# Lab 1: Oracle DDL and User Administration

**Date:** 19/09/2025

## Objectives

1. Create parent and child table relationships.
2. Verify the tables created.
3. Create and manage non-privileged users.

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## Tools

- Oracle Database XE
- SQL Developer
- Docker

**Lab Users:**

- SYS (Admin user)
- sandesh_csit (Lab user)

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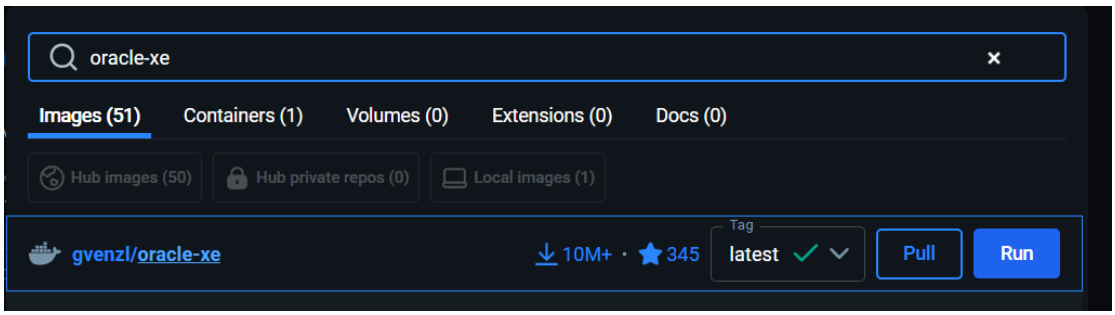
## Steps

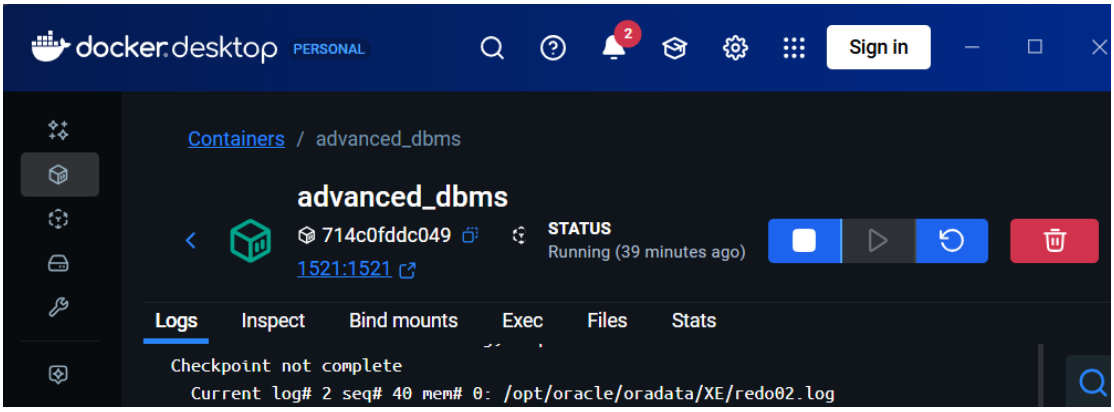
1. **Access Docker Container**

Open docker desktop and pull and run oracle




Open terminal and enter the Oracle container:

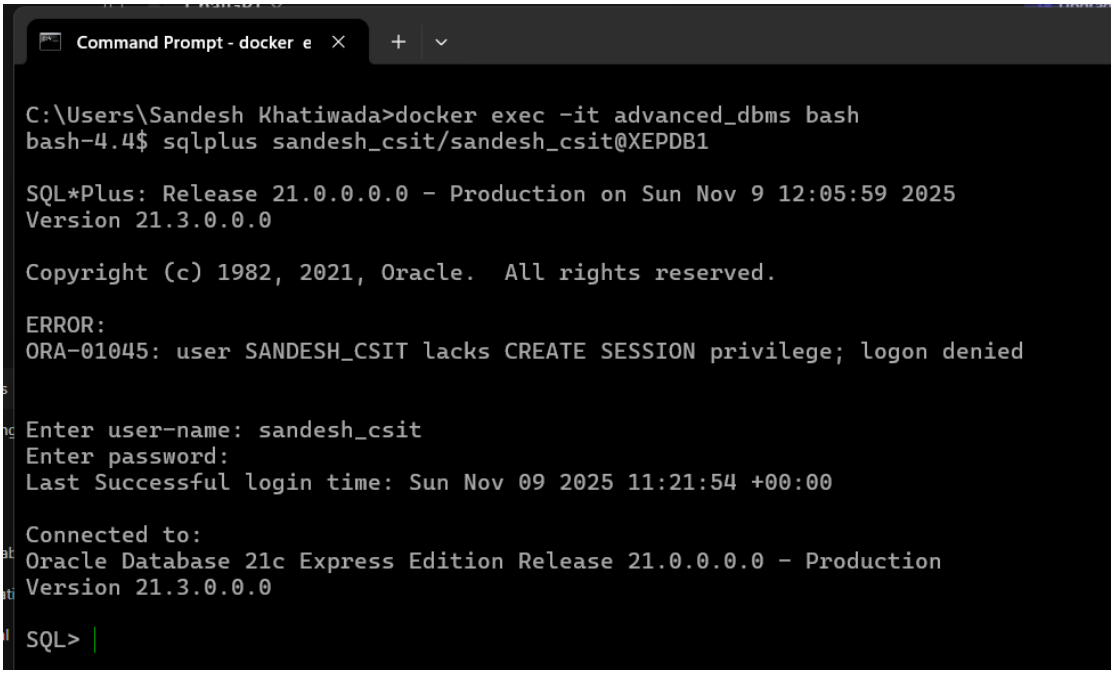
docker exec -it advanced_dbms bash




**2. Connect as SYSDBA**

Connect to Oracle using SQL*Plus as SYSDBA:

sqlplus sys/oracle@XE as sysdba




**3. Switch to the Pluggable Database**

ALTER SESSION SET CONTAINER = XEPDB1;

SHOW CON_NAME;

-- Should display: XEPDB1

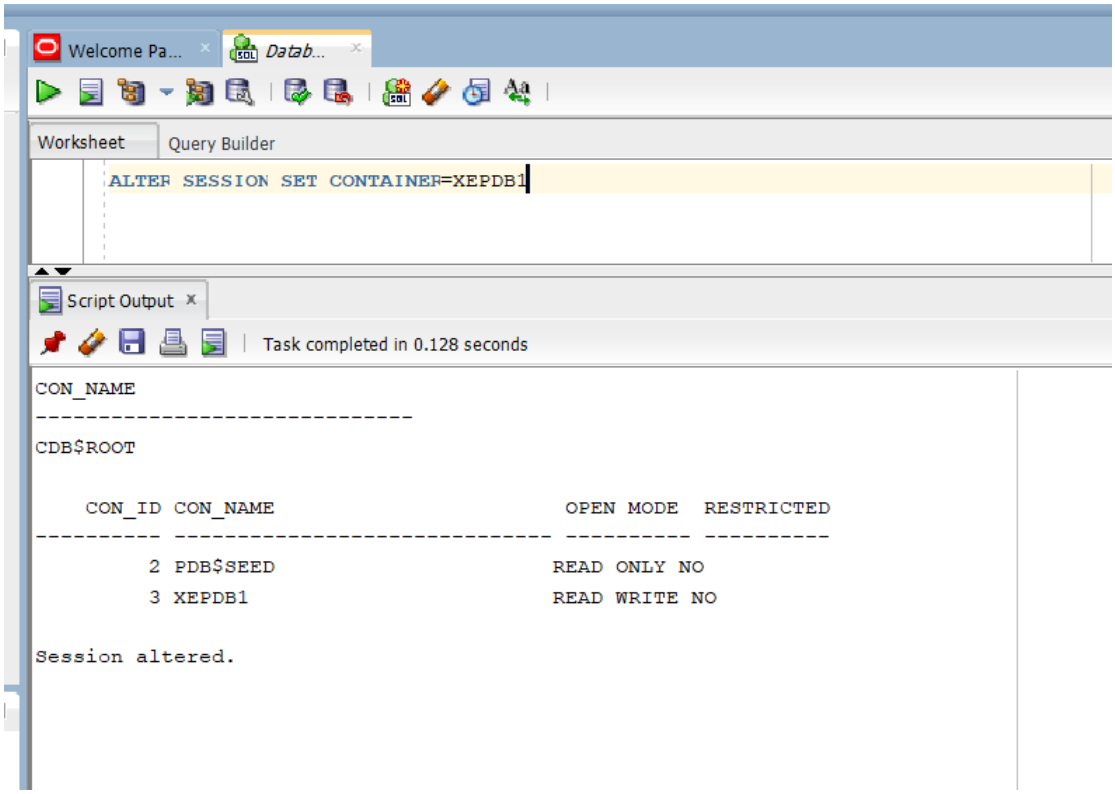
SHOW PDBS;

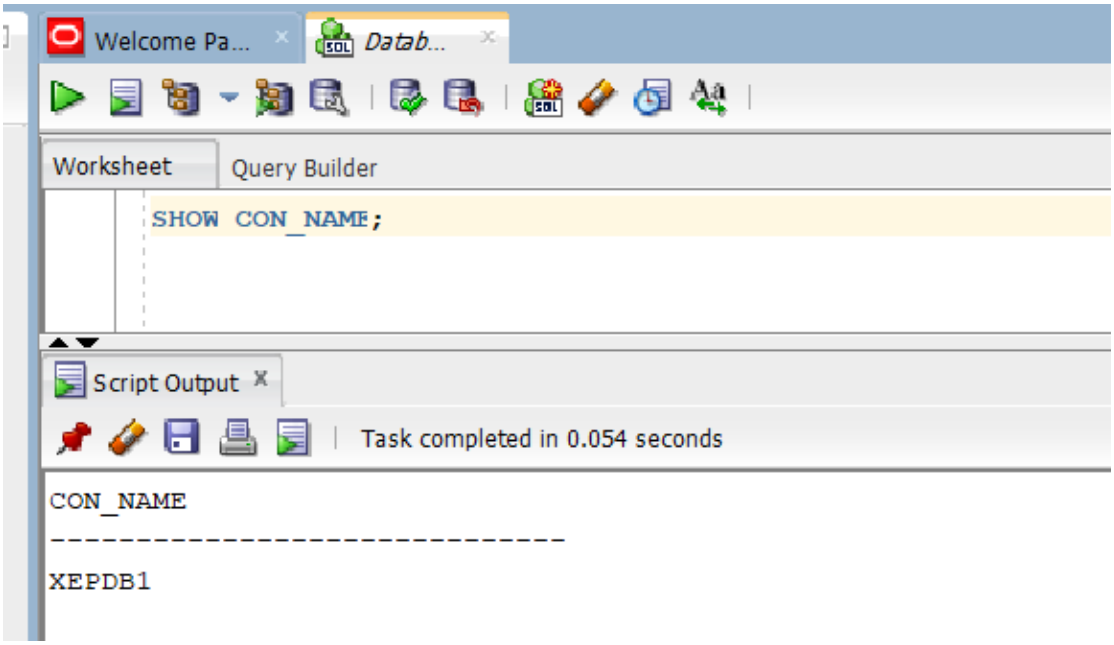
-- Should display:

-- PDB$SEED

-- XEPDB1

-- FREEPDB1





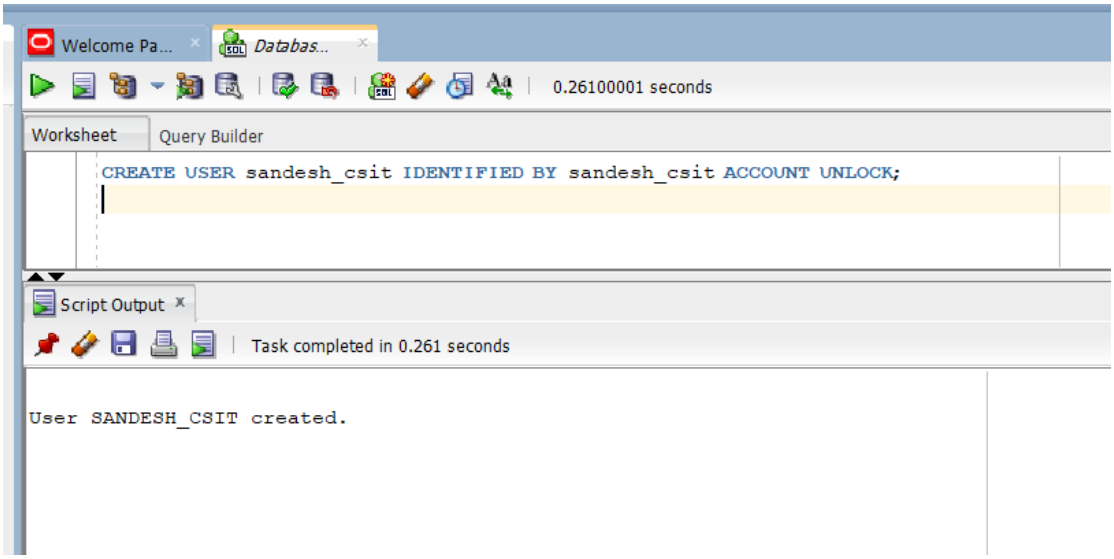

**4. Create Lab User**

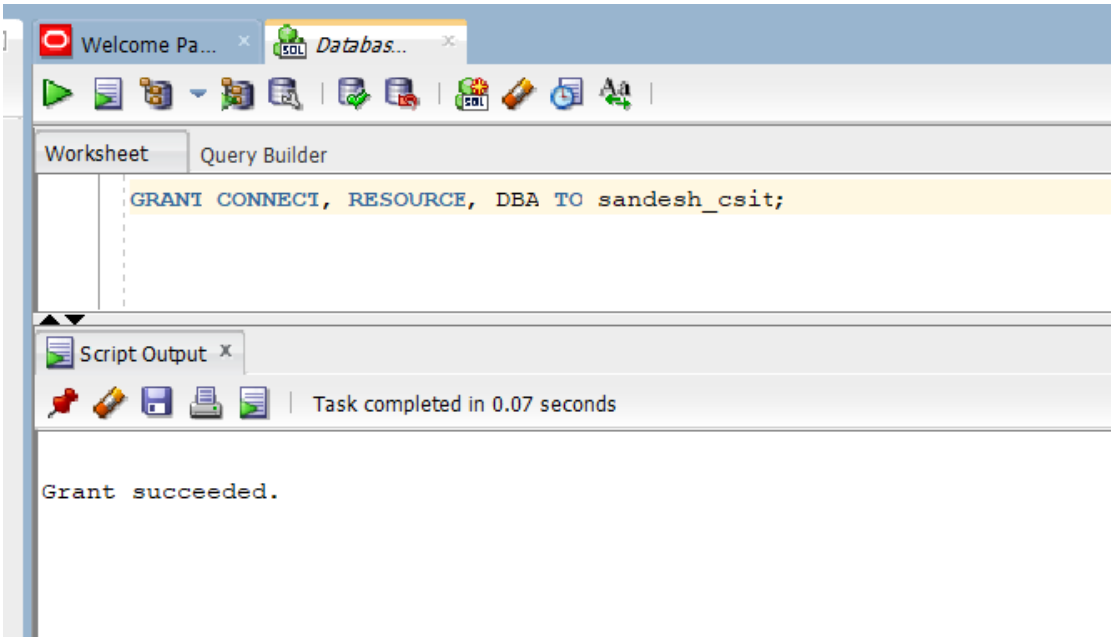
Create a new user sandesh_csit with password sandesh_csit:

CREATE USER sandesh_csit IDENTIFIED BY sandesh_csit ACCOUNT UNLOCK;

Grant necessary privileges:

GRANT CONNECT, RESOURCE, DBA TO sandesh_csit;





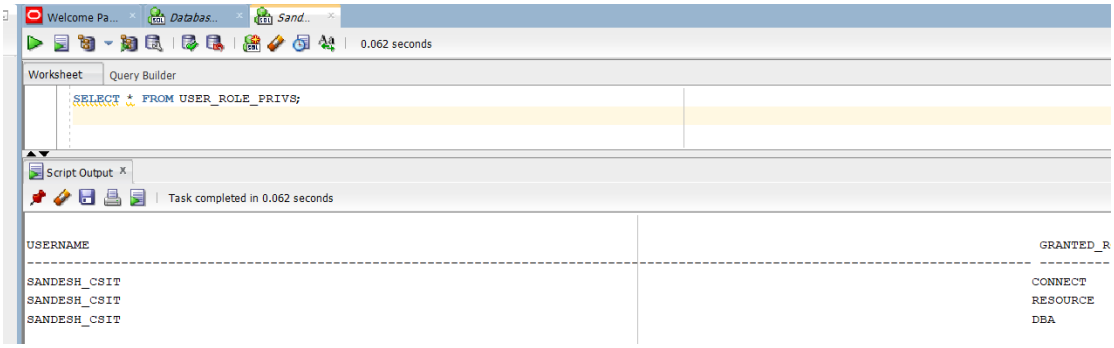

**5. Connect as Lab User**

Open a new session as sandesh_csit:

sqlplus sandesh_csit/sandesh_csit@XEPDB1
SHOW USER;

You should see:

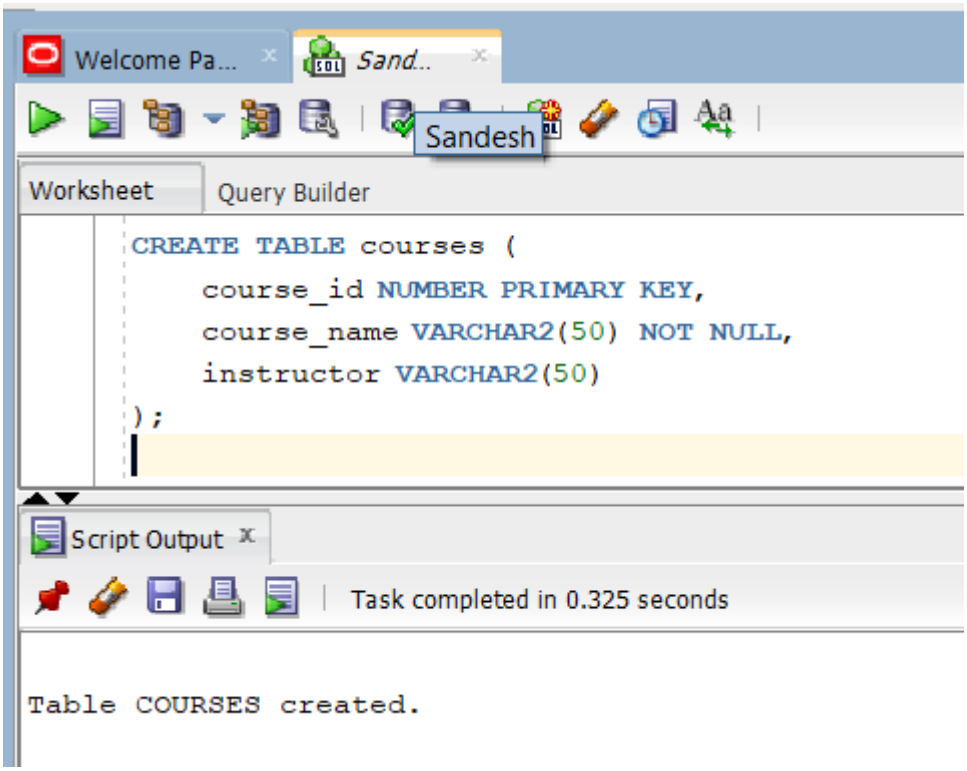
USER is "SANDESH_CSIT"



## 6. Create Parent and Child Tables

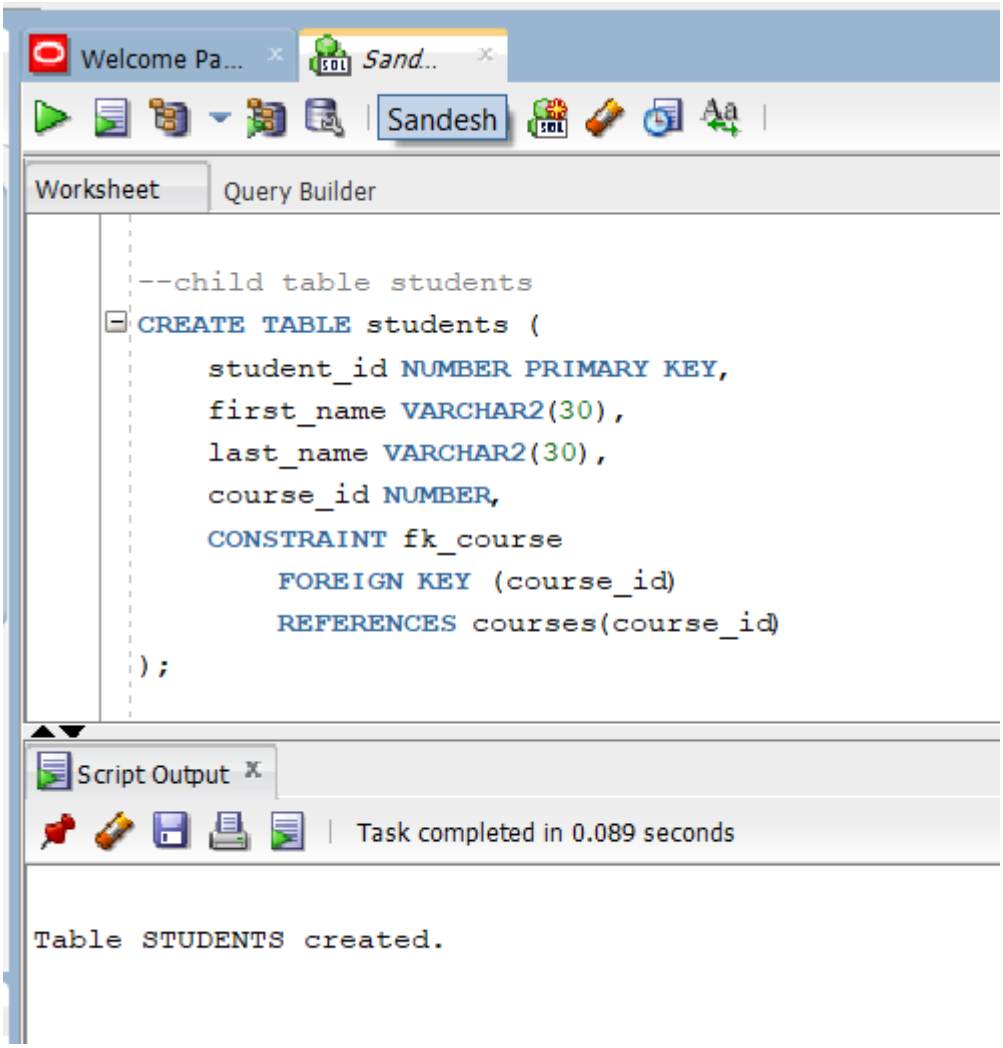
### Parent Table: COURSES

```
CREATE TABLE courses (
    course_id NUMBER PRIMARY KEY,
    course_name VARCHAR2(50) NOT NULL,
    instructor VARCHAR2(50)
);
```



## Child Table: STUDENTS

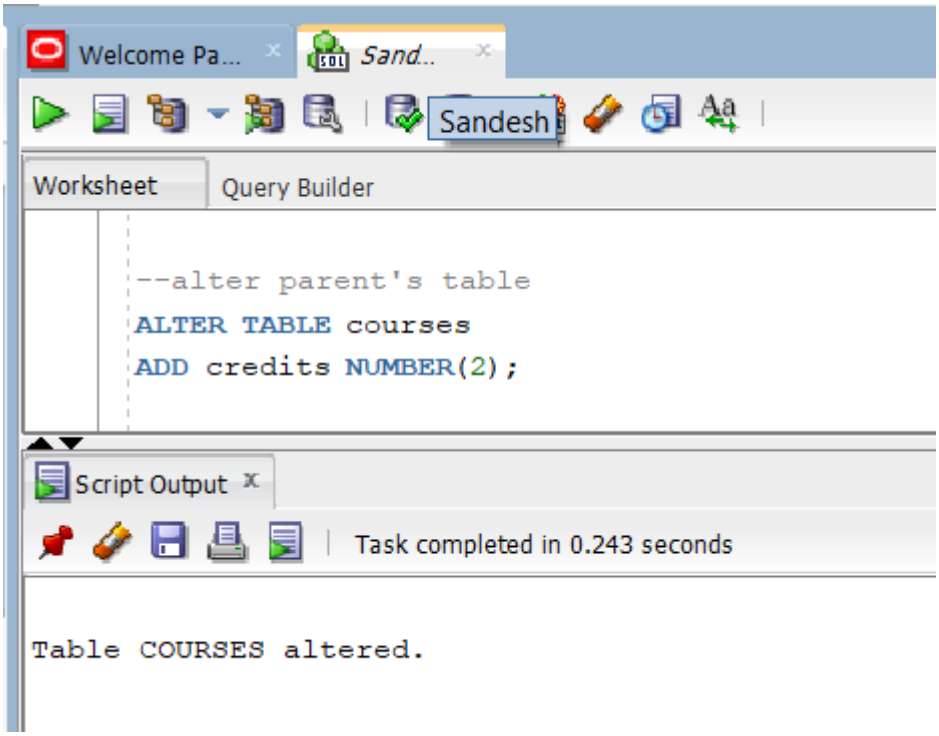
```
CREATE TABLE students (
    student_id NUMBER PRIMARY KEY,
    first_name VARCHAR2(30),
    last_name VARCHAR2(30),
    course_id NUMBER,
    CONSTRAINT fk_course
        FOREIGN KEY (course_id)
        REFERENCES courses(course_id)
);
```



7. Modify Tables (ALTER) and Delete Tables

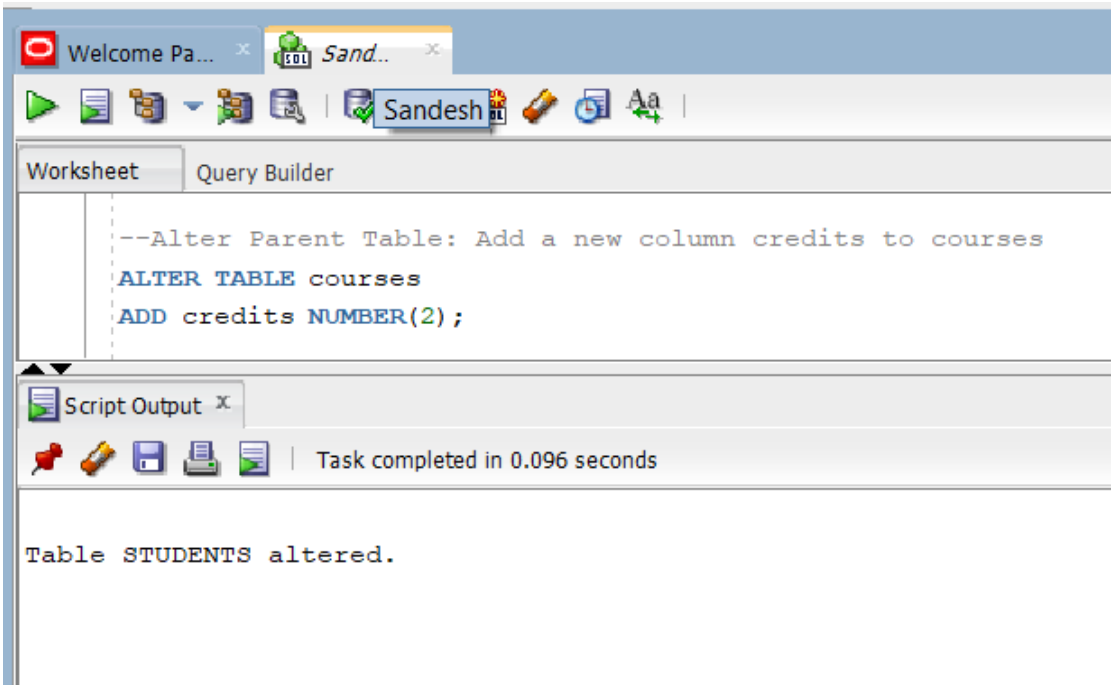
Alter Parent Table: Add a new column credits to courses

ALTER TABLE courses
ADD credits NUMBER(2);



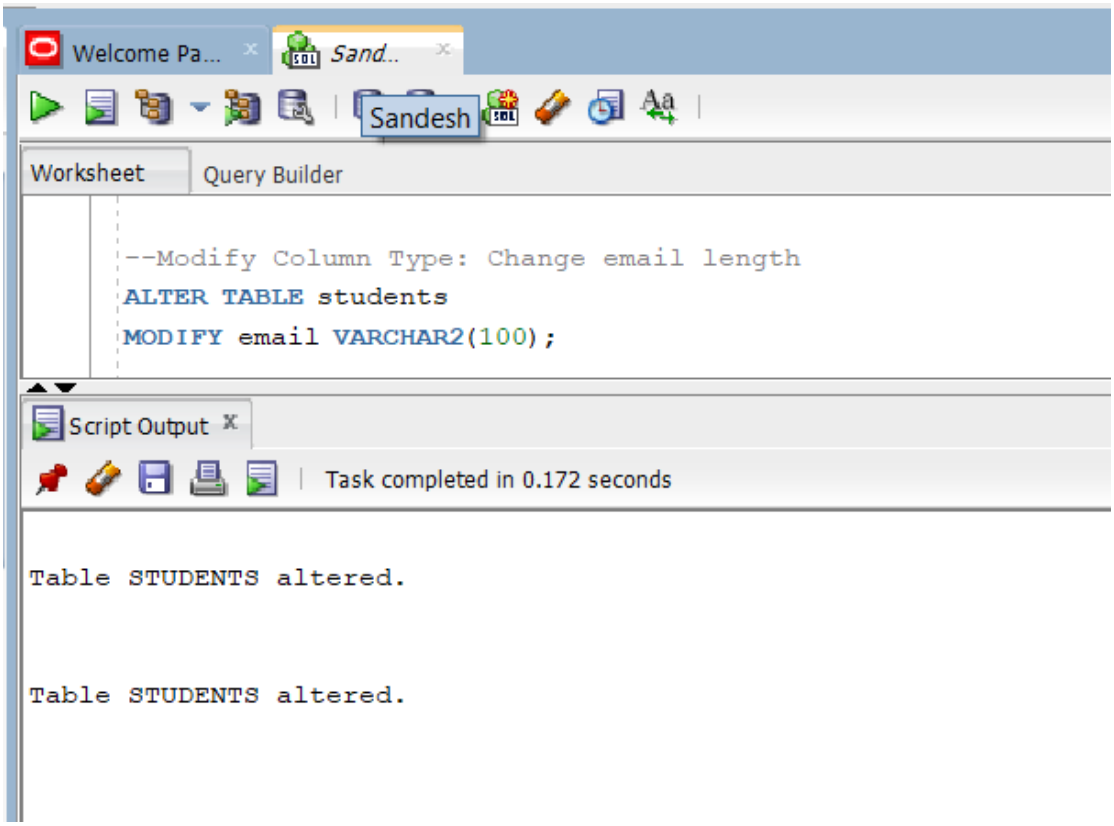

Alter Child Table: Add a new column email to students

ALTER TABLE students
ADD email VARCHAR2(50);




Modify Column Type: Change email length

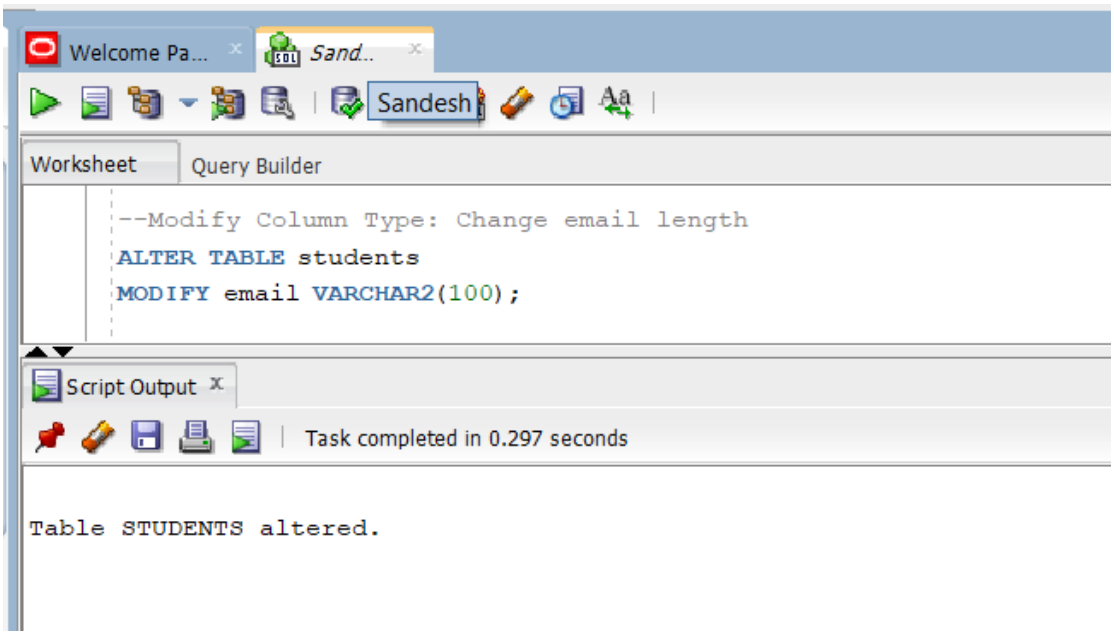
ALTER TABLE students
MODIFY email VARCHAR2(100);



Drop Column: Remove email column if not needed

ALTER TABLE students

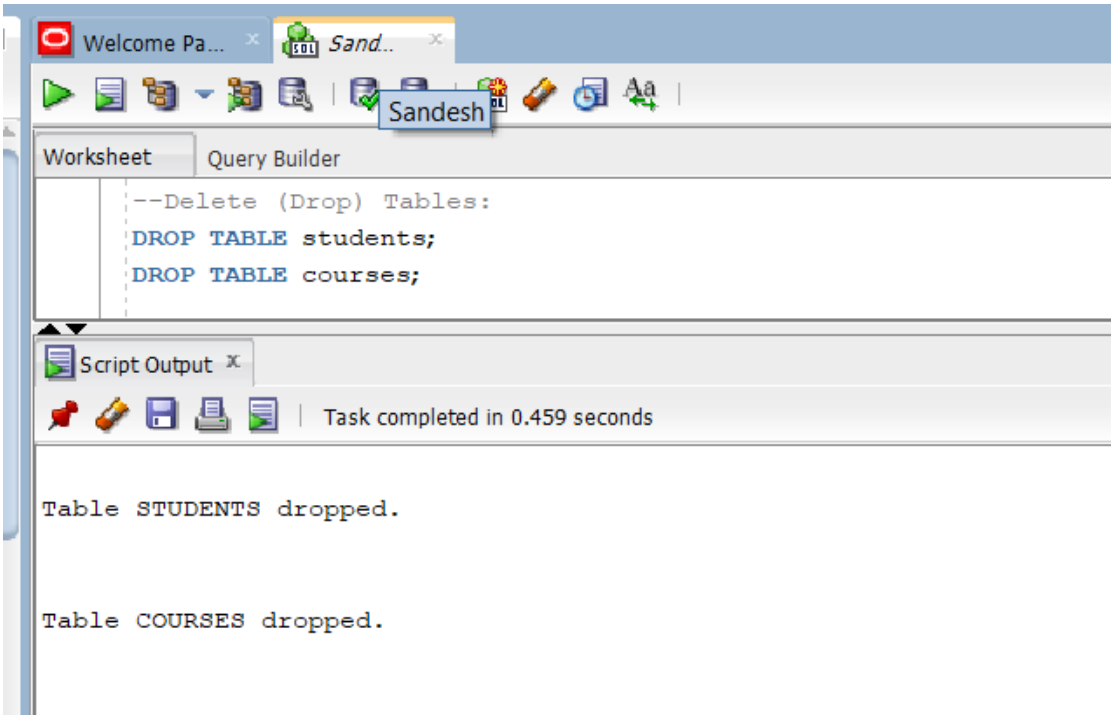
DROP COLUMN email;




Delete (Drop) Tables:

DROP TABLE students;

DROP TABLE courses;



Conclusion

In this lab, we have successfully:

- Created a non-privileged user (sandesh_csit) with appropriate privileges.
- Created parent (courses) and child (students) tables with a foreign key relationship.
- Practiced altering tables: adding columns, modifying column types, and dropping columns.
- Practiced deleting tables using DROP TABLE.
- Reinforced basic DDL commands (CREATE, ALTER, DROP) and user administration.

