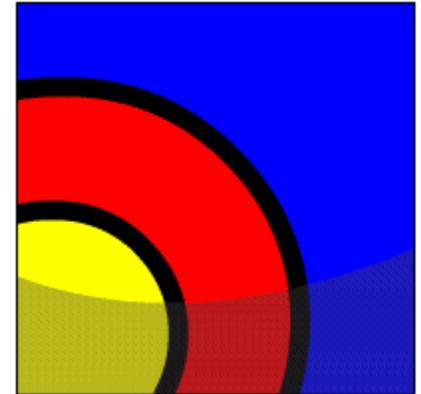


Using Cursors for Update

What Will I Learn?

In this lesson, you will learn to:

- Create PL/SQL code to lock rows before an update using the appropriate clause
- Explain the effect of using `NOWAIT` in an update cursor declaration
- Create PL/SQL code to use the current row of the cursor in an `UPDATE` or `DELETE` statement

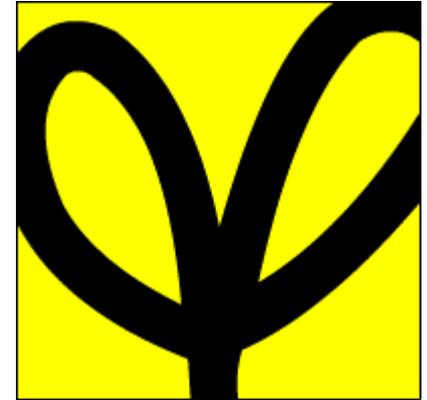


Why Learn It?

If there are multiple users connected to the database at the same time, there is the possibility that another user updated the rows of a particular table after you opened your cursor and fetched the rows.

We can lock rows as we open the cursor, to prevent other users from updating them.

It is important to do this if we want to update the same rows ourselves.

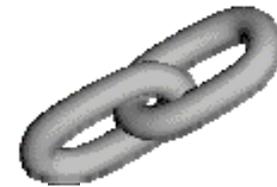


Tell Me/Show Me

Declaring a Cursor with the `FOR UPDATE` Clause

When we declare a cursor `FOR UPDATE`, each row is locked as we open the cursor. This prevents other users from modifying the rows while our cursor is open. It also allows us to modify the rows ourselves using a `... WHERE CURRENT OF ...` clause.

Syntax:



```
CURSOR cursor_name IS  
SELECT ... FROM ...  
FOR UPDATE [OF column_reference][NOWAIT | WAIT n];
```

This does not prevent other users from reading the rows.



Tell Me/Show Me

Declaring a Cursor with the FOR UPDATE Clause

```
CURSOR cursor_name IS  
SELECT ... FROM ...  
FOR UPDATE [OF column_reference][NOWAIT | WAIT n];
```

column_reference is a column in the table whose rows we need to lock.

If the rows have already been locked by another session:

- NOWAIT returns an Oracle server error immediately
- WAIT *n* waits for *n* seconds, and returns an Oracle server error if the other session is still locking the rows at the end of that time.



Tell Me/Show Me

NOWAIT Keyword in the FOR UPDATE Clause

The optional `NOWAIT` keyword tells the Oracle server not to wait if any of the requested rows have already been locked by another user. Control is immediately returned to your program so that it can do other work before trying again to acquire the lock.

If you omit the `NOWAIT` keyword, then the Oracle server waits indefinitely until the rows are available.

Example:

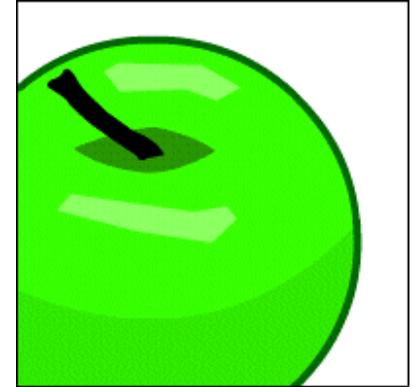
```
DECLARE
  CURSOR emp_cursor IS
    SELECT employee_id, last_name FROM employees
       WHERE department_id = 80 FOR UPDATE NOWAIT;
  ...
```

Tell Me/Show Me

NOWAIT Keyword in the FOR UPDATE Clause

If the rows are already locked by another session and you have specified `NOWAIT`, then opening the cursor will result in an error. You can try to open the cursor later.

You can use `WAIT n` instead of `NOWAIT` and specify the number of seconds to wait and check whether the rows are unlocked. If the rows are still locked after *n* seconds, then an error is returned.





Tell Me/Show Me

FOR UPDATE OF column-name

If the cursor is based on a join of two tables, we may want to lock the rows of one table but not the other. To do this, we specify any column of the table we want to lock.

