

דוח הפרוייקט שלב 3

בשלב זה ניצור פונקציות ופרוצדורות שימשו את בסיס הנתונים שלנו.

מטרתה של הפרוצדורה הראשונה היא לבדוק מי הן 5 המחלקות שצריכות הכי פחות צוותים (AKA הגישו הכי פחות בקשות תחזוקה) ומעבירה צוות אחד מכל אחת מהן למחלקה שדורשת הכי הרבה צוותים (המחלקה שהגישו הכי הרבה בקשות תחזוקה). הפרוצדורה תשתמש בפונקציה שתחזיר לנו את המחלקה עם הכי הרבה בקשות תחזוקה, וחמשת המחלקות עם הכי קצת, ותשתמש בזה על מנת להעביר את הצוותים בין המחלקות.

הפונקציה

```
CREATE OR REPLACE FUNCTION find_departments_with_requests
RETURN SYS.ODCINUMBERLIST
IS
    v_max_dept_id INT;
    v_min_dept_ids SYS.ODCINUMBERLIST := SYS.ODCINUMBERLIST();
BEGIN
    -- Find department with the most maintenance requests
    SELECT department_ID INTO v_max_dept_id
    FROM (
        SELECT d.department_ID, COUNT(*) AS cnt
        FROM department d
        JOIN maintenance_request mr ON d.department_ID = mr.department_ID
        GROUP BY d.department_ID
        ORDER BY cnt DESC
    )
    WHERE ROWNUM = 1;

    -- Find departments with the least maintenance requests
    SELECT department_ID BULK COLLECT INTO v_min_dept_ids
    FROM (
        SELECT d.department_ID, COUNT(*) AS cnt
        FROM department d
        JOIN maintenance_request mr ON d.department_ID = mr.department_ID
        GROUP BY d.department_ID
        ORDER BY cnt ASC
    )
    WHERE ROWNUM <= 5;

    -- Add the department IDs to the result list
    v_min_dept_ids.EXTEND;
    v_min_dept_ids(v_min_dept_ids.COUNT) := v_max_dept_id;

    RETURN v_min_dept_ids;
```

הפרוצדורה:

```
END;
/
CREATE OR REPLACE PROCEDURE move_teams_between_departments
IS
    v_departments SYS.ODCINUMBERLIST;
    v_max_dept_id INT;
BEGIN
    -- Get the department IDs
    v_departments := find_departments_with_requests;

    -- The last element in v_departments is the department with the most requests
    v_max_dept_id := v_departments(v_departments.COUNT);

    -- Move one team from each of the departments with the least requests to the department with the most requests
    FOR i IN 1..v_departments.COUNT-1 LOOP
        DECLARE
            v_team_id INT;
        BEGIN
            -- Print initial state of the least worked team
            DBMS_OUTPUT.PUT_LINE('Initial State of Least Worked Team (Department ID: ' || v_departments(i) || '):';
            DBMS_OUTPUT.PUT_LINE(get_team_state(v_departments(i)));

            -- Select one team from the current v_departments(i) to move
            SELECT team_ID INTO v_team_id
            FROM (
                SELECT t.team_ID, ROW_NUMBER() OVER (ORDER BY t.team_ID) AS rn
                FROM team t
                WHERE t.department_ID = v_departments(i)
            )
            WHERE rn = 1; -- Select the first team

            -- Update the team's department to v_max_dept_id
```

```

-- Update the team's department to v_max_dept_id
UPDATE team
SET department_ID = v_max_dept_id
WHERE team_ID = v_team_id;

COMMIT;

-- Print moved employee details
DBMS_OUTPUT.PUT_LINE('Moved team ' || v_team_id || ' from Department ' || v_departments(i) || ' to Dep

-- Print final state of the least worked team after move
DBMS_OUTPUT.PUT_LINE('Final State of Least Worked Team (Department ID: ' || v_departments(i) || '):');
DBMS_OUTPUT.PUT_LINE(get_team_state(v_departments(i)));

EXCEPTION
  WHEN NO_DATA_FOUND THEN
    DBMS_OUTPUT.PUT_LINE('No team found in department ' || v_departments(i));
  END;
END LOOP;

-- Print final state of the most worked team
DBMS_OUTPUT.PUT_LINE('Final State of Most Worked Team (Department ID: ' || v_max_dept_id || '):');
DBMS_OUTPUT.PUT_LINE(get_team_state(v_max_dept_id));

DBMS_OUTPUT.PUT_LINE('Teams moved successfully.');
```

```

EXCEPTION
  WHEN OTHERS THEN
```

הדפסה של מצב המחלקות לפני ואחרי השימוש בפרוצדורה:

```

Department with most requests:
-----
Department ID: 224
Team ID: 4601, Team Name: team a47
Department with least requests:
-----
Department ID: 205
```

```

No team found in department 205
Department with most requests:
-----
Department ID: 224
Team ID: 4601, Team Name: team a47
Team ID: 12801, Team Name: team b1
Team ID: 18601, Team Name: team b1
Team ID: 19501, Team Name: team a1
Team ID: 19601, Team Name: team b1
Department with least requests:
-----
Department ID: 205
```

הפרוצדורה השניה תעשה דבר דומה עבור הצוותים. היא תשתמש בפונקציה על מנת למצוא את הצוות שעבד הכי הרבה עד כה, וכן את 5 הצוותים שעבדו הכי פחות (על פי דוחות תחזוקה), ותעביר עובד אחד מכל צוות אל הצוות שצריך את העובדים.