# Lab 2: Oracle DML Operations – Insert, Update, Select, Delete

**Date:** 02/11/2025

**Database Lab**

**Objectives:**

To be able to insert a new record in a parent table.

To be able to verify the records inserted.

To be able to verify domain constraints and referential integrity.

To be able to update and delete records.

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## Tools Used

Oracle Database XE

SQL Developer

Docker

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## 1. INSERT Operations

**General Syntax:**

```
INSERT INTO table_name (column1, column2, ...)
VALUES (value1, value2, ...);
```

**Example:**

Insert records into parent and child tables.

Parent table: COURSES

```
INSERT INTO courses (course_id, course_name, instructor)
```

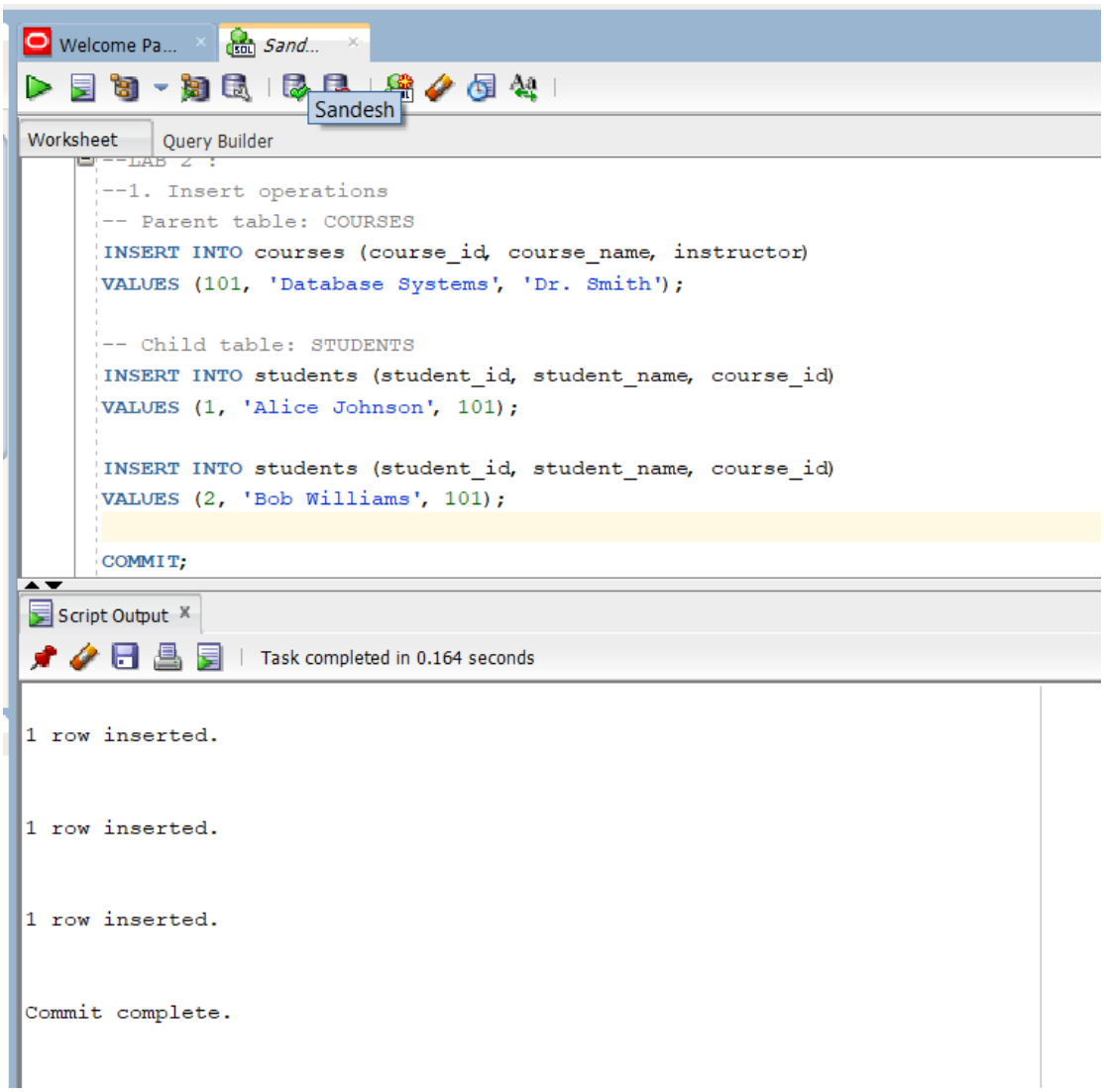
VALUES (101, 'Database Systems', 'Dr. Smith');

Child table: STUDENTS

INSERT INTO students (student_id, student_name, course_id)
VALUES (1, 'Alice Johnson', 101);

INSERT INTO students (student_id, student_name, course_id)
VALUES (2, 'Bob Williams', 101);

COMMIT;



## 2. SELECT Operations (Verification)

### General Syntax:

SELECT column1, column2, ...

FROM table_name

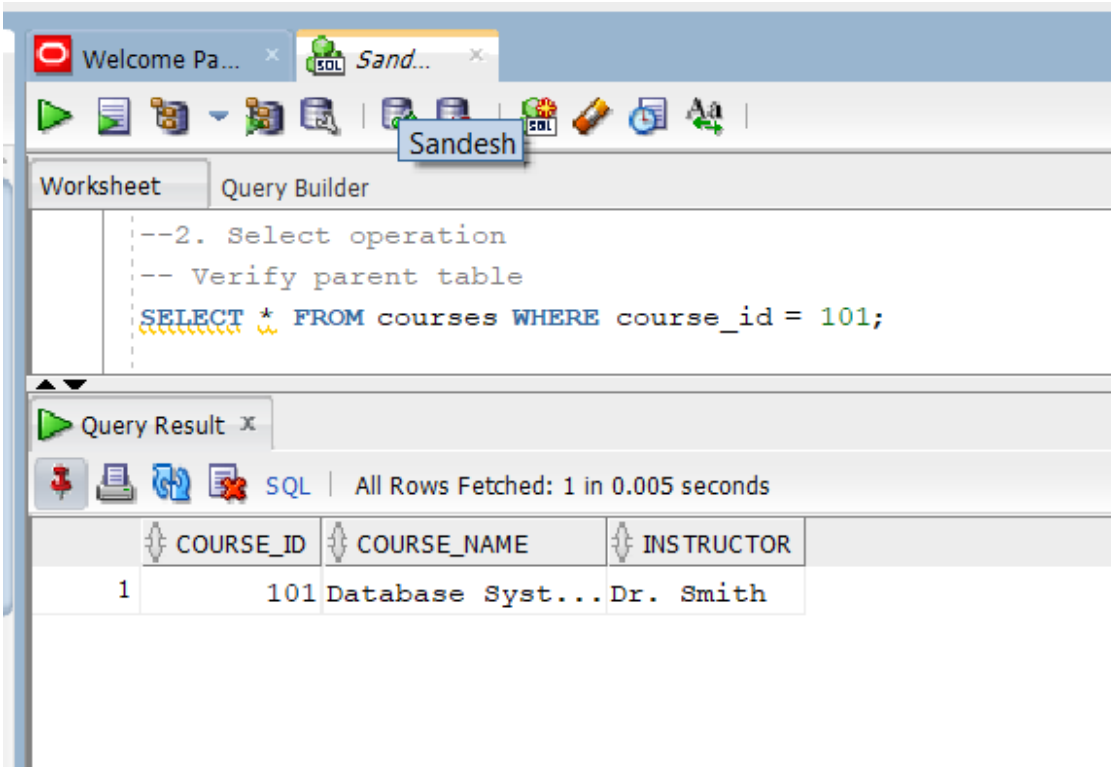
WHERE condition;

### Example:

Verify that the records were inserted successfully.

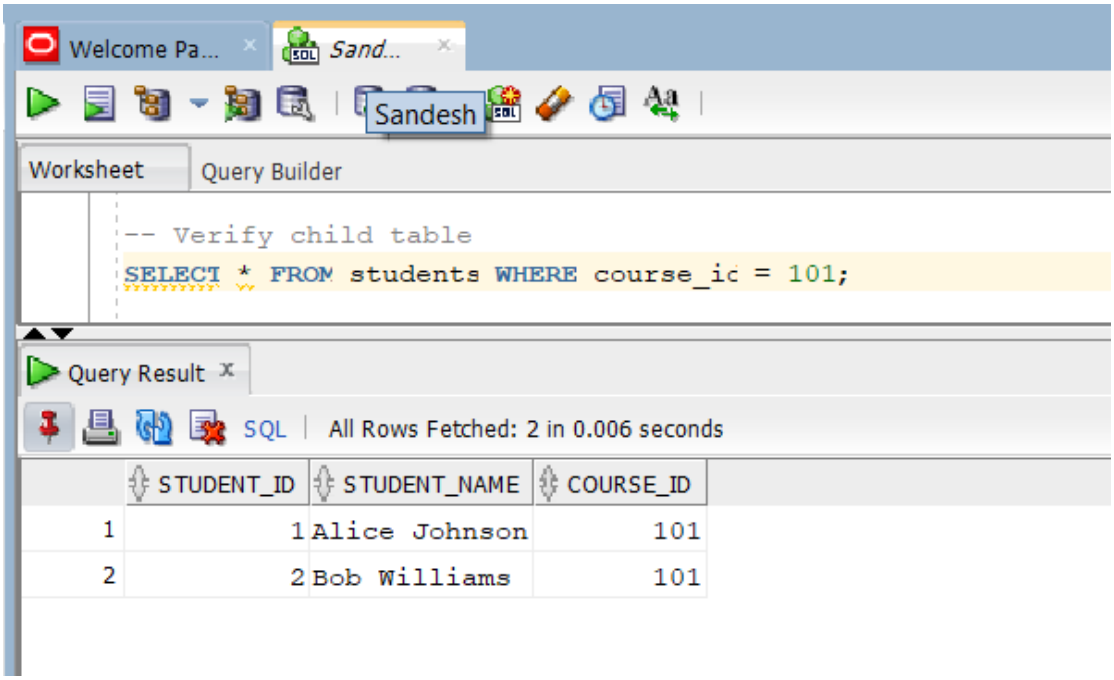
Verify parent table

SELECT * FROM courses WHERE course_id = 101;




Verify child table

SELECT * FROM students WHERE course_id = 101;

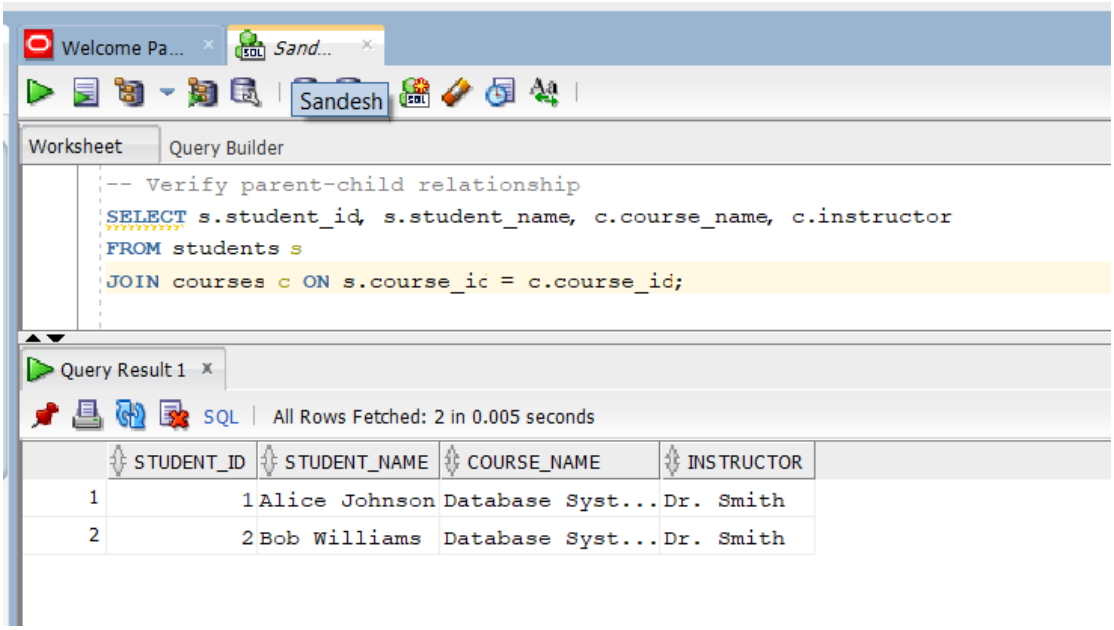



Verify parent-child relationship

SELECT s.student_id, s.student_name, c.course_name, c.instructor

FROM students s

JOIN courses c ON s.course_id = c.course_id;



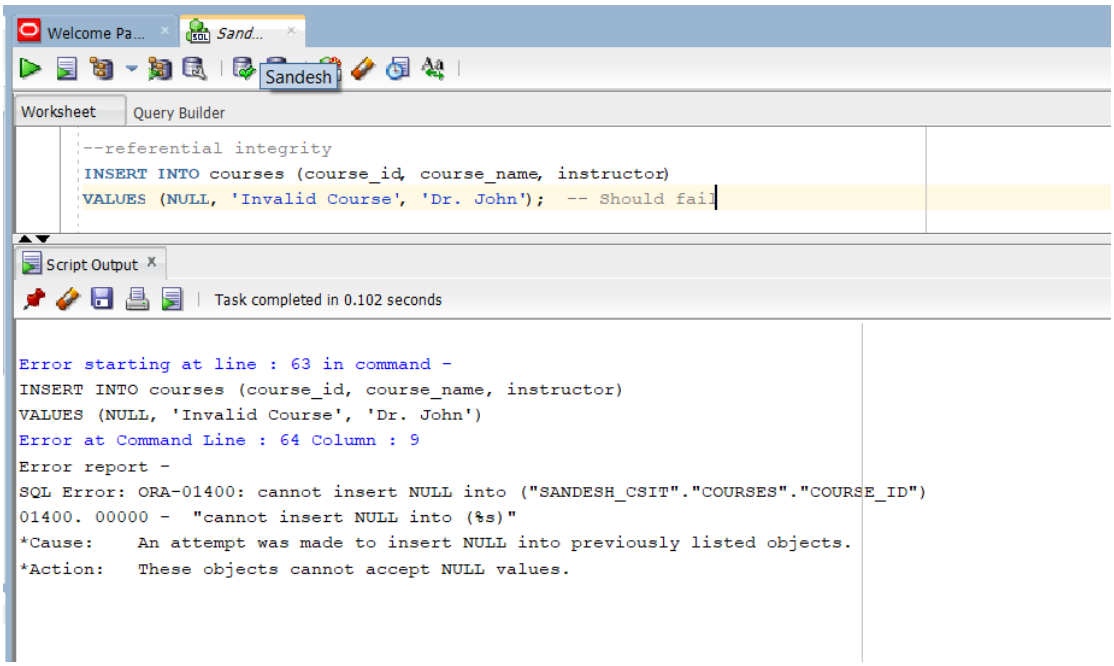

## 3. Constraint Verification

### Domain Constraint Check:

Try inserting invalid data (violating NOT NULL constraint)

INSERT INTO courses (course_id, course_name, instructor)

VALUES (NULL, 'Invalid Course', 'Dr. John');  -- Should fail

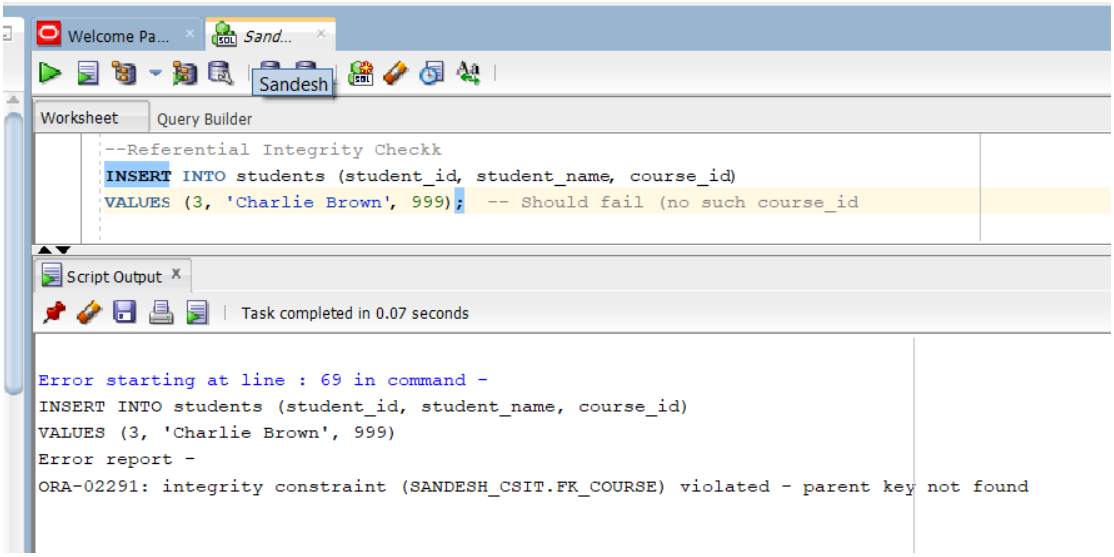



## Referential Integrity Check:

Try inserting student in non-existent course

INSERT INTO students (student_id, student_name, course_id)

VALUES (3, 'Charlie Brown', 999);  -- Should fail (no such course_id)



# 4. UPDATE Operations

## General Syntax:

UPDATE table_name

SET column1 = new_value1, column2 = new_value2, ...

WHERE condition;

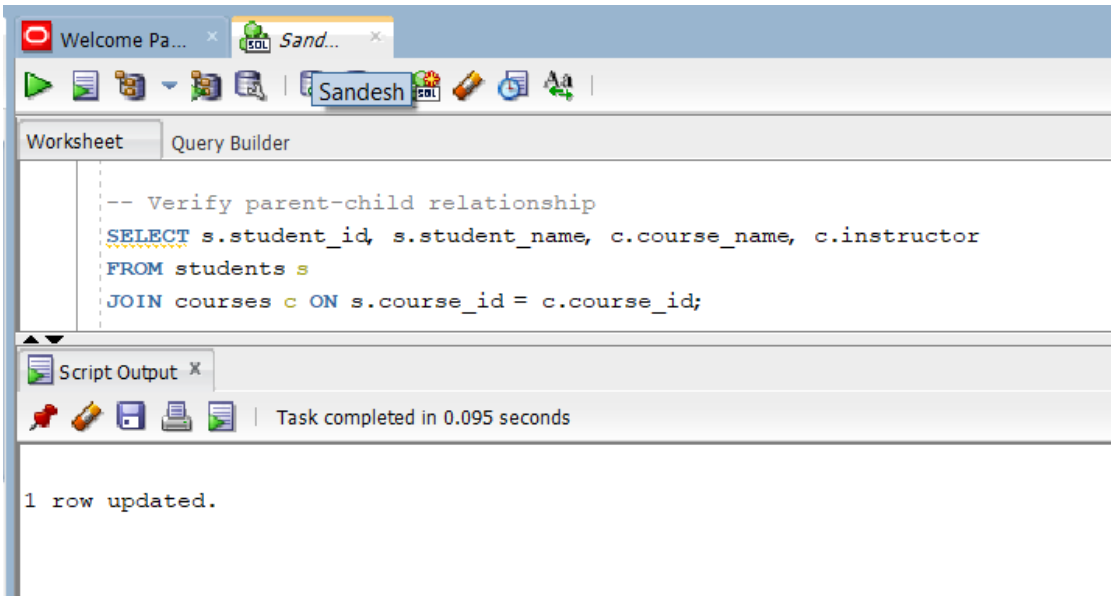
## Example:

Update course instructor

UPDATE courses

SET instructor = 'Dr. Adams'

WHERE course_id = 101;



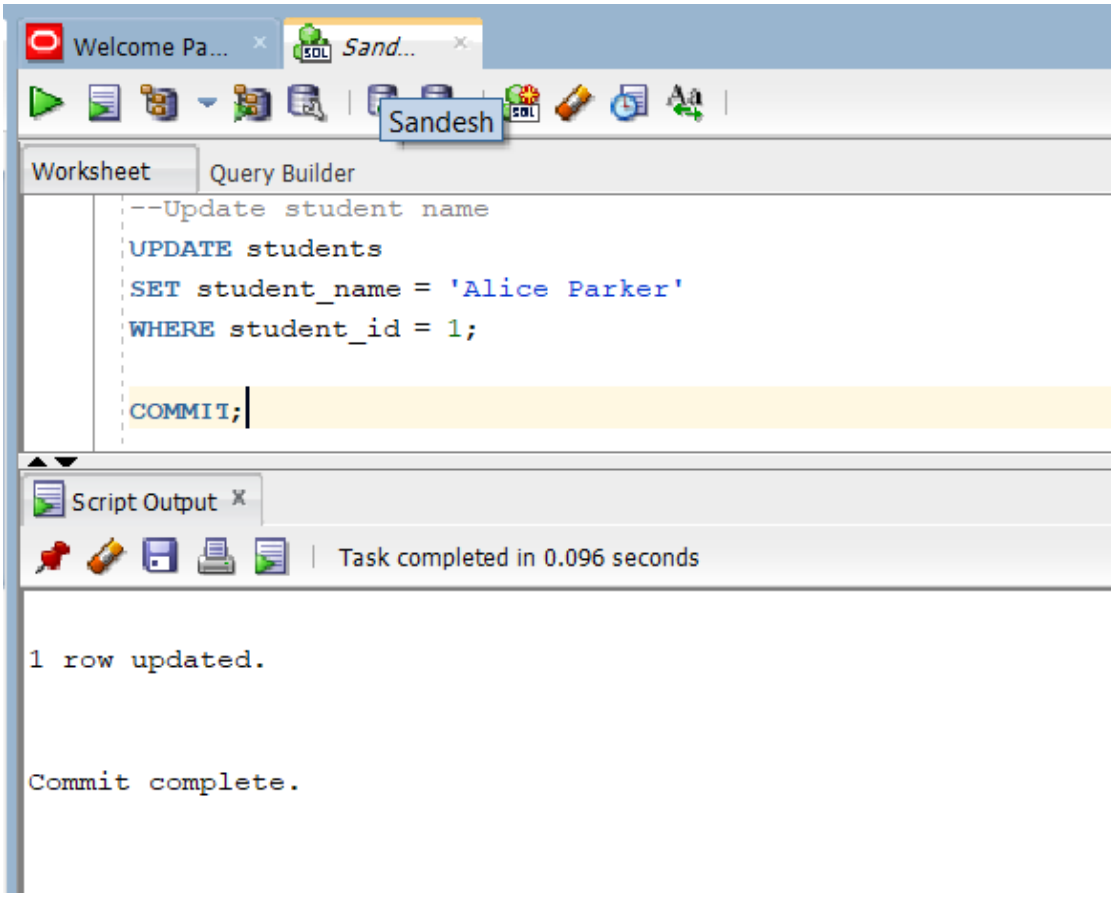

Update student name

UPDATE students

SET student_name = 'Alice Parker'

WHERE student_id = 1;

COMMIT;



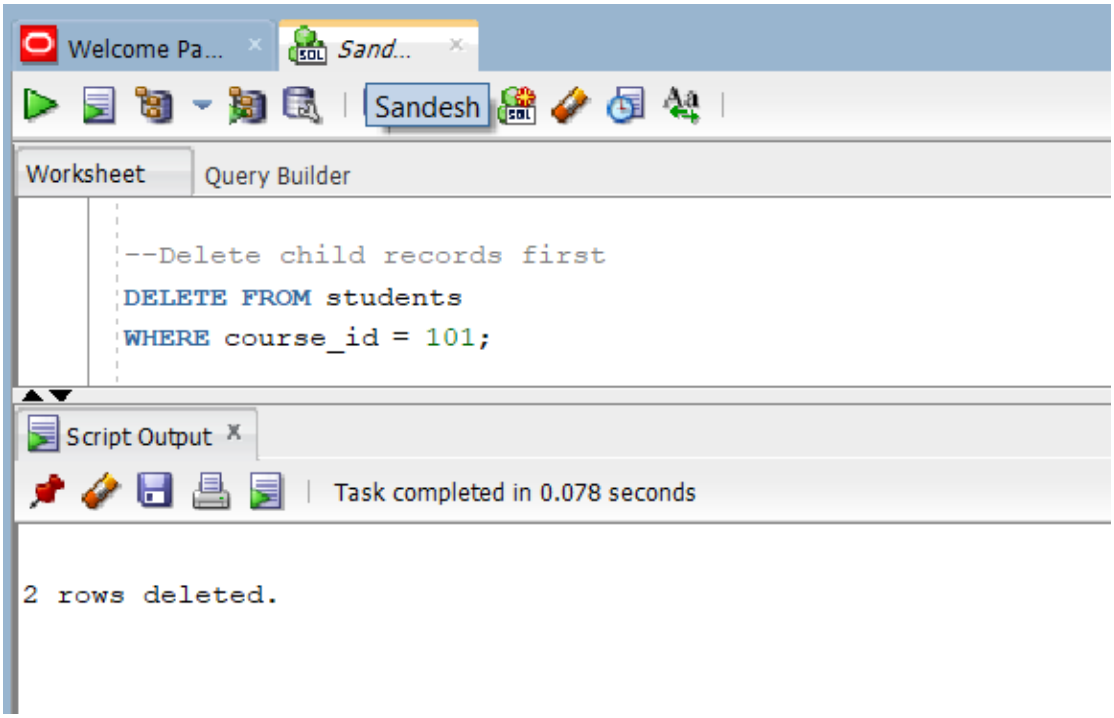

## 5. DELETE Operations

### General Syntax:

DELETE FROM table_name
WHERE condition;

### Example:

Delete child records first
DELETE FROM students
WHERE course_id = 101;




Then delete parent record

```
DELETE FROM courses
WHERE course_id = 101;

COMMIT;
```

## Conclusion

In this lab, we practiced **DML operations** including inserting, updating, selecting, and deleting records in related tables (**courses** and **students**). We also verified **domain constraints** and **referential integrity**, ensuring that dependent records maintain consistency when performing modifications.

```
-- LAB #3: SELECT STATEMENT (QUERY)
-- Student: Sandesh Khatiwada (Sandeshcsit)
-- Date: 09/11/2025



-- OBJECTIVES:
-- 1. Fetch data from a single table
-- 2. Fetch data conditionally [WHERE]
-- 3. Use IN, BETWEEN, AND, OR, NOT operations
-- 4. Apply aggregation (SUM, MIN, MAX, AVG, COUNT, STDDEV)
-- 5. Apply JOINs (CROSS, INNER, OUTER)
-- 6. Arrange data (ORDER BY) and fetch limited records

-- OBJECTIVE 1: FETCH DATA FROM A SINGLE TABLE

-- General Syntax:
-- SELECT * FROM <table_name>;

-- 1. Select all employees
SELECT * FROM employees;

-- 2. Select all departments
SELECT * FROM departments;

-- 3. Find employee first name, last name, and email from employees
SELECT first_name, last_name, email FROM employees;

-- 4. Find department name and location ID from departments
SELECT department_name, location_id FROM departments;

-- ================================================
-- OBJECTIVE 2: FETCH DATA CONDITIONALLY [WHERE]
-- ================================================
```

```
-- General Syntax:
-- SELECT * FROM <table_name> WHERE <condition>;

-- 5. Find all employees who work in department 60 (IT)
SELECT * FROM employees
WHERE department_id = 60;

-- 6. Find list of all employees hired before 1st January 2006
SELECT * FROM employees
WHERE hire_date < TO_DATE('01/01/2006', 'DD/MM/YYYY');

-- 7. Find employees with salary greater than 10000
SELECT * FROM employees
WHERE salary > 10000;

-- ================================================
-- OBJECTIVE 3: IN, BETWEEN, AND, OR, NOT OPERATIONS
-- ================================================

-- 8. AND Operator - Find employees in IT dept (60) with salary > 5000
SELECT * FROM employees
WHERE department_id = 60 AND salary > 5000;

-- 9. OR Operator - Find employees in department 50 OR 60
SELECT * FROM employees
WHERE department_id = 50 OR department_id = 60;

-- 10. NOT Operator - Find employees NOT in department 90
SELECT * FROM employees
WHERE NOT department_id = 90;

-- General Syntax for BETWEEN:
-- SELECT * FROM <table_name> WHERE <col_name> BETWEEN value1 AND
value2;
```

```
-- 11. BETWEEN - Find employees with salary between 5000 and 10000
SELECT * FROM employees
WHERE salary BETWEEN 5000 AND 10000;

-- 12. BETWEEN with dates - Find employees hired between 2005 and 2007
SELECT * FROM employees
WHERE hire_date BETWEEN TO_DATE('01/01/2005', 'DD/MM/YYYY')
                    AND TO_DATE('31/12/2007', 'DD/MM/YYYY');

-- 13. NOT BETWEEN - Find employees with salary NOT between 3000 and 7000
SELECT * FROM employees
WHERE salary NOT BETWEEN 3000 AND 7000;

-- General Syntax for IN:
-- SELECT * FROM <table_name> WHERE <col_name> IN (list_of_values);

-- 14. IN Operator - Find employees in departments 30, 50, or 60
SELECT * FROM employees
WHERE department_id IN (30, 50, 60);

-- 15. IN Operator with job titles
SELECT * FROM employees
WHERE job_id IN ('IT_PROG', 'FI_ACCOUNT', 'SA_MAN');

-- 16. NOT IN - Find employees NOT in departments 50 or 90
SELECT * FROM employees
WHERE department_id NOT IN (50, 90);

-- ================================================
-- OBJECTIVE 4: AGGREGATION FUNCTIONS
-- ================================================

-- General Syntax:
```

```
-- SELECT SUM(<col>) FROM <table_name>;
-- SELECT MIN(<col>) FROM <table_name>;
-- SELECT MAX(<col>) FROM <table_name>;
-- SELECT AVG(<col>) FROM <table_name>;
-- SELECT COUNT(*) FROM <table_name>;
-- SELECT STDDEV(<col>) FROM <table_name>;

-- 17. Find total number of employees
SELECT COUNT(*) AS "Total Employees"
FROM employees;

-- 18. Find total salary (SUM)
SELECT SUM(salary) AS "Total Salary"
FROM employees;

-- 19. Find minimum salary
SELECT MIN(salary) AS "Minimum Salary"
FROM employees;

-- 20. Find maximum salary
SELECT MAX(salary) AS "Maximum Salary"
FROM employees;

-- 21. Find average salary
SELECT AVG(salary) AS "Average Salary"
FROM employees;

-- 22. Find standard deviation of salaries
SELECT STDDEV(salary) AS "Salary Std Deviation"
FROM employees;

-- 23. Find total salary by department (GROUP BY)
SELECT
    department_id,
```

```
    COUNT(*) AS "Employee Count",
    SUM(salary) AS "Total Salary",
    AVG(salary) AS "Average Salary"
FROM employees
GROUP BY department_id
ORDER BY department_id;

-- ====================================================
-- OBJECTIVE 5: JOINS (CROSS, INNER, OUTER)
-- ====================================================

-- CROSS JOIN - General Syntax:
-- SELECT * FROM table1, table2;

-- 24. Cross Join - Cartesian product
SELECT * FROM employees, departments;

-- CROSS JOIN with WHERE (Old Style Join):
-- SELECT * FROM table1, table2 WHERE <condition>;

-- 25. Cross Join with WHERE clause
SELECT
    e.employee_id,
    e.first_name,
    e.last_name,
    d.department_name
FROM employees e, departments d
WHERE e.department_id = d.department_id;

-- INNER JOIN - General Syntax:
-- SELECT * FROM table1 t1
-- INNER JOIN table2 t2
-- ON t1.column = t2.column;
```

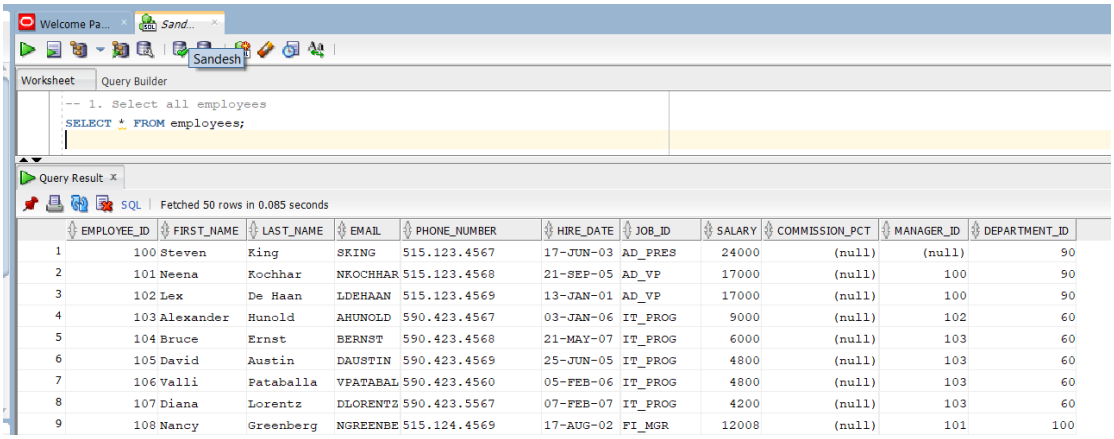
```
-- 26. Inner Join - Employees with department names
SELECT
    e.employee_id,
    e.first_name,
    e.last_name,
    e.salary,
    d.department_name
FROM employees e
INNER JOIN departments d
ON e.department_id = d.department_id;

-- 27. Inner Join - Employees with job titles
SELECT
    e.employee_id,
    e.first_name || ' ' || e.last_name AS "Full Name",
    j.job_title,
    e.salary
FROM employees e
INNER JOIN jobs j
ON e.job_id = j.job_id;

-- 28. Multiple INNER JOINs - Employees with department and location
SELECT
    e.employee_id,
    e.first_name || ' ' || e.last_name AS "Employee Name",
    d.department_name,
    l.city,
    c.country_name
FROM employees e
INNER JOIN departments d ON e.department_id = d.department_id
INNER JOIN locations l ON d.location_id = l.location_id
INNER JOIN countries c ON l.country_id = c.country_id;

-- LEFT OUTER JOIN - General Syntax:
```

```
-- SELECT * FROM table1 t1
-- LEFT OUTER JOIN table2 t2
-- ON t1.column = t2.column;

-- 29. Left Outer Join - All departments with employee count
SELECT
    d.department_id,
    d.department_name,
    COUNT(e.employee_id) AS "Employee Count"
FROM departments d
LEFT OUTER JOIN employees e
ON d.department_id = e.department_id
GROUP BY d.department_id, d.department_name
ORDER BY d.department_id;

-- ================================================
-- COMBINATION OF JOIN AND AGGREGATION
-- ================================================

-- General Syntax:
-- SELECT t1.col, SUM(t2.col) FROM table1 t1
-- INNER JOIN table2 t2 ON t1.id = t2.id
-- GROUP BY t1.col;

-- 30. Total salary by department with department names
SELECT
    d.department_id,
    d.department_name,
    COUNT(e.employee_id) AS "Employee Count",
    SUM(e.salary) AS "Total Salary"
FROM departments d
INNER JOIN employees e
ON d.department_id = e.department_id
GROUP BY d.department_id, d.department_name;
```

