Πανεπιστήμιο Δυτικής Αττικής

Βάσεις Δεδομένων Μεταπτυχιακού Κύκλου Σπουδών (MSCICT101)

Ενότητα 7: Όψεις (Views)

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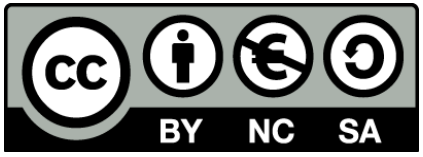


Περιγραφή Μαθήματος

- Στόχος του μαθήματος είναι η εστίαση στη χρήση views κατά την υλοποίηση εφαρμογών Βάσεων Δεδομένων.

‘Οψη (view)

- Μια όψη (view) είναι ένας ιδεατός (virtual) πίνακας που περιλαμβάνει στοιχεία από ένα ή περισσότερους πίνακες ή και άλλες όψεις της βάσης δεδομένων. Η όψη δεν έχει "φυσική" υπόσταση, δηλαδή δεν υπάρχει σαν πίνακας με αποθηκευμένα στοιχεία. Παρ' όλα αυτά τα στοιχεία της όψης αντανακλούν άμεσα τις αλλαγές που γίνονται στο περιεχόμενο των πινάκων στους οποίους βασίζεται.

- Ο χρήστης διαχειρίζεται τις όψεις σαν πραγματικούς πίνακες (με κάποιους περιορισμούς). Η χρήση τους συνιστάται σε περιπτώσεις όπως:
  - απλοποίηση της προσπέλασης στοιχείων
  - ακεραιότητα στοιχείων
  - ανεξαρτησία των στοιχείων
  - ασφάλεια των στοιχείων
  - προστασία του ιδιωτικού απόρρητου.

Θέμα: βάση δεδομένων διεύθυνσης προσωπικού

```
mysql> SELECT * FROM DEPT;
+--------+------------+--------+
| DEPTNO | DNAME      | LOC    |
+--------+------------+--------+
|     50 | SALES      | ATHENS |
|     60 | ACCOUNTING | ATHENS |
|     70 | PAYROL     | VOLOS  |
+--------+------------+--------+
3 rows in set (0.00 sec)

mysql> SELECT * FROM JOB;
+---------+----------+---------+
| JOBCODE | JOB_DESCR | SAL     |
+---------+----------+---------+
|     100 | SALESMAN  | 2000.00 |
|     200 | ANALYST   | 2000.00 |
|     300 | DBA       | 3000.00 |
+---------+----------+---------+
3 rows in set (0.00 sec)

mysql> SELECT * FROM EMP;
+-------+---------+-------+--------+--------+
| EMPNO | NAME    | JOBNO | DEPTNO | COMM   |
+-------+---------+-------+--------+--------+
|    10 | CODD    |   100 |     50 |   NULL |
|    20 | NAVATHE |   200 |     50 | 450.00 |
|    30 | ELMASRI |   300 |     60 |   NULL |
|    40 | DATE    |   100 |     50 |   NULL |
|    50 | CODD    |   100 |     50 |   NULL |
|    60 | CODD    |   200 |     50 | 450.00 |
|    70 | CODD    |   200 |     60 | 500.00 |
|    80 | CODD    |   100 |     60 |   NULL |
+-------+---------+-------+--------+--------+
8 rows in set (0.00 sec)

mysql>
```

Δημιουργία view με όνομα emp_view. Δείτε τα στοιχεία της. Κάθε φορά που ενημερώνω τον πίνακα ενημερώνεται και η view. Δοκιμάστε, στη συνέχεια, δηλώσεις INSERT, UPDATE, DELETE στη view.