הפונקציה

```
CREATE OR REPLACE FUNCTION find_teams_most_least_worked
RETURN SYS.ODCINUMBERLIST
IS
    v_most_worked_team_id INT;
    v_least_worked_teams SYS.ODCINUMBERLIST := SYS.ODCINUMBERLIST();
BEGIN
    -- Find team with the most work
    SELECT team_ID INTO v_most_worked_team_id
    FROM (
        SELECT wt.team_ID, COUNT(*) AS num_reports
        FROM worked wt
        JOIN maintenance_report mr ON wt.report_ID = mr.report_ID
        GROUP BY wt.team_ID
        ORDER BY num_reports DESC
    )
    WHERE ROWNUM = 1;

    -- Find teams with the least work
    SELECT team_ID BULK COLLECT INTO v_least_worked_teams
    FROM (
        SELECT wt.team_ID, COUNT(*) AS num_reports
        FROM worked wt
        JOIN maintenance_report mr ON wt.report_ID = mr.report_ID
        GROUP BY wt.team_ID
        ORDER BY num_reports ASC
    )
    WHERE ROWNUM <= 5;

    -- Add the team with the most work to the result list
    v_least_worked_teams.EXTEND;
    v_least_worked_teams(v_least_worked_teams.COUNT) := v_most_worked_team_id;

    RETURN v_least_worked_teams;
```

הפרוצדורה

```
CREATE OR REPLACE PROCEDURE move_employees_to_most_worked_team_with_state
IS
    v_teams SYS.ODCINUMBERLIST;
    v_most_worked_team_id INT;
    v_output VARCHAR2(4000);
BEGIN
    -- Get the team IDs
    v_teams := find_teams_most_least_worked;

    -- The last element in v_teams is the team with the most work
    v_most_worked_team_id := v_teams(v_teams.COUNT);

    -- Print initial state of the most worked team
    v_output := 'Initial State of Most Worked Team (Team ID: ' || v_most_worked_team_id || '):' || CHR(10);
    v_output := v_output || get_team_state(v_most_worked_team_id) || CHR(10);

    FOR i IN 1..v_teams.COUNT-1 LOOP
        DECLARE
            v_team_id INT := v_teams(i);
            v_supervisor_id INT;
            v_employee_id INT;
        BEGIN
            -- Print initial state of the least worked team
            v_output := v_output || 'Initial State of Least Worked Team (Team ID: ' || v_team_id || '):' || CHR(10);
            v_output := v_output || get_team_state(v_team_id) || CHR(10);

            -- Select one non-supervisor employee from the current team to move
            SELECT employee_ID INTO v_employee_id
            FROM (
                SELECT m.employee_ID, ROW_NUMBER() OVER (ORDER BY m.employee_ID) AS rn
                FROM member_of m
                WHERE m.team_ID = v_team_id
            )
            WHERE rn = 1;
```

```

WHERE m.team_ID = v_team_id
AND m.employee_ID != (
    SELECT supervisor_ID
    FROM department d
    WHERE d.department_ID = (
        SELECT t.department_ID
        FROM team t
        WHERE t.team_ID = v_team_id
    )
)
)
WHERE rn = 1; -- Select the first non-supervisor employee

-- Move the employee to the most worked team
UPDATE member_of
SET team_ID = v_most_worked_team_id
WHERE employee_ID = v_employee_id
AND team_ID = v_team_id;

COMMIT;

-- Print moved employee details
v_output := v_output || 'Moved employee ' || v_employee_id || ' from Team ' || v_team_id || ' to Team

-- Print final state of the least worked team after move
v_output := v_output || 'Final State of Least Worked Team (Team ID: ' || v_team_id || '):' || CHR(10);
v_output := v_output || get_team_state(v_team_id) || CHR(10);

EXCEPTION
WHEN NO_DATA_FOUND THEN
    v_output := v_output || 'No eligible employee found in team ' || v_team_id || CHR(10);
WHEN OTHERS THEN

```

הדפסה לאחר השימוש:

Initial State of Most Worked Team (Team ID: 10101):
Team Name: team c102
Speciality: repairs
Member Count: 3
Supervisor ID: 1444
Members:
- Sharon Reinhold
- Gabrielle Rio
- Blair Womack

Initial State of Least Worked Team (Team ID: 601):
Team Name: team a7
Speciality: plumbing
Member Count: 1
Supervisor ID: 1408
Members:
- Lena Noseworthy

Moved employee 1426 from Team 601 to Team 10101
Final State of Least Worked Team (Team ID: 601):
Team Name: team a7
Speciality: plumbing
Member Count: 0
Supervisor ID: 1408
Members:

Initial State of Least Worked Team (Team ID: 1001):
Team Name: team d11
Speciality: 'electric
Member Count: 2
Supervisor ID: 1812
Members:

Supervisor ID: 1170
Members:

No eligible employee found in team 901
Initial State of Least Worked Team (Team ID: 801):
Team Name: team a9
Speciality: repairs
Member Count: 0
Supervisor ID: 1440
Members:

No eligible employee found in team 801
Initial State of Least Worked Team (Team ID: 701):
Team Name: team d8
Speciality: repairs
Member Count: 0
Supervisor ID: 1772
Members:

No eligible employee found in team 701
Final State of Most Worked Team (Team ID: 10101):
Team Name: team c102
Speciality: repairs
Member Count: 5
Supervisor ID: 1444
Members:
- Sharon Reinhold
- Lena Noseworthy
- Gabrielle Rio
- Roy Jordan
- Blair Womack