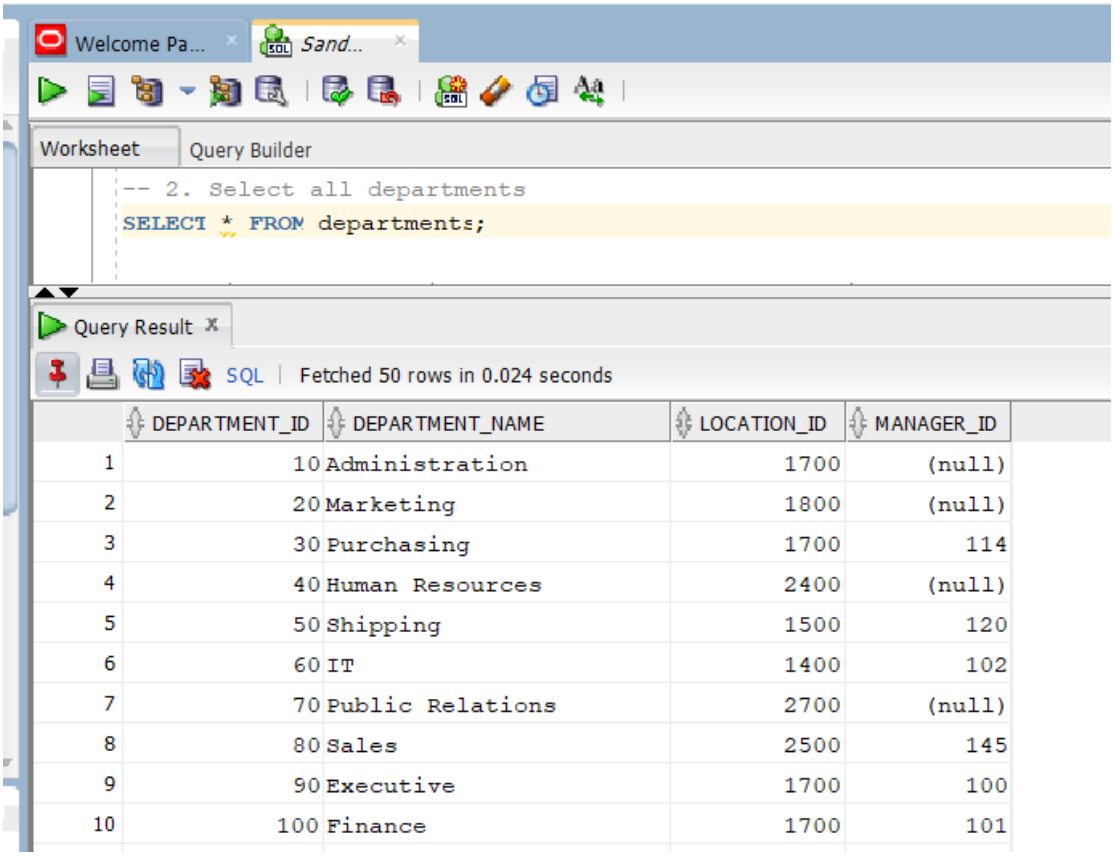
```
-- 31. Average salary by job title
SELECT
   j.job_title,
   COUNT(e.employee_id) AS "Number of Employees",
   AVG(e.salary) AS "Average Salary"
FROM jobs j
INNER JOIN employees e
ON j.job_id = e.job_id
GROUP BY j.job_title;

-- ======================================================
-- OBJECTIVE 6: ORDER BY AND LIMIT (ROWNUM)
-- ======================================================

-- General Syntax for ORDER BY:
-- SELECT * FROM <table_name> ORDER BY <col> ASC;
-- SELECT * FROM <table_name> ORDER BY <col> DESC;

-- 32. Employees ordered by salary (ascending)
SELECT employee_id, first_name, last_name, salary
FROM employees
ORDER BY salary ASC;

-- 33. Employees ordered by salary (descending)
SELECT employee_id, first_name, last_name, salary
FROM employees
ORDER BY salary DESC;

-- 34. Employees ordered by hire date (newest first)
SELECT employee_id, first_name, last_name, hire_date
FROM employees
ORDER BY hire_date DESC;
```

```
-- General Syntax for ROWNUM (LIMIT):
-- WHERE ROWNUM <= n;

-- 35. Top 5 highest paid employees using ROWNUM
SELECT * FROM (
   SELECT employee_id, first_name, last_name, salary
   FROM employees
   ORDER BY salary DESC
)
WHERE ROWNUM <= 5;

-- 36. Top 3 most recent hires
SELECT * FROM (
   SELECT employee_id, first_name, last_name, hire_date
   FROM employees
   ORDER BY hire_date DESC
)
WHERE ROWNUM <= 3;

-- 37. Combine JOIN, Aggregation, ORDER BY, and ROWNUM
-- Top 5 departments by total salary
SELECT * FROM (
   SELECT
      d.department_name,
      SUM(e.salary) AS "Total Salary"
   FROM departments d
   INNER JOIN employees e
   ON d.department_id = e.department_id
   GROUP BY d.department_name
   ORDER BY SUM(e.salary) DESC
)
WHERE ROWNUM <= 5;

-- ================================================
```

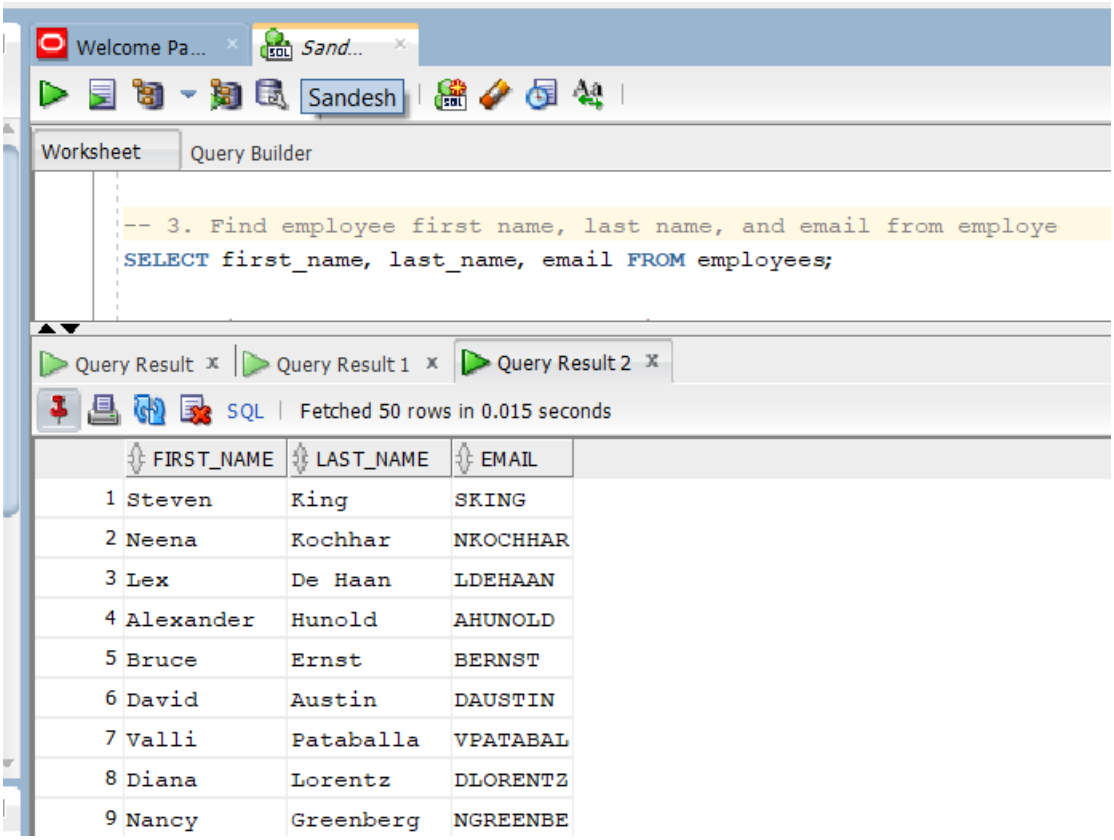
```
-- ADDITIONAL IMPORTANT QUERIES
-- ==================================================

-- 38. Self Join - Employees with their managers
SELECT
    e.employee_id,
    e.first_name || ' ' || e.last_name AS "Employee",
    m.first_name || ' ' || m.last_name AS "Manager"
FROM employees e
LEFT OUTER JOIN employees m
ON e.manager_id = m.employee_id;

-- 39. Subquery - Employees earning more than average salary
SELECT employee_id, first_name, last_name, salary
FROM employees
WHERE salary > (SELECT AVG(salary) FROM employees)
ORDER BY salary DESC;

-- 40. HAVING Clause - Departments with more than 5 employees
SELECT
    d.department_name,
    COUNT(e.employee_id) AS "Employee Count"
FROM departments d
INNER JOIN employees e
ON d.department_id = e.department_id
GROUP BY d.department_name
HAVING COUNT(e.employee_id) > 5
ORDER BY COUNT(e.employee_id) DESC;
```



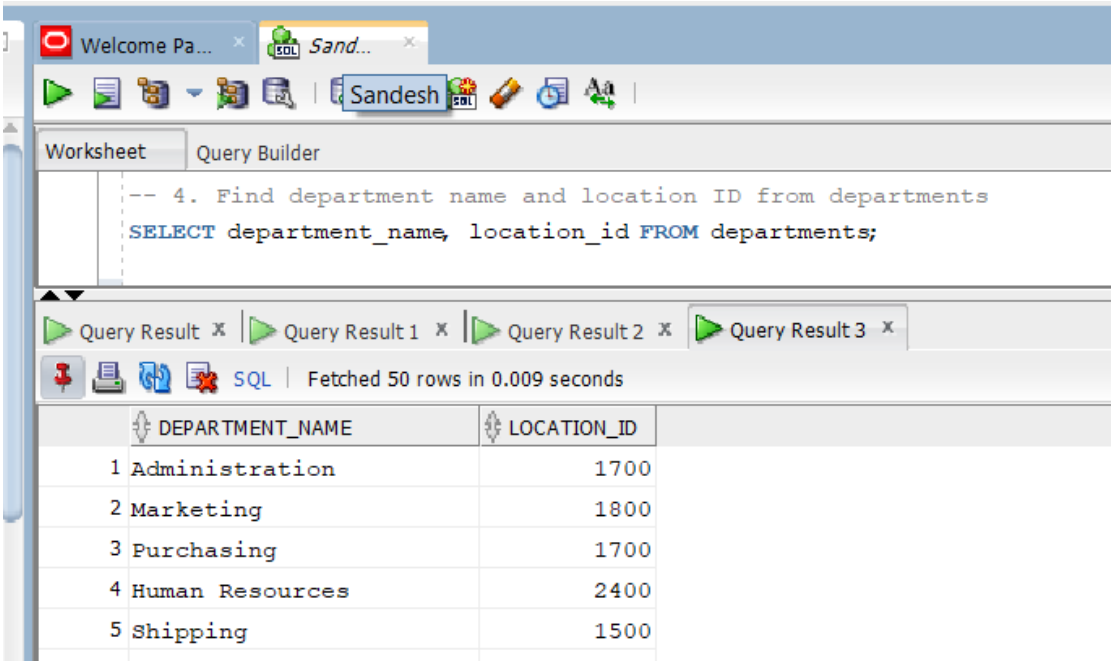

| | EMPLOYEE_ID | FIRST_NAME | LAST_NAME | EMAIL | PHONE_NUMBER | HIRE_DATE | JOB_ID | SALARY | COMMISSION_PCT | MANAGER_ID | DEPARTMENT_ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 100 | Steven | King | SKING | 515.123.4567 | 17-JUN-03 | AD_PRES | 24000 | (null) | (null) | 90 |
| 2 | 101 | Neena | Kochhar | NKOCHHAR | 515.123.4568 | 21-SEP-05 | AD_VP | 17000 | (null) | 100 | 90 |
| 3 | 102 | Lex | De Haan | LDEHAAN | 515.123.4569 | 13-JAN-01 | AD_VP | 17000 | (null) | 100 | 90 |
| 4 | 103 | Alexander | Hunold | AHUNOLD | 590.423.4567 | 03-JAN-06 | IT_PROG | 9000 | (null) | 102 | 60 |
| 5 | 104 | Bruce | Ernst | BERNST | 590.423.4568 | 21-MAY-07 | IT_PROG | 6000 | (null) | 103 | 60 |
| 6 | 105 | David | Austin | DAUSTIN | 590.423.4569 | 25-JUN-05 | IT_PROG | 4800 | (null) | 103 | 60 |
| 7 | 106 | Valli | Pataballa | VPATABAL | 590.423.4560 | 05-FEB-06 | IT_PROG | 4800 | (null) | 103 | 60 |
| 8 | 107 | Diana | Lorentz | DLORENTZ | 590.423.5567 | 07-FEB-07 | IT_PROG | 4200 | (null) | 103 | 60 |
| 9 | 108 | Nancy | Greenberg | NGREENBE | 515.124.4569 | 17-AUG-02 | FI_MGR | 12008 | (null) | 101 | 100 |



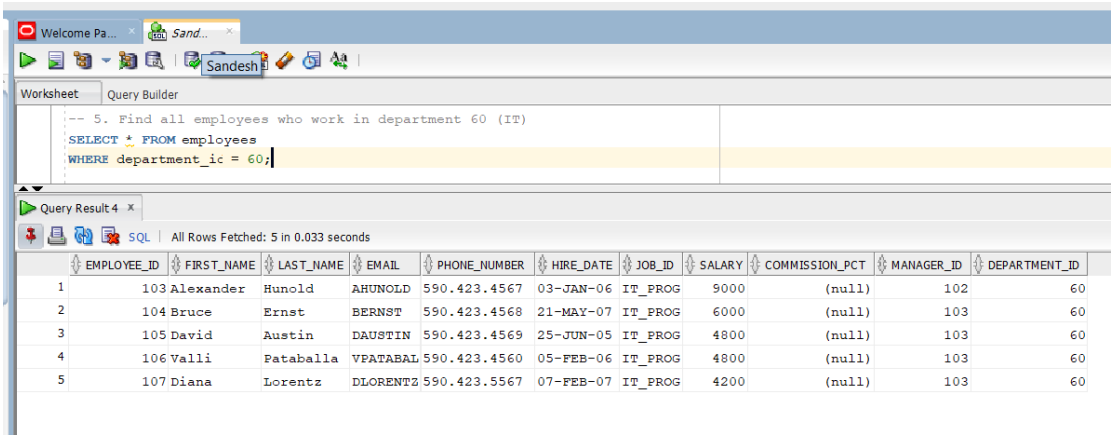

| | DEPARTMENT_ID | DEPARTMENT_NAME | LOCATION_ID | MANAGER_ID |
|---|---|---|---|---|
| 1 | 10 | Administration | 1700 | (null) |
| 2 | 20 | Marketing | 1800 | (null) |
| 3 | 30 | Purchasing | 1700 | 114 |
| 4 | 40 | Human Resources | 2400 | (null) |
| 5 | 50 | Shipping | 1500 | 120 |
| 6 | 60 | IT | 1400 | 102 |
| 7 | 70 | Public Relations | 2700 | (null) |
| 8 | 80 | Sales | 2500 | 145 |
| 9 | 90 | Executive | 1700 | 100 |
| 10 | 100 | Finance | 1700 | 101 |



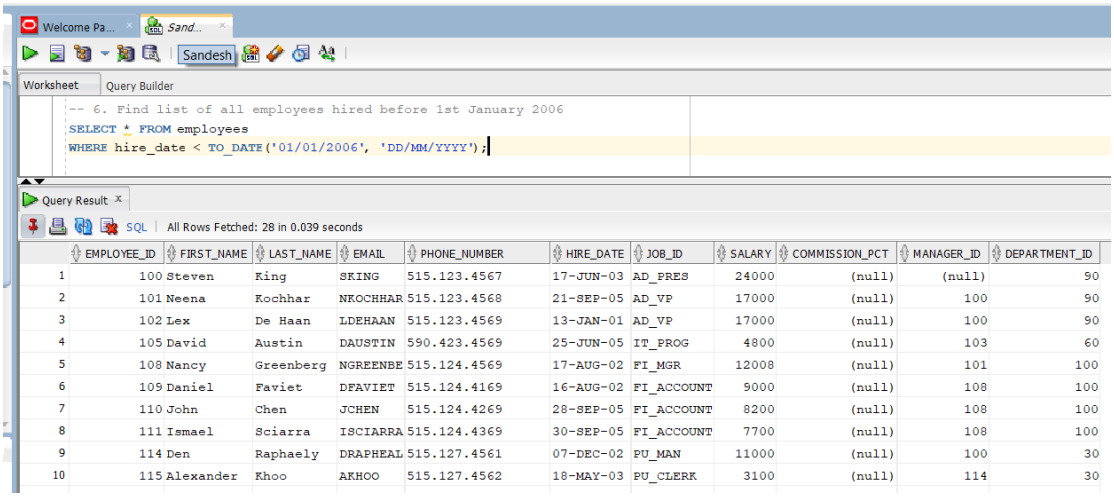

| | FIRST_NAME | LAST_NAME | EMAIL |
|---|---|---|---|
| 1 | Steven | King | SKING |
| 2 | Neena | Kochhar | NKOCHHAR |
| 3 | Lex | De Haan | LDEHAAN |
| 4 | Alexander | Hunold | AHUNOLD |
| 5 | Bruce | Ernst | BERNST |
| 6 | David | Austin | DAUSTIN |
| 7 | Valli | Pataballa | VPATABAL |
| 8 | Diana | Lorentz | DLORENTZ |
| 9 | Nancy | Greenberg | NGREENBE |



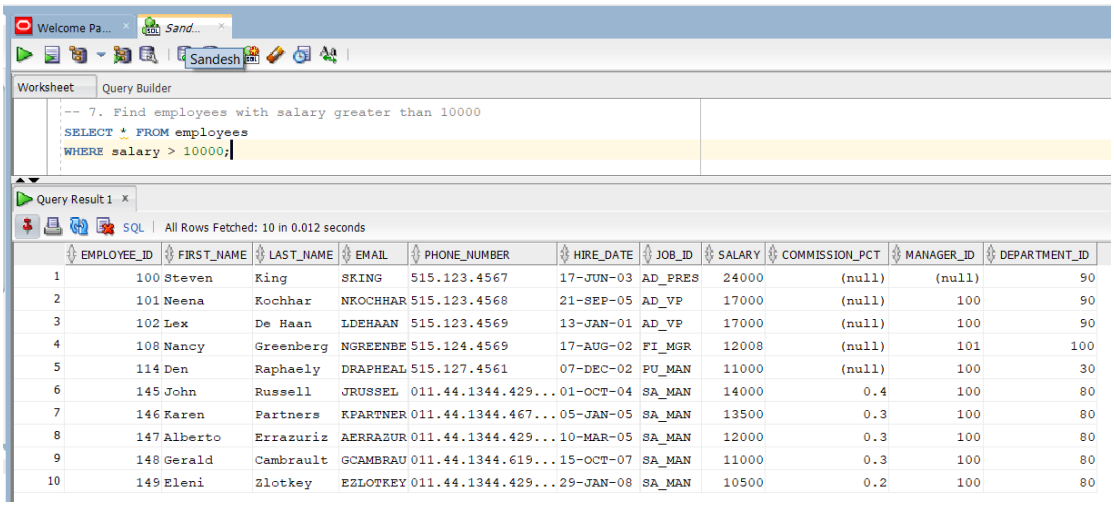

| | DEPARTMENT_NAME | LOCATION_ID |
|---|---|---|
| 1 | Administration | 1700 |
| 2 | Marketing | 1800 |
| 3 | Purchasing | 1700 |
| 4 | Human Resources | 2400 |
| 5 | Shipping | 1500 |



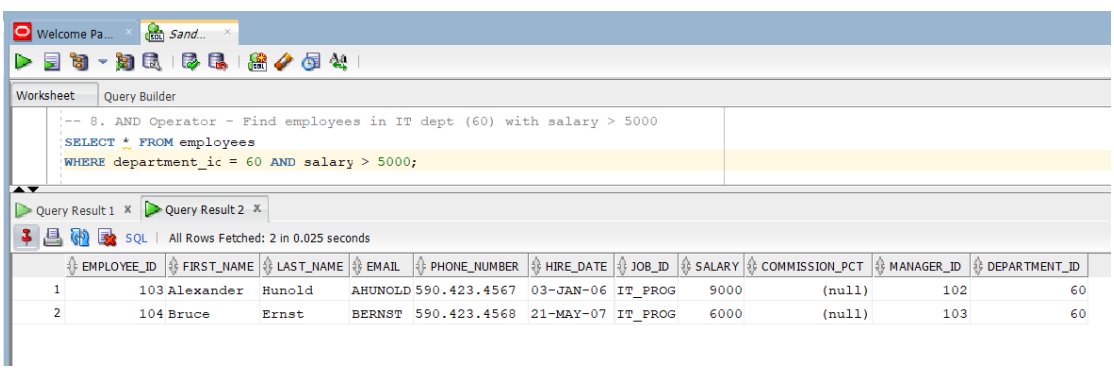

| | EMPLOYEE_ID | FIRST_NAME | LAST_NAME | EMAIL | PHONE_NUMBER | HIRE_DATE | JOB_ID | SALARY | COMMISSION_PCT | MANAGER_ID | DEPARTMENT_ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 103 | Alexander | Hunold | AHUNOLD | 590.423.4567 | 03-JAN-06 | IT_PROG | 9000 | (null) | 102 | 60 |
| 2 | 104 | Bruce | Ernst | BERNST | 590.423.4568 | 21-MAY-07 | IT_PROG | 6000 | (null) | 103 | 60 |
| 3 | 105 | David | Austin | DAUSTIN | 590.423.4569 | 25-JUN-05 | IT_PROG | 4800 | (null) | 103 | 60 |
| 4 | 106 | Valli | Pataballa | VPATABAL | 590.423.4560 | 05-FEB-06 | IT_PROG | 4800 | (null) | 103 | 60 |
| 5 | 107 | Diana | Lorentz | DLORENTZ | 590.423.5567 | 07-FEB-07 | IT_PROG | 4200 | (null) | 103 | 60 |



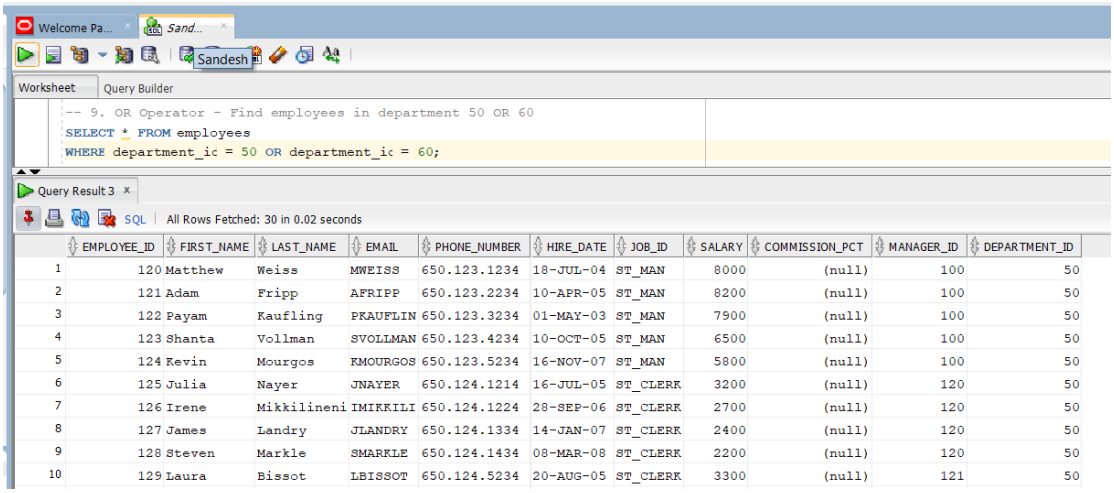

| | EMPLOYEE_ID | FIRST_NAME | LAST_NAME | EMAIL | PHONE_NUMBER | HIRE_DATE | JOB_ID | SALARY | COMMISSION_PCT | MANAGER_ID | DEPARTMENT_ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 100 | Steven | King | SKING | 515.123.4567 | 17-JUN-03 | AD_PRES | 24000 | (null) | (null) | 90 |
| 2 | 101 | Neena | Kochhar | NKOCHHAR | 515.123.4568 | 21-SEP-05 | AD_VP | 17000 | (null) | 100 | 90 |
| 3 | 102 | Lex | De Haan | LDEHAAN | 515.123.4569 | 13-JAN-01 | AD_VP | 17000 | (null) | 100 | 90 |
| 4 | 105 | David | Austin | DAUSTIN | 590.423.4569 | 25-JUN-05 | IT_PROG | 4800 | (null) | 103 | 60 |
| 5 | 108 | Nancy | Greenberg | NGREENBE | 515.124.4569 | 17-AUG-02 | FI_MGR | 12008 | (null) | 101 | 100 |
| 6 | 109 | Daniel | Faviet | DFAVIET | 515.124.4169 | 16-AUG-02 | FI_ACCOUNT | 9000 | (null) | 108 | 100 |
| 7 | 110 | John | Chen | JCHEN | 515.124.4269 | 28-SEP-05 | FI_ACCOUNT | 8200 | (null) | 108 | 100 |
| 8 | 111 | Ismael | Sciarra | ISCIARRA | 515.124.4369 | 30-SEP-05 | FI_ACCOUNT | 7700 | (null) | 108 | 100 |
| 9 | 114 | Den | Raphaely | DRAPHEAL | 515.127.4561 | 07-DEC-02 | PU_MAN | 11000 | (null) | 100 | 30 |
| 10 | 115 | Alexander | Khoo | AKHOO | 515.127.4562 | 18-MAY-03 | PU_CLERK | 3100 | (null) | 114 | 30 |



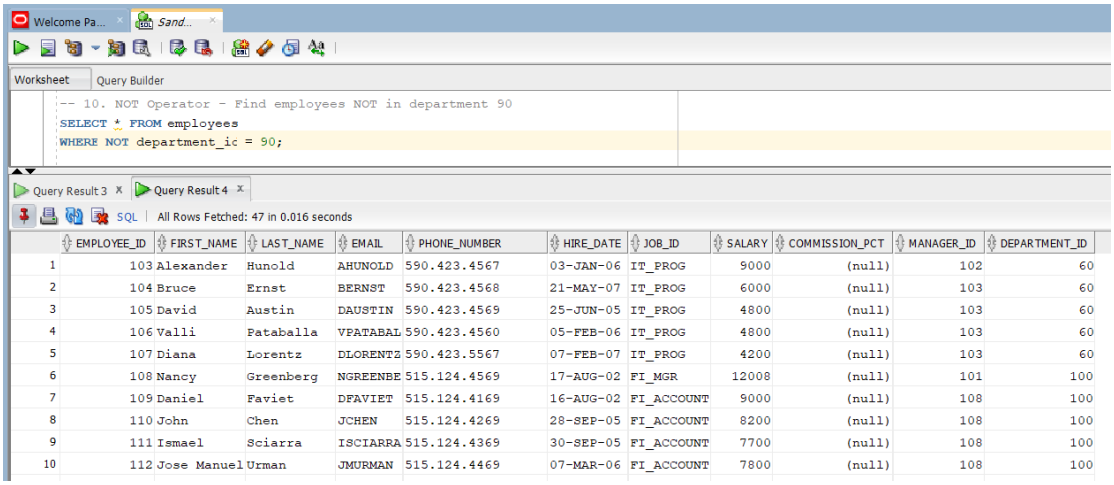

| | EMPLOYEE_ID | FIRST_NAME | LAST_NAME | EMAIL | PHONE_NUMBER | HIRE_DATE | JOB_ID | SALARY | COMMISSION_PCT | MANAGER_ID | DEPARTMENT_ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 100 | Steven | King | SKING | 515.123.4567 | 17-JUN-03 | AD_PRES | 24000 | (null) | (null) | 90 |
| 2 | 101 | Neena | Kochhar | NKOCHHAR | 515.123.4568 | 21-SEP-05 | AD_VP | 17000 | (null) | 100 | 90 |
| 3 | 102 | Lex | De Haan | LDEHAAN | 515.123.4569 | 13-JAN-01 | AD_VP | 17000 | (null) | 100 | 90 |
| 4 | 108 | Nancy | Greenberg | NGREENBE | 515.124.4569 | 17-AUG-02 | FI_MGR | 12008 | (null) | 101 | 100 |
| 5 | 114 | Den | Raphaely | DRAPHEAL | 515.127.4561 | 07-DEC-02 | PU_MAN | 11000 | (null) | 100 | 30 |
| 6 | 145 | John | Russell | JRUSSEL | 011.44.1344.429... | 01-OCT-04 | SA_MAN | 14000 | 0.4 | 100 | 80 |
| 7 | 146 | Karen | Partners | KPARTNER | 011.44.1344.467... | 05-JAN-05 | SA_MAN | 13500 | 0.3 | 100 | 80 |
| 8 | 147 | Alberto | Errazuriz | AERRAZUR | 011.44.1344.429... | 10-MAR-05 | SA_MAN | 12000 | 0.3 | 100 | 80 |
| 9 | 148 | Gerald | Cambrault | GCAMBRAU | 011.44.1344.619... | 15-OCT-07 | SA_MAN | 11000 | 0.3 | 100 | 80 |
| 10 | 149 | Eleni | Zlotkey | EZLOTKEY | 011.44.1344.429... | 29-JAN-08 | SA_MAN | 10500 | 0.2 | 100 | 80 |



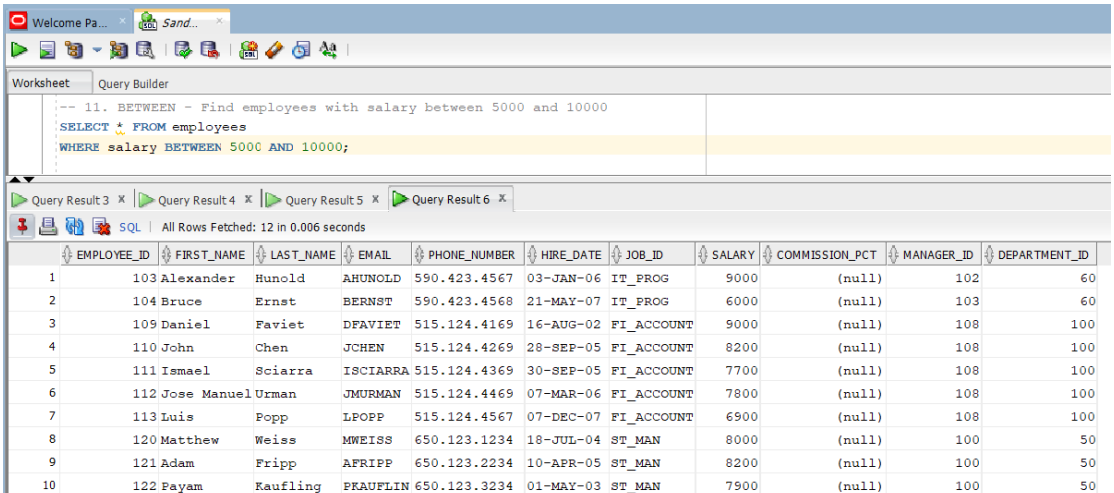

| | EMPLOYEE_ID | FIRST_NAME | LAST_NAME | EMAIL | PHONE_NUMBER | HIRE_DATE | JOB_ID | SALARY | COMMISSION_PCT | MANAGER_ID | DEPARTMENT_ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 103 | Alexander | Hunold | AHUNOLD | 590.423.4567 | 03-JAN-06 | IT_PROG | 9000 | (null) | 102 | 60 |
| 2 | 104 | Bruce | Ernst | BERNST | 590.423.4568 | 21-MAY-07 | IT_PROG | 6000 | (null) | 103 | 60 |



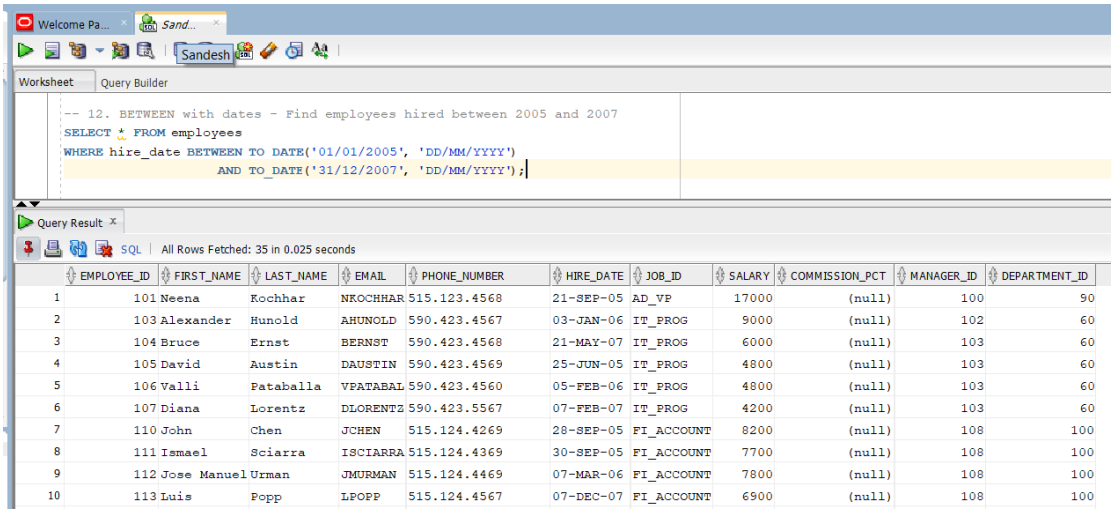

| | EMPLOYEE_ID | FIRST_NAME | LAST_NAME | EMAIL | PHONE_NUMBER | HIRE_DATE | JOB_ID | SALARY | COMMISSION_PCT | MANAGER_ID | DEPARTMENT_ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 120 | Matthew | Weiss | MWEISS | 650.123.1234 | 18-JUL-04 | ST_MAN | 8000 | (null) | 100 | 50 |
| 2 | 121 | Adam | Fripp | AFRIPP | 650.123.2234 | 10-APR-05 | ST_MAN | 8200 | (null) | 100 | 50 |
| 3 | 122 | Payam | Kaufling | PKAUFLIN | 650.123.3234 | 01-MAY-03 | ST_MAN | 7900 | (null) | 100 | 50 |
| 4 | 123 | Shanta | Vollman | SVOLLMAN | 650.123.4234 | 10-OCT-05 | ST_MAN | 6500 | (null) | 100 | 50 |
| 5 | 124 | Kevin | Mourgos | KMOURGOS | 650.123.5234 | 16-NOV-07 | ST_MAN | 5800 | (null) | 100 | 50 |
| 6 | 125 | Julia | Nayer | JNAYER | 650.124.1214 | 16-JUL-05 | ST_CLERK | 3200 | (null) | 120 | 50 |
| 7 | 126 | Irene | Mikkilineni | IMIKKILI | 650.124.1224 | 28-SEP-06 | ST_CLERK | 2700 | (null) | 120 | 50 |
| 8 | 127 | James | Landry | JLANDRY | 650.124.1334 | 14-JAN-07 | ST_CLERK | 2400 | (null) | 120 | 50 |
| 9 | 128 | Steven | Markle | SMARKLE | 650.124.1434 | 08-MAR-08 | ST_CLERK | 2200 | (null) | 120 | 50 |
| 10 | 129 | Laura | Bissot | LBISSOT | 650.124.5234 | 20-AUG-05 | ST_CLERK | 3300 | (null) | 121 | 50 |