Διαπιστώστε ότι ενημερώνεται ο πίνακας EMP

CREATE VIEW emp_view(e_ID, e_Name, e_Job, e_Dept, e_Comm)
AS SELECT EMPNO, NAME, JOBNO, DEPTNO, COMM FROM EMP;
SELECT * FROM emp_view;

```
mysql> CREATE VIEW emp_view(e_ID, e_Name, e_Job, e_Dept, e_Comm)
    -> AS SELECT EMPNO, NAME, JOBNO, DEPTNO, COMM FROM EMP;
Query OK, 0 rows affected (0.09 sec)

mysql> SELECT * FROM emp_view;
+------+---------+-------+--------+--------+
| e_ID | e_Name  | e_Job | e_Dept | e_Comm |
+------+---------+-------+--------+--------+
|   10 | CODD    |   100 |     50 |   NULL |
|   20 | NAVATHE |   200 |     50 | 450.00 |
|   30 | ELMASRI |   300 |     60 |   NULL |
|   40 | DATE    |   100 |     50 |   NULL |
|   50 | CODD    |   100 |     50 |   NULL |
|   60 | CODD    |   200 |     50 | 450.00 |
|   70 | CODD    |   200 |     60 | 500.00 |
|   80 | CODD    |   100 |     60 |   NULL |
+------+---------+-------+--------+--------+
8 rows in set (0.00 sec)
```

INSERT INTO EMP(EMPNO, NAME, JOBNO, DEPTNO, COMM)
VALUES (90, 'CLARKE', 100, 50, NULL);

```
mysql> SELECT * FROM EMP;
+-------+--------+-------+--------+--------+
| EMPNO | NAME   | JOBNO | DEPTNO | COMM   |
+-------+--------+-------+--------+--------+
|    10 | CODD   |   100 |     50 |   NULL |
|    20 | NAVATHE|   200 |     50 | 450.00 |
|    30 | ELMASRI|   300 |     60 |   NULL |
|    40 | DATE   |   100 |     50 |   NULL |
|    50 | CODD   |   100 |     50 |   NULL |
|    60 | CODD   |   200 |     50 | 450.00 |
|    70 | CODD   |   200 |     60 | 500.00 |
|    80 | CODD   |   100 |     60 |   NULL |
|    90 | CLARKE |   100 |     50 |   NULL |
+-------+--------+-------+--------+--------+
9 rows in set (0.00 sec)

mysql> SELECT * FROM emp_view;
+------+--------+------+--------+--------+
| e_ID | e_Name | e_Job| e_Dept | e_Comm |
+------+--------+------+--------+--------+
|   10 | CODD   |  100 |     50 |   NULL |
|   20 | NAVATHE|  200 |     50 | 450.00 |
|   30 | ELMASRI|  300 |     60 |   NULL |
|   40 | DATE   |  100 |     50 |   NULL |
|   50 | CODD   |  100 |     50 |   NULL |
|   60 | CODD   |  200 |     50 | 450.00 |
|   70 | CODD   |  200 |     60 | 500.00 |
|   80 | CODD   |  100 |     60 |   NULL |
|   90 | CLARKE |  100 |     50 |   NULL |
+------+--------+------+--------+--------+
9 rows in set (0.00 sec)

mysql>
```

