Exists clause

Let's use the example from the nested correlation:

```
mysql> Select * from Class;
+---------+-------------+
| ClassID | TimeOffered |
+---------+-------------+
| CS314   | 11-12:15    |
| CS575   | NULL        |
| CT320   | 11-12:15    |
+---------+-------------+
3 rows in set (0.00 sec)

mysql> Select * from Enrolled;
+-----+---------+-------+
| SID | ClassID | Grade |
+-----+---------+-------+
|   1 | CS314   | NULL  |
|   1 | CS575   | NULL  |
|   2 | CS575   | NULL  |
|   3 | CT320   | NULL  |
+-----+---------+-------+
4 rows in set (0.00 sec)

mysql> Select * from Students;
+-----+------------------+------------+
| SID | SName            | NumCredits |
+-----+------------------+------------+
|   1 | Elmer Fudd       |         48 |
|   2 | Roger Ramjet     |         20 |
|   3 | Alice Wonderland |         72 |
+-----+------------------+------------+
3 rows in set (0.00 sec)

mysql> SELECT S.Sname
    ->   FROM Students S
    ->   WHERE S.SID IN
    ->     (SELECT E.SID
    ->      FROM Enrolled E, Class C
    ->      WHERE E.ClassID = C.ClassID
    ->        AND C.TimeOffered = '11-12:15'
    ->        AND E.SID = S.SID);
+------------------+
| Sname            |
+------------------+
| Elmer Fudd       |
| Alice Wonderland |
+------------------+
2 rows in set (0.00 sec)
```

In this example, we are using an inner and outer query to find all the people taking classes at 11-12:15. We can do the same with the where exists:

```
mysql> SELECT S.Sname
    ->   FROM Students S
    ->   WHERE EXISTS
    ->     (SELECT *
    ->      FROM Enrolled E, Class C
    ->      WHERE E.ClassID = C.ClassID
    ->        AND C.TimeOffered = '11-12:15'
    ->        AND E.SID = S.SID);
+------------------+
| Sname            |
+------------------+
| Elmer Fudd       |
| Alice Wonderland |
+------------------+
```

In this case, if the subquery returns any rows, EXISTS is set to true, otherwise false. NOT EXISTS is a valid query as well.

```
mysql> SELECT S.Sname
    ->   FROM Students S
    ->   WHERE NOT EXISTS
    ->     (SELECT *
    ->      FROM Enrolled E, Class C
    ->      WHERE E.ClassID = C.ClassID
    ->        AND C.TimeOffered = '11-12:15'
    ->        AND E.SID = S.SID);
+--------------+
| Sname        |
+--------------+
| Roger Ramjet |
+--------------+
1 row in set (0.00 sec)
```

In the above query, every time the inner query returns a false (i.e. when the student has no classes at 11-12:15), a true is returned to the outer query and the name is printed. How about if the student has multiple entries?

```
mysql> insert into Class values ("CS430", "12:30-1:45");
Query OK, 1 row affected (0.00 sec)

mysql> insert into Enrolled values (2, "CS430", NULL);
Query OK, 1 row affected (0.00 sec)

mysql> SELECT S.Sname
    ->   FROM Students S
    ->   WHERE NOT EXISTS
    ->     (SELECT *
    ->      FROM Enrolled E, Class C
    ->      WHERE E.ClassID = C.ClassID
    ->        AND C.TimeOffered = '11-12:15'
    ->        AND E.SID = S.SID);
+--------------+
| Sname        |
+--------------+
| Roger Ramjet |
+--------------+
1 row in set (0.00 sec)
```

No difference. Why is that?

Because the check on the inner loop can only return a TRUE or FALSE for each row it is checking.