INF305 Database Management Systems 2

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Lab Work 11

1 Instructions

Topics covered in this lab work from lecture slides of Week 11 (12.2): Improving PL/SQL Performance

1. Solve all these tasks before the deadline and submit your solutions to Moodle in one txt file

2. Present your solutions during the practice lesson. **This topic is mostly theoretical**, and the work mostly will be graded on answers provided to questions related to the topic

2 Tasks

1. Run this code to load 25,000 records into a local nested table and pass these values to two local procedures that do nothing. Notice the call to the subprogram using NOCOPY. What are the results?

```
CREATE OR REPLACE PACKAGE nocopy_test AS
TYPE EmpTabTyp IS TABLE OF employees%ROWTYPE;
emp_tab EmpTabTyp := EmpTabTyp(NULL);
PROCEDURE get_time (t OUT NUMBER);
PROCEDURE do_nothing1 (tab IN OUT EmpTabTyp);
PROCEDURE do_nothing2 (tab IN OUT NOCOPY EmpTabTyp);
END nocopy_test;

CREATE OR REPLACE PACKAGE BODY nocopy_test AS
PROCEDURE get_time (t OUT NUMBER) IS
BEGIN
   t := DBMS_UTILITY.get_time;
END;

PROCEDURE do_nothing1 (tab IN OUT EmpTabTyp) IS
BEGIN
   NULL;
END;

PROCEDURE do_nothing2 (tab IN OUT NOCOPY EmpTabTyp) IS
BEGIN
   NULL;
END;
END nocopy_test;

DECLARE
        t1 NUMBER;
        t2 NUMBER;
        t3 NUMBER;
BEGIN
   SELECT * INTO nocopy_test.emp_tab(1) FROM EMPLOYEES
      WHERE employee_id = 100;
   nocopy_test.emp_tab.EXTEND(49999, 1); -- Copy element 1 into 2..50000
   nocopy_test.get_time(t1);
   nocopy_test.do_nothing1(nocopy_test.emp_tab); -- Pass IN OUT parameter
   nocopy_test.get_time(t2);
   nocopy_test.do_nothing2(nocopy_test.emp_tab); -- Pass IN OUT NOCOPY parameter
   nocopy_test.get_time(t3);
   DBMS_OUTPUT.PUT_LINE ('Call Duration (secs)');
   DBMS_OUTPUT.PUT_LINE ('--------------------');
   DBMS_OUTPUT.PUT_LINE ('Just IN OUT: ' || TO_CHAR((t2 - t1)/100.0));
   DBMS_OUTPUT.PUT_LINE ('With NOCOPY: ' || TO_CHAR((t3 - t2))/100.0);
END;
```

2. Run the following PL/SQL program which increases the salary for employees with IDs 100, 102, 104, or 110. The FORALL statement bulk-binds the collection. What are the results?

```
CREATE OR REPLACE PROCEDURE raise_salary (p_percent NUMBER) IS
TYPE numlist_type IS TABLE OF NUMBER
INDEX BY BINARY_INTEGER;
v_id numlist_type; -- collection
BEGIN
    v_id(1) := 100;
    v_id(2) := 102;
    v_id(3) := 104;
    v_id(4) := 110;
    -- bulk-bind the associative array
    FORALL i IN v_id.FIRST .. v_id.LAST
    UPDATE employees
        SET salary = (1 + p_percent / 100) * salary
        WHERE employee_id = v_id (i);
END;
```

Execute the following SELECT statement to find out salaries before executing the raise_salary procedure:

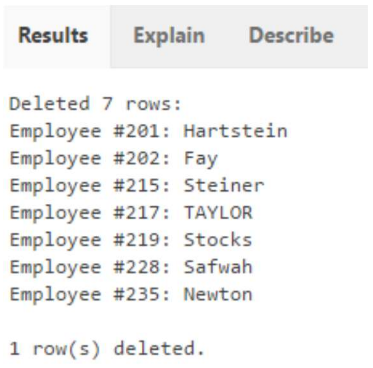
```
    SELECT salary
        FROM employees
        WHERE employee_id = 100 OR employee_id = 102
        OR employee_id = 104 OR employee_id = 100;
```

Execute the raise_salary procedure and verify the results

```
BEGIN
    raise_salary(10);
END;
SELECT salary
    FROM employees
    WHERE employee_id = 100 OR employee_id = 102
OR employee_id = 104 OR employee_id = 100;
```

3 Create and execute a procedure called get_departments that obtains all rows from the DEPARTMENTS table for a specific location using the BULK COLLECT clause.

4 Create and execute an anonymous block containing the BULK COLLECT and RETURNING clause that deletes all employees in department_id 20 from the EMP_TEMP table. Create the EMP_TEMP table from the EMPLOYEES table. Your anonymous block should produce results that look similar to this (your results may vary depending on previous changes you may have made to the EMPLOYEES table):



```
Deleted 7 rows:
Employee #201: Hartstein
Employee #202: Fay
Employee #215: Steiner
Employee #217: TAYLOR
Employee #219: Stocks
Employee #228: Safwah
Employee #235: Newton

1 row(s) deleted.
```