUNTING	1200.00	150.00
23	CODD	20	RESEARCH	2000.00	NULL
10	CODD	10	ACCOUNTING	3000.00	NULL
30	DATE	10	ACCOUNTING	1800.00	200.00
15	ELMASRI	10	ACCOUNTING	1200.00	150.00
20	NAVATHE	20	RESEARCH	2000.00	NULL

```

9 rows in set (0.00 sec)

```

```
SELECT empno, ename, dept.deptno
FROM emp
INNER JOIN dept ON emp.deptno=dept.deptno
ORDER BY ename;
```

```
SELECT empno, ename, dept.deptno
FROM emp
JOIN dept ON emp.deptno=dept.deptno
ORDER BY ename;
```

```
mysql>
mysql> SELECT empno, ename, dept.deptno
-> FROM emp
-> JOIN dept
-> ON emp.deptno=dept.deptno
-> ORDER BY ename;
+-----+-----+-----+
| empno | ename  | deptno |
+-----+-----+-----+
| 21    | CODD   | 10     |
| 10    | CODD   | 10     |
| 11    | CODD   | 10     |
| 22    | CODD   | 20     |
| 12    | CODD   | 10     |
| 23    | CODD   | 20     |
| 30    | DATE   | 10     |
| 15    | ELMASRI | 10     |
| 20    | NAVATHE | 20     |
+-----+-----+-----+
9 rows in set (0.00 sec)
```

```

SELECT EMPNO, ENAME, EMP.DEPTNO, DEPT.DNAME, SAL, COMM
      FROM emp
INNER JOIN dept
ON emp.deptno=dept.deptno
ORDER BY ename;

```

```

mysql> SELECT EMPNO, ENAME, EMP.DEPTNO, DEPT.DNAME, SAL, COMM
-> FROM emp
-> INNER JOIN dept
-> ON emp.deptno=dept.deptno
-> ORDER BY ename;

```

EMPNO	ENAME	DEPTNO	DNAME	SAL	COMM
11	CODD	10	ACCOUNTING	2900.00	NULL
21	CODD	10	ACCOUNTING	2000.00	NULL
22	CODD	20	RESEARCH	1200.00	150.00
12	CODD	10	ACCOUNTING	1200.00	150.00
23	CODD	20	RESEARCH	2000.00	NULL
10	CODD	10	ACCOUNTING	3000.00	NULL
30	DATE	10	ACCOUNTING	1800.00	200.00
15	ELMASRI	10	ACCOUNTING	1200.00	150.00
20	NAVATHE	20	RESEARCH	2000.00	NULL

```

9 rows in set (0.00 sec)

```

```
SELECT empno, ename, dept.deptno
FROM emp
LEFT JOIN dept
ON emp.deptno=dept.deptno
ORDER BY ename;
```

```
mysql> SELECT empno, ename, dept.deptno
-> FROM emp
-> LEFT JOIN dept
-> ON emp.deptno=dept.deptno
-> ORDER BY ename;
```

empno	ename	deptno
77	BATES	NULL
23	CODD	20
22	CODD	20
21	CODD	10
12	CODD	10
11	CODD	10
10	CODD	10
30	DATE	10
15	ELMASRI	10
20	NAVATHE	20

```
10 rows in set (0.00 sec)
```

```

SELECT empno, ename, dept.deptno
FROM emp
RIGHT JOIN dept
ON emp.deptno=dept.deptno
ORDER BY ename;

```

```

mysql> SELECT empno, ename, dept.deptno
-> FROM emp
-> RIGHT JOIN dept
-> ON emp.deptno=dept.deptno
-> ORDER BY ename;
+-----+-----+-----+
| empno | ename  | deptno |
+-----+-----+-----+
| NULL  | NULL   | 30     |
| NULL  | NULL   | 40     |
| 12    | Codd   | 10     |
| 21    | Codd   | 10     |
| 22    | Codd   | 20     |
| 23    | Codd   | 20     |
| 10    | Codd   | 10     |
| 11    | Codd   | 10     |
| 30    | DATE   | 10     |
| 15    | ELMASRI | 10     |
| 20    | NAUATHE | 20     |
+-----+-----+-----+
11 rows in set (0.00 sec)

```

```
SELECT column_names  
FROM table1  
FULL JOIN table2  
ON table1.column_name=table2.column_name;
```