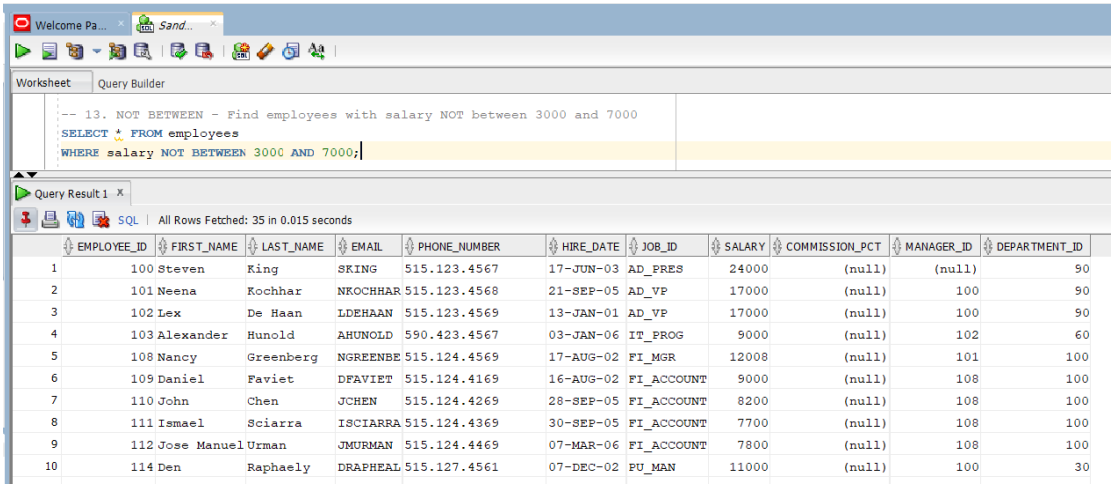

| | EMPLOYEE_ID | FIRST_NAME | LAST_NAME | EMAIL | PHONE_NUMBER | HIRE_DATE | JOB_ID | SALARY | COMMISSION_PCT | MANAGER_ID | DEPARTMENT_ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 103 | Alexander | Hunold | AHUNOLD | 590.423.4567 | 03-JAN-06 | IT_PROG | 9000 | (null) | 102 | 60 |
| 2 | 104 | Bruce | Ernst | BERNST | 590.423.4568 | 21-MAY-07 | IT_PROG | 6000 | (null) | 103 | 60 |
| 3 | 105 | David | Austin | DAUSTIN | 590.423.4569 | 25-JUN-05 | IT_PROG | 4800 | (null) | 103 | 60 |
| 4 | 106 | Valli | Pataballa | VPATABAL | 590.423.4560 | 05-FEB-06 | IT_PROG | 4800 | (null) | 103 | 60 |
| 5 | 107 | Diana | Lorentz | DLORENTZ | 590.423.5567 | 07-FEB-07 | IT_PROG | 4200 | (null) | 103 | 60 |
| 6 | 108 | Nancy | Greenberg | NGREENBE | 515.124.4569 | 17-AUG-02 | FI_MGR | 12008 | (null) | 101 | 100 |
| 7 | 109 | Daniel | Faviet | DFAVIET | 515.124.4169 | 16-AUG-02 | FI_ACCOUNT | 9000 | (null) | 108 | 100 |
| 8 | 110 | John | Chen | JCHEN | 515.124.4269 | 28-SEP-05 | FI_ACCOUNT | 8200 | (null) | 108 | 100 |
| 9 | 111 | Ismael | Sciarra | ISCIARRA | 515.124.4369 | 30-SEP-05 | FI_ACCOUNT | 7700 | (null) | 108 | 100 |
| 10 | 112 | Jose Manuel | Urman | JMURMAN | 515.124.4469 | 07-MAR-06 | FI_ACCOUNT | 7800 | (null) | 108 | 100 |



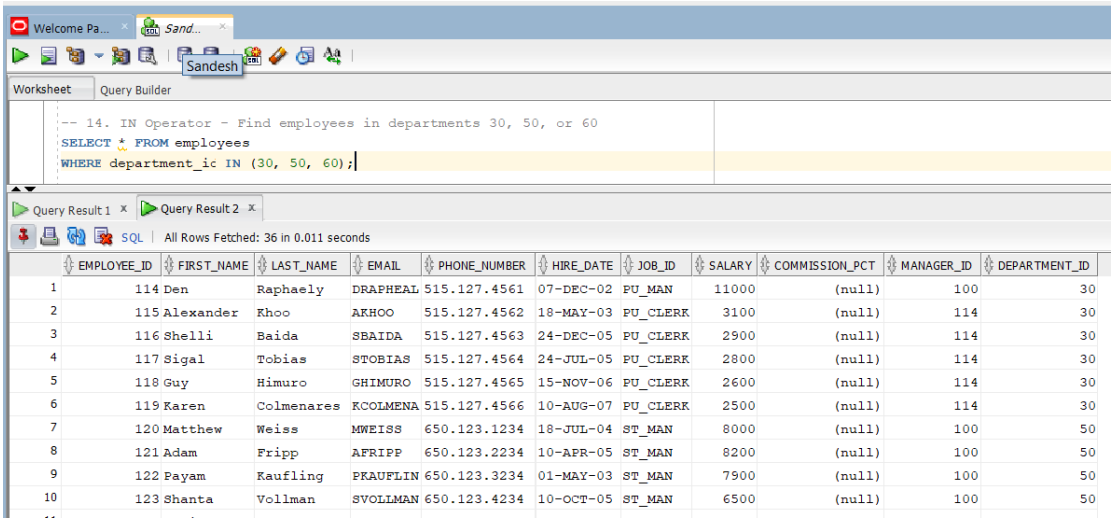

| | EMPLOYEE_ID | FIRST_NAME | LAST_NAME | EMAIL | PHONE_NUMBER | HIRE_DATE | JOB_ID | SALARY | COMMISSION_PCT | MANAGER_ID | DEPARTMENT_ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 103 | Alexander | Hunold | AHUNOLD | 590.423.4567 | 03-JAN-06 | IT_PROG | 9000 | (null) | 102 | 60 |
| 2 | 104 | Bruce | Ernst | BERNST | 590.423.4568 | 21-MAY-07 | IT_PROG | 6000 | (null) | 103 | 60 |
| 3 | 109 | Daniel | Faviet | DFAVIET | 515.124.4169 | 16-AUG-02 | FI_ACCOUNT | 9000 | (null) | 108 | 100 |
| 4 | 110 | John | Chen | JCHEN | 515.124.4269 | 28-SEP-05 | FI_ACCOUNT | 8200 | (null) | 108 | 100 |
| 5 | 111 | Ismael | Sciarra | ISCIARRA | 515.124.4369 | 30-SEP-05 | FI_ACCOUNT | 7700 | (null) | 108 | 100 |
| 6 | 112 | Jose Manuel | Urman | JMURMAN | 515.124.4469 | 07-MAR-06 | FI_ACCOUNT | 7800 | (null) | 108 | 100 |
| 7 | 113 | Luis | Popp | LPOPP | 515.124.4567 | 07-DEC-07 | FI_ACCOUNT | 6900 | (null) | 108 | 100 |
| 8 | 120 | Matthew | Weiss | MWEISS | 650.123.1234 | 18-JUL-04 | ST_MAN | 8000 | (null) | 100 | 50 |
| 9 | 121 | Adam | Fripp | AFRIPP | 650.123.2234 | 10-APR-05 | ST_MAN | 8200 | (null) | 100 | 50 |
| 10 | 122 | Payam | Kaufling | PKAUFLIN | 650.123.3234 | 01-MAY-03 | ST_MAN | 7900 | (null) | 100 | 50 |
| 11 | 123 | Shanta | Vollman | SVOLLMAN | 650.123.4234 | 10-OCT-05 | ST_MAN | 6500 | (null) | 100 | 50 |
| 12 | 124 | Kevin | Mourgos | KMOURGOS | 650.123.5234 | 16-NOV-07 | ST_MAN | 5800 | (null) | 100 | 50 |



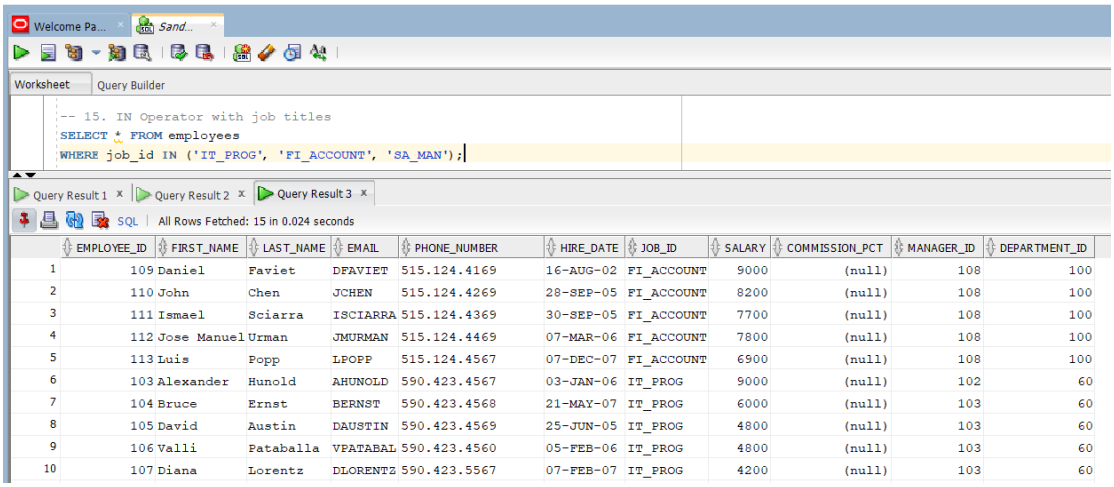

| | EMPLOYEE_ID | FIRST_NAME | LAST_NAME | EMAIL | PHONE_NUMBER | HIRE_DATE | JOB_ID | SALARY | COMMISSION_PCT | MANAGER_ID | DEPARTMENT_ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 101 | Neena | Kochhar | NKOCHHAR | 515.123.4568 | 21-SEP-05 | AD_VP | 17000 | (null) | 100 | 90 |
| 2 | 103 | Alexander | Hunold | AHUNOLD | 590.423.4567 | 03-JAN-06 | IT_PROG | 9000 | (null) | 102 | 60 |
| 3 | 104 | Bruce | Ernst | BERNST | 590.423.4568 | 21-MAY-07 | IT_PROG | 6000 | (null) | 103 | 60 |
| 4 | 105 | David | Austin | DAUSTIN | 590.423.4569 | 25-JUN-05 | IT_PROG | 4800 | (null) | 103 | 60 |
| 5 | 106 | Valli | Pataballa | VPATABAL | 590.423.4560 | 05-FEB-06 | IT_PROG | 4800 | (null) | 103 | 60 |
| 6 | 107 | Diana | Lorentz | DLORENTZ | 590.423.5567 | 07-FEB-07 | IT_PROG | 4200 | (null) | 103 | 60 |
| 7 | 110 | John | Chen | JCHEN | 515.124.4269 | 28-SEP-05 | FI_ACCOUNT | 8200 | (null) | 108 | 100 |
| 8 | 111 | Ismael | Sciarra | ISCIARRA | 515.124.4369 | 30-SEP-05 | FI_ACCOUNT | 7700 | (null) | 108 | 100 |
| 9 | 112 | Jose Manuel | Urman | JMURMAN | 515.124.4469 | 07-MAR-06 | FI_ACCOUNT | 7800 | (null) | 108 | 100 |
| 10 | 113 | Luis | Popp | LPOPP | 515.124.4567 | 07-DEC-07 | FI_ACCOUNT | 6900 | (null) | 108 | 100 |




| | EMPLOYEE_ID | FIRST_NAME | LAST_NAME | EMAIL | PHONE_NUMBER | HIRE_DATE | JOB_ID | SALARY | COMMISSION_PCT | MANAGER_ID | DEPARTMENT_ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 100 | Steven | King | SKING | 515.123.4567 | 17-JUN-03 | AD_PRES | 24000 | (null) | (null) | 90 |
| 2 | 101 | Neena | Kochhar | NKOCHHAR | 515.123.4568 | 21-SEP-05 | AD_VP | 17000 | (null) | 100 | 90 |
| 3 | 102 | Lex | De Haan | LDEHAAN | 515.123.4569 | 13-JAN-01 | AD_VP | 17000 | (null) | 100 | 90 |
| 4 | 103 | Alexander | Hunold | AHUNOLD | 590.423.4567 | 03-JAN-06 | IT_PROG | 9000 | (null) | 102 | 60 |
| 5 | 108 | Nancy | Greenberg | NGREENBE | 515.124.4569 | 17-AUG-02 | FI_MGR | 12008 | (null) | 101 | 100 |
| 6 | 109 | Daniel | Faviet | DFAVIET | 515.124.4169 | 16-AUG-02 | FI_ACCOUNT | 9000 | (null) | 108 | 100 |
| 7 | 110 | John | Chen | JCHEN | 515.124.4269 | 28-SEP-05 | FI_ACCOUNT | 8200 | (null) | 108 | 100 |
| 8 | 111 | Ismael | Sciarra | ISCIARRA | 515.124.4369 | 30-SEP-05 | FI_ACCOUNT | 7700 | (null) | 108 | 100 |
| 9 | 112 | Jose Manuel | Urman | JMURMAN | 515.124.4469 | 07-MAR-06 | FI_ACCOUNT | 7800 | (null) | 108 | 100 |
| 10 | 114 | Den | Raphaely | DRAPHEAL | 515.127.4561 | 07-DEC-02 | PU_MAN | 11000 | (null) | 100 | 30 |



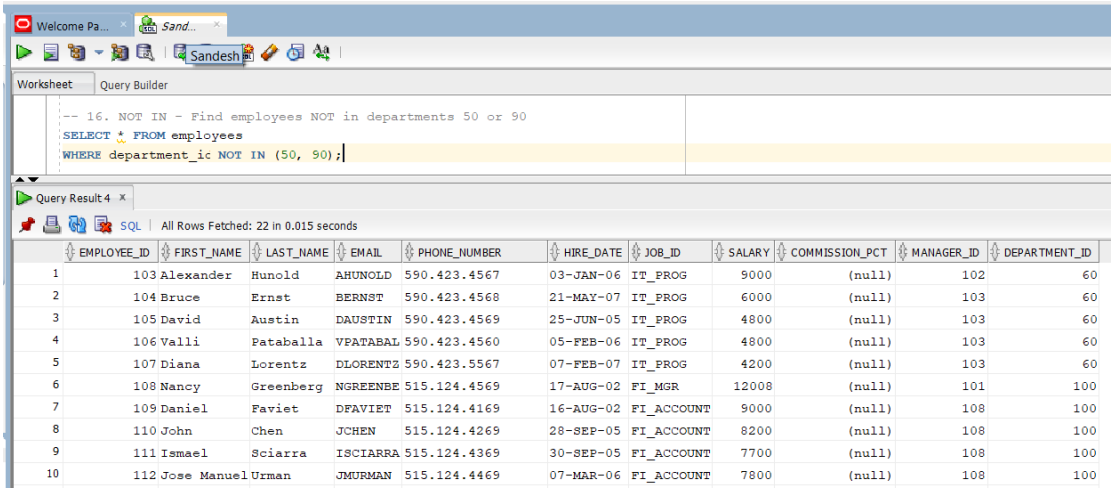

| | EMPLOYEE_ID | FIRST_NAME | LAST_NAME | EMAIL | PHONE_NUMBER | HIRE_DATE | JOB_ID | SALARY | COMMISSION_PCT | MANAGER_ID | DEPARTMENT_ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 114 | Den | Raphaely | DRAPHEAL | 515.127.4561 | 07-DEC-02 | PU_MAN | 11000 | (null) | 100 | 30 |
| 2 | 115 | Alexander | Khoo | AKHOO | 515.127.4562 | 18-MAY-03 | PU_CLERK | 3100 | (null) | 114 | 30 |
| 3 | 116 | Shelli | Baida | SBAIDA | 515.127.4563 | 24-DEC-05 | PU_CLERK | 2900 | (null) | 114 | 30 |
| 4 | 117 | Sigal | Tobias | STOBIAS | 515.127.4564 | 24-JUL-05 | PU_CLERK | 2800 | (null) | 114 | 30 |
| 5 | 118 | Guy | Himuro | GHIMURO | 515.127.4565 | 15-NOV-06 | PU_CLERK | 2600 | (null) | 114 | 30 |
| 6 | 119 | Karen | Colmenares | KCOLMENA | 515.127.4566 | 10-AUG-07 | PU_CLERK | 2500 | (null) | 114 | 30 |
| 7 | 120 | Matthew | Weiss | MWEISS | 650.123.1234 | 18-JUL-04 | ST_MAN | 8000 | (null) | 100 | 50 |
| 8 | 121 | Adam | Fripp | AFRIPP | 650.123.2234 | 10-APR-05 | ST_MAN | 8200 | (null) | 100 | 50 |
| 9 | 122 | Payam | Kaufling | PKAUFLIN | 650.123.3234 | 01-MAY-03 | ST_MAN | 7900 | (null) | 100 | 50 |
| 10 | 123 | Shanta | Vollman | SVOLLMAN | 650.123.4234 | 10-OCT-05 | ST_MAN | 6500 | (null) | 100 | 50 |



```
-- 15. IN Operator with job titles
SELECT * FROM employees
WHERE job_id IN ('IT_PROG', 'FI_ACCOUNT', 'SA_MAN');
```

Query Result 3 — All Rows Fetched: 15 in 0.024 seconds

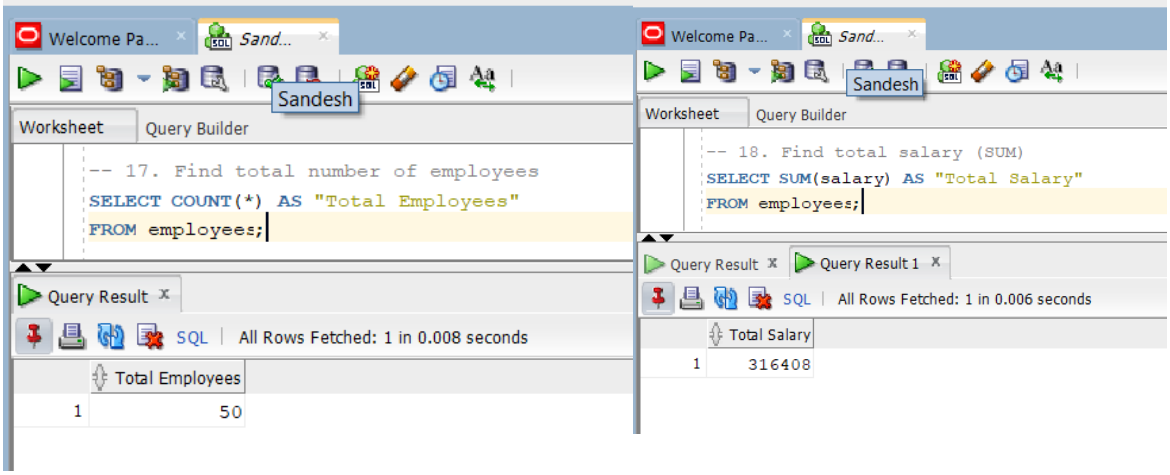
| | EMPLOYEE_ID | FIRST_NAME | LAST_NAME | EMAIL | PHONE_NUMBER | HIRE_DATE | JOB_ID | SALARY | COMMISSION_PCT | MANAGER_ID | DEPARTMENT_ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 109 | Daniel | Faviet | DFAVIET | 515.124.4169 | 16-AUG-02 | FI_ACCOUNT | 9000 | (null) | 108 | 100 |
| 2 | 110 | John | Chen | JCHEN | 515.124.4269 | 28-SEP-05 | FI_ACCOUNT | 8200 | (null) | 108 | 100 |
| 3 | 111 | Ismael | Sciarra | ISCIARRA | 515.124.4369 | 30-SEP-05 | FI_ACCOUNT | 7700 | (null) | 108 | 100 |
| 4 | 112 | Jose Manuel | Urman | JMURMAN | 515.124.4469 | 07-MAR-06 | FI_ACCOUNT | 7800 | (null) | 108 | 100 |
| 5 | 113 | Luis | Popp | LPOPP | 515.124.4567 | 07-DEC-07 | FI_ACCOUNT | 6900 | (null) | 108 | 100 |
| 6 | 103 | Alexander | Hunold | AHUNOLD | 590.423.4567 | 03-JAN-06 | IT_PROG | 9000 | (null) | 102 | 60 |
| 7 | 104 | Bruce | Ernst | BERNST | 590.423.4568 | 21-MAY-07 | IT_PROG | 6000 | (null) | 103 | 60 |
| 8 | 105 | David | Austin | DAUSTIN | 590.423.4569 | 25-JUN-05 | IT_PROG | 4800 | (null) | 103 | 60 |
| 9 | 106 | Valli | Pataballa | VPATABAL | 590.423.4560 | 05-FEB-06 | IT_PROG | 4800 | (null) | 103 | 60 |
| 10 | 107 | Diana | Lorentz | DLORENTZ | 590.423.5567 | 07-FEB-07 | IT_PROG | 4200 | (null) | 103 | 60 |



```
-- 16. NOT IN - Find employees NOT in departments 50 or 90
SELECT * FROM employees
WHERE department_ic NOT IN (50, 90);
```

Query Result 4 — All Rows Fetched: 22 in 0.015 seconds

| | EMPLOYEE_ID | FIRST_NAME | LAST_NAME | EMAIL | PHONE_NUMBER | HIRE_DATE | JOB_ID | SALARY | COMMISSION_PCT | MANAGER_ID | DEPARTMENT_ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 103 | Alexander | Hunold | AHUNOLD | 590.423.4567 | 03-JAN-06 | IT_PROG | 9000 | (null) | 102 | 60 |
| 2 | 104 | Bruce | Ernst | BERNST | 590.423.4568 | 21-MAY-07 | IT_PROG | 6000 | (null) | 103 | 60 |
| 3 | 105 | David | Austin | DAUSTIN | 590.423.4569 | 25-JUN-05 | IT_PROG | 4800 | (null) | 103 | 60 |
| 4 | 106 | Valli | Pataballa | VPATABAL | 590.423.4560 | 05-FEB-06 | IT_PROG | 4800 | (null) | 103 | 60 |
| 5 | 107 | Diana | Lorentz | DLORENTZ | 590.423.5567 | 07-FEB-07 | IT_PROG | 4200 | (null) | 103 | 60 |
| 6 | 108 | Nancy | Greenberg | NGREENBE | 515.124.4569 | 17-AUG-02 | FI_MGR | 12008 | (null) | 101 | 100 |
| 7 | 109 | Daniel | Faviet | DFAVIET | 515.124.4169 | 16-AUG-02 | FI_ACCOUNT | 9000 | (null) | 108 | 100 |
| 8 | 110 | John | Chen | JCHEN | 515.124.4269 | 28-SEP-05 | FI_ACCOUNT | 8200 | (null) | 108 | 100 |
| 9 | 111 | Ismael | Sciarra | ISCIARRA | 515.124.4369 | 30-SEP-05 | FI_ACCOUNT | 7700 | (null) | 108 | 100 |
| 10 | 112 | Jose Manuel | Urman | JMURMAN | 515.124.4469 | 07-MAR-06 | FI_ACCOUNT | 7800 | (null) | 108 | 100 |



```
-- 17. Find total number of employees
SELECT COUNT(*) AS "Total Employees"
FROM employees;
```

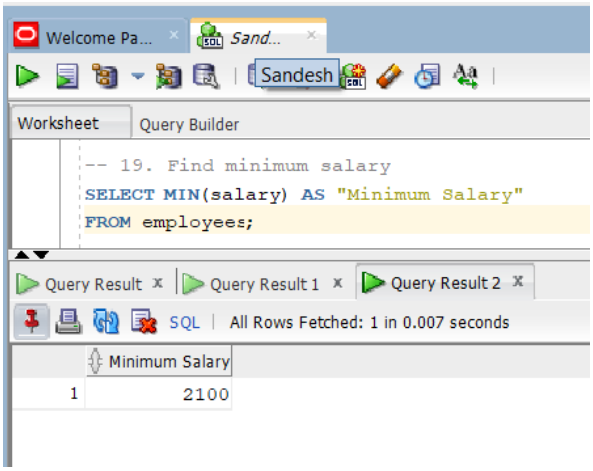
Query Result — All Rows Fetched: 1 in 0.008 seconds

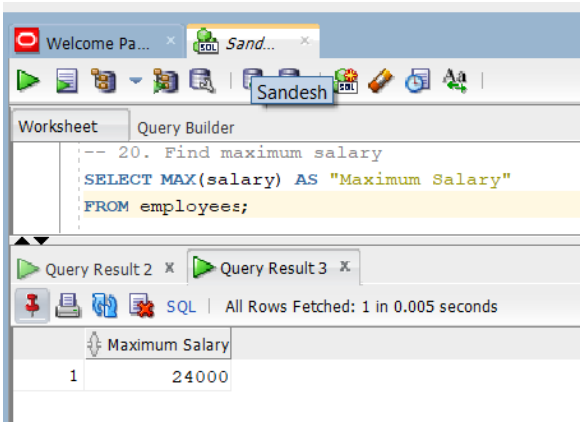
| | Total Employees |
|---|---|
| 1 | 50 |

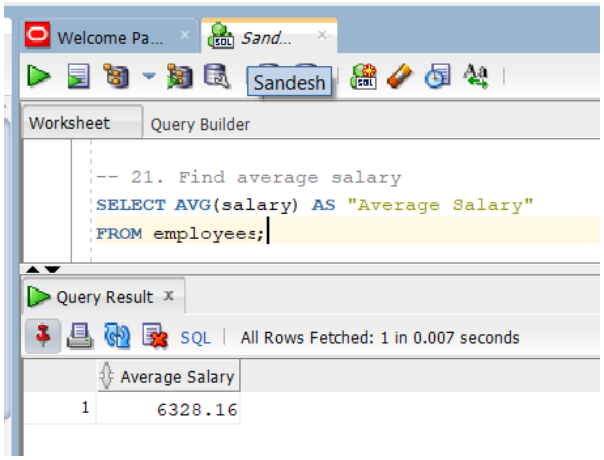
```
-- 18. Find total salary (SUM)
SELECT SUM(salary) AS "Total Salary"
FROM employees;
```

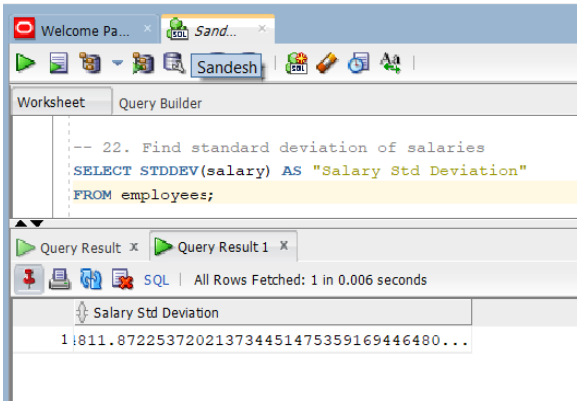
Query Result 1 — All Rows Fetched: 1 in 0.006 seconds

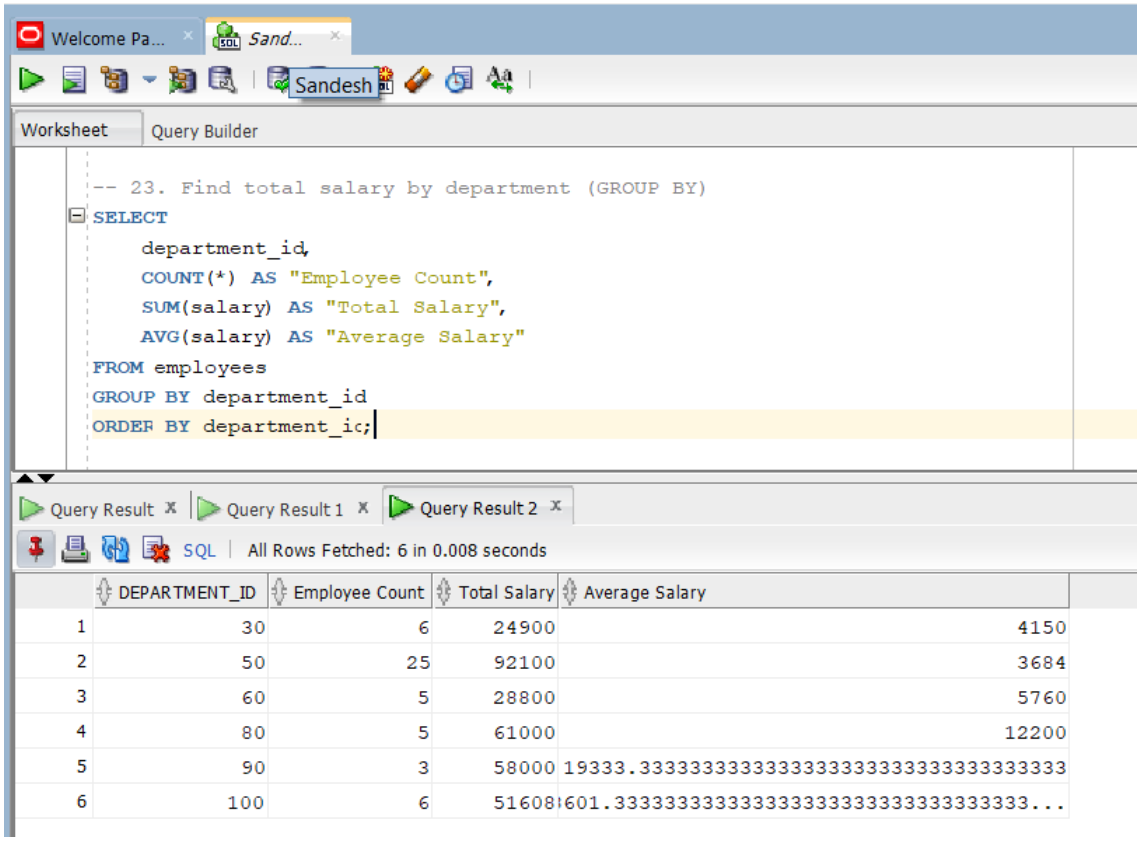
| | Total Salary |
|---|---|
| 1 | 316408 |