INSERT INTO emp_view(e_ID, e_Name, e_Job, e_Dept, e_Comm)
VALUES (100, 'ADAMS', 100, 60, NULL);

```
mysql> INSERT INTO emp_view(e_ID, e_Name, e_Job, e_Dept, e_Comm)
    ->      VALUES (100, 'ADAMS', 100, 60, NULL);
Query OK, 1 row affected (0.04 sec)

mysql> SELECT * FROM EMP;
+-------+---------+-------+--------+--------+
| EMPNO | NAME    | JOBNO | DEPTNO | COMM   |
+-------+---------+-------+--------+--------+
|    10 | CODD    |   100 |     50 |   NULL |
|    20 | NAVATHE |   200 |     50 | 450.00 |
|    30 | ELMASRI |   300 |     60 |   NULL |
|    40 | DATE    |   100 |     50 |   NULL |
|    50 | CODD    |   100 |     50 |   NULL |
|    60 | CODD    |   200 |     50 | 450.00 |
|    70 | CODD    |   200 |     60 | 500.00 |
|    80 | CODD    |   100 |     60 |   NULL |
|    90 | CLARKE  |   100 |     50 |   NULL |
|   100 | ADAMS   |   100 |     60 |   NULL |
+-------+---------+-------+--------+--------+
10 rows in set (0.00 sec)

mysql> SELECT * FROM emp_view;
+------+---------+-------+--------+--------+
| e_ID | e_Name  | e_Job | e_Dept | e_Comm |
+------+---------+-------+--------+--------+
|   10 | CODD    |   100 |     50 |   NULL |
|   20 | NAVATHE |   200 |     50 | 450.00 |
|   30 | ELMASRI |   300 |     60 |   NULL |
|   40 | DATE    |   100 |     50 |   NULL |
|   50 | CODD    |   100 |     50 |   NULL |
|   60 | CODD    |   200 |     50 | 450.00 |
|   70 | CODD    |   200 |     60 | 500.00 |
|   80 | CODD    |   100 |     60 |   NULL |
|   90 | CLARKE  |   100 |     50 |   NULL |
|  100 | ADAMS   |   100 |     60 |   NULL |
+------+---------+-------+--------+--------+
10 rows in set (0.00 sec)
```

```
UPDATE emp_view
SET e_Job=200
WHERE e_ID=100;
SELECT * FROM EMP;
SELECT * FROM emp_view;
```

```
mysql> UPDATE emp_view
    -> SET e_Job=200
    -> WHERE e_ID=100;
Query OK, 1 row affected (0.09 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> SELECT * FROM EMP;
+-------+---------+-------+--------+--------+
| EMPNO | NAME    | JOBNO | DEPTNO | COMM   |
+-------+---------+-------+--------+--------+
|    10 | CODD    |   100 |     50 |   NULL |
|    20 | NAVATHE |   200 |     50 | 450.00 |
|    30 | ELMASRI |   300 |     60 |   NULL |
|    40 | DATE    |   100 |     50 |   NULL |
|    50 | CODD    |   100 |     50 |   NULL |
|    60 | CODD    |   200 |     50 | 450.00 |
|    70 | CODD    |   200 |     60 | 500.00 |
|    80 | CODD    |   100 |     60 |   NULL |
|    90 | CLARKE  |   100 |     50 |   NULL |
|   100 | ADAMS   |   200 |     60 |   NULL |
+-------+---------+-------+--------+--------+
10 rows in set (0.00 sec)
```

Να μία view «αφύλακτη», δηλαδή χωρίς την υποπρόταση with check option στον ορισμό της. Υποτίθεται από τον τρόπο ορισμού της όψης μπορούμε να κάνουμε μεταβολές σε υπαλλήλους του τμήματος 50 μόνο. Μία view «αφύλακτη» επιτρέπει παράνομες μεταβολές της βάσης

```
CREATE VIEW emp_on_SALES(e_ID, e_Name, e_Job, e_Dept, e_Comm)
AS SELECT EMPNO, NAME, JOBNO, DEPTNO, COMM FROM EMP
WHERE deptno=50;
```

```
SELECT * FROM EMP;
SELECT * FROM emp_on_SALES;
```

```
mysql> SELECT * FROM EMP;
+-------+---------+-------+--------+--------+
| EMPNO | NAME    | JOBNO | DEPTNO | COMM   |
+-------+---------+-------+--------+--------+
|    10 | CODD    |   100 |     50 |   NULL |
|    20 | NAVATHE |   200 |     50 | 450.00 |
|    30 | ELMA$RI |   300 |     60 |   NULL |
|    40 | DATE    |   100 |     50 |   NULL |
|    50 | CODD    |   100 |     50 |   NULL |
|    60 | CODD    |   200 |     50 | 450.00 |
|    70 | CODD    |   200 |     60 | 500.00 |
|    80 | CODD    |   100 |     60 |   NULL |
|    90 | CLARKE  |   100 |     50 |   NULL |
|   100 | ADAM$   |   200 |     60 |   NULL |
+-------+---------+-------+--------+--------+
10 rows in set (0.00 sec)

mysql> SELECT * FROM emp_on_SALES;
+------+---------+-------+--------+--------+
| e_ID | e_Name  | e_Job | e_Dept | e_Comm |
+------+---------+-------+--------+--------+
|   10 | CODD    |   100 |     50 |   NULL |
|   20 | NAVATHE |   200 |     50 | 450.00 |
|   40 | DATE    |   100 |     50 |   NULL |
|   50 | CODD    |   100 |     50 |   NULL |
|   60 | CODD    |   200 |     50 | 450.00 |
|   90 | CLARKE  |   100 |     50 |   NULL |
+------+---------+-------+--------+--------+
6 rows in set (0.01 sec)
```