Example:

```
DECLARE
  CURSOR emp_cursor IS
    SELECT e.employee_id, d.department_name
       FROM employees e, departments d
       WHERE e.department_id = d.department_id
          AND department_id = 80 FOR UPDATE OF salary;
  ...
```

Tell Me/Show Me

WHERE CURRENT OF Clause

The WHERE CURRENT OF clause is used in conjunction with the FOR UPDATE clause to refer to the current row (the most recently FETCHED row) in an explicit cursor. The WHERE CURRENT OF clause is used in the UPDATE or DELETE statement, whereas the FOR UPDATE clause is specified in the cursor declaration.

```
WHERE CURRENT OF cursor-name ;
```

Syntax:

cursor_name Is the name of a declared cursor (The cursor must have been declared with the FOR UPDATE clause.)



Tell Me/Show Me

WHERE CURRENT OF Clause (continued)

You can use `WHERE CURRENT OF` for updating or deleting the current row from the corresponding database table. This enables you to apply updates and deletes to the row currently being addressed, without the need to use a `WHERE` clause. You must include the `FOR UPDATE` clause in the cursor query so that the rows are locked on `OPEN`.

```
WHERE CURRENT OF cursor_name ;
```



Tell Me/Show Me

WHERE CURRENT OF Clause

Use cursors to update or delete the current row.

- Include the `FOR UPDATE` clause in the cursor query to lock the rows first.
- Use the `WHERE CURRENT OF` clause to reference the current row from an explicit cursor.

Example:

```
UPDATE employees
   SET    salary = ...
   WHERE CURRENT OF emp_cursor;
```



Tell Me/Show Me

NOWAIT, FOR UPDATE, and WHERE CURRENT OF Clauses

```
DECLARE
  CURSOR empcur IS
    SELECT employee_id, salary FROM my_employees
      WHERE salary <= 20000 FOR UPDATE NOWAIT;
  v_emp_rec empcur%ROWTYPE;
BEGIN
  OPEN empcur;
  LOOP
    FETCH empcur INTO v_emp_rec;
    EXIT WHEN empcur%NOTFOUND;
    UPDATE my_employees
      SET salary = v_emp_rec.salary*1.1
      WHERE CURRENT OF empcur;
  END LOOP;
  CLOSE empcur;
  COMMIT;
END;
```

In this example, we don't need a column-reference in the FOR UPDATE clause because the cursor is not based on a join.



Tell Me/Show Me

A Second Example:

```
DECLARE
  CURSOR ed_cur IS
    SELECT employee_id, salary, department_name
      FROM my_employees e, my_departments d
     WHERE e.department_id = d.department_id
      FOR UPDATE OF salary NOWAIT;
BEGIN
  FOR v_ed_rec IN ed_cur LOOP
    UPDATE my_employees
      SET salary = v_ed_rec.salary*1.1
      WHERE CURRENT OF ed_cur;
  END LOOP;
  COMMIT;
END;
```

FOR UPDATE OF salary locks only the MY_EMPLOYEES rows, not the MY_DEPARTMENTS rows. Note that we update the table-name, not the cursor-name!

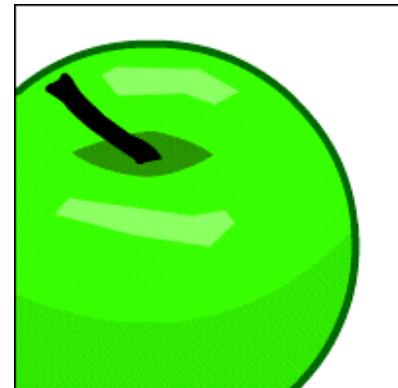
Tell Me/Show Me

Terminology

Key terms used in this lesson include:

FOR UPDATE

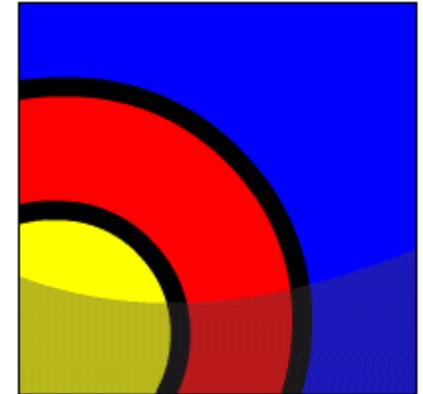
NOWAIT



Summary

In this lesson, you learned to:

- Create PL/SQL code to lock rows before an update using the appropriate clause
- Explain the effect of using NOWAIT in an update cursor declaration
- Create PL/SQL code to use the current row of the cursor in an UPDATE or DELETE statement



Try It/Solve It

The exercises in this lesson cover the following topic:

- Creating PL/SQL code to lock rows before an update using the appropriate clause
- Explaining the effect of using NOWAIT in an update cursor declaration
- Creating PL/SQL code to use the current row of the cursor in an UPDATE or DELETE statement