**Δεν υποστηρίζεται ο τελεστής
στο προϊόν MySQL.**

```
mysql> SELECT empno, ename, dept.deptno  
-> FROM emp  
-> LEFT JOIN dept  
-> ON emp.deptno=dept.deptno  
-> UNION  
-> SELECT empno, ename, dept.deptno  
-> FROM emp  
-> RIGHT JOIN dept  
-> ON emp.deptno=dept.deptno  
-> ORDER BY ename;
```

empno	ename	deptno
NULL	NULL	30
NULL	NULL	40
77	BATES	NULL
21	CODD	10
10	CODD	10
22	CODD	20
11	CODD	10
23	CODD	20
12	CODD	10
30	DATE	10
15	ELMASRI	10
20	NAVATHE	20

```
12 rows in set (0.04 sec)
```

```
SELECT empno, ename, dept.deptno
FROM emp
LEFT JOIN dept
ON emp.deptno=dept.deptno
UNION
SELECT empno, ename, dept.deptno
FROM emp
RIGHT JOIN dept
ON emp.deptno=dept.deptno
ORDER BY ename;
```

Σχεσιακή βάση δεδομένων προσωπικού

Θα χρησιμοποιήσουμε μία βάση τεσσάρων (4) πινάκων:

- emp-πίνακας με στοιχεία υπαλλήλων,
- dept- πίνακας με στοιχεία τμημάτων,
- project-πίνακας με στοιχεία έργων,
- assign-πίνακας που δείχνει σε ποια έργα εργάζονται οι υπάλληλοι.

Δημιουργία της βάσης με **mysql**

Οι πίνακες δημιουργούνται με κύρια και ξένα κλειδιά

```
DROP DATABASE IF EXISTS new_personnel;
CREATE DATABASE new_personnel;
USE new_personnel;

CREATE TABLE DEPT(DEPTNO INT NOT NULL,
                    DNAME VARCHAR(14), LOC VARCHAR(14),
                    PRIMARY KEY(DEPTNO));

CREATE TABLE EMP(EMPNO INT NOT NULL,
                    ENAME VARCHAR(10), JOB VARCHAR(25),
                    HIREDATE DATE, MGR INT, SAL FLOAT, COMM FLOAT,
                    DEPTNO INT,
                    PRIMARY KEY(EMPNO),
                    FOREIGN KEY(DEPTNO) REFERENCES DEPT(DEPTNO));

CREATE TABLE PROJ (projno INT NOT NULL,
                    pname VARCHAR(15),
                    budget FLOAT,
                    PRIMARY KEY(projno));

CREATE TABLE ASSIGN(
    EMPNO INT NOT NULL, PROJNO INT NOT NULL, PTIME INT,
    PRIMARY KEY(EMPNO, PROJNO),
    FOREIGN KEY(EMPNO) REFERENCES EMP(EMPNO),
    FOREIGN KEY(PROJNO) REFERENCES PROJ(PROJNO));

SHOW TABLES;
```

```

INSERT INTO DEPT(DEPTNO, DNAME, LOC)
    VALUES (10, 'ACCOUNTING', 'NEW YORK');
INSERT INTO DEPT(DEPTNO, DNAME, LOC)
    VALUES (20, 'RESEARCH', 'DALLAS');
INSERT INTO DEPT(DEPTNO, DNAME, LOC)
    VALUES (30, 'SALES', 'CHICAGO');
INSERT INTO DEPT(DEPTNO, DNAME, LOC)
    VALUES (40, 'OPERATIONS', 'BOSTON');

INSERT INTO EMP
    VALUES (10, 'CODD', 'ANALYST', '1989/01/01', 15, 3000, NULL, 10);
INSERT INTO EMP
    VALUES (15, 'ELMASRI', 'ANALYST', '1995/05/02', 15, 1200, 150, 10);
INSERT INTO EMP
    VALUES (20, 'NAVATHE', 'SALESMAN', '1977/07/07', 20, 2000, NULL, 20);
INSERT INTO EMP
    VALUES (30, 'DATE', 'PROGRAMMER', '2004/05/04', 15, 1800, 200, 10);

INSERT INTO proj(projno, pname, budget)
    VALUES(100, 'PAYROLL', 100000);
INSERT INTO proj(projno, pname, budget)
    VALUES(200, 'PERSONNEL', 200000 );
INSERT INTO proj(projno, pname, budget)
    VALUES(300, 'SALES', 150000);

INSERT INTO assign(empno, projno, ptime)
    VALUES(10, 100, 40);
INSERT INTO assign(empno, projno, ptime)
    VALUES(10, 200, 60);
INSERT INTO assign(empno, projno, ptime)
    VALUES(15, 100, 100);
INSERT INTO assign(empno, projno, ptime)
    VALUES(20, 200, 100);
INSERT INTO assign(empno, projno, ptime)
    VALUES(30, 100, 100);