Εισάγω στοιχεία στον πίνακα που σωστά δεν φαίνονται στην όψη

```
INSERT INTO EMP(EMPNO, NAME, JOBNO, DEPTNO, COMM)
    VALUES (110, 'NAVATHE', 100, 60, NULL);

SELECT * FROM EMP;

SELECT * FROM emp_on_SALES;
```

```
mysql> INSERT INTO EMP(EMPNO, NAME, JOBNO, DEPTNO, COMM)
    ->      VALUES (110, 'NAVATHE', 100, 60, NULL);
Query OK, 1 row affected (0.02 sec)

mysql> SELECT * FROM EMP;
+-------+---------+-------+--------+--------+
| EMPNO | NAME    | JOBNO | DEPTNO | COMM   |
+-------+---------+-------+--------+--------+
|    10 | CODD    |   100 |     50 |   NULL |
|    20 | NAVATHE |   200 |     50 | 450.00 |
|    30 | ELMASRI |   300 |     60 |   NULL |
|    40 | DATE    |   100 |     50 |   NULL |
|    50 | CODD    |   100 |     50 |   NULL |
|    60 | CODD    |   200 |     50 | 450.00 |
|    70 | CODD    |   200 |     60 | 500.00 |
|    80 | CODD    |   100 |     60 |   NULL |
|    90 | CLARKE  |   100 |     50 |   NULL |
|   100 | ADAMS   |   200 |     60 |   NULL |
|   110 | NAVATHE |   100 |     60 |   NULL |
+-------+---------+-------+--------+--------+
11 rows in set (0.00 sec)

mysql> SELECT * FROM emp_on_SALES;
+------+---------+-------+--------+--------+
| e_ID | e_Name  | e_Job | e_Dept | e_Comm |
+------+---------+-------+--------+--------+
|   10 | CODD    |   100 |     50 |   NULL |
|   20 | NAVATHE |   200 |     50 | 450.00 |
|   40 | DATE    |   100 |     50 |   NULL |
|   50 | CODD    |   100 |     50 |   NULL |
|   60 | CODD    |   200 |     50 | 450.00 |
|   90 | CLARKE  |   100 |     50 |   NULL |
+------+---------+-------+--------+--------+
6 rows in set (0.00 sec)
```

Τώρα θα «παρανομήσω».

INSERT INTO emp_on_SALES(e_ID, e_Name, e_Job, e_Dept, e_Comm)
VALUES (120, 'ELMASRI', 100, 60, NULL);