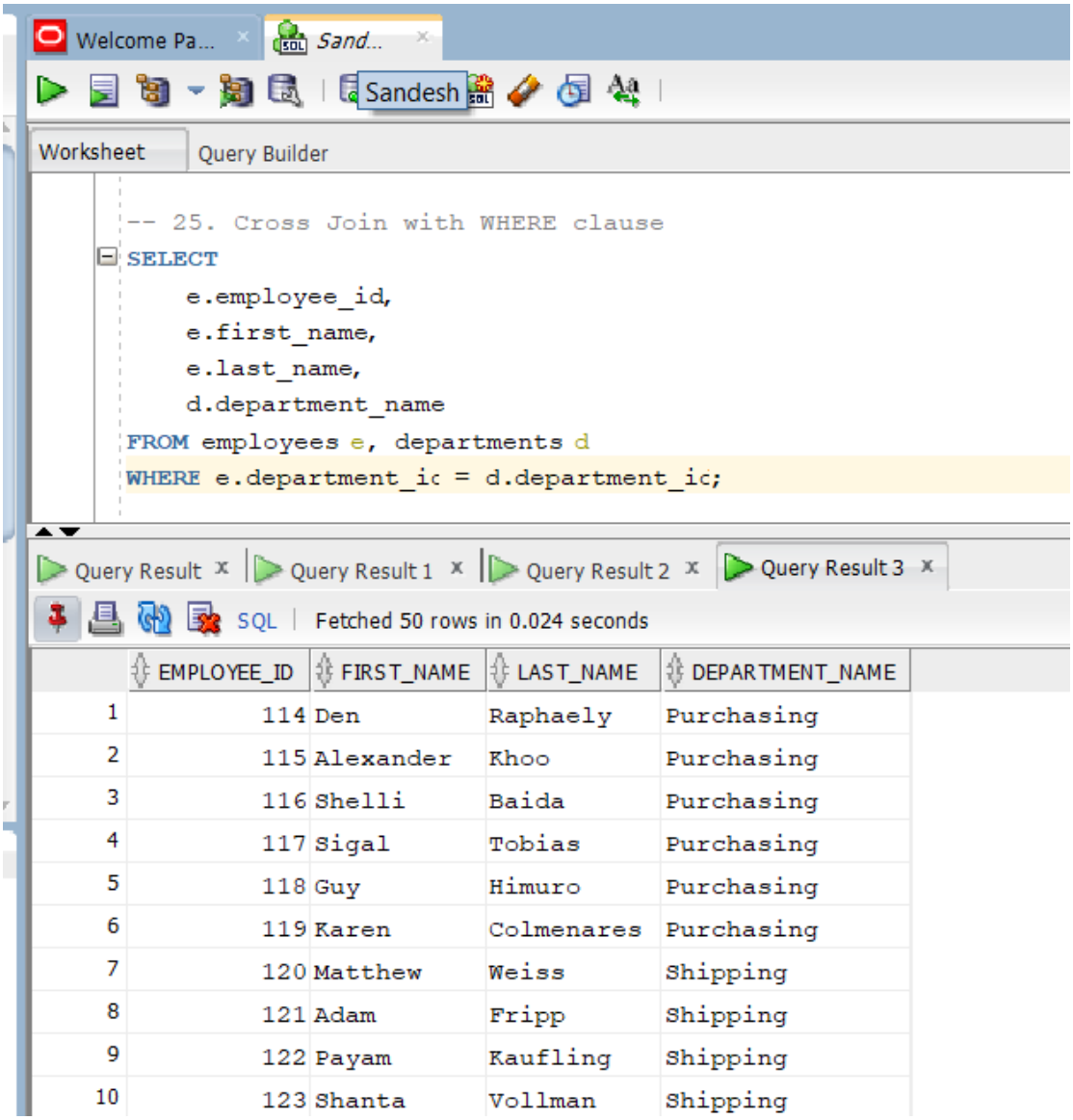



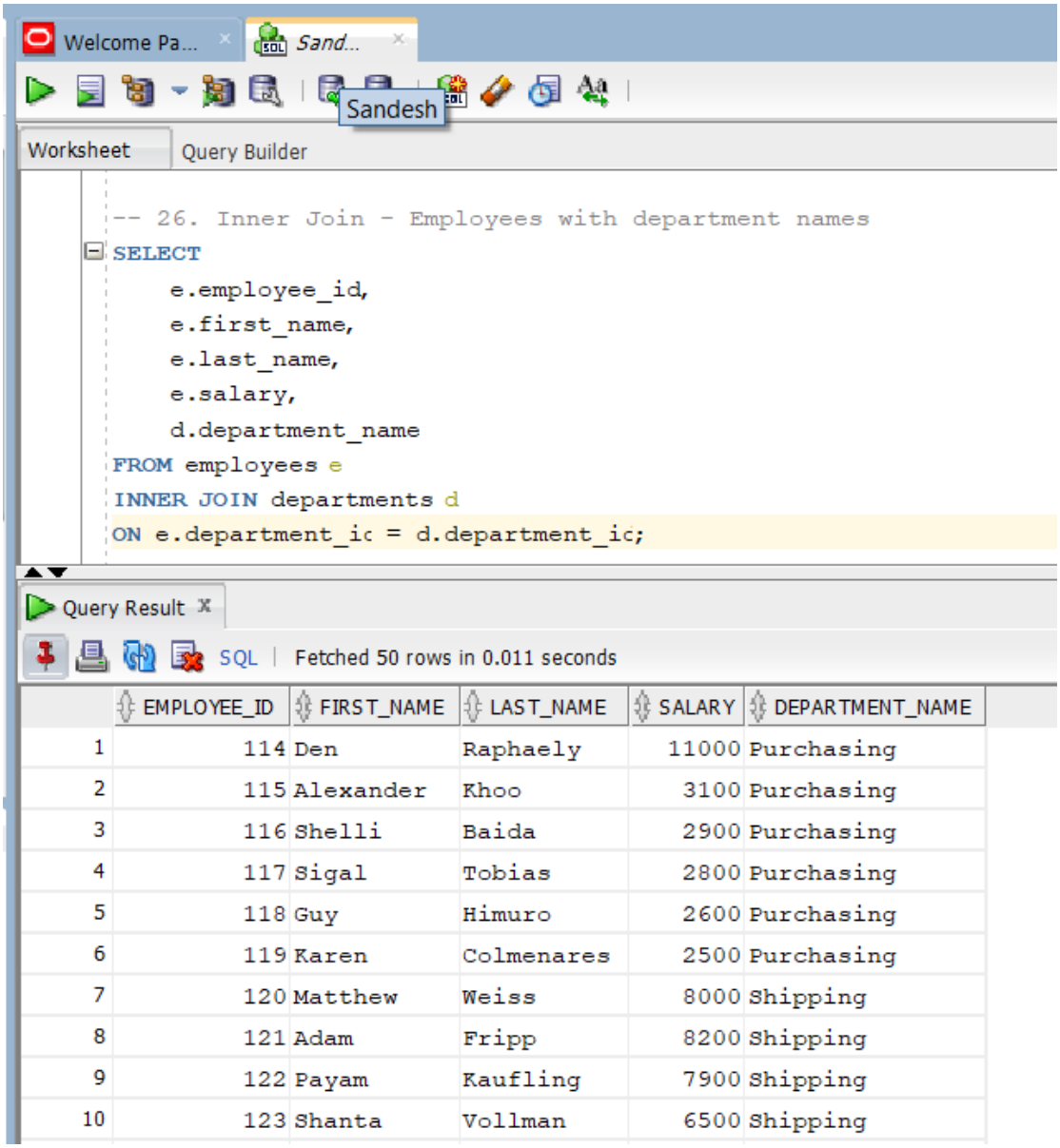



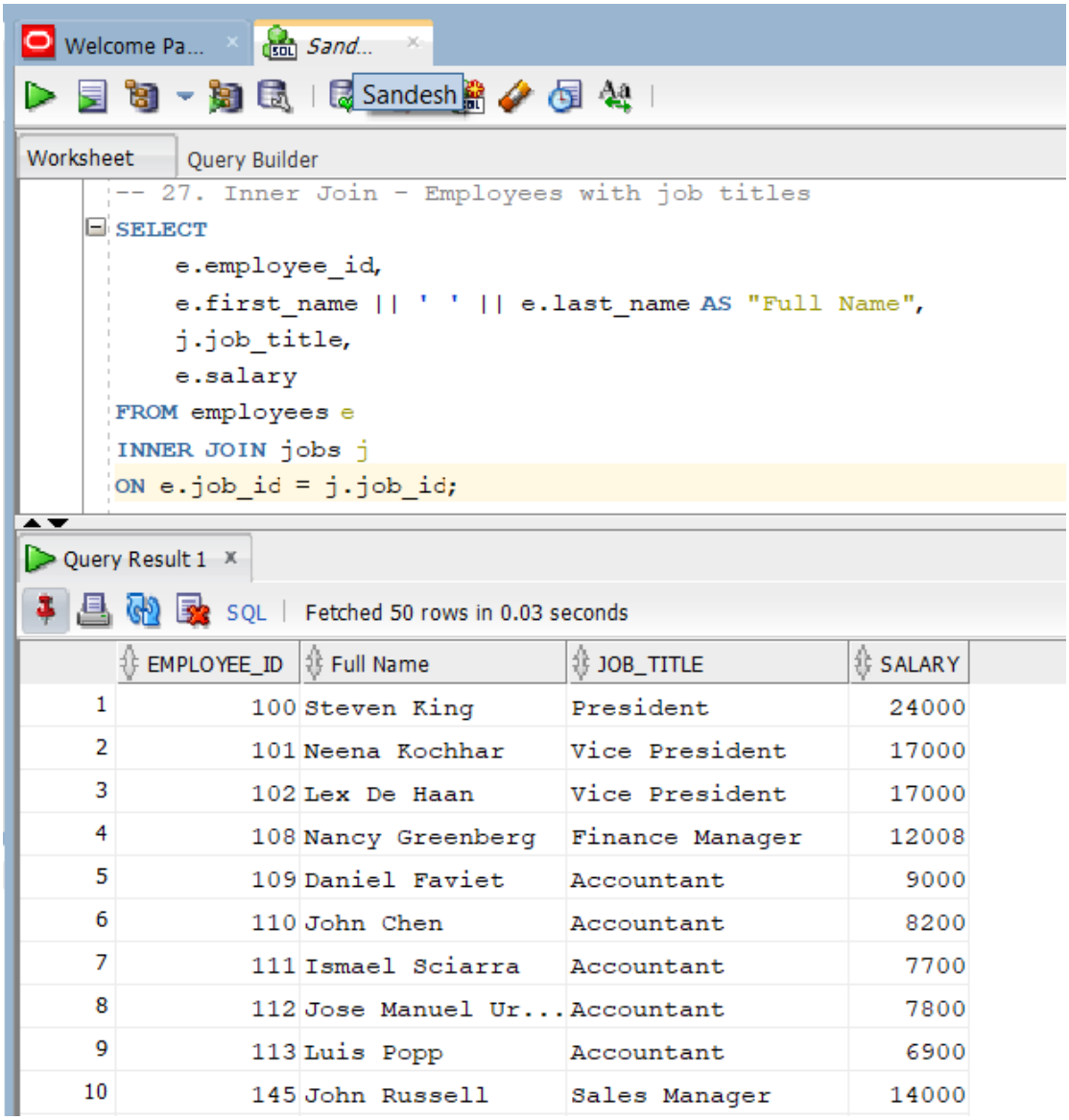




| | DEPARTMENT_ID | Employee Count | Total Salary | Average Salary |
|---|---|---|---|---|
| 1 | 30 | 6 | 24900 | 4150 |
| 2 | 50 | 25 | 92100 | 3684 |
| 3 | 60 | 5 | 28800 | 5760 |
| 4 | 80 | 5 | 61000 | 12200 |
| 5 | 90 | 3 | 58000 | 19333.33333333333333333333333333333333 |
| 6 | 100 | 6 | 51608 | 601.33333333333333333333333333333333... |

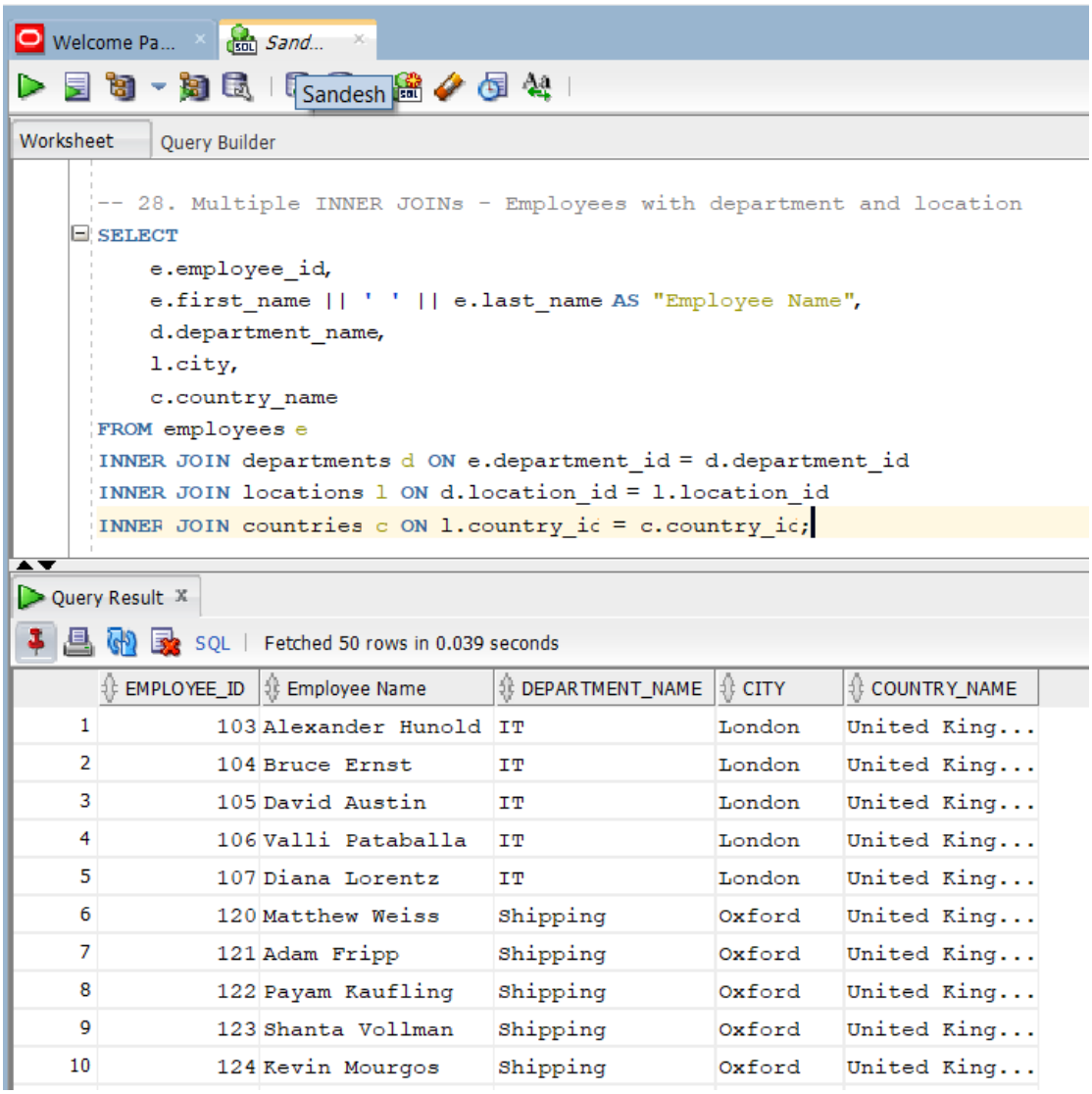



| | EMPLOYEE_ID | FIRST_NAME | LAST_NAME | DEPARTMENT_NAME |
|---|---|---|---|---|
| 1 | 114 | Den | Raphaely | Purchasing |
| 2 | 115 | Alexander | Khoo | Purchasing |
| 3 | 116 | Shelli | Baida | Purchasing |
| 4 | 117 | Sigal | Tobias | Purchasing |
| 5 | 118 | Guy | Himuro | Purchasing |
| 6 | 119 | Karen | Colmenares | Purchasing |
| 7 | 120 | Matthew | Weiss | Shipping |
| 8 | 121 | Adam | Fripp | Shipping |
| 9 | 122 | Payam | Kaufling | Shipping |
| 10 | 123 | Shanta | Vollman | Shipping |

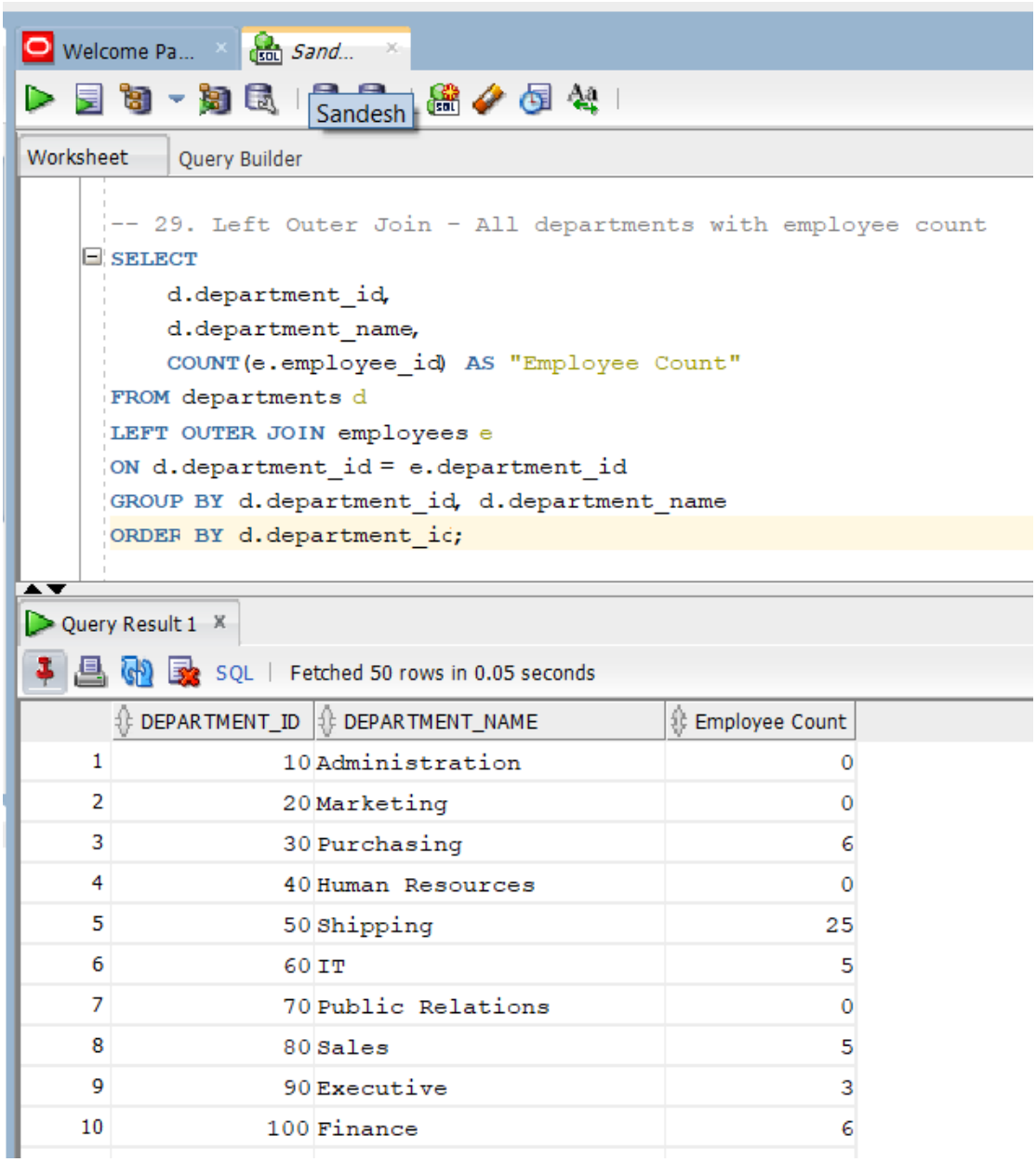

Welcome Pa...
Sand...
Sandesh
Worksheet
Query Builder
-- 26. Inner Join - Employees with department names
SELECT
e.employee_id,
e.first_name,
e.last_name,
e.salary,
d.department_name
FROM employees e
INNER JOIN departments d
ON e.department_ic = d.department_ic;
Query Result
SQL | Fetched 50 rows in 0.011 seconds
EMPLOYEE_ID FIRST_NAME LAST_NAME SALARY DEPARTMENT_NAME
1 114 Den Raphaely 11000 Purchasing
2 115 Alexander Khoo 3100 Purchasing
3 116 Shelli Baida 2900 Purchasing
4 117 Sigal Tobias 2800 Purchasing
5 118 Guy Himuro 2600 Purchasing
6 119 Karen Colmenares 2500 Purchasing
7 120 Matthew Weiss 8000 Shipping
8 121 Adam Fripp 8200 Shipping
9 122 Payam Kaufling 7900 Shipping
10 123 Shanta Vollman 6500 Shipping

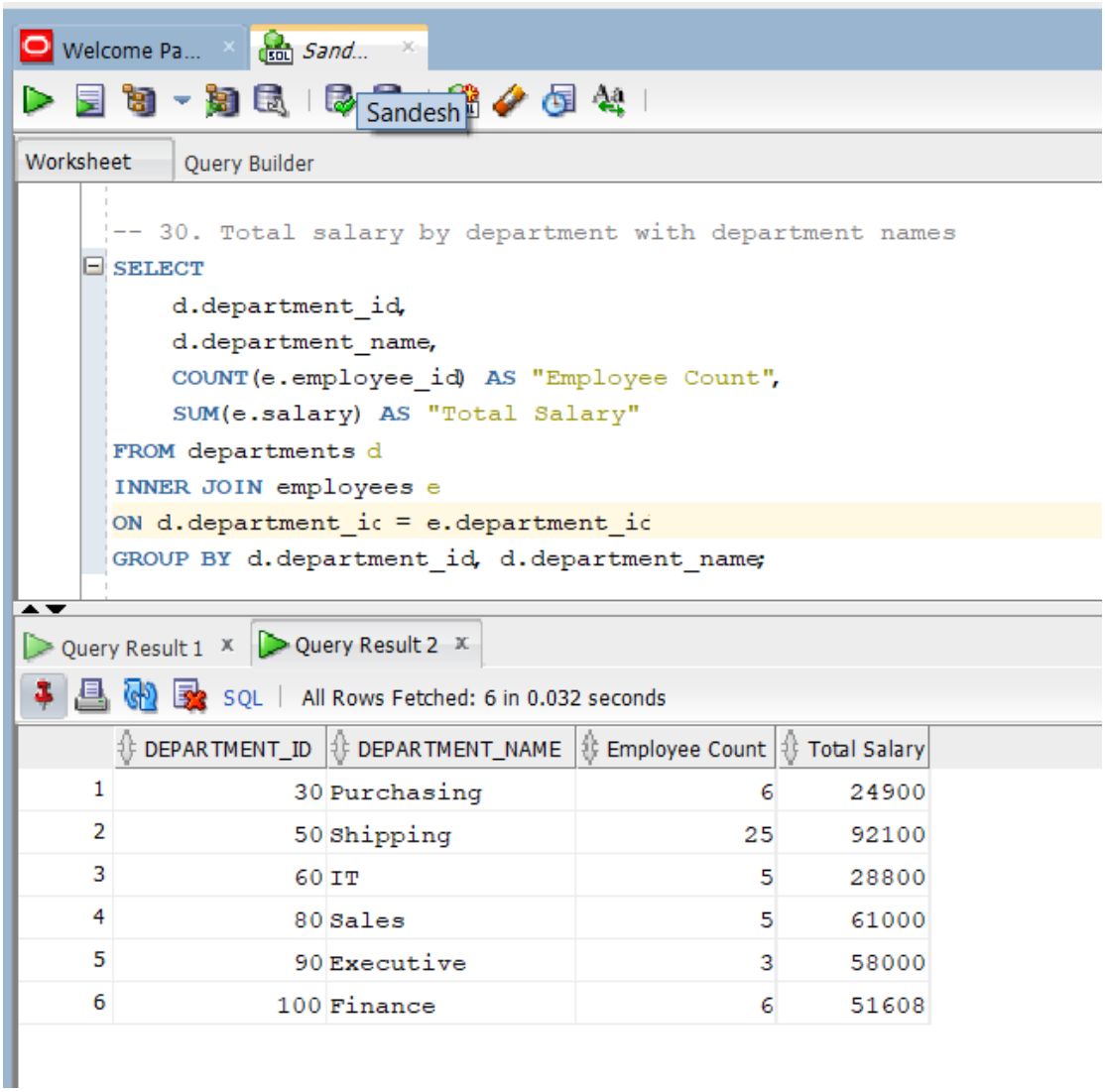



| | EMPLOYEE_ID | Full Name | JOB_TITLE | SALARY |
|---|---|---|---|---|
| 1 | 100 | Steven King | President | 24000 |
| 2 | 101 | Neena Kochhar | Vice President | 17000 |
| 3 | 102 | Lex De Haan | Vice President | 17000 |
| 4 | 108 | Nancy Greenberg | Finance Manager | 12008 |
| 5 | 109 | Daniel Faviet | Accountant | 9000 |
| 6 | 110 | John Chen | Accountant | 8200 |
| 7 | 111 | Ismael Sciarra | Accountant | 7700 |
| 8 | 112 | Jose Manuel Ur... | Accountant | 7800 |
| 9 | 113 | Luis Popp | Accountant | 6900 |
| 10 | 145 | John Russell | Sales Manager | 14000 |

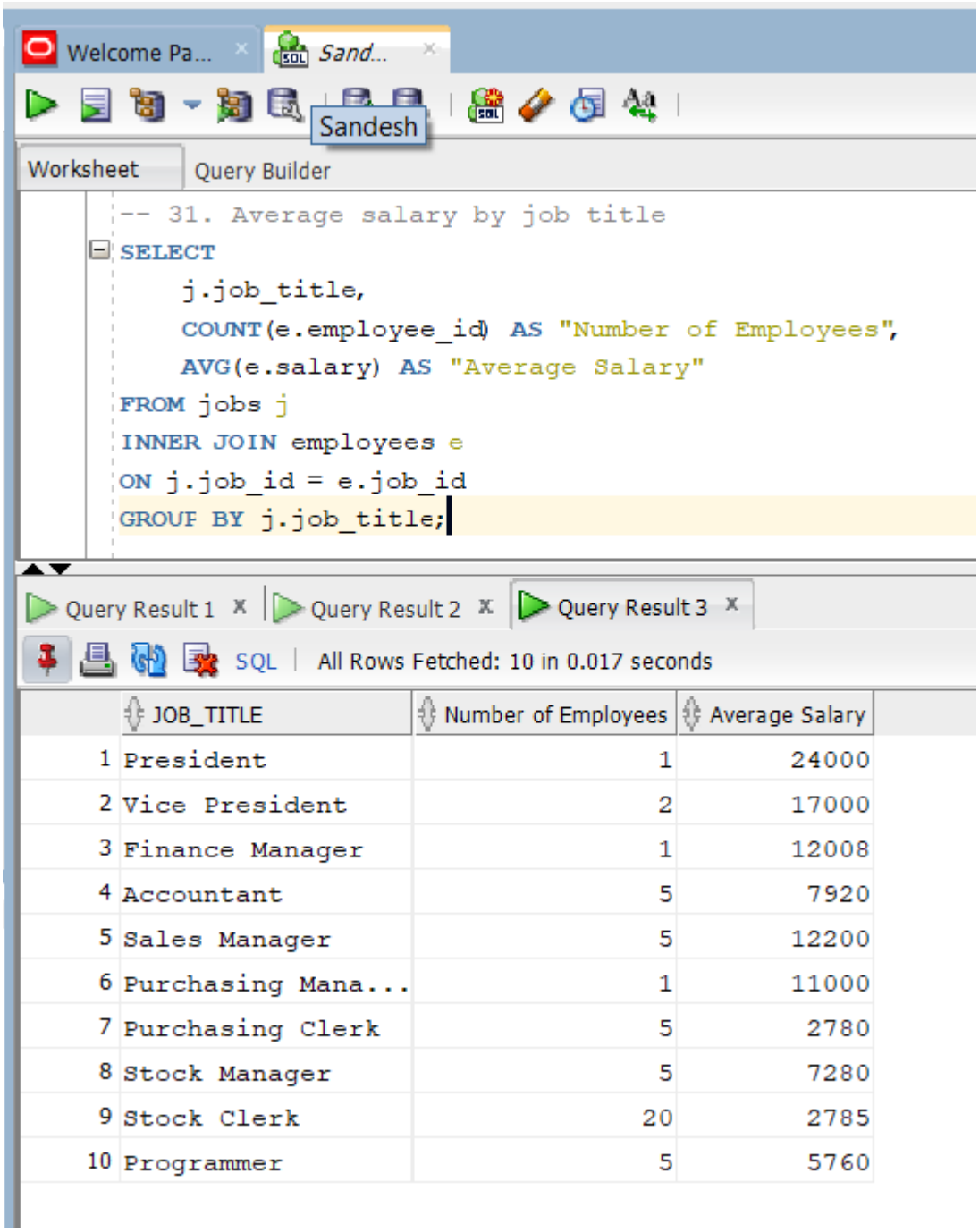



| | EMPLOYEE_ID | Employee Name | DEPARTMENT_NAME | CITY | COUNTRY_NAME |
|---|---|---|---|---|---|
| 1 | 103 | Alexander Hunold | IT | London | United King... |
| 2 | 104 | Bruce Ernst | IT | London | United King... |
| 3 | 105 | David Austin | IT | London | United King... |
| 4 | 106 | Valli Pataballa | IT | London | United King... |
| 5 | 107 | Diana Lorentz | IT | London | United King... |
| 6 | 120 | Matthew Weiss | Shipping | Oxford | United King... |
| 7 | 121 | Adam Fripp | Shipping | Oxford | United King... |
| 8 | 122 | Payam Kaufling | Shipping | Oxford | United King... |
| 9 | 123 | Shanta Vollman | Shipping | Oxford | United King... |
| 10 | 124 | Kevin Mourgos | Shipping | Oxford | United King... |

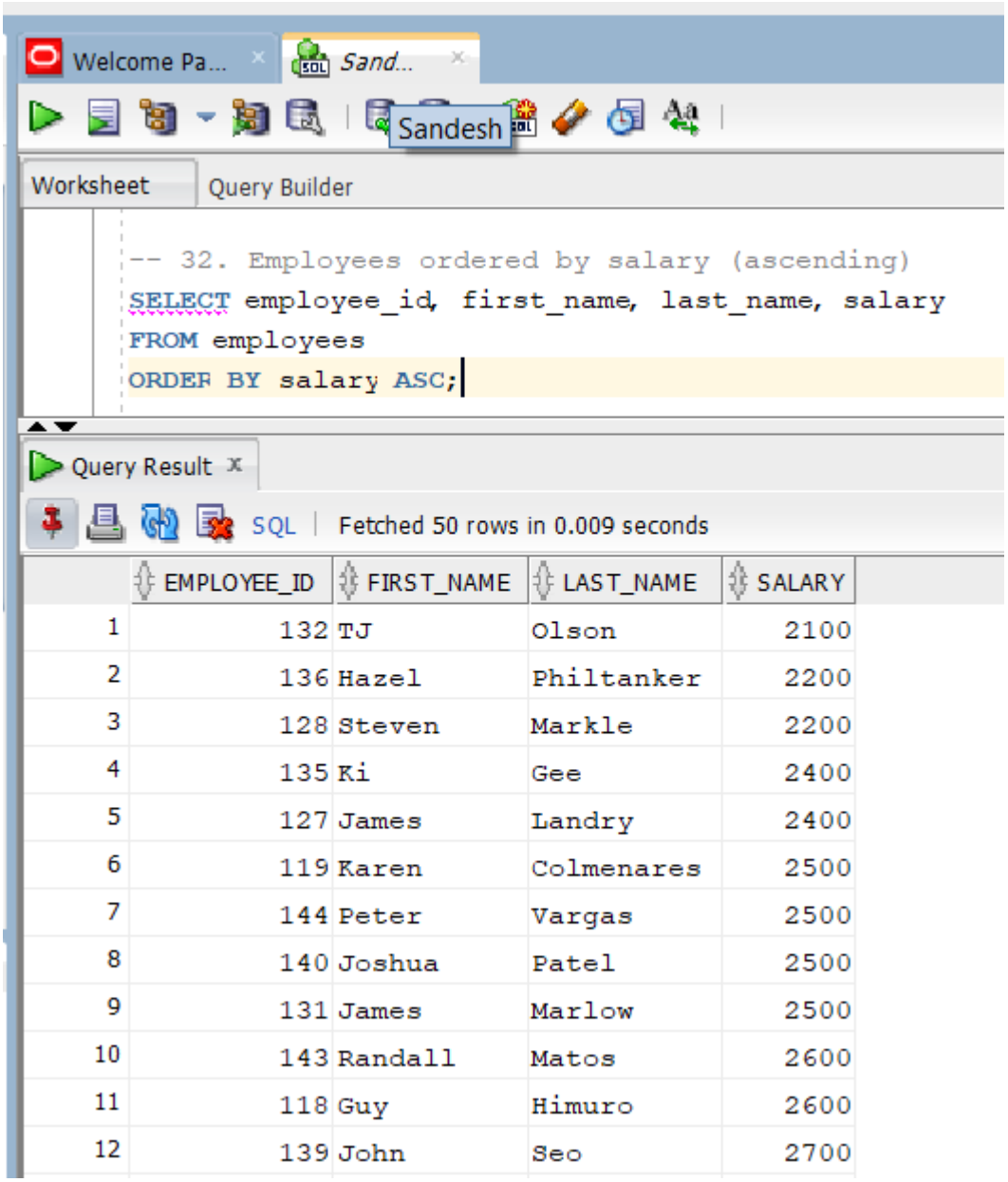

Welcome Pa...
Sand...
Sandesh
Worksheet
Query Builder
-- 29. Left Outer Join - All departments with employee count
SELECT
d.department_id,
d.department_name,
COUNT(e.employee_id) AS "Employee Count"
FROM departments d
LEFT OUTER JOIN employees e
ON d.department_id = e.department_id
GROUP BY d.department_id, d.department_name
ORDER BY d.department_ic;
Query Result 1
SQL | Fetched 50 rows in 0.05 seconds
DEPARTMENT_ID DEPARTMENT_NAME Employee Count
1 10 Administration 0
2 20 Marketing 0
3 30 Purchasing 6
4 40 Human Resources 0
5 50 Shipping 25
6 60 IT 5
7 70 Public Relations 0
8 80 Sales 5
9 90 Executive 3
10 100 Finance 6



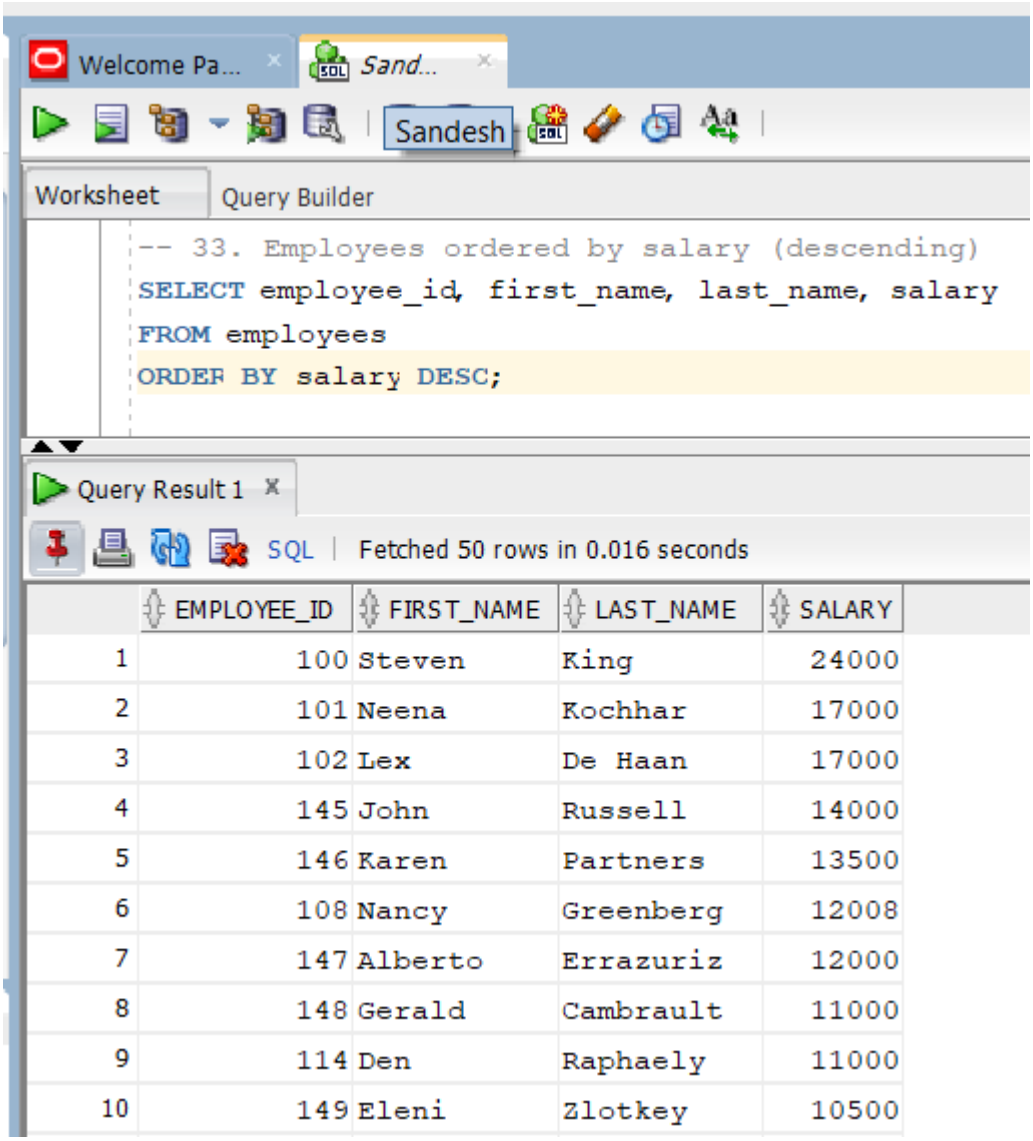

| | DEPARTMENT_ID | DEPARTMENT_NAME | Employee Count | Total Salary |
|---|---|---|---|---|
| 1 | 30 | Purchasing | 6 | 24900 |
| 2 | 50 | Shipping | 25 | 92100 |
| 3 | 60 | IT | 5 | 28800 |
| 4 | 80 | Sales | 5 | 61000 |
| 5 | 90 | Executive | 3 | 58000 |
| 6 | 100 | Finance | 6 | 51608 |



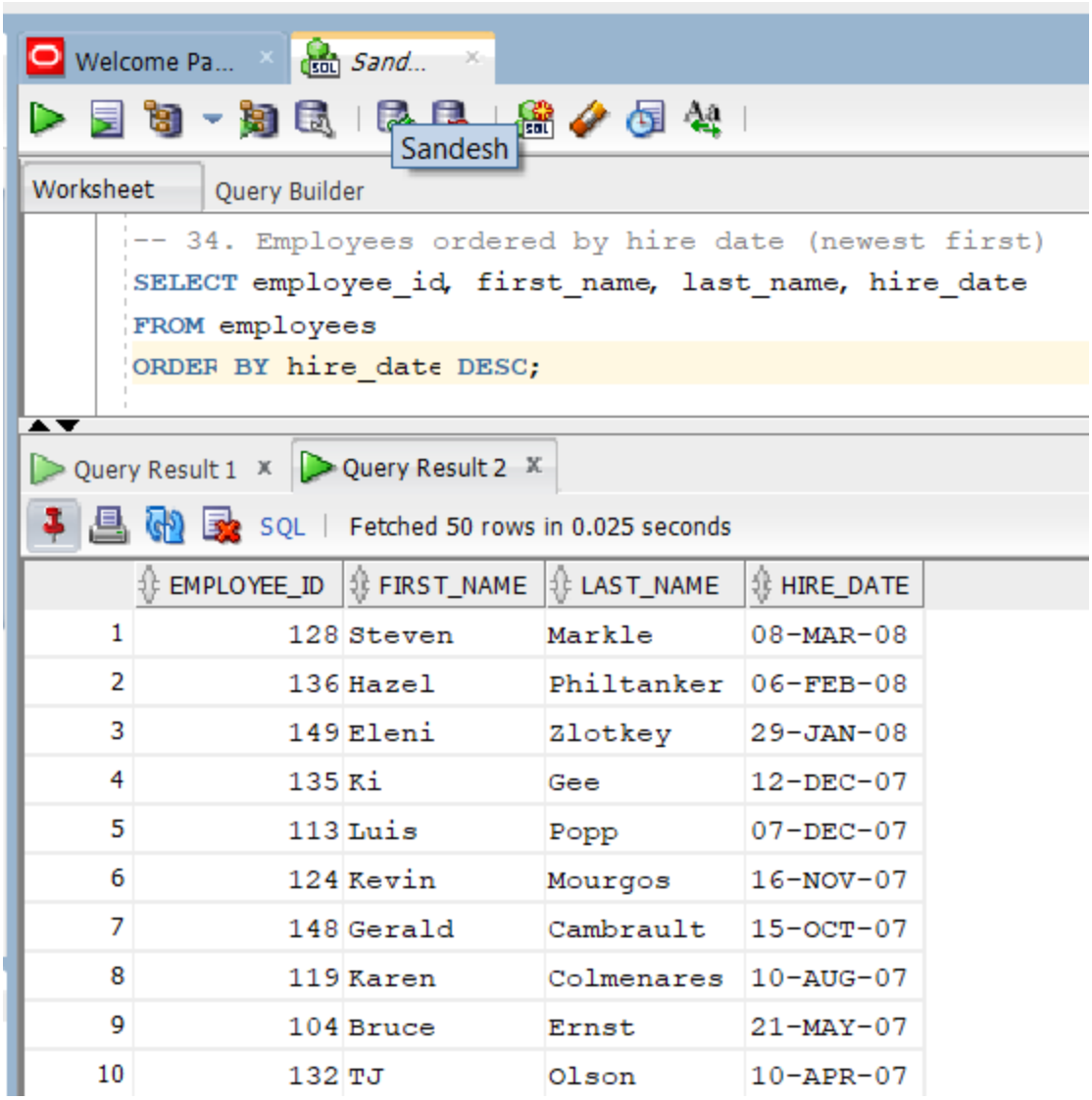

| | JOB_TITLE | Number of Employees | Average Salary |
|---|---|---|---|
| 1 | President | 1 | 24000 |
| 2 | Vice President | 2 | 17000 |
| 3 | Finance Manager | 1 | 12008 |
| 4 | Accountant | 5 | 7920 |
| 5 | Sales Manager | 5 | 12200 |
| 6 | Purchasing Mana... | 1 | 11000 |
| 7 | Purchasing Clerk | 5 | 2780 |
| 8 | Stock Manager | 5 | 7280 |
| 9 | Stock Clerk | 20 | 2785 |
| 10 | Programmer | 5 | 5760 |