```

mysql> DESCRIBE DEPT;

Field	Type	Null	Key	Default	Extra
DEPTNO	int	NO	PRI	NULL	
DNAME	varchar(14)	YES		NULL	
LOC	varchar(14)	YES		NULL	

3 rows in set (0.01 sec)

mysql> DESCRIBE EMP;

Field	Type	Null	Key	Default	Extra
EMPNO	int	NO	PRI	NULL	
ENAME	varchar(10)	YES		NULL	
JOB	varchar(25)	YES		NULL	
HIREDATE	date	YES		NULL	
MGR	int	YES		NULL	
SAL	float(7,2)	YES		NULL	
COMM	float(7,2)	YES		NULL	
DEPTNO	int	YES	MUL	NULL	

8 rows in set (0.00 sec)

mysql> DESCRIBE PROJ;

Field	Type	Null	Key	Default	Extra
projno	int	NO	PRI	NULL	
pname	varchar(15)	YES		NULL	
budget	float(12,2)	YES		NULL	

3 rows in set (0.00 sec)

mysql> DESCRIBE ASSIGN;

Field	Type	Null	Key	Default	Extra
EMPNO	int	NO	PRI	NULL	
PROJNO	int	NO	PRI	NULL	
PTIME	int	YES		NULL	

3 rows in set (0.00 sec)

Πως βλέπουμε τα δεδομένα

```
SELECT * FROM DEPT;  
SELECT * FROM EMP;  
SELECT * FROM PROJ;  
SELECT * FROM ASSIGN;
```

Διαγραφή πινάκων

```
DROP TABLE assign;  
DROP TABLE emp;  
DROP TABLE proj;  
DROP TABLE dept;
```

Η διαγραφή της βάσης γίνεται με τη δήλωση:

```
DROP DATABASE NEW_PERSONNEL;
```

Σχεσιακή βάση δεδομένων προσωπικού

assign (πίνακας που καταχωρεί ποιοί υπάλληλοι απασχολούνται σε ποιά έργα)

Empno	Projno	ptime
10	100	40
10	200	60
15	100	100
20	200	100
30	100	100

project (πίνακας έργων)