SELECT * FROM EMP;
SELECT * FROM emp_on_SALES;

```
mysql> SELECT * FROM EMP;
+-------+--------+------+--------+--------+
| EMPNO | NAME   | JOBNO | DEPTNO | COMM   |
+-------+--------+------+--------+--------+
|    10 | CODD   |   100 |     50 |   NULL |
|    20 | NAVATHE |   200 |     50 | 450.00 |
|    30 | ELMASRI |   300 |     60 |   NULL |
|    40 | DATE   |   100 |     50 |   NULL |
|    50 | CODD   |   100 |     50 |   NULL |
|    60 | CODD   |   200 |     50 | 450.00 |
|    70 | CODD   |   200 |     60 | 500.00 |
|    80 | CODD   |   100 |     60 |   NULL |
|    90 | CLARKE |   100 |     50 |   NULL |
|   100 | ADAMS  |   200 |     60 |   NULL |
|   110 | NAVATHE |   100 |     60 |   NULL |
|   120 | ELMASRI |   100 |     60 |   NULL |
+-------+--------+------+--------+--------+
12 rows in set (0.00 sec)

mysql> SELECT * FROM emp_on_SALES;
+------+--------+------+--------+--------+
| e_ID | e_Name | e_Job | e_Dept | e_Comm |
+------+--------+------+--------+--------+
|   10 | CODD   |   100 |     50 |   NULL |
|   20 | NAVATHE |   200 |     50 | 450.00 |
|   40 | DATE   |   100 |     50 |   NULL |
|   50 | CODD   |   100 |     50 |   NULL |
|   60 | CODD   |   200 |     50 | 450.00 |
|   90 | CLARKE |   100 |     50 |   NULL |
+------+--------+------+--------+--------+
6 rows in set (0.00 sec)
```

Πως μια ενημερώσιμη όψη θα είναι ασφαλής ή πως πρέπει να ορίζω τις (ενημερώσιμες) όψεις

CREATE VIEW emp_on_SALES_safe(e_ID, e_Name, e_Job, e_Dept, e_Comm)
AS SELECT EMPNO, NAME, JOBNO, DEPTNO, COMM FROM EMP
WHERE deptno IN(SELECT deptno FROM dept WHERE dname='SALES')
WITH CHECK OPTION;

INSERT INTO emp_on_SALES_safe(e_ID, e_Name, e_Job, e_Dept, e_Comm)
VALUES (130, 'DATE', 100, 60, NULL);

SELECT * FROM EMP;
SELECT * FROM emp_on_SALES_safe;

```
mysql>
mysql> INSERT INTO emp_on_SALES_safe(e_ID, e_Name, e_Job, e_Dept, e_Comm)
    -> VALUES (130, 'DATE', 100, 60, NULL);
ERROR 1369 (HY000): CHECK OPTION failed 'pers_view.emp_on_sales_safe'
```

Μη ενημερώσιμες όψεις.
Να και μία όψη μη ενημερώσιμη. Απαγορεύεται INSERT, UPDATE, DELETE. Μόνο SELECT

DROP VIEW IF EXISTS EMP_DISTINCT_NAMES;

CREATE VIEW EMP_DISTINCT_NAMES (NAME)

AS SELECT **DISTINCT** NAME FROM EMP ORDER BY NAME;

SELECT * FROM EMP_DISTINCT_NAMES;

INSERT INTO EMP_DISTINCT_NAMES VALUES('GREEN');

```
mysql> CREATE VIEW EMP_DISTINCT_NAMES (NAME)
    ->  AS SELECT DISTINCT NAME FROM EMP ORDER BY NAME;
Query OK, 0 rows affected (0.02 sec)

mysql> SELECT * FROM EMP_DISTINCT_NAMES;
+---------+
| NAME    |
+---------+
| ADAMS   |
| CLARKE  |
| CODD    |
| DATE    |
| ELMASRI |
| NAVATHE |
+---------+
6 rows in set (0.01 sec)

mysql> INSERT INTO EMP_DISTINCT_NAMES VALUES('GREEN');
ERROR 1471 (HY000): The target table EMP_DISTINCT_NAMES of the INSERT is not ins
ertable-into
mysql>
```

Και άλλο παράδειγμα μη ενημερώσιμης view

```
DROP VIEW IF EXISTS GROUP_EMP;

CREATE VIEW GROUP_EMP (dept, count_emp, avg_comm)
 AS SELECT deptno, COUNT(*), AVG(comm) FROM EMP GROUP BY deptno;

SELECT * FROM GROUP_EMP;
INSERT INTO GROUP_EMP VALUES('GREEN');
```

