```sql
-- Exercise 5.4: Retrieve a list of all employees that earn above 120,000
-- and are in the Finance or HR departments

-- Retrieve a list of all employees that earn above 120,000
SELECT emp_no, salary FROM salaries
WHERE salary > 120000;

-- Solution
SELECT emp_no, salary FROM salaries
WHERE salary > 120000
AND emp_no IN (SELECT emp_no FROM departments
               WHERE dept_no = 'd002' OR dept_no = 'd003');

-- Alternative Solution
SELECT emp_no, salary FROM salaries
WHERE salary > 120000
AND emp_no IN (SELECT emp_no FROM dept_emp
               WHERE dept_no IN ('d002','d003'));
```

```sql
-- Exercise 6.2: Find the difference between an employee's average salary
-- and the average salary of all employees
SELECT e.emp_no, e.first_name, e.last_name, a.emp_avg_salary,
(SELECT ROUND(AVG(salary), 2) FROM salaries) avg_salary,
a.emp_avg_salary - (SELECT ROUND(AVG(salary), 2) FROM salaries) AS avg_salary_diff
FROM employees e
JOIN (SELECT emp_no, ROUND(AVG(salary), 2) AS emp_avg_salary
FROM salaries
GROUP BY emp_no
ORDER BY emp_no) a
ON e.emp_no = a.emp_no
ORDER BY e.emp_no;
```

```sql
-- Exercise 6.3: Find the difference between the maximum salary of employees
-- in the Finance or HR department and the maximum salary of all employees

SELECT e.emp_no, e.first_name, e.last_name, a.emp_max_salary,
(SELECT MAX(salary) max_salary FROM salaries),
(SELECT MAX(salary) max_salary FROM salaries) - a.emp_max_salary salary_diff
FROM employees e
JOIN (SELECT s.emp_no, MAX(salary) AS emp_max_salary
                  FROM salaries s
                  GROUP BY s.emp_no
                  ORDER BY s.emp_no) a
ON e.emp_no = a.emp_no
WHERE e.emp_no IN (SELECT emp_no FROM dept_emp WHERE dept_no IN ('d002', 'd003'))
ORDER BY emp_no;
```

```sql
-- Exercise 7.3: Retrieve a list of customers id, name that have
-- bought the most from the store

-- Returns a list of customer counts
SELECT customer_id, COUNT(*) AS cust_count
FROM sales
GROUP BY customer_id
ORDER BY cust_count DESC;

-- Solution
SELECT c.customer_id, c.customer_name, a.cust_count
FROM customers c,
    (SELECT customer_id, COUNT(*) AS cust_count
    FROM sales
    GROUP BY customer_id
    ORDER BY cust_count DESC) AS a
WHERE c.customer_id = a.customer_id
ORDER BY a.cust_count DESC;
```

```sql
-- Exercise 7.4: Retrieve a list of the customer name and segment
-- of those customers that bought the most from the store and
-- had the highest total sales

-- Returns a list of customer counts and total sales
SELECT customer_id, COUNT(*) AS cust_count, SUM(sales) total_sales
FROM sales
GROUP BY customer_id
ORDER BY total_sales DESC, cust_count DESC;

-- Solution
SELECT c.customer_id, c.customer_name, c.segment, a.cust_count, a.total_sales
FROM customers c,
    (SELECT customer_id, COUNT(*) AS cust_count, SUM(sales) total_sales
    FROM sales
    GROUP BY customer_id
    ORDER BY total_sales DESC, cust_count DESC) AS a
WHERE c.customer_id = a.customer_id
ORDER BY a.total_sales DESC, a.cust_count DESC;
```

```sql
-- Exercise 7.2: Find the average salary excluding the highest and
-- the lowest salaries

-- Returns the average salary of all employees
SELECT ROUND(AVG(salary), 2) avg_salary
FROM salaries

-- Solution
SELECT ROUND(AVG(salary), 2) avg_salary
FROM salaries
WHERE salary NOT IN (
    (SELECT MIN(salary) FROM salaries),
    (SELECT MAX(salary) FROM salaries)
);
```

```sql
-- 8.4 (Ex.): Retrieve the average salary for the different departments where the
-- average_salary is more than 60000
SELECT d.dept_name, ROUND(AVG(s.salary), 2) AS avg_salary
FROM departments d
JOIN dept_emp de
ON d.dept_no = de.dept_no
JOIN salaries s
ON de.emp_no = s.emp_no
GROUP BY d.dept_name
HAVING AVG(salary) > 60000
ORDER BY avg_salary DESC;
```

```sql
-- 8.4 (Ex.): Retrieve the average salary for the different departments where the
-- average_salary is more than 60000
SELECT d.dept_name, ROUND(AVG(s.salary), 2) AS avg_salary
FROM departments d
JOIN dept_emp de
ON d.dept_no = de.dept_no
JOIN salaries s
ON de.emp_no = s.emp_no
GROUP BY d.dept_name
HAVING AVG(salary) > 60000
ORDER BY avg_salary DESC;
```