PROJNO	PNAME	BUDGET
100	PAYROLL	100000
200	PERSONNEL	200000
300	SALES	150000

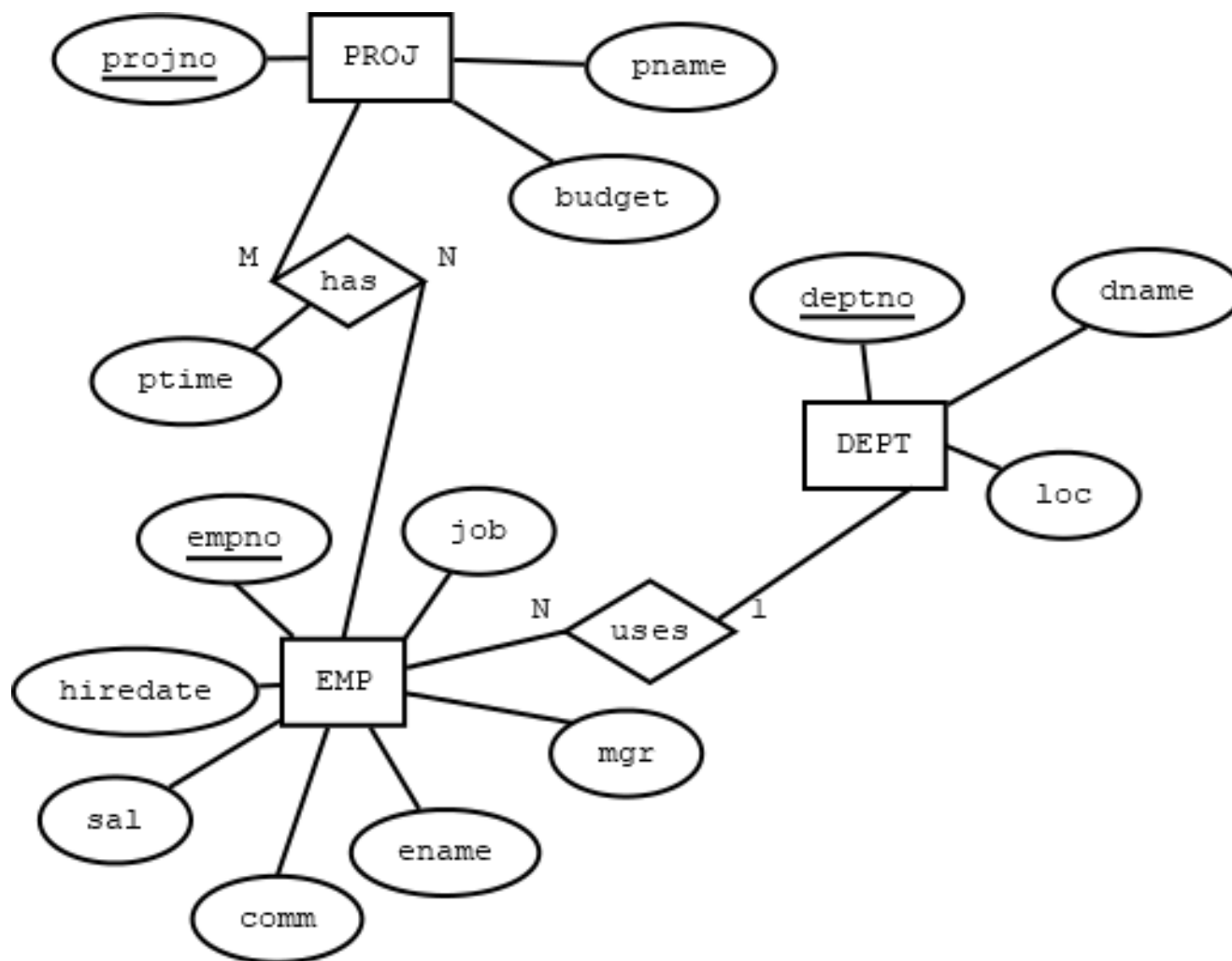
emp (πίνακας υπαλλήλων)

Empno	Ename	Job	Hiredate	Mgr	Sal	Comm	Deptno
10	Codd	ANALYST	1/1/89	15	3000		10
15	Elmasri	ANALYST	2/5/95	15	1200	150	10
20	Navathe	SALESMAN	7/7/77	20	2000		20
30	Date	PROGRAMMER	4/5/04	15	1800	200	10