Τι γίνεται όταν η όψη βασίζεται σε συνδέσεις πινάκων. Δημιουργία μη ενημερώσιμης όψης βασιζόμενης σε join

```
CREATE VIEW emp_dept_view(EMPNO, NAME, JOBNO, DEPTNO, DNAME)
AS SELECT empno, name, jobno, emp.deptno, dname
FROM emp INNER JOIN dept ON emp.deptno=dept.deptno;

SELECT * FROM emp_dept_view;

INSERT INTO emp_dept_view(EMPNO, NAME, JOBNO, DEPTNO, DNAME)
VALUES (140, 'DATE', 100, 50, NULL);

SELECT * FROM emp_dept_view;
```

```
mysql> CREATE VIEW emp_dept_view(EMPNO, NAME, JOBNO, DEPTNO, DNAME)
    -> AS SELECT empno, name, jobno, emp.deptno, dname
    -> FROM emp INNER JOIN dept ON emp.deptno=dept.deptno;
Query OK, 0 rows affected (0.03 sec)

mysql> SELECT * FROM emp_dept_view;
+-------+--------+------+-------+------------+
| EMPNO | NAME   | JOBNO | DEPTNO | DNAME      |
+-------+--------+------+-------+------------+
|    10 | CODD   |   100 |     50 | SALES      |
|    20 | NAVATHE |   200 |     50 | SALES      |
|    30 | ELMASRI |   300 |     60 | ACCOUNTING |
|    40 | DATE   |   100 |     50 | SALES      |
|    50 | CODD   |   100 |     50 | SALES      |
|    60 | CODD   |   200 |     50 | SALES      |
|    70 | CODD   |   200 |     60 | ACCOUNTING |
|    80 | CODD   |   100 |     60 | ACCOUNTING |
|    90 | CLARKE |   100 |     50 | SALES      |
|   100 | ADAMS  |   200 |     60 | ACCOUNTING |
|   110 | NAVATHE |   100 |     60 | ACCOUNTING |
|   120 | ELMASRI |   100 |     60 | ACCOUNTING |
+-------+--------+------+-------+------------+
12 rows in set (0.00 sec)

mysql> INSERT INTO emp_dept_view(EMPNO, NAME, JOBNO, DEPTNO, DNAME)
    -> VALUES (140, 'DATE', 100, 50, NULL);
ERROR 1393 (HY000): Can not modify more than one base table through a join view
'pers_view.emp_dept_view'
mysql>
```

Δημιουργία ενημερώσιμης όψης βασιζόμενης σε join.

```
CREATE VIEW NEW_emp_dept_view(EMPNO, NAME, JOBNO, DEPTNO)
AS SELECT empno, name, jobno, emp.deptno
FROM emp INNER JOIN dept ON emp.deptno=dept.deptno;

SELECT * FROM NEW_emp_dept_view;

INSERT INTO NEW_emp_dept_view(EMPNO, NAME, JOBNO, DEPTNO)
VALUES (140, 'DATE', 100, 50);

SELECT * FROM NEW_emp_dept_view;
```

```
mysql> INSERT INTO NEW_emp_dept_view(EMPNO, NAME, JOBNO, DEPTNO)
    -> VALUES (140, 'DATE', 100, 50);
Query OK, 1 row affected (0.04 sec)

mysql> SELECT * FROM NEW_emp_dept_view;
+-------+--------+-------+--------+
| EMPNO | NAME   | JOBNO | DEPTNO |
+-------+--------+-------+--------+
|    10 | CODD   |   100 |     50 |
|    20 | NAVATHE|   200 |     50 |
|    30 | ELMASRI|   300 |     60 |
|    40 | DATE   |   100 |     50 |
|    50 | CODD   |   100 |     50 |
|    60 | CODD   |   200 |     50 |
|    70 | CODD   |   200 |     60 |
|    80 | CODD   |   100 |     60 |
|    90 | CLARKE |   100 |     50 |
|   100 | ADAMS  |   200 |     60 |
|   110 | NAVATHE|   100 |     60 |
|   120 | ELMASRI|   100 |     60 |
|   140 | DATE   |   100 |     50 |
+-------+--------+-------+--------+
13 rows in set (0.00 sec)
```

Τελικά πότε μια view δεν είναι ενημερώσιμη;