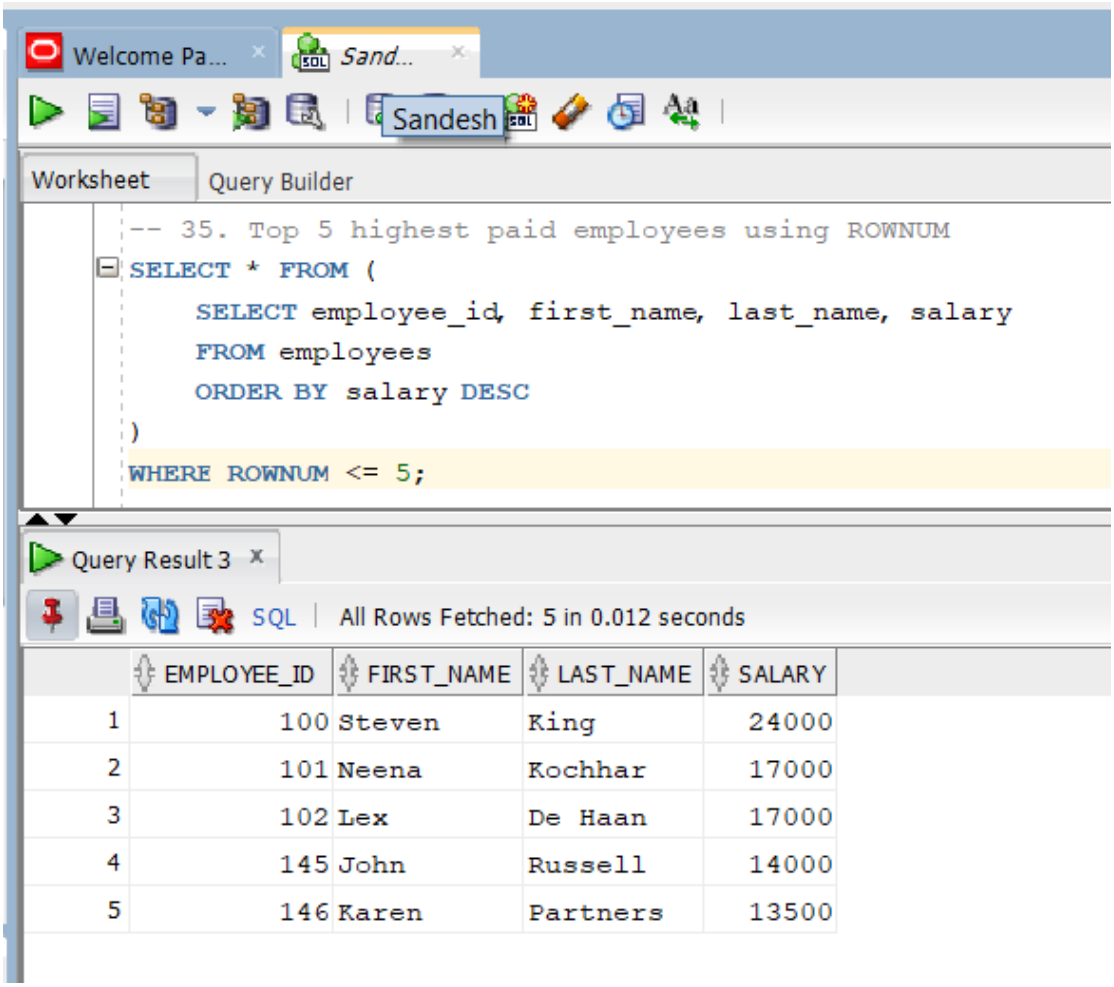

| | EMPLOYEE_ID | FIRST_NAME | LAST_NAME | SALARY |
|---|---|---|---|---|
| 1 | 132 | TJ | Olson | 2100 |
| 2 | 136 | Hazel | Philtanker | 2200 |
| 3 | 128 | Steven | Markle | 2200 |
| 4 | 135 | Ki | Gee | 2400 |
| 5 | 127 | James | Landry | 2400 |
| 6 | 119 | Karen | Colmenares | 2500 |
| 7 | 144 | Peter | Vargas | 2500 |
| 8 | 140 | Joshua | Patel | 2500 |
| 9 | 131 | James | Marlow | 2500 |
| 10 | 143 | Randall | Matos | 2600 |
| 11 | 118 | Guy | Himuro | 2600 |
| 12 | 139 | John | Seo | 2700 |

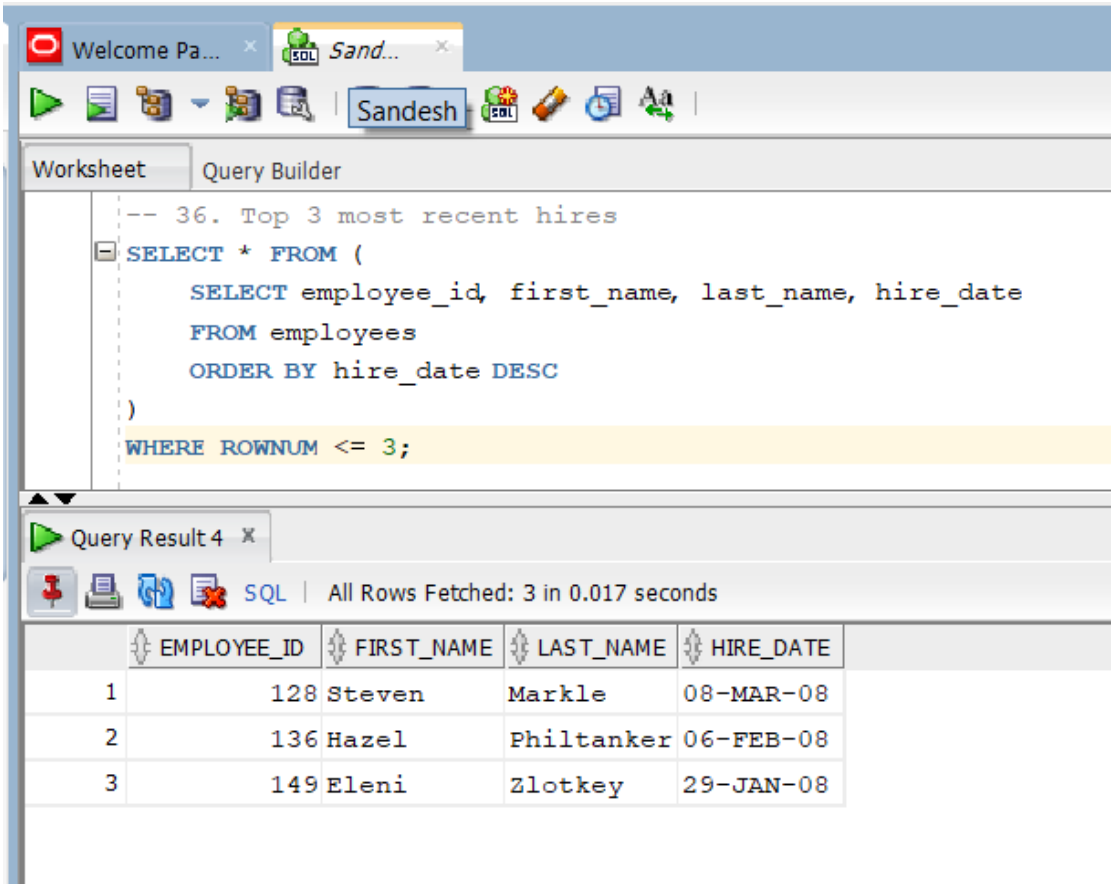


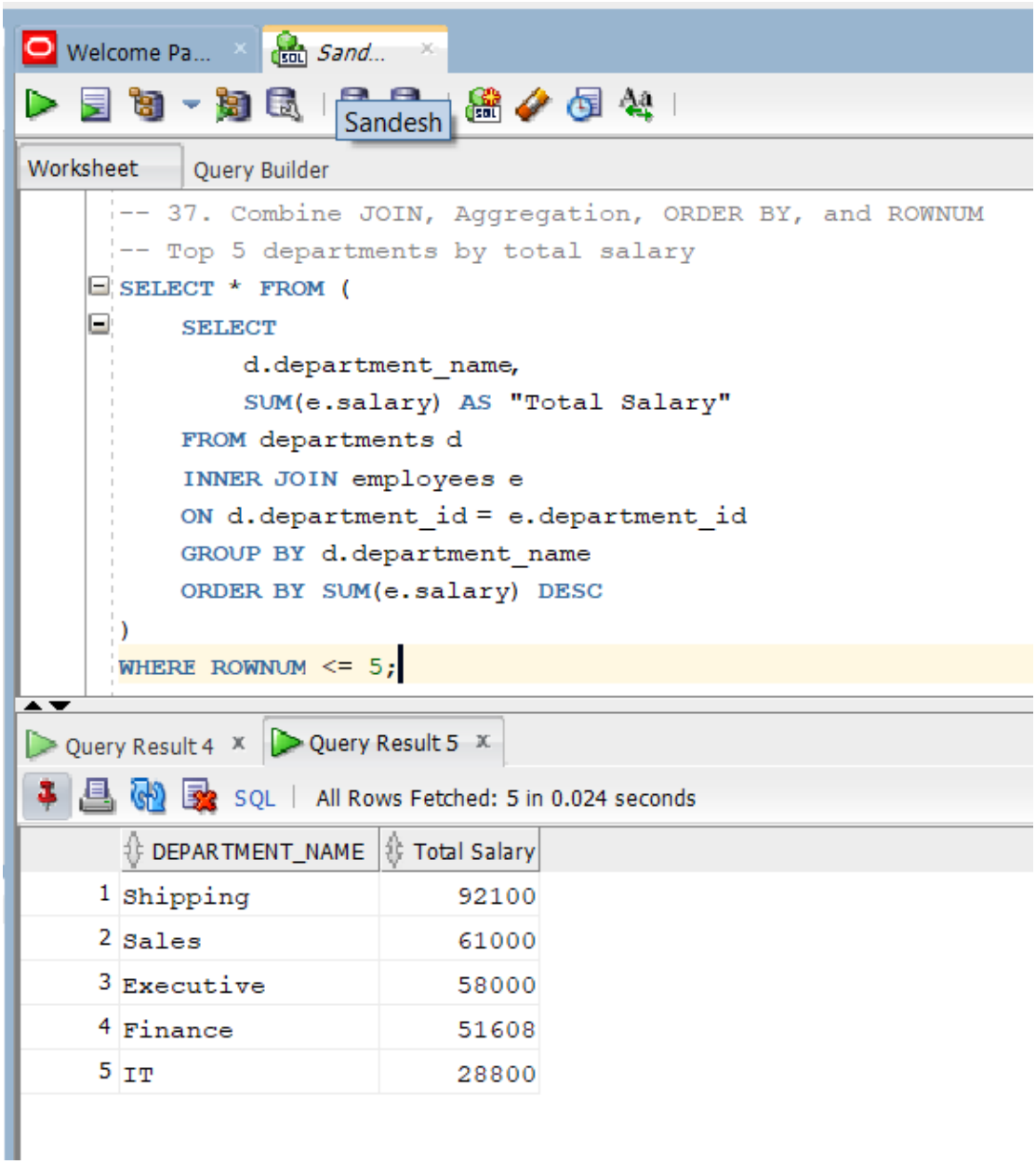

| | EMPLOYEE_ID | FIRST_NAME | LAST_NAME | SALARY |
|---|---|---|---|---|
| 1 | 100 | Steven | King | 24000 |
| 2 | 101 | Neena | Kochhar | 17000 |
| 3 | 102 | Lex | De Haan | 17000 |
| 4 | 145 | John | Russell | 14000 |
| 5 | 146 | Karen | Partners | 13500 |
| 6 | 108 | Nancy | Greenberg | 12008 |
| 7 | 147 | Alberto | Errazuriz | 12000 |
| 8 | 148 | Gerald | Cambrault | 11000 |
| 9 | 114 | Den | Raphaely | 11000 |
| 10 | 149 | Eleni | Zlotkey | 10500 |



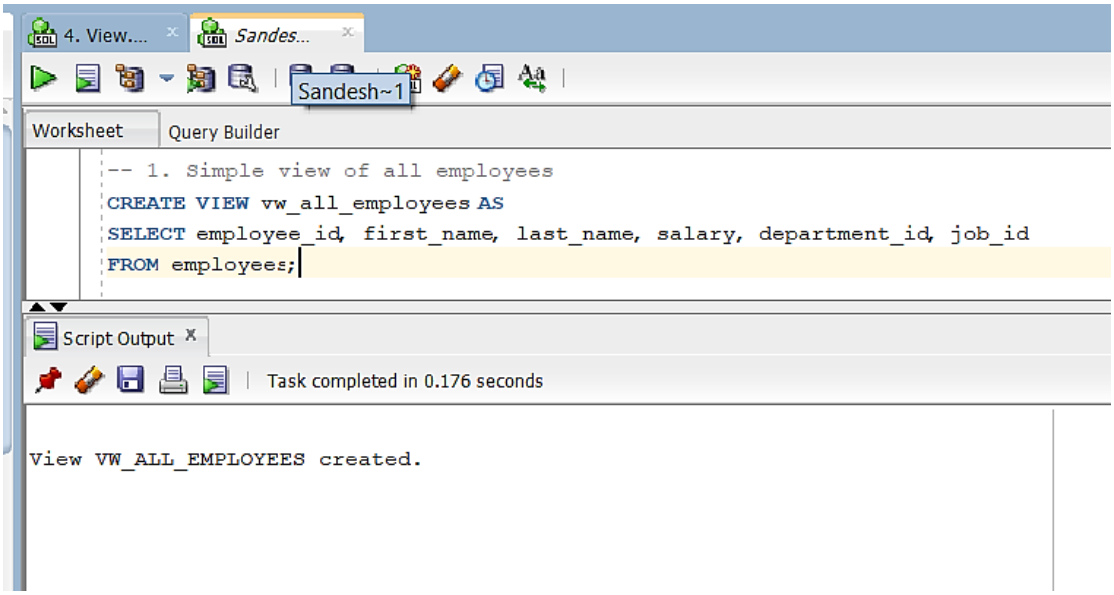

| | EMPLOYEE_ID | FIRST_NAME | LAST_NAME | HIRE_DATE |
|---|---|---|---|---|
| 1 | 128 | Steven | Markle | 08-MAR-08 |
| 2 | 136 | Hazel | Philtanker | 06-FEB-08 |
| 3 | 149 | Eleni | Zlotkey | 29-JAN-08 |
| 4 | 135 | Ki | Gee | 12-DEC-07 |
| 5 | 113 | Luis | Popp | 07-DEC-07 |
| 6 | 124 | Kevin | Mourgos | 16-NOV-07 |
| 7 | 148 | Gerald | Cambrault | 15-OCT-07 |
| 8 | 119 | Karen | Colmenares | 10-AUG-07 |
| 9 | 104 | Bruce | Ernst | 21-MAY-07 |
| 10 | 132 | TJ | Olson | 10-APR-07 |

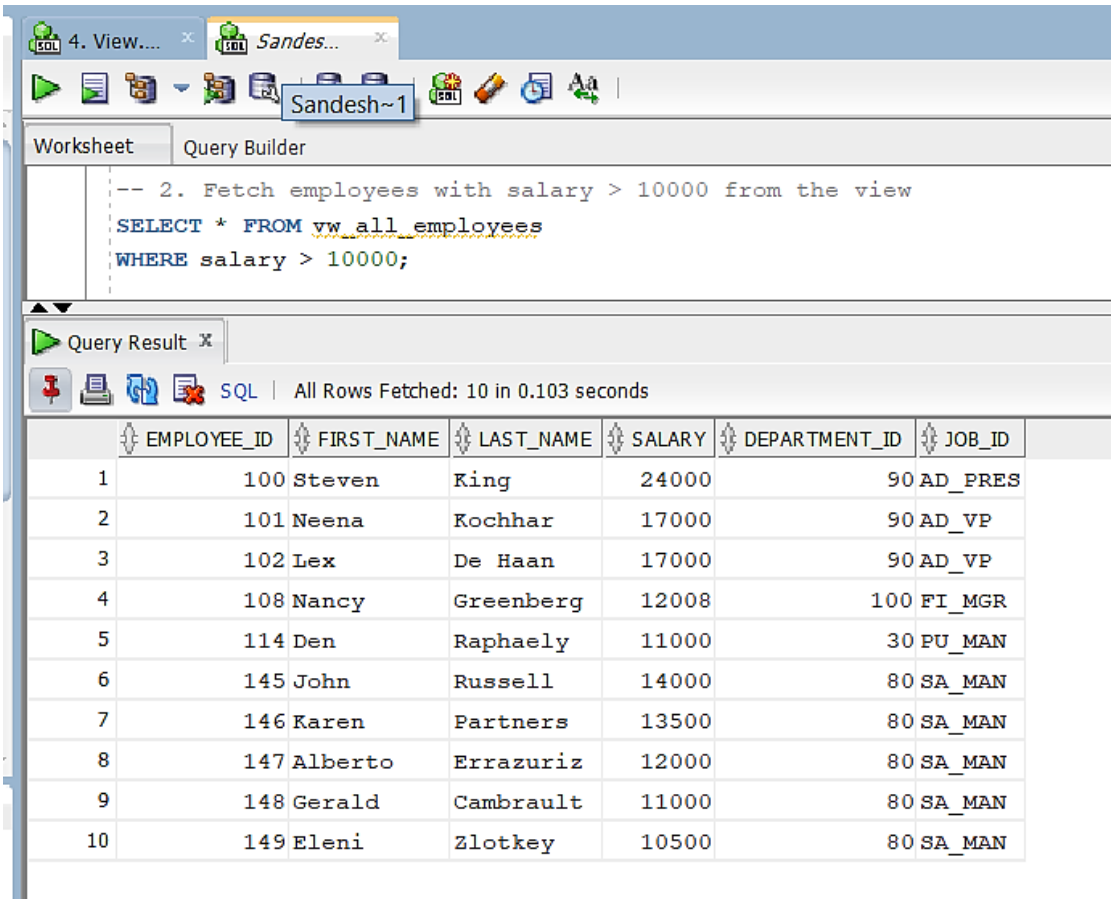

Welcome Pa...
Sand...
Sandesh
Worksheet
Query Builder
-- 35. Top 5 highest paid employees using ROWNUM
SELECT * FROM (
SELECT employee_id, first_name, last_name, salary
FROM employees
ORDER BY salary DESC
)
WHERE ROWNUM <= 5;
Query Result 3
SQL
All Rows Fetched: 5 in 0.012 seconds
EMPLOYEE_ID FIRST_NAME LAST_NAME SALARY
1 100 Steven King 24000
2 101 Neena Kochhar 17000
3 102 Lex De Haan 17000
4 145 John Russell 14000
5 146 Karen Partners 13500


Welcome Pa...
Sand...
Sandesh
Worksheet
Query Builder
-- 36. Top 3 most recent hires
SELECT * FROM (
SELECT employee_id, first_name, last_name, hire_date
FROM employees
ORDER BY hire_date DESC
)
WHERE ROWNUM <= 3;
Query Result 4
SQL
All Rows Fetched: 3 in 0.017 seconds
EMPLOYEE_ID
FIRST_NAME
LAST_NAME
HIRE_DATE
1 128 Steven Markle 08-MAR-08
2 136 Hazel Philtanker 06-FEB-08
3 149 Eleni Zlotkey 29-JAN-08

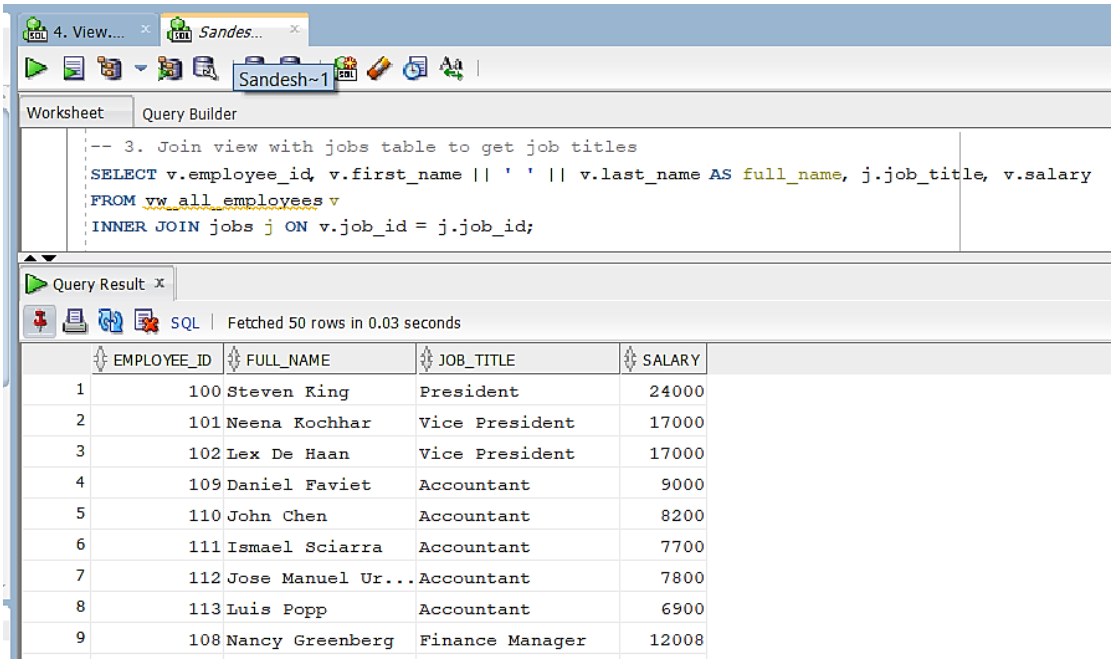

Welcome Pa...
Sand...
Sandesh
Worksheet
Query Builder
-- 37. Combine JOIN, Aggregation, ORDER BY, and ROWNUM
-- Top 5 departments by total salary
SELECT * FROM (
SELECT
d.department_name,
SUM(e.salary) AS "Total Salary"
FROM departments d
INNER JOIN employees e
ON d.department_id = e.department_id
GROUP BY d.department_name
ORDER BY SUM(e.salary) DESC
)
WHERE ROWNUM <= 5;
Query Result 4
Query Result 5
SQL
All Rows Fetched: 5 in 0.024 seconds
DEPARTMENT_NAME
Total Salary
1 Shipping 92100
2 Sales 61000
3 Executive 58000
4 Finance 51608
5 IT 28800

Lab 4:

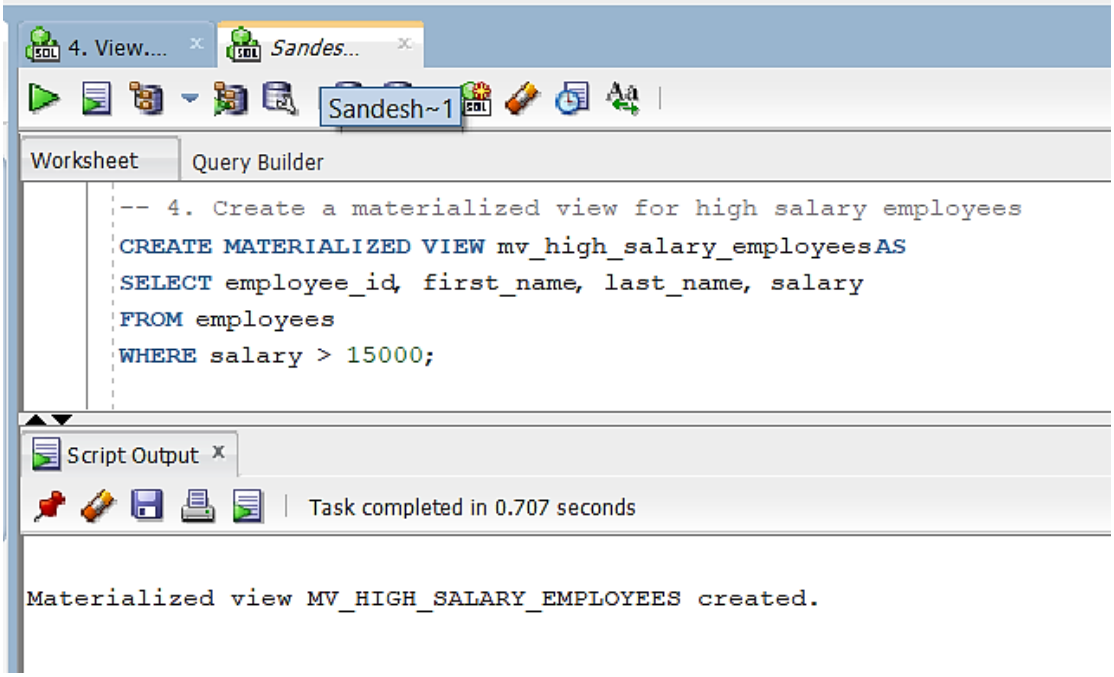


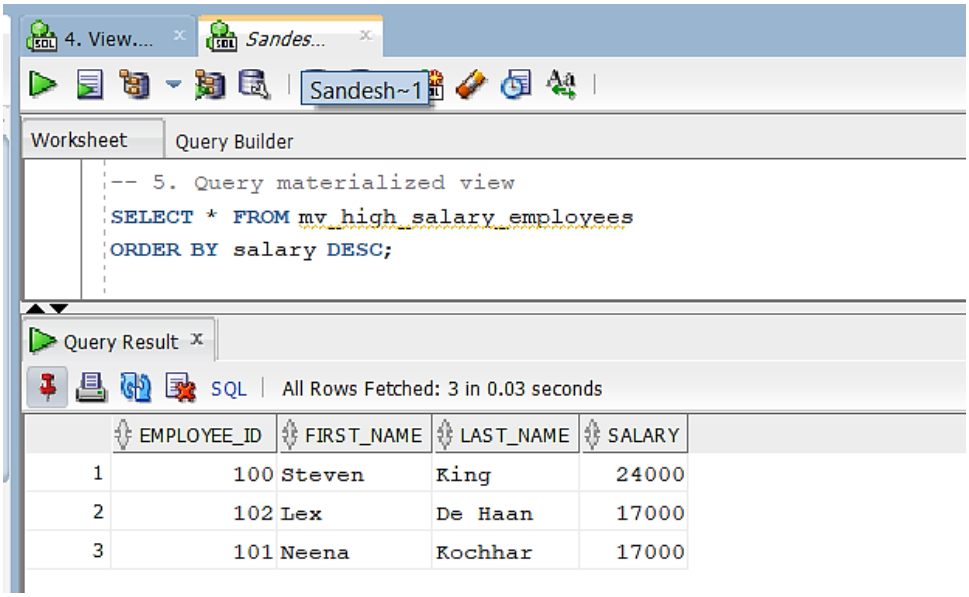




| | EMPLOYEE_ID | FIRST_NAME | LAST_NAME | SALARY | DEPARTMENT_ID | JOB_ID |
|---|---|---|---|---|---|---|
| 1 | 100 | Steven | King | 24000 | 90 | AD_PRES |
| 2 | 101 | Neena | Kochhar | 17000 | 90 | AD_VP |
| 3 | 102 | Lex | De Haan | 17000 | 90 | AD_VP |
| 4 | 108 | Nancy | Greenberg | 12008 | 100 | FI_MGR |
| 5 | 114 | Den | Raphaely | 11000 | 30 | PU_MAN |
| 6 | 145 | John | Russell | 14000 | 80 | SA_MAN |
| 7 | 146 | Karen | Partners | 13500 | 80 | SA_MAN |
| 8 | 147 | Alberto | Errazuriz | 12000 | 80 | SA_MAN |
| 9 | 148 | Gerald | Cambrault | 11000 | 80 | SA_MAN |
| 10 | 149 | Eleni | Zlotkey | 10500 | 80 | SA_MAN |




| | EMPLOYEE_ID | FULL_NAME | JOB_TITLE | SALARY |
|---|---|---|---|---|
| 1 | 100 | Steven King | President | 24000 |
| 2 | 101 | Neena Kochhar | Vice President | 17000 |
| 3 | 102 | Lex De Haan | Vice President | 17000 |
| 4 | 109 | Daniel Faviet | Accountant | 9000 |
| 5 | 110 | John Chen | Accountant | 8200 |
| 6 | 111 | Ismael Sciarra | Accountant | 7700 |
| 7 | 112 | Jose Manuel Ur... | Accountant | 7800 |
| 8 | 113 | Luis Popp | Accountant | 6900 |
| 9 | 108 | Nancy Greenberg | Finance Manager | 12008 |




| | EMPLOYEE_ID | FIRST_NAME | LAST_NAME | SALARY |
|---|---|---|---|---|
| 1 | 100 | Steven | King | 24000 |
| 2 | 102 | Lex | De Haan | 17000 |
| 3 | 101 | Neena | Kochhar | 17000 |

LAB 5: PL/SQL

Student: Sandesh Khatiwada

Date: 11/11/2025

OBJECTIVES:

1. Understand basic PL/SQL structure
2. Perform simple computations and decision-making
3. Create and execute functions and procedures
4. Use loops in PL/SQL programs

```
-- ======================================================
-- GENERAL SYNTAX (REFERENCE)
-- ======================================================
-- DECLARE
--     <variables>;
-- BEGIN
--     <statements>;
-- EXCEPTION
--     <exception-handling>;
-- END;
-- /
```

OBJECTIVE 1: BASIC PL/SQL BLOCK

```
SET SERVEROUTPUT ON;
```

1. Hello World in PL/SQL

```
BEGIN
   DBMS_OUTPUT.PUT_LINE('Hello world');
END;
/
```

OBJECTIVE 2: SIMPLE COMPUTATION & CONDITIONS

2.1 Calculate area of a circle

```
SET SERVEROUTPUT ON;

DECLARE
   pi CONSTANT NUMBER := 3.14;
   radius NUMBER := &r;
   area NUMBER;
BEGIN
   area := pi * radius * radius;
   DBMS_OUTPUT.PUT_LINE('The area is: ' || area);
END;
/
```

2.2 Eligibility check using IF-ELSE

```
SET SERVEROUTPUT ON;

DECLARE
   age NUMBER := &age;
BEGIN
   IF age > 22 THEN
      DBMS_OUTPUT.PUT_LINE('Student is eligible for admission.');
   ELSE
      DBMS_OUTPUT.PUT_LINE('Student is NOT eligible for admission.');
   END IF;
END;
/
```