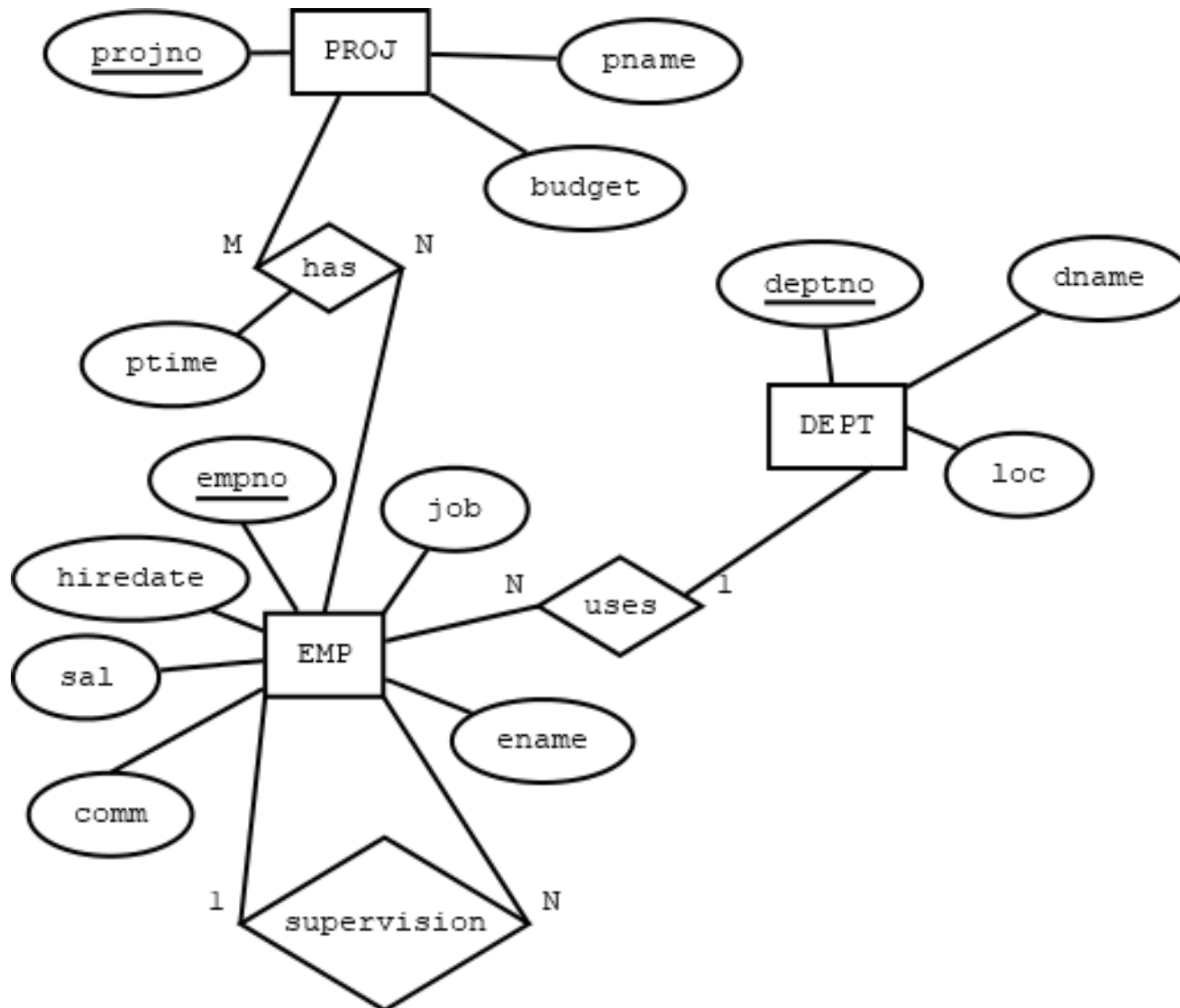
dept (πίνακας τμημάτων)