Όταν ο ορισμός της περιλαμβάνει:

1. Δήλωση Select με πράξεις, π.χ. CREATE VIEW … AS SELECT sal+IFNULL(comm,0) …
2. Aggregate functions (SUM(), MIN(), MAX(), COUNT(), …
3. DISTINCT
4. GROUP BY
5. GROUP BY …. HAVING …
6. UNION
7. Subquery (πράξεις κ.λπ.) in the select list
8. **Certain joins**
9. Non updatable view in the FROM clause
10. A subquery in the WHERE clause that refers to a table in the FROM clause

DEFAULT
AUTO_INCREMENT

DEFAULT

Στον πίνακα DEPT ορίζουμε ότι η στήλη department θα έχει την προκαθορισμένη τιμή 'Development'.

```
CREATE TABLE dept
(D_Id int NOT NULL,
department varchar(90) DEFAULT 'Development',
primary key(d_id));

INSERT INTO dept(D_Id) VALUES (10), (20);
SELECT * FROM DEPT;

INSERT INTO DEPT VALUES (30, 'Sales');
SELECT * FROM DEPT;
```

D_id	Department
10	**Development**
20	**Development**
30	**Sales**

auto_increment

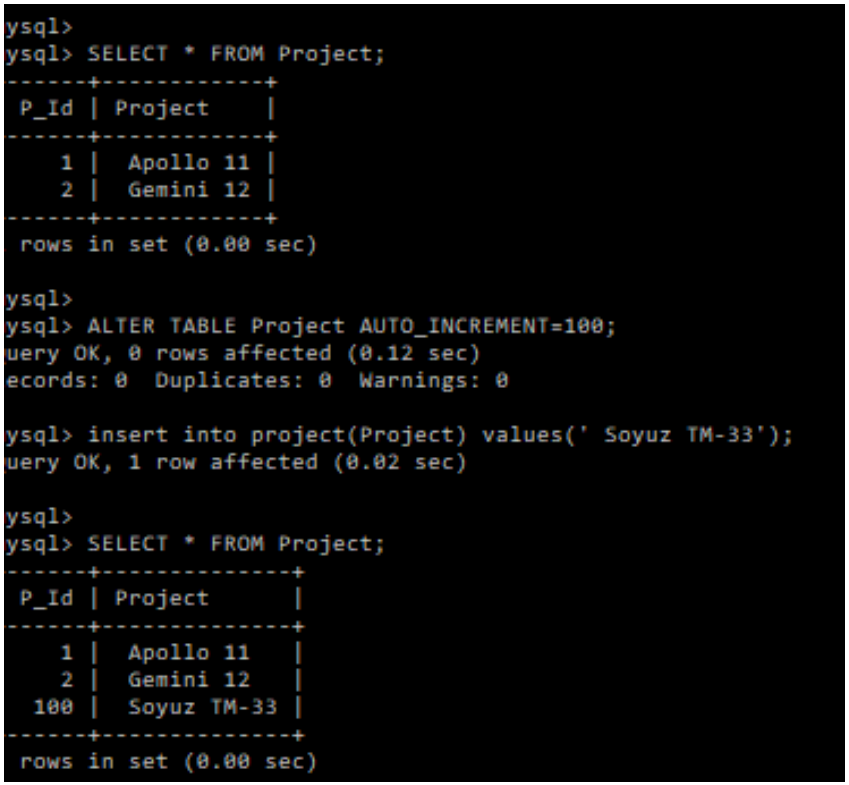
```
CREATE TABLE Project( P_Id int NOT NULL
    AUTO_INCREMENT, Project
    varchar(255), PRIMARY KEY (P_Id));

insert into project(p_id, Project)
    values(1,' Apollo 11');
insert into project(Project)
    values('Gemini 12');

SELECT * FROM Project;

ALTER TABLE Project
    AUTO_INCREMENT=100;
insert into project(Project) values('Soyuz
    TM-33');

SELECT * FROM Project;
```



Τέλος Ενότητας