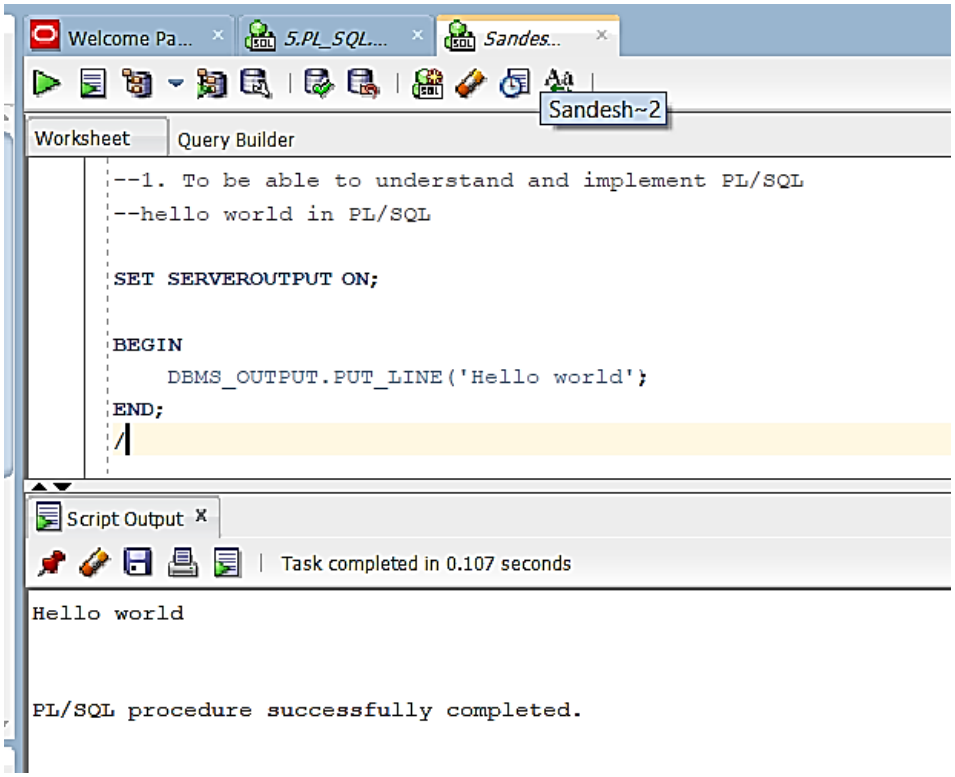
OBJECTIVE 3: FUNCTIONS IN PL/SQL

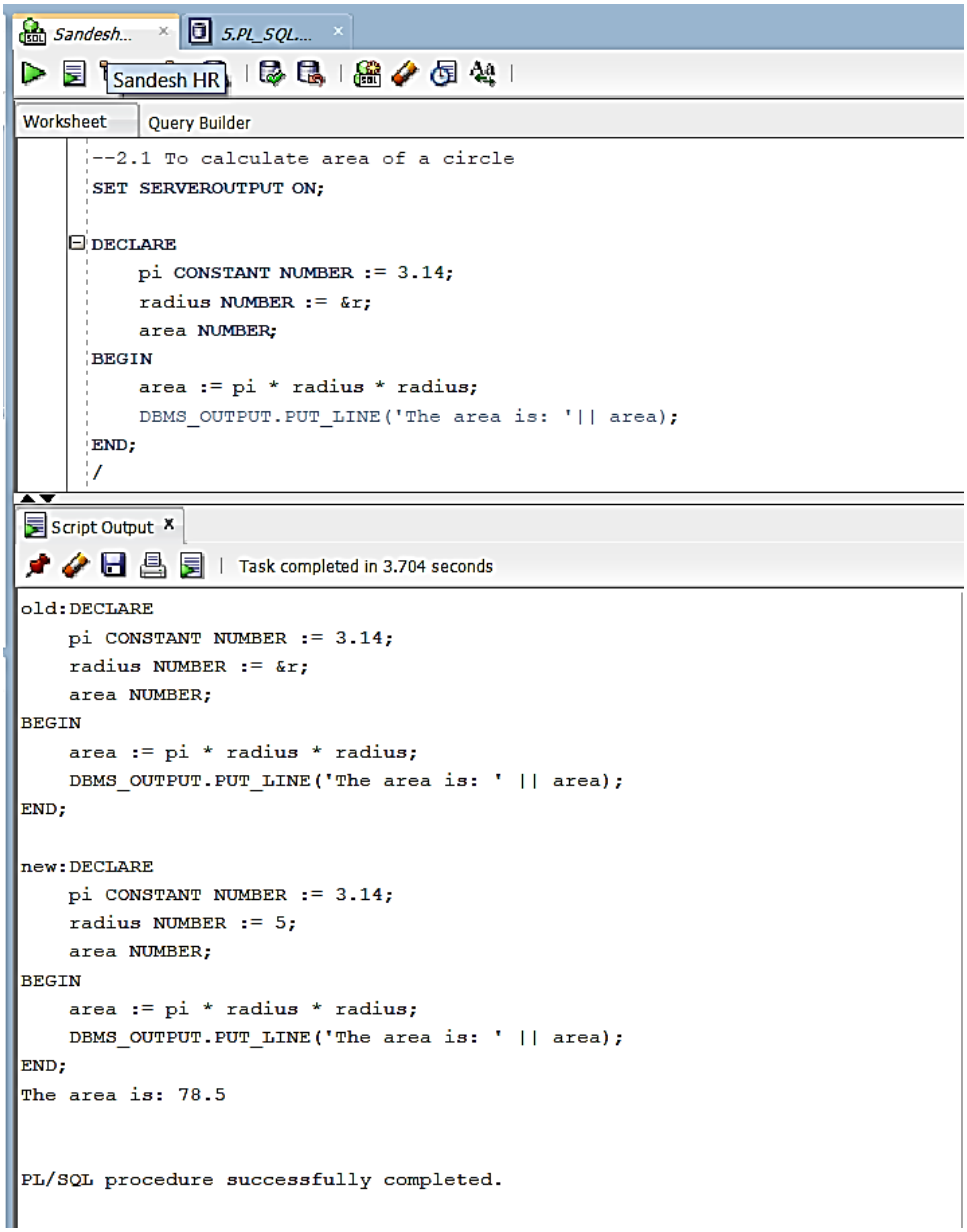
3 Function: Total salary by department

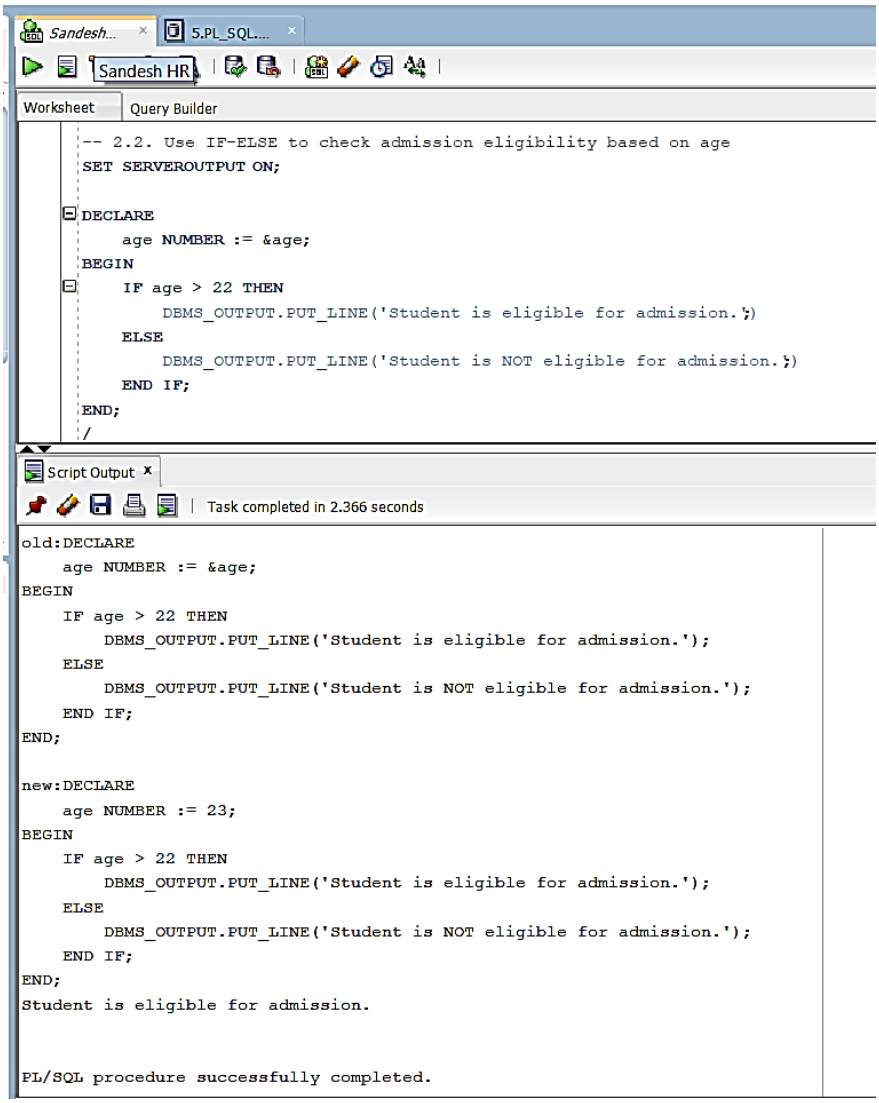
```
CREATE OR REPLACE FUNCTION get_total_salary_by_dept
(
   p_dept_id IN NUMBER
)
RETURN NUMBER
AS
   v_total_salary NUMBER;
BEGIN
   SELECT SUM(salary + NVL(commission_pct,0) * salary)
   INTO v_total_salary
   FROM employees
   WHERE department_id = p_dept_id;

   RETURN NVL(v_total_salary, 0);
END;
/

SET SERVEROUTPUT ON;

DECLARE
   v_total NUMBER;
BEGIN
   v_total := get_total_salary_by_dept(80);
   DBMS_OUTPUT.PUT_LINE('Total Salary for Dept 80: ' || v_total);
END;
/
```

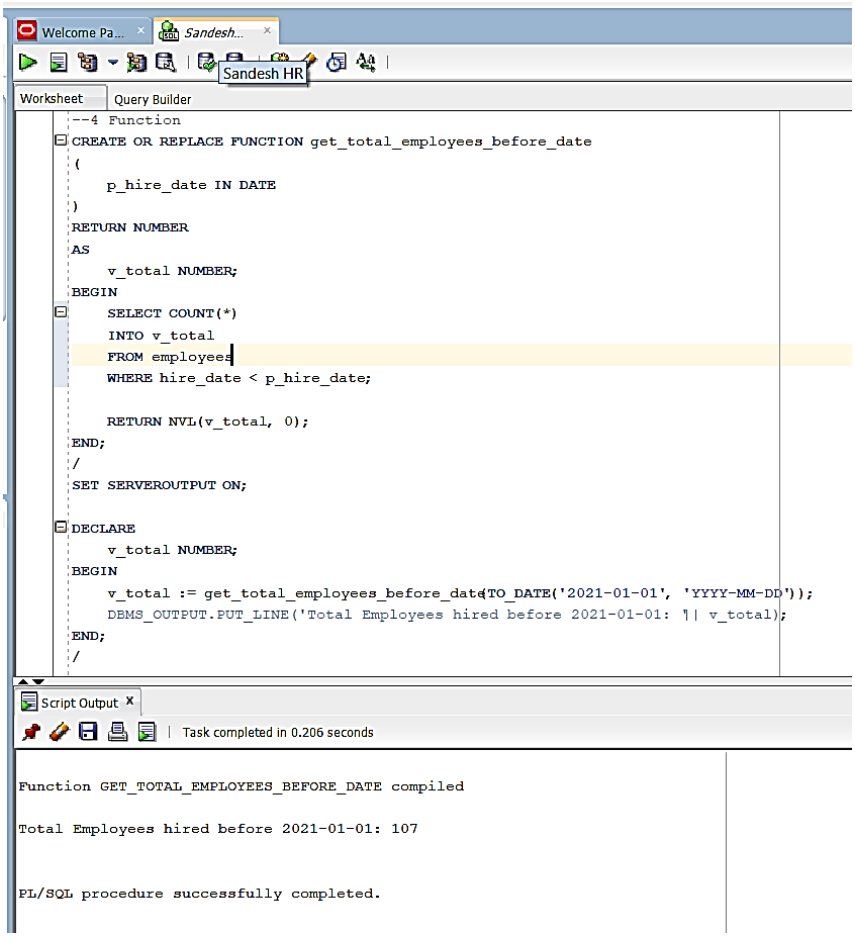
```
-- ================================================
-- OBJECTIVE 4: STORED PROCEDURES
-- ================================================

CREATE OR REPLACE PROCEDURE get_max_salary(
   v_max_salary OUT employees.salary%TYPE,
   dept_id IN employees.department_id%TYPE
)
AS
BEGIN
   SELECT MAX(salary)
   INTO v_max_salary
   FROM employees
   WHERE department_id = dept_id;

   DBMS_OUTPUT.PUT_LINE('Maximum Salary: ' || v_max_salary);
END get_max_salary;
/

SET SERVEROUTPUT ON;

DECLARE
   v_max employees.salary%TYPE;
BEGIN
   get_max_salary(v_max, 80);
   DBMS_OUTPUT.PUT_LINE('Returned Max Salary: ' || v_max);
END;
/

 OBJECTIVE 5: LOOPS IN PL/SQL

-- Print even multiples of 5 less than 100
SET SERVEROUTPUT ON;
```

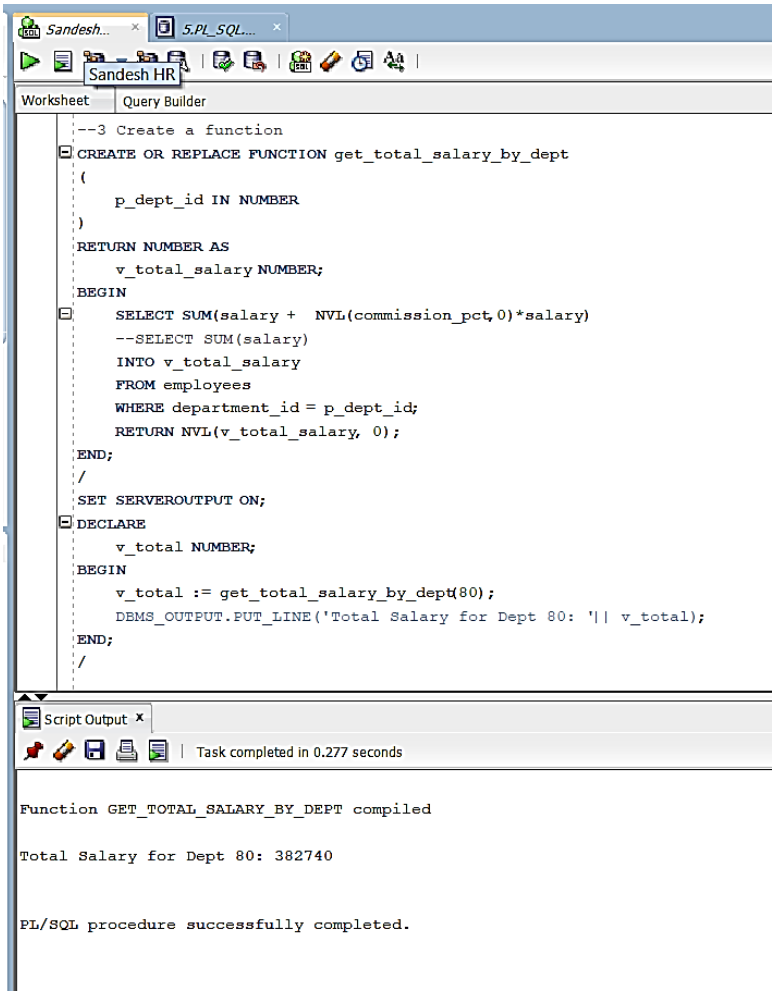
```
DECLARE
   i NUMBER := 1;
   prod NUMBER;
BEGIN
   LOOP
      prod := i * 5;

      EXIT WHEN prod >= 100;

      IF MOD(prod, 2) = 0 THEN
         DBMS_OUTPUT.PUT_LINE(prod);
      END IF;

      i := i + 1;
   END LOOP;
END;
/

-- ======================================================
-- CONCLUSION
-- ======================================================
-- PL/SQL allows procedural logic inside SQL environments.
-- Variables, loops, conditions, functions, and procedures make Oracle more powerful.
-- This lab demonstrated practical use cases of PL/SQL blocks, functions, procedures, and loops.
```

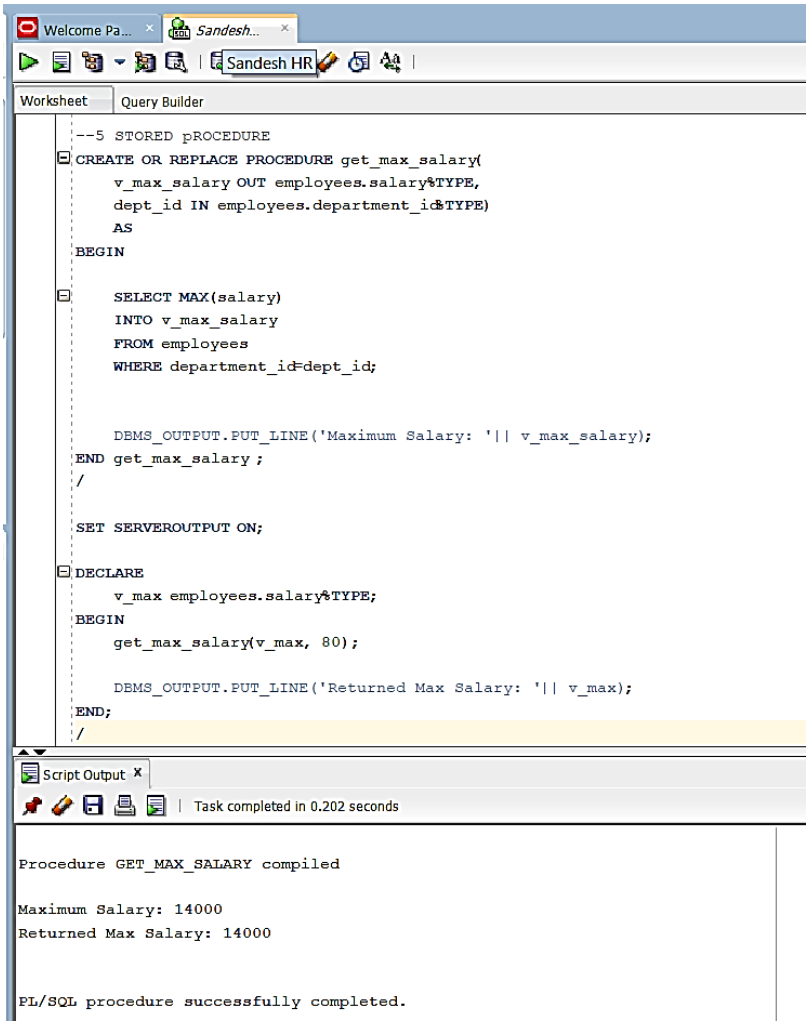

Welcome Pa...
5.PL_SQL....
Sandes...
Sandesh~2
Worksheet
Query Builder
--1. To be able to understand and implement PL/SQL
--hello world in PL/SQL
SET SERVEROUTPUT ON;
BEGIN
DBMS_OUTPUT.PUT_LINE('Hello world');
END;
/
Script Output
Task completed in 0.107 seconds
Hello world
PL/SQL procedure successfully completed.

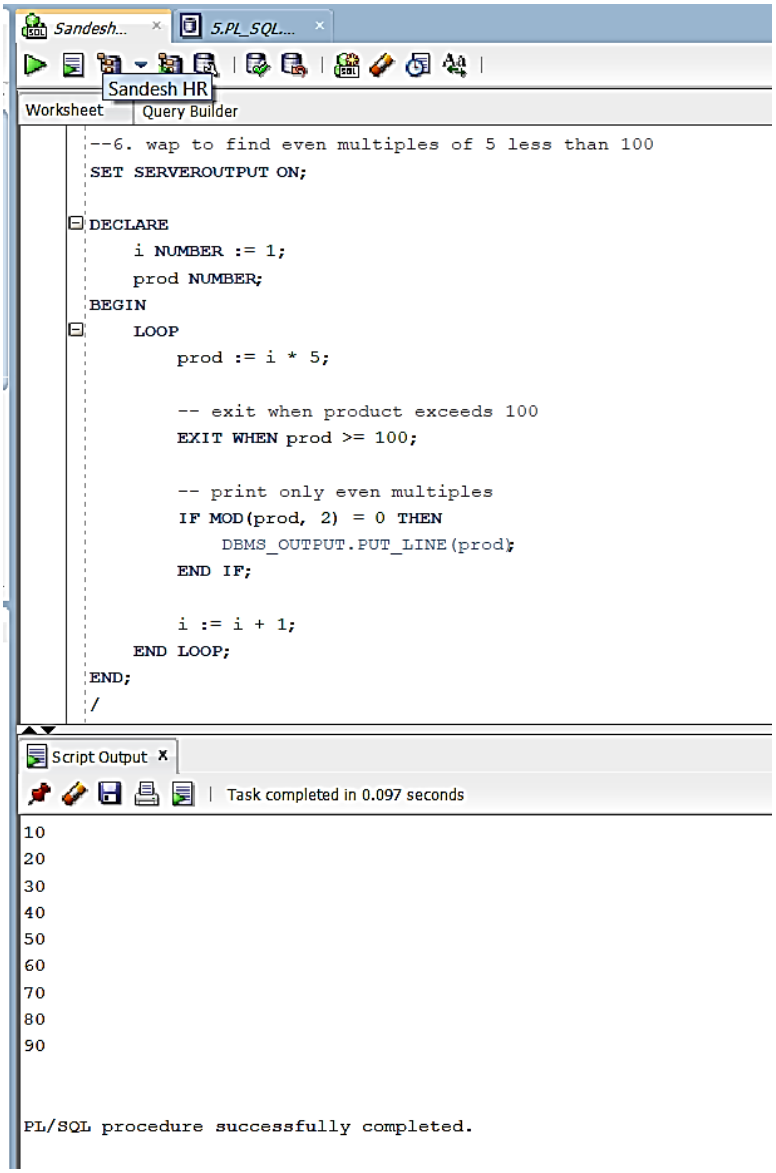

Sandesh...
5.PL_SQL...
Sandesh HR
Worksheet
Query Builder
--2.1 To calculate area of a circle
SET SERVEROUTPUT ON;
DECLARE
pi CONSTANT NUMBER := 3.14;
radius NUMBER := &r;
area NUMBER;
BEGIN
area := pi * radius * radius;
DBMS_OUTPUT.PUT_LINE('The area is: '|| area);
END;
/
Script Output
Task completed in 3.704 seconds
old:DECLARE
pi CONSTANT NUMBER := 3.14;
radius NUMBER := &r;
area NUMBER;
BEGIN
area := pi * radius * radius;
DBMS_OUTPUT.PUT_LINE('The area is: ' || area);
END;
new:DECLARE
pi CONSTANT NUMBER := 3.14;
radius NUMBER := 5;
area NUMBER;
BEGIN
area := pi * radius * radius;
DBMS_OUTPUT.PUT_LINE('The area is: ' || area);
END;
The area is: 78.5
PL/SQL procedure successfully completed.


Sandesh...
5.PL_SQL...
Sandesh HR
Worksheet
Query Builder
-- 2.2. Use IF-ELSE to check admission eligibility based on age
SET SERVEROUTPUT ON;
DECLARE
age NUMBER := &age;
BEGIN
IF age > 22 THEN
DBMS_OUTPUT.PUT_LINE('Student is eligible for admission.');
ELSE
DBMS_OUTPUT.PUT_LINE('Student is NOT eligible for admission.');
END IF;
END;
/
Script Output
Task completed in 2.366 seconds
old:DECLARE
age NUMBER := &age;
BEGIN
IF age > 22 THEN
DBMS_OUTPUT.PUT_LINE('Student is eligible for admission.');
ELSE
DBMS_OUTPUT.PUT_LINE('Student is NOT eligible for admission.');
END IF;
END;
new:DECLARE
age NUMBER := 23;
BEGIN
IF age > 22 THEN
DBMS_OUTPUT.PUT_LINE('Student is eligible for admission.');
ELSE
DBMS_OUTPUT.PUT_LINE('Student is NOT eligible for admission.');
END IF;
END;
Student is eligible for admission.
PL/SQL procedure successfully completed.


Welcome Pa...
Sandesh...
Sandesh HR
Worksheet
Query Builder
--4 Function
CREATE OR REPLACE FUNCTION get_total_employees_before_date
(
p_hire_date IN DATE
)
RETURN NUMBER
AS
v_total NUMBER;
BEGIN
SELECT COUNT(*)
INTO v_total
FROM employees
WHERE hire_date < p_hire_date;
RETURN NVL(v_total, 0);
END;
/
SET SERVEROUTPUT ON;
DECLARE
v_total NUMBER;
BEGIN
v_total := get_total_employees_before_date(TO_DATE('2021-01-01', 'YYYY-MM-DD'));
DBMS_OUTPUT.PUT_LINE('Total Employees hired before 2021-01-01: ' || v_total);
END;
/
Script Output
Task completed in 0.206 seconds
Function GET_TOTAL_EMPLOYEES_BEFORE_DATE compiled
Total Employees hired before 2021-01-01: 107
PL/SQL procedure successfully completed.

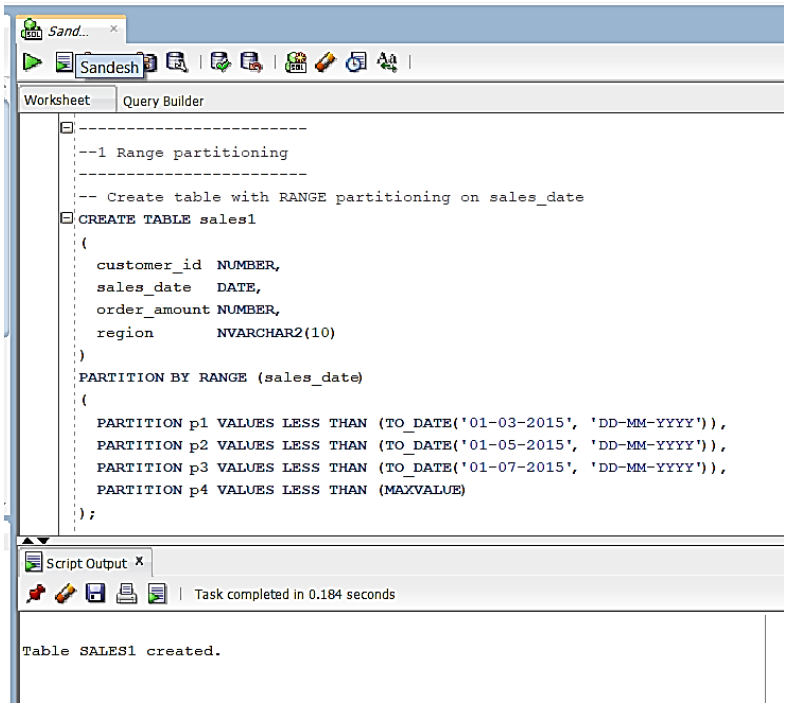

Sandesh...
5.PL_SQL...
Sandesh HR
Worksheet
Query Builder
--3 Create a function
CREATE OR REPLACE FUNCTION get_total_salary_by_dept
(
p_dept_id IN NUMBER
)
RETURN NUMBER AS
v_total_salary NUMBER;
BEGIN
SELECT SUM(salary + NVL(commission_pct,0)*salary)
--SELECT SUM(salary)
INTO v_total_salary
FROM employees
WHERE department_id = p_dept_id;
RETURN NVL(v_total_salary, 0);
END;
/
SET SERVEROUTPUT ON;
DECLARE
v_total NUMBER;
BEGIN
v_total := get_total_salary_by_dept(80);
DBMS_OUTPUT.PUT_LINE('Total Salary for Dept 80: '|| v_total);
END;
/
Script Output
Task completed in 0.277 seconds
Function GET_TOTAL_SALARY_BY_DEPT compiled
Total Salary for Dept 80: 382740
PL/SQL procedure successfully completed.


Welcome Pa...
Sandesh...
Sandesh HR
Worksheet
Query Builder
--5 STORED pROCEDURE
CREATE OR REPLACE PROCEDURE get_max_salary(
v_max_salary OUT employees.salary%TYPE,
dept_id IN employees.department_id%TYPE)
AS
BEGIN
SELECT MAX(salary)
INTO v_max_salary
FROM employees
WHERE department_id=dept_id;
DBMS_OUTPUT.PUT_LINE('Maximum Salary: '|| v_max_salary);
END get_max_salary ;
/
SET SERVEROUTPUT ON;
DECLARE
v_max employees.salary%TYPE;
BEGIN
get_max_salary(v_max, 80);
DBMS_OUTPUT.PUT_LINE('Returned Max Salary: '|| v_max);
END;
/
Script Output
Task completed in 0.202 seconds
Procedure GET_MAX_SALARY compiled
Maximum Salary: 14000
Returned Max Salary: 14000
PL/SQL procedure successfully completed.

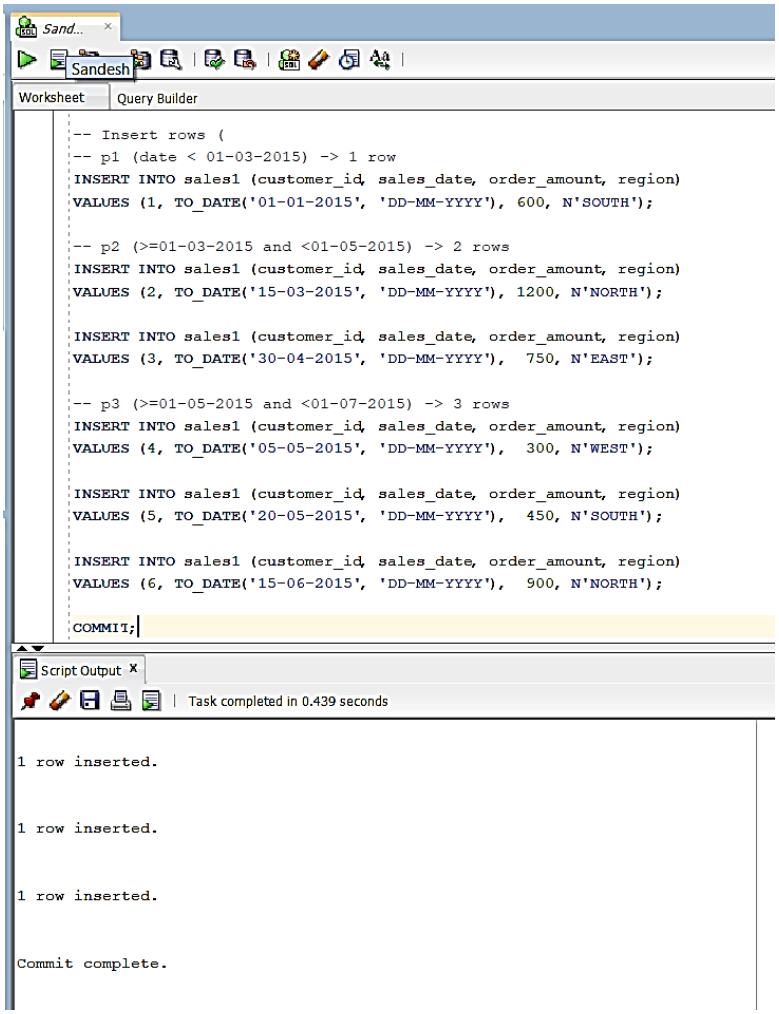

Sandesh...
5.PL_SQL...
Sandesh HR
Worksheet
Query Builder
--6. wap to find even multiples of 5 less than 100
SET SERVEROUTPUT ON;
DECLARE
i NUMBER := 1;
prod NUMBER;
BEGIN
LOOP
prod := i * 5;
-- exit when product exceeds 100
EXIT WHEN prod >= 100;
-- print only even multiples
IF MOD(prod, 2) = 0 THEN
DBMS_OUTPUT.PUT_LINE(prod);
END IF;
i := i + 1;
END LOOP;
END;
/
Script Output
Task completed in 0.097 seconds
10
20
30
40
50
60
70
80
90
PL/SQL procedure successfully completed.

1. Range Partitioning

```
-- Create table with RANGE partitioning on sales_date
CREATE TABLE sales1
(
  customer_id  NUMBER,
  sales_date   DATE,
  order_amount NUMBER,
  region       NVARCHAR2(10)
)
PARTITION BY RANGE (sales_date)
(
  PARTITION p1 VALUES LESS THAN (TO_DATE('01-03-2015', 'DD-MM-YYYY')),
  PARTITION p2 VALUES LESS THAN (TO_DATE('01-05-2015', 'DD-MM-YYYY')),
  PARTITION p3 VALUES LESS THAN (TO_DATE('01-07-2015', 'DD-MM-YYYY')),
  PARTITION p4 VALUES LESS THAN (MAXVALUE)
);
```

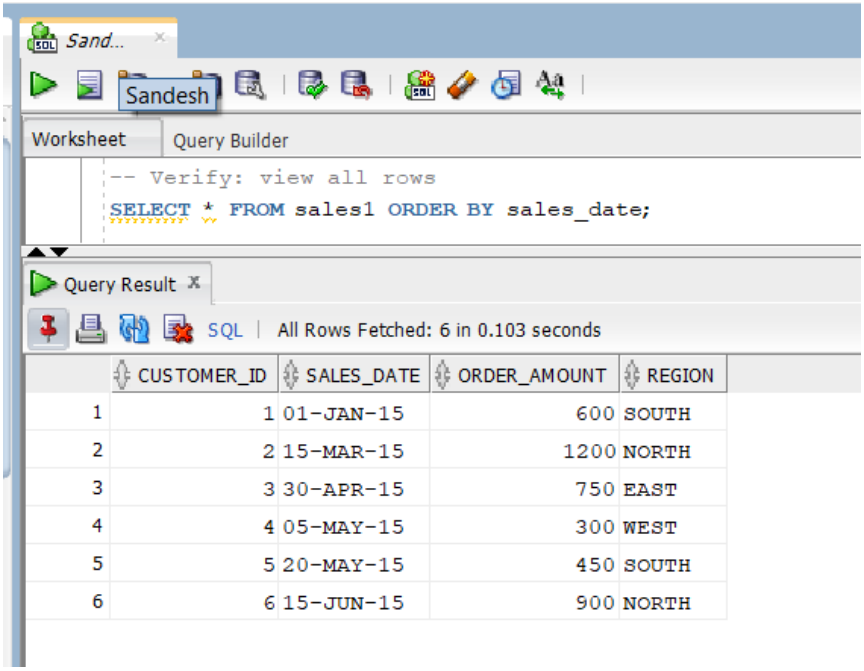


```
-- Insert rows (
-- p1 (date < 01-03-2015) -> 1 row
INSERT INTO sales1 (customer_id, sales_date, order_amount, region)
VALUES (1, TO_DATE('01-01-2015', 'DD-MM-YYYY'), 600, N'SOUTH');

-- p2 (>=01-03-2015 and <01-05-2015) -> 2 rows
INSERT INTO sales1 (customer_id, sales_date, order_amount, region)
VALUES (2, TO_DATE('15-03-2015', 'DD-MM-YYYY'), 1200, N'NORTH');

INSERT INTO sales1 (customer_id, sales_date, order_amount, region)
VALUES (3, TO_DATE('30-04-2015', 'DD-MM-YYYY'),  750, N'EAST');

-- p3 (>=01-05-2015 and <01-07-2015) -> 3 rows
INSERT INTO sales1 (customer_id, sales_date, order_amount, region)
VALUES (4, TO_DATE('05-05-2015', 'DD-MM-YYYY'),  300, N'WEST');

INSERT INTO sales1 (customer_id, sales_date, order_amount, region)
VALUES (5, TO_DATE('20-05-2015', 'DD-MM-YYYY'),  450, N'SOUTH');

INSERT INTO sales1 (customer_id, sales_date, order_amount, region)
VALUES (6, TO_DATE('15-06-2015', 'DD-MM-YYYY'),  900, N'NORTH');

COMMIT;
```




-- Verify: view all rows

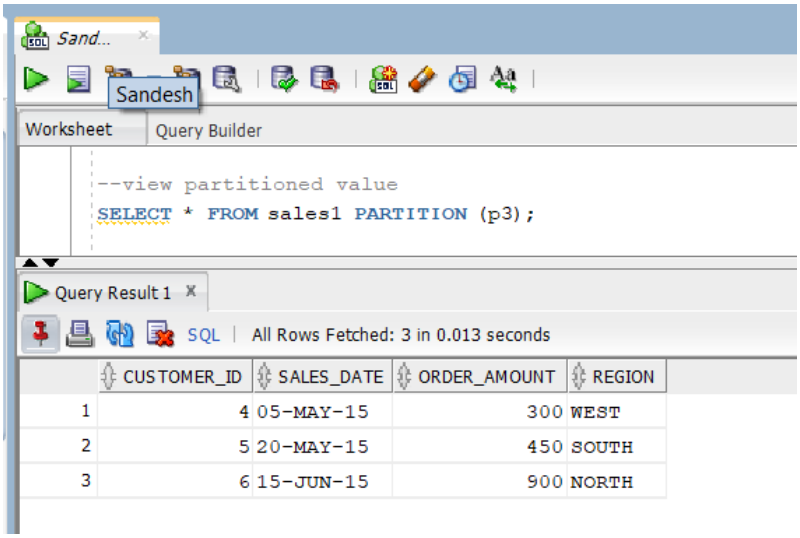
SELECT * FROM sales1 ORDER BY sales_date;




| | CUSTOMER_ID | SALES_DATE | ORDER_AMOUNT | REGION |
|---|---|---|---|---|
| 1 | 1 | 01-JAN-15 | 600 | SOUTH |
| 2 | 2 | 15-MAR-15 | 1200 | NORTH |
| 3 | 3 | 30-APR-15 | 750 | EAST |
| 4 | 4 | 05-MAY-15 | 300 | WEST |
| 5 | 5 | 20-MAY-15 | 450 | SOUTH |
| 6 | 6 | 15-JUN-15 | 900 | NORTH |

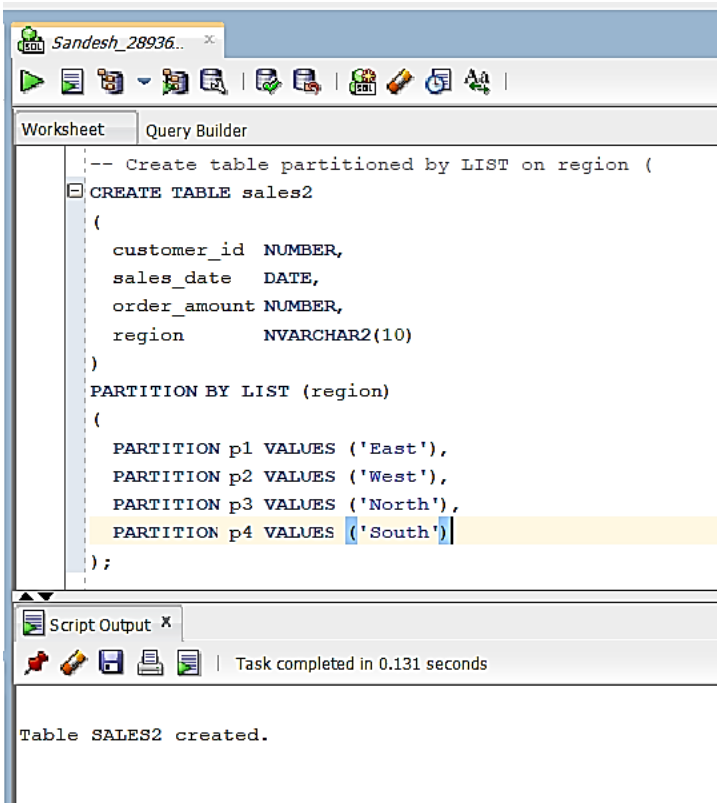
--view partitioned value

SELECT * FROM sales1 PARTITION (p3);