Deptno	Dname	Loc
10	ACCOUNTING	ATHENS
20	SALES	LONDON
30	RESEARCH	ATHENS
40	PAYROLL	LONDON

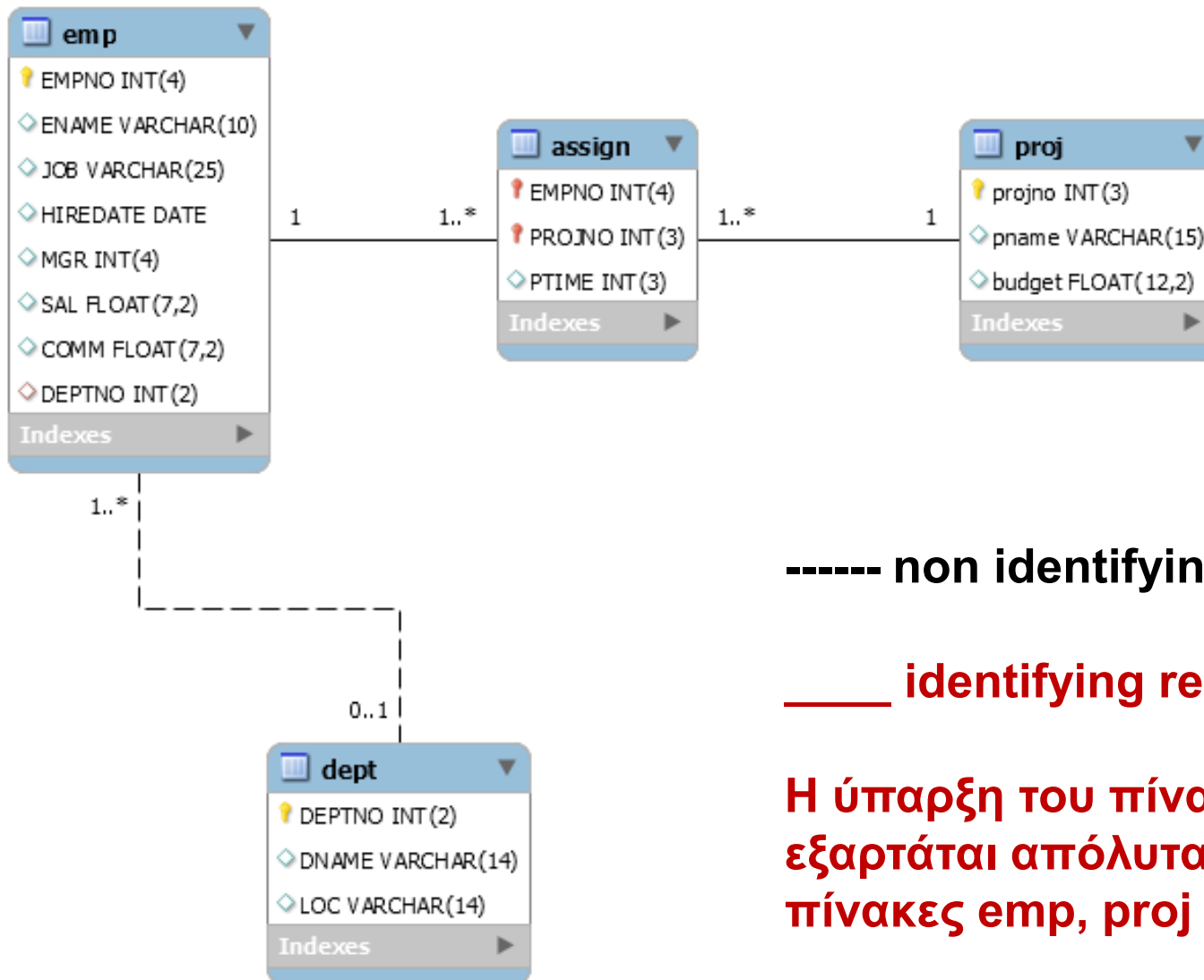
Μοντέλο οντοτήτων συσχετίσεων με συμβολισμό Chen, Navathe-Elmasri κ.λπ.



Μοντέλο οντοτήτων συσχετίσεων με συμβολισμό Chen, Navathe-Elmasri



UML



----- non identifying relationship

_____ identifying relationships

Η ύπαρξη του πίνακα assign εξαρτάται απόλυτα από τους πίνακες emp, proj

Παράδειγμα με 3 πίνακες

Query

```
select
    emp.empno,
    emp.emp_name,
    proj.pname
from
    emp,
    proj,
    assign
where
    emp.empno=assign.empno and
    assign.projno=proj.projno
;
```

Result

Result Grid   Filter Rows:			
	empno	emp_name	pname
▶	30	DATE	PAYROLL
	15	ELMASRI	PAYROLL
	10	CODD	PAYROLL
	20	NAVATHE	PERSONNEL
	10	CODD	PERSONNEL

Παράδειγμα με 3 πίνακες

Query

```
SELECT
    assign.empno,
    emp_name,
    dname,
    assign.projno,
    ptime
FROM dept
INNER JOIN emp ON dept.deptno=emp.empno
JOIN assign ON emp.empno=assign.empno
JOIN proj ON assign.projno=proj.projno;
```

Result

	empno	emp_name	dname	projno	ptime
▶	10	CODD	ACCOUNTING	100	40
	10	CODD	ACCOUNTING	200	60
	20	NAVATHE	RESEARCH	200	100
	30	DATE	SALES	100	100

Παράδειγμα με 3 πίνακες

Query

SELECT

assign.empno,
emp_name,
dname,
assign.projno,
ptime

FROM dept

right JOIN emp **ON** dept.deptno=emp.empno

JOIN assign **ON** emp.empno=assign.empno

JOIN proj **ON** assign.projno=proj.projno;

Result

Result Grid   Filter Rows: Expo					
	empno	emp_name	dname	projno	ptime
▶	10	CODD	ACCOUNTING	100	40
	10	CODD	ACCOUNTING	200	60
	15	ELMASRI	NULL	100	100
	20	NAVATHE	RESEARCH	200	100
	30	DATE	SALES	100	100

Τέλος Ενότητας

Ερωτήσεις;