Data Output | Explain | Messages | Notifications

	dept_name character varying (40)	avg_salary numeric
1	Sales	80864.73
2	Marketing	72451.85
3	Finance	70621.00
4	Research	60312.63

```sql
-- 3.1: Retrieve a list of all customers living in the southern region
SELECT a.customer_id, a.customer_name, a.customer_age, a.region, b.category
FROM (SELECT customer_id, customer_name, age customer_age, region
      FROM customers WHERE region = 'South') a,
      (SELECT customer_id, category FROM sales) b;

-- 3.2: Retrieve a list of managers and their department names
```

Output | Explain | Messages | Notifications

customer_id character (8)	customer_name character varying (255)	customer_age integer	region character varying (255)	category character varying (255)
CG-12520	Claire Gute	67	South	Furniture
SO-20335	Sean O'Donnell	65	South	Furniture
AA-10480	Andrew Allen	50	South	Furniture
ES-14080	Erin Smith	20	South	Furniture
KD-16270	Karen Daniels	59	South	Furniture
JE-15745	Joel Eaton	25	South	Furniture
SC-20770	Stewart Carmichael	18	South	Furniture

```sql
-- Exercise 5.1: Return a list of all employees who are in Customer Service department

-- Returns data from the dept_emp and departments tables
SELECT * FROM dept_emp;
SELECT * FROM departments;

-- Solution
SELECT *
FROM dept_emp
WHERE dept_no IN (SELECT dept_no FROM departments
                  WHERE dept_name = 'Customer Service');

-- Exercise 5.2: Include the employee number, first and last names
SELECT a.emp_no, b.dept_no, a.first_name, a.last_name
FROM employees a
JOIN
(SELECT * FROM dept_emp
WHERE dept_no IN (SELECT dept_no FROM departments
                  WHERE dept_name = 'Customer Service')) b
ON a.emp_no = b.emp_no
```

```sql
-- Exercise 5.1: Return a list of all employees who are in Customer Service department

-- Returns data from the dept_emp and departments tables
SELECT * FROM dept_emp;
SELECT * FROM departments;

-- Solution
SELECT *
FROM dept_emp
WHERE dept_no IN (SELECT dept_no FROM departments
                  WHERE dept_name = 'Customer Service');
```

```sql
-- Exercise 5.3: Retrieve a list of all managers who became managers after
-- the 1st of January, 1985 and are in the Finance or HR department

-- Returns data from the departments and dept_manager tables
SELECT * FROM departments;
SELECT * FROM dept_manager
WHERE from_date > '1985-01-01';

-- Solution
SELECT * FROM dept_manager
WHERE from_date > '1985-01-01'
AND dept_no IN (SELECT dept_no FROM departments
                WHERE dept_name = 'Finance' OR dept_name = 'Human Resources');
```