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practical 2 Advanced databases

IDE= Visual Studio

Question 1

a) Name, department, salary, rank, row number, and dense rank are displayed in descending order of salary:

```sql
SELECT
    name,
    department_id,
    salary,
    RANK() OVER (ORDER BY salary DESC) AS rank,
    DENSE_RANK() OVER (ORDER BY salary DESC) AS dense_rank,
    ROW_NUMBER() OVER (ORDER BY salary DESC) AS row_num
FROM
    employees;
```

b) Each department's top three earners:

```sql
SELECT
    name,
    department_id,
    salary
FROM (
    SELECT
        name,
        department_id,
        salary,
        ROW_NUMBER() OVER (PARTITION BY department_id ORDER BY salary DESC) AS row_num
    FROM
        employees
) AS ranked
WHERE
    row_num <= 3;
```

Question 2

a) Use a subquery to find the second-highest salary:

```sql
SELECT MAX(salary) AS second_highest_salary
FROM employees
WHERE salary < (
    SELECT MAX(salary)
    FROM employees
);
```

b) Rewrite with OFFSET and LIMIT:

```sql
SELECT salary
FROM employees
ORDER BY salary DESC
LIMIT 1 OFFSET 1;
```

Question 3

Common Table Expressions (CTEs)

```sql
WITH department_salary AS (
    SELECT
        department_id,
        SUM(salary) AS total_department_salary
    FROM
        employees
    GROUP BY
        department_id
)
SELECT
    e.name,
    e.department_id,
    e.salary AS individual_salary,
    d.total_department_salary
FROM
    employees e
JOIN
    department_salary d
ON
    e.department_id = d.department_id;
```

Question 4

Eliminate redundant employee records, retaining only the one with the lowest ID:

```sql
DELETE FROM employees
WHERE id NOT IN (
    SELECT MIN(id)
    FROM employees
    GROUP BY name, department_id, salary
);
```

Question 5

Create the top-level managers' reporting hierarchy:

```sql
WITH RECURSIVE hierarchy AS (
    SELECT
        id,
        name,
        manager_id
    FROM
        employees
    WHERE
        manager_id IS NULL

    UNION ALL

    SELECT
        e.id,
        e.name,
        e.manager_id
    FROM
        employees e
    INNER JOIN
        hierarchy h
    ON
        e.manager_id = h.id
)
SELECT
    id,
    name,
    manager_id
FROM
    hierarchy;
```