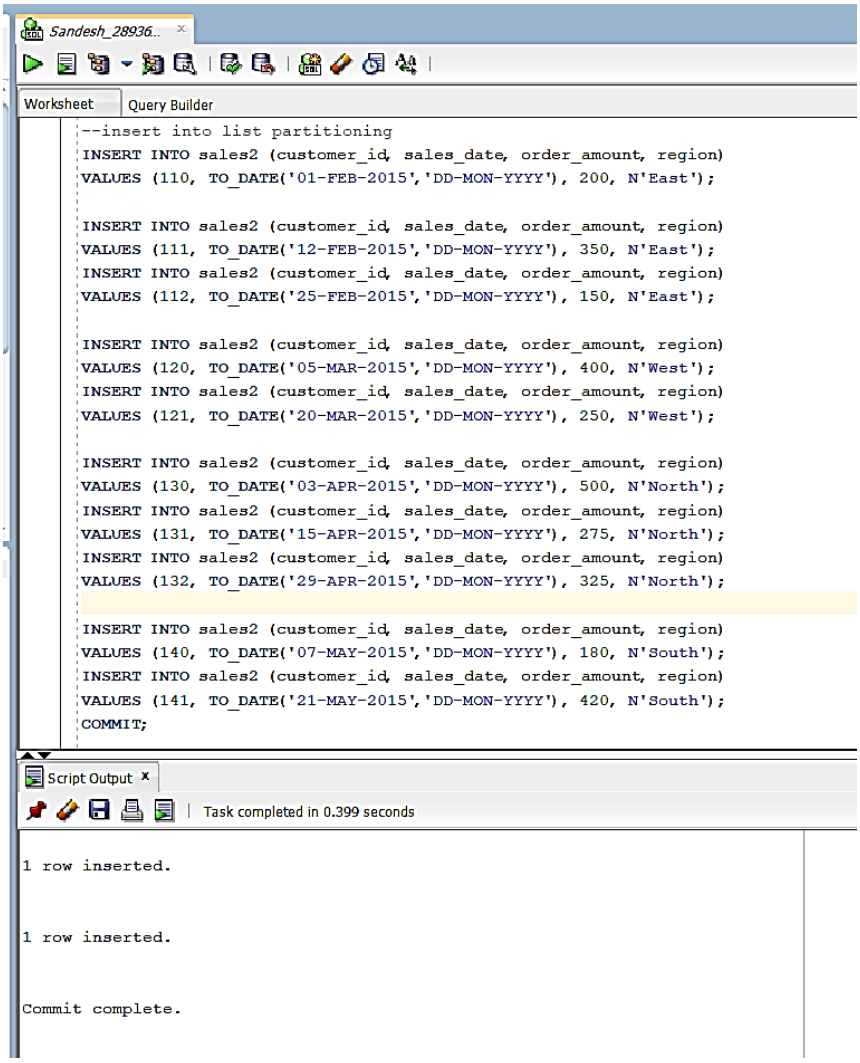


2. List partitioning

```
-- Create table partitioned by LIST on region (
CREATE TABLE sales2
(
  customer_id  NUMBER,
  sales_date   DATE,
  order_amount NUMBER,
  region       NVARCHAR2(10)
)
PARTITION BY LIST (region)
(
  PARTITION p1 VALUES ('East'),
  PARTITION p2 VALUES ('West'),
  PARTITION p3 VALUES ('North'),
  PARTITION p4 VALUES ('South')
);
```

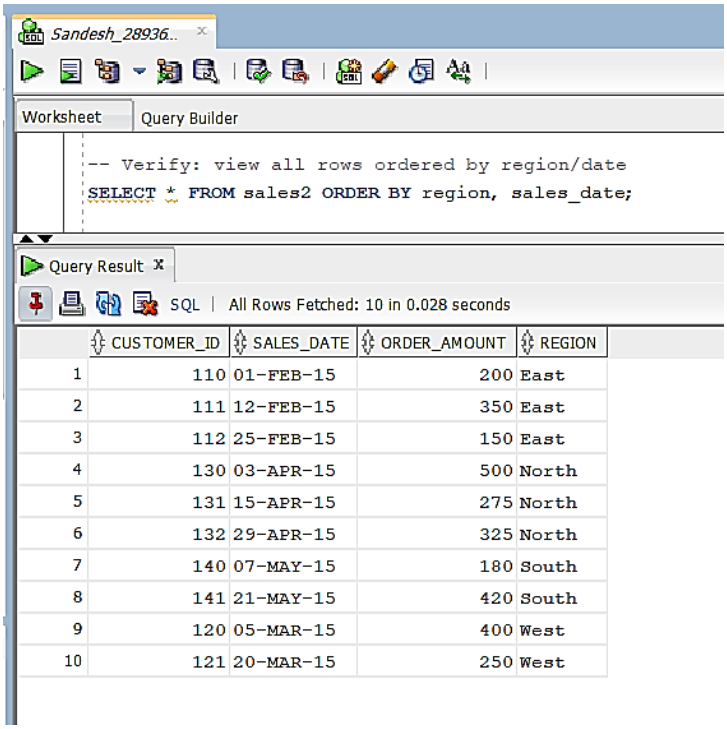


```
--insert into list partitioning
INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (110, TO_DATE('01-FEB-2015','DD-MON-YYYY'), 200, N'East');

INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (111, TO_DATE('12-FEB-2015','DD-MON-YYYY'), 350, N'East');
INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (112, TO_DATE('25-FEB-2015','DD-MON-YYYY'), 150, N'East');

INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (120, TO_DATE('05-MAR-2015','DD-MON-YYYY'), 400, N'West');
INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (121, TO_DATE('20-MAR-2015','DD-MON-YYYY'), 250, N'West');

INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (130, TO_DATE('03-APR-2015','DD-MON-YYYY'), 500, N'North');
INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (131, TO_DATE('15-APR-2015','DD-MON-YYYY'), 275, N'North');
INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (132, TO_DATE('29-APR-2015','DD-MON-YYYY'), 325, N'North');

INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (140, TO_DATE('07-MAY-2015','DD-MON-YYYY'), 180, N'South');
INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (141, TO_DATE('21-MAY-2015','DD-MON-YYYY'), 420, N'South');
COMMIT;
```


Sandesh_28936...
Worksheet
Query Builder
--insert into list partitioning
INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (110, TO_DATE('01-FEB-2015','DD-MON-YYYY'), 200, N'East');
INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (111, TO_DATE('12-FEB-2015','DD-MON-YYYY'), 350, N'East');
INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (112, TO_DATE('25-FEB-2015','DD-MON-YYYY'), 150, N'East');
INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (120, TO_DATE('05-MAR-2015','DD-MON-YYYY'), 400, N'West');
INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (121, TO_DATE('20-MAR-2015','DD-MON-YYYY'), 250, N'West');
INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (130, TO_DATE('03-APR-2015','DD-MON-YYYY'), 500, N'North');
INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (131, TO_DATE('15-APR-2015','DD-MON-YYYY'), 275, N'North');
INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (132, TO_DATE('29-APR-2015','DD-MON-YYYY'), 325, N'North');
INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (140, TO_DATE('07-MAY-2015','DD-MON-YYYY'), 180, N'South');
INSERT INTO sales2 (customer_id, sales_date, order_amount, region)
VALUES (141, TO_DATE('21-MAY-2015','DD-MON-YYYY'), 420, N'South');
COMMIT;
Script Output
Task completed in 0.399 seconds
1 row inserted.
1 row inserted.
Commit complete.

-- Verify: view all rows ordered by region/date

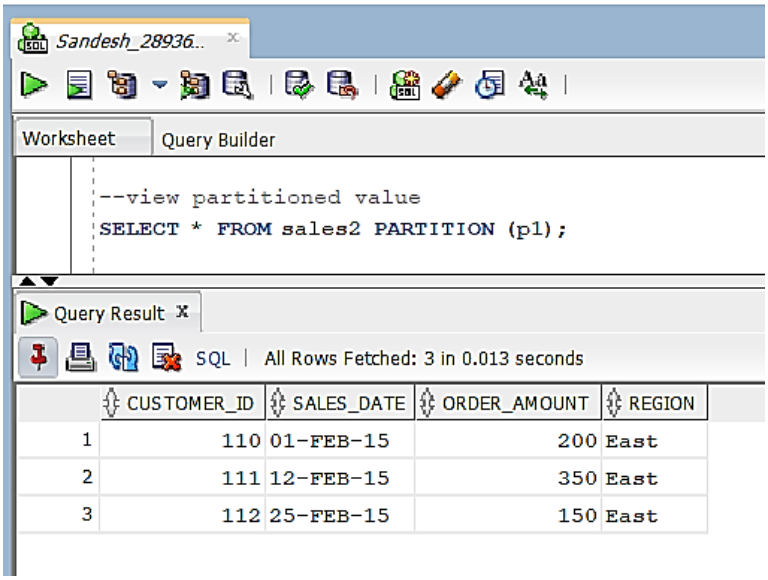
SELECT * FROM sales2 ORDER BY region, sales_date;




| | CUSTOMER_ID | SALES_DATE | ORDER_AMOUNT | REGION |
|---|---|---|---|---|
| 1 | 110 | 01-FEB-15 | 200 | East |
| 2 | 111 | 12-FEB-15 | 350 | East |
| 3 | 112 | 25-FEB-15 | 150 | East |
| 4 | 130 | 03-APR-15 | 500 | North |
| 5 | 131 | 15-APR-15 | 275 | North |
| 6 | 132 | 29-APR-15 | 325 | North |
| 7 | 140 | 07-MAY-15 | 180 | South |
| 8 | 141 | 21-MAY-15 | 420 | South |
| 9 | 120 | 05-MAR-15 | 400 | West |
| 10 | 121 | 20-MAR-15 | 250 | West |

--view partitioned value

SELECT * FROM sales2 PARTITION (p1);

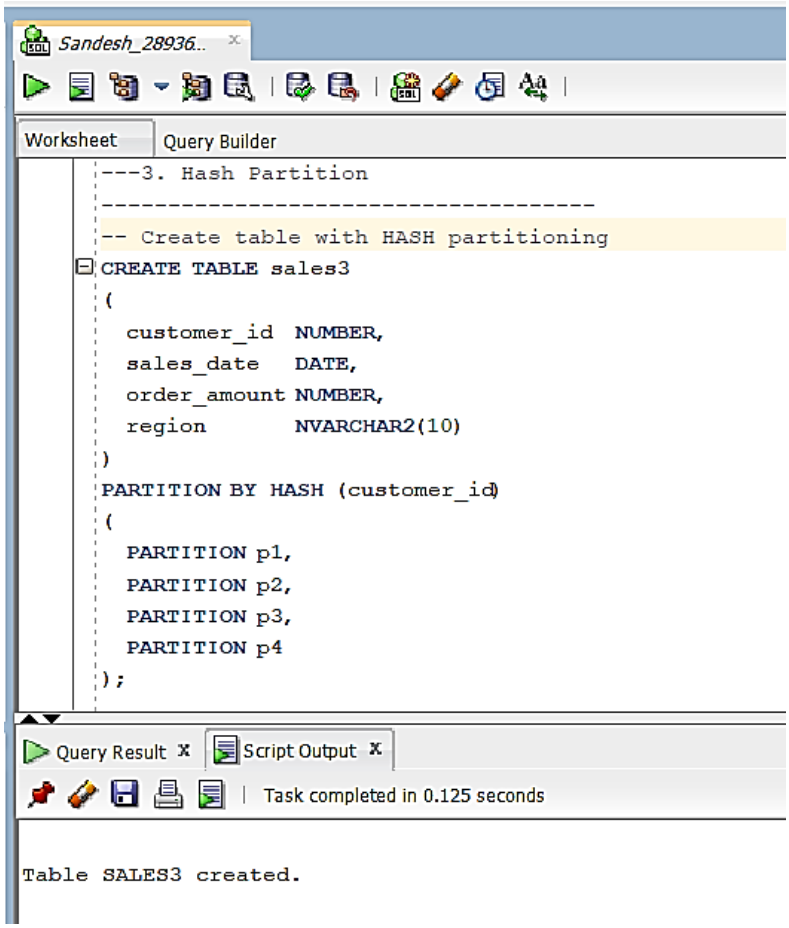



| | CUSTOMER_ID | SALES_DATE | ORDER_AMOUNT | REGION |
|---|---|---|---|---|
| 1 | 110 | 01-FEB-15 | 200 | East |
| 2 | 111 | 12-FEB-15 | 350 | East |
| 3 | 112 | 25-FEB-15 | 150 | East |

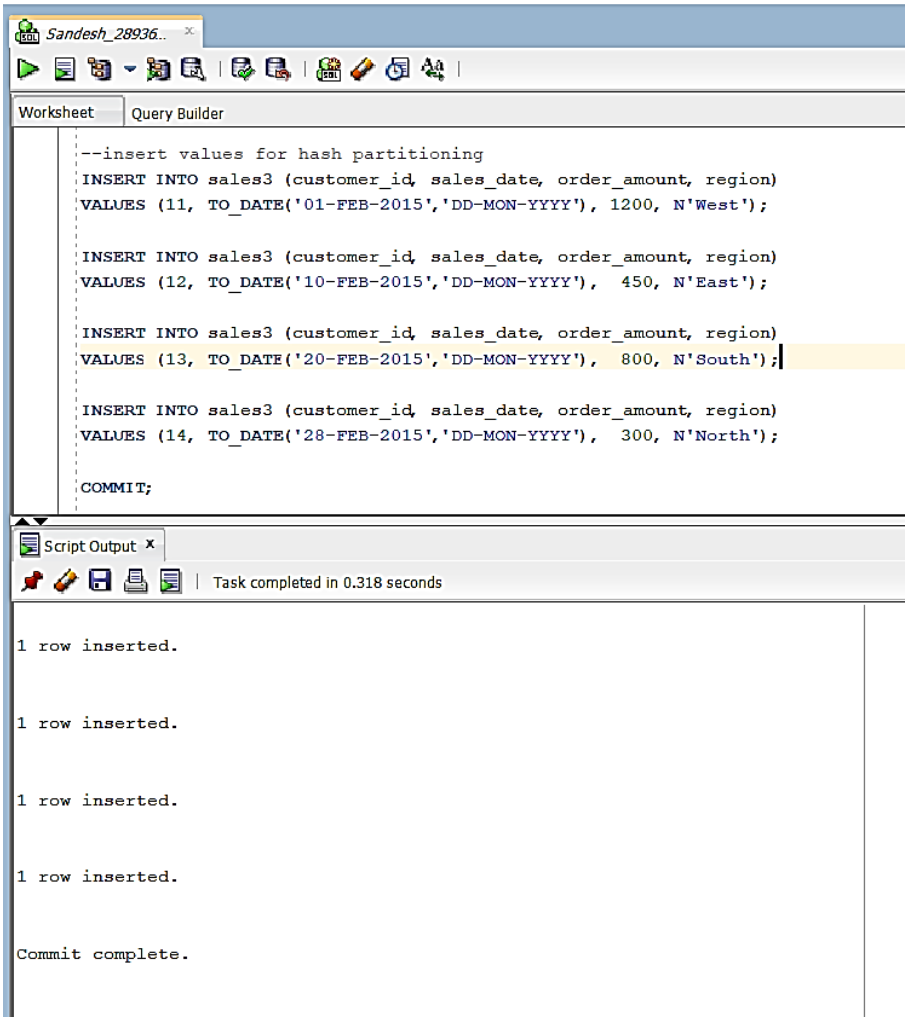
3. Hash Partitioning

-- Create table with HASH partitioning and named partitions so PARTITION(...) selects work

```
CREATE TABLE sales3
(
  customer_id  NUMBER,
  sales_date   DATE,
  order_amount NUMBER,
  region       NVARCHAR2(10)
)
PARTITION BY HASH (customer_id)
(
  PARTITION p1,
  PARTITION p2,
  PARTITION p3,
  PARTITION p4
);
```

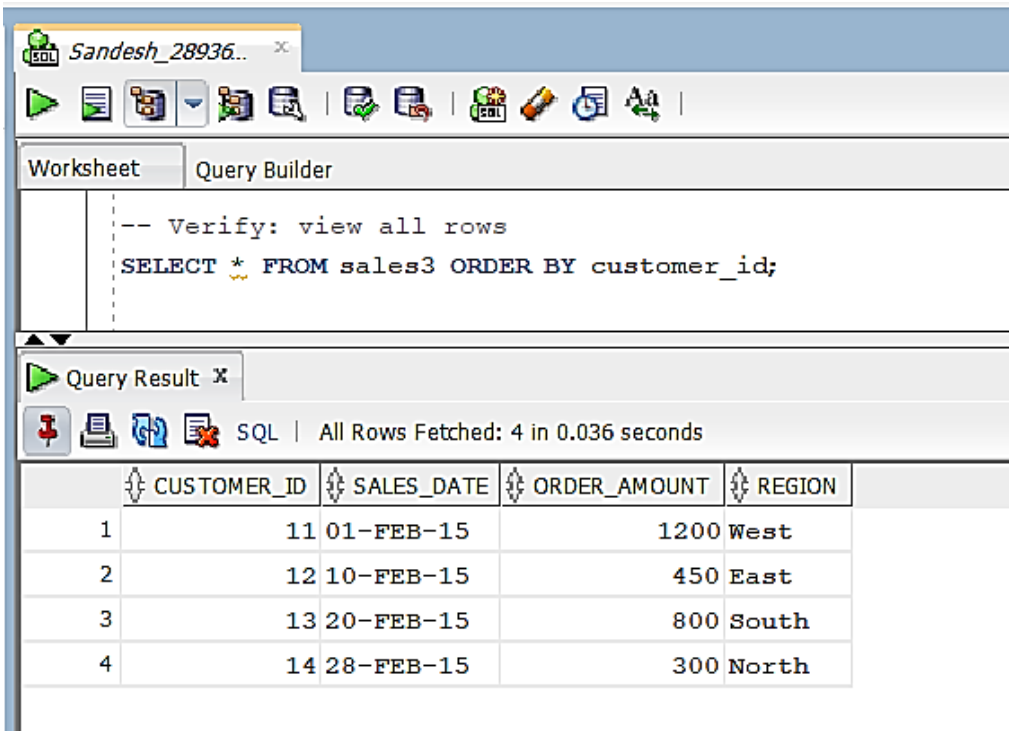


```
--insert values for hash partitioning
INSERT INTO sales3 (customer_id, sales_date, order_amount, region)
VALUES (11, TO_DATE('01-FEB-2015','DD-MON-YYYY'), 1200, N'West');

INSERT INTO sales3 (customer_id, sales_date, order_amount, region)
VALUES (12, TO_DATE('10-FEB-2015','DD-MON-YYYY'),  450, N'East');

INSERT INTO sales3 (customer_id, sales_date, order_amount, region)
VALUES (13, TO_DATE('20-FEB-2015','DD-MON-YYYY'),  800, N'South');

INSERT INTO sales3 (customer_id, sales_date, order_amount, region)
VALUES (14, TO_DATE('28-FEB-2015','DD-MON-YYYY'),  300, N'North');

COMMIT;
```



-- Verify: view all rows

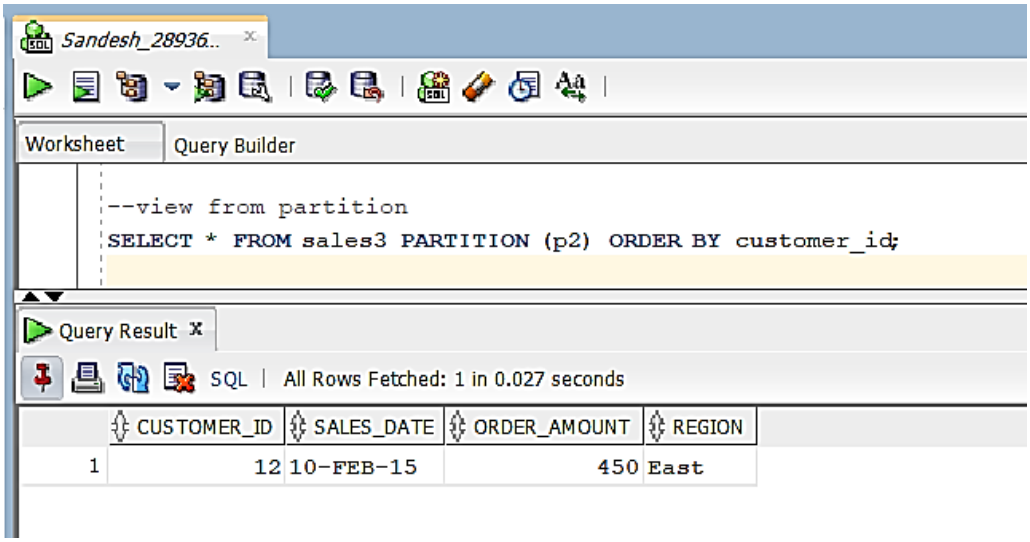
SELECT * FROM sales3 ORDER BY customer_id;




| | CUSTOMER_ID | SALES_DATE | ORDER_AMOUNT | REGION |
|---|---|---|---|---|
| 1 | 11 | 01-FEB-15 | 1200 | West |
| 2 | 12 | 10-FEB-15 | 450 | East |
| 3 | 13 | 20-FEB-15 | 800 | South |
| 4 | 14 | 28-FEB-15 | 300 | North |

--view from partition

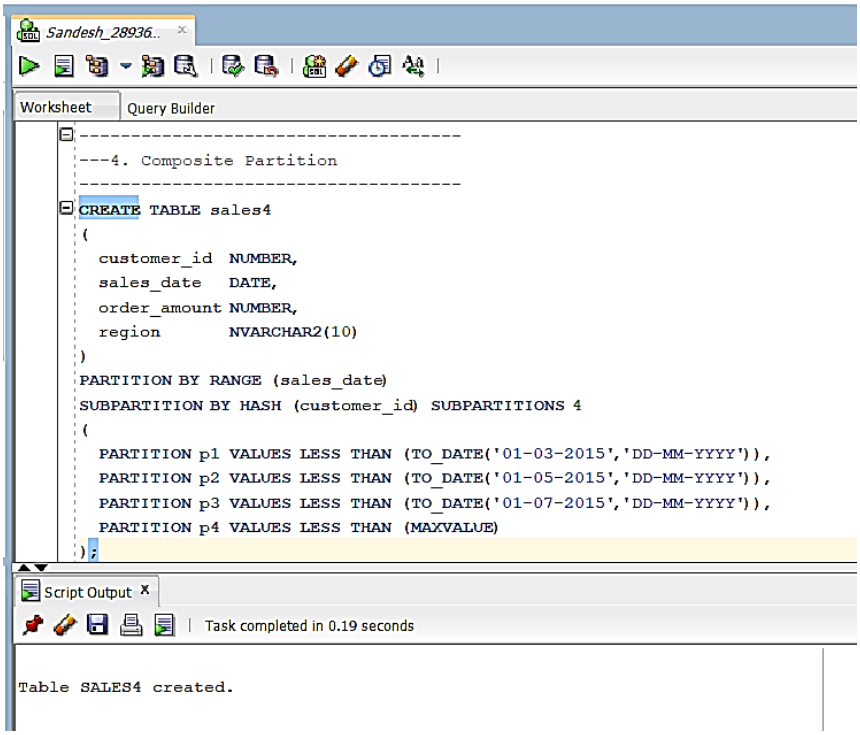
SELECT * FROM sales3 PARTITION (p2) ORDER BY customer_id;




| | CUSTOMER_ID | SALES_DATE | ORDER_AMOUNT | REGION |
|---|---|---|---|---|
| 1 | 12 | 10-FEB-15 | 450 | East |

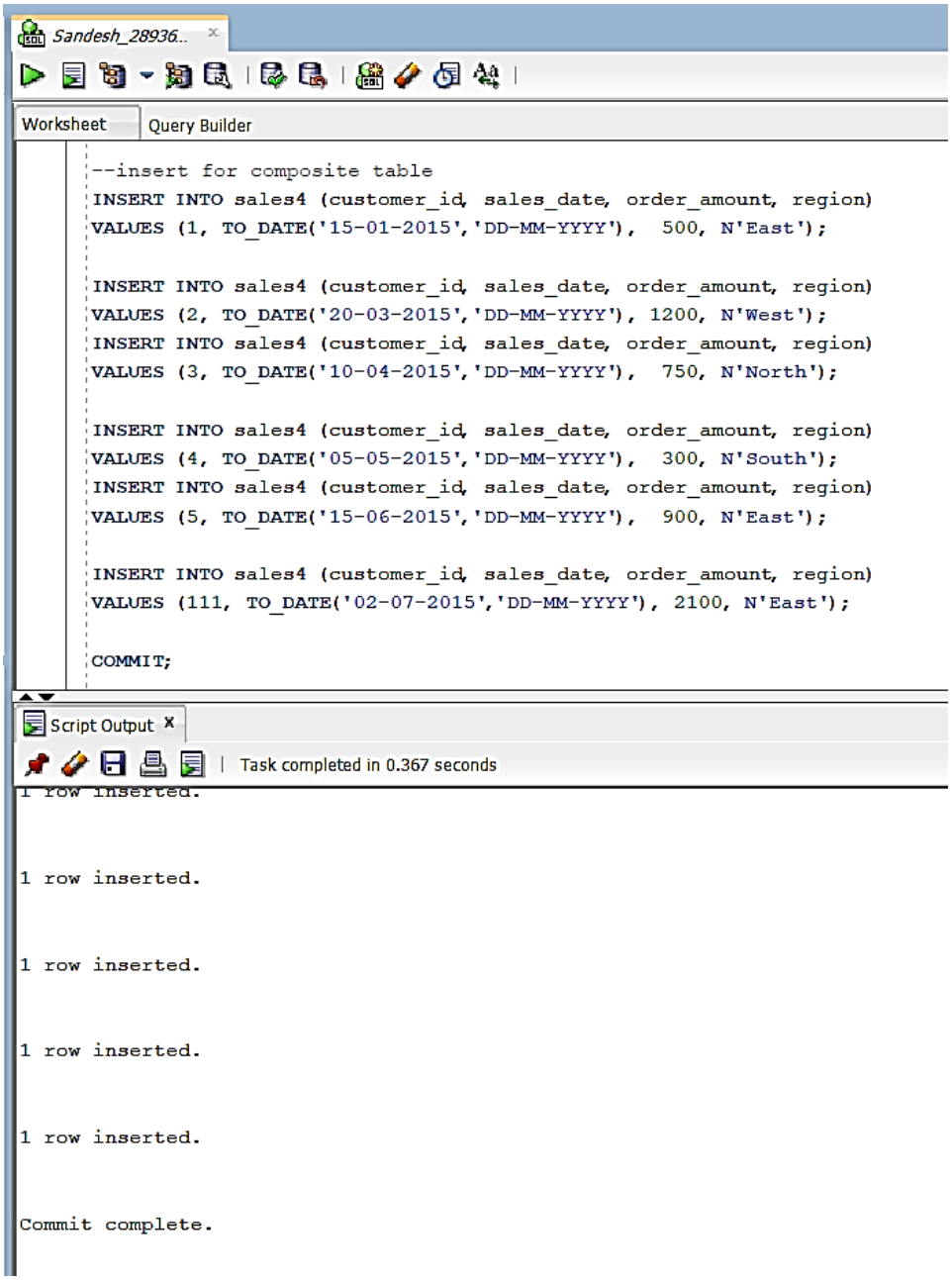
4. Composite Partitioning

```
CREATE TABLE sales4
(
  customer_id  NUMBER,
  sales_date   DATE,
  order_amount NUMBER,
  region       NVARCHAR2(10)
)
PARTITION BY RANGE (sales_date)
SUBPARTITION BY HASH (customer_id) SUBPARTITIONS 4
(
  PARTITION p1 VALUES LESS THAN (TO_DATE('01-03-2015','DD-MM-YYYY')),
  PARTITION p2 VALUES LESS THAN (TO_DATE('01-05-2015','DD-MM-YYYY')),
  PARTITION p3 VALUES LESS THAN (TO_DATE('01-07-2015','DD-MM-YYYY')),
  PARTITION p4 VALUES LESS THAN (MAXVALUE)
);
```



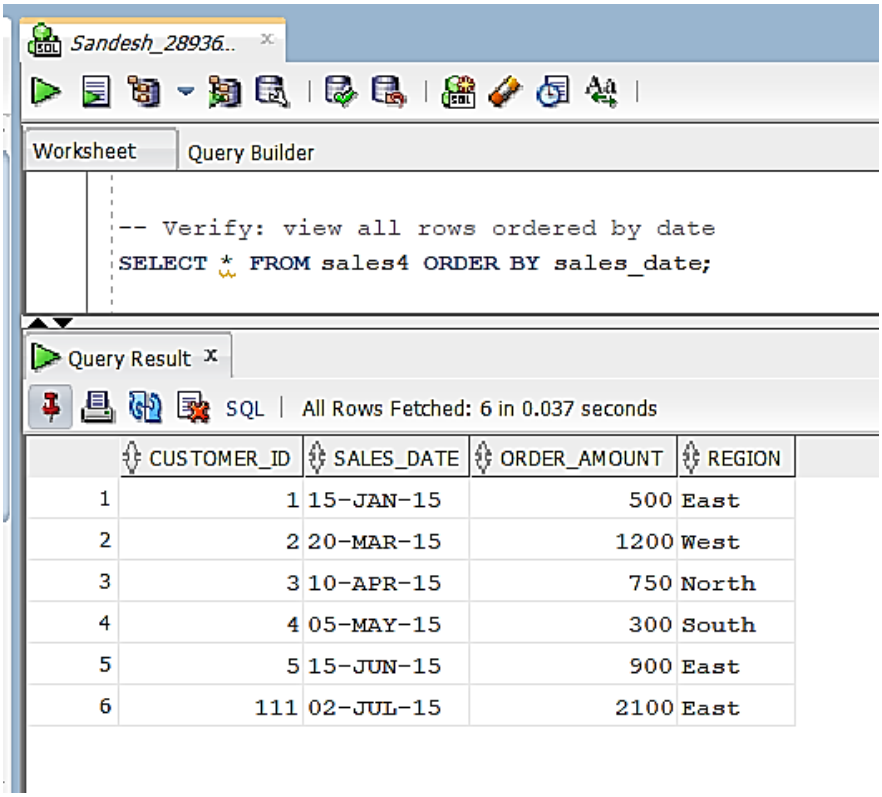

-- Inserts to composite table

```
-- p1 (date < 01-03-2015) -> 1 row
INSERT INTO sales4 (customer_id, sales_date, order_amount, region)
VALUES (1, TO_DATE('15-01-2015','DD-MM-YYYY'),  500, N'East');

-- p2 (>=01-03-2015 and <01-05-2015) -> 2 rows
INSERT INTO sales4 (customer_id, sales_date, order_amount, region)
VALUES (2, TO_DATE('20-03-2015','DD-MM-YYYY'), 1200, N'West');

INSERT INTO sales4 (customer_id, sales_date, order_amount, region)
VALUES (3, TO_DATE('10-04-2015','DD-MM-YYYY'),  750, N'North');

-- p3 (>=01-05-2015 and <01-07-2015) -> 2 rows
INSERT INTO sales4 (customer_id, sales_date, order_amount, region)
VALUES (4, TO_DATE('05-05-2015','DD-MM-YYYY'),  300, N'South');

INSERT INTO sales4 (customer_id, sales_date, order_amount, region)
VALUES (5, TO_DATE('15-06-2015','DD-MM-YYYY'),  900, N'East');

-- p4 (MAXVALUE) -> 1 row (example from your original)
INSERT INTO sales4 (customer_id, sales_date, order_amount, region)
VALUES (111, TO_DATE('02-07-2015','DD-MM-YYYY'), 2100, N'East');

COMMIT;
```


Sandesh_28936...
Worksheet
Query Builder
--insert for composite table
INSERT INTO sales4 (customer_id, sales_date, order_amount, region)
VALUES (1, TO_DATE('15-01-2015','DD-MM-YYYY'), 500, N'East');
INSERT INTO sales4 (customer_id, sales_date, order_amount, region)
VALUES (2, TO_DATE('20-03-2015','DD-MM-YYYY'), 1200, N'West');
INSERT INTO sales4 (customer_id, sales_date, order_amount, region)
VALUES (3, TO_DATE('10-04-2015','DD-MM-YYYY'), 750, N'North');
INSERT INTO sales4 (customer_id, sales_date, order_amount, region)
VALUES (4, TO_DATE('05-05-2015','DD-MM-YYYY'), 300, N'South');
INSERT INTO sales4 (customer_id, sales_date, order_amount, region)
VALUES (5, TO_DATE('15-06-2015','DD-MM-YYYY'), 900, N'East');
INSERT INTO sales4 (customer_id, sales_date, order_amount, region)
VALUES (111, TO_DATE('02-07-2015','DD-MM-YYYY'), 2100, N'East');
COMMIT;
Script Output
Task completed in 0.367 seconds
1 row inserted.
1 row inserted.
1 row inserted.
1 row inserted.
1 row inserted.
Commit complete.

-- Verify: view all rows ordered by date

SELECT * FROM sales4 ORDER BY sales_date;




| | CUSTOMER_ID | SALES_DATE | ORDER_AMOUNT | REGION |
|---|---|---|---|---|
| 1 | 1 | 15-JAN-15 | 500 | East |
| 2 | 2 | 20-MAR-15 | 1200 | West |
| 3 | 3 | 10-APR-15 | 750 | North |
| 4 | 4 | 05-MAY-15 | 300 | South |
| 5 | 5 | 15-JUN-15 | 900 | East |
| 6 | 111 | 02-JUL-15 | 2100 | East |

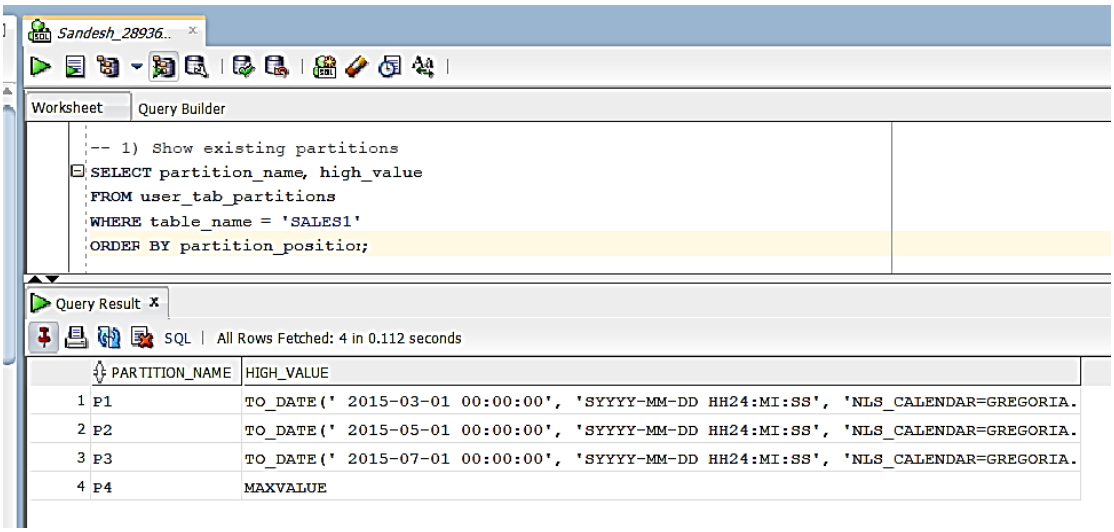
-- 1) Show existing partitions (Oracle dictionary)

SELECT partition_name, high_value

FROM user_tab_partitions

WHERE table_name = 'SALES1'

ORDER BY partition_position;




| | PARTITION_NAME | HIGH_VALUE |
|---|---|---|
| 1 | P1 | TO_DATE(' 2015-03-01 00:00:00', 'SYYYY-MM-DD HH24:MI:SS', 'NLS_CALENDAR=GREGORIA. |
| 2 | P2 | TO_DATE(' 2015-05-01 00:00:00', 'SYYYY-MM-DD HH24:MI:SS', 'NLS_CALENDAR=GREGORIA. |
| 3 | P3 | TO_DATE(' 2015-07-01 00:00:00', 'SYYYY-MM-DD HH24:MI:SS', 'NLS_CALENDAR=GREGORIA. |
| 4 | P4 | MAXVALUE |

-- 2) Drop partition p2

ALTER TABLE sales1

DROP PARTITION p2;