```
mysql> CREATE DATABASE labassignment2;
Query OK, 1 row affected (0.00 sec)

mysql> USE labassignment2;
Database changed
mysql> CREATE TABLE employees (
    ->     employee_id CHAR(10),
    ->     first_name VARCHAR(20),
    ->     last_name VARCHAR(20),
    ->     email VARCHAR(60),
    ->     phone_number CHAR(14),
    ->     hire_date DATE,
    ->     job_id CHAR(10),
    ->     salary INT,
    ->     commission_pct DECIMAL(5,3),
    ->     manager_id CHAR(10),
    ->     department_id CHAR(10)
    -> );
Query OK, 0 rows affected (0.02 sec)

mysql>
mysql> INSERT INTO employees VALUES
    ->   ('EMP001', 'John', 'Doe', 'john.doe@example.com', '555-555-1001', '2023-01-15', 'JOB001', 60000, 0.05, 'MNG001', 'DPT001'),
    ->   ('EMP002', 'Jane', 'Smith', 'jane.smith@example.com', '555-555-2002', '2023-02-20', 'JOB002', 75000, 0.03, 'MNG001', 'DPT002'),
    ->   ('EMP003', 'Michael', 'Johnson', 'michael.j@example.com', '555-555-3003', '2023-03-25', 'JOB003', 55000, 0.02, 'MNG002', 'DPT001'),
    ->   ('EMP004', 'Emily', 'Brown', 'emily.b@example.com', '555-555-4004', '2023-04-10', 'JOB002', 70000, 0.03, 'MNG002', 'DPT003'),
    ->   ('EMP005', 'David', 'Wilson', 'david.w@example.com', '555-555-5005', '2023-05-05', 'JOB001', 62000, 0.04, 'MNG003', 'DPT002'),
    ->   ('EMP006', 'Sara', 'Garcia', 'sara.g@example.com', '555-555-6006', '2023-06-12', 'JOB004', 58000, 0.01, 'MNG003', 'DPT004'),
    ->   ('EMP007', 'Robert', 'Martinez', 'robert.m@example.com', '555-555-7007', '2023-07-18', 'JOB005', 68000, 0.02, 'MNG001', 'DPT005'),
    ->   ('EMP008', 'Amanda', 'Miller', 'amanda.m@example.com', '555-555-8008', '2023-08-21', 'JOB003', 72000, 0.03, 'MNG001', 'DPT006'),
    ->   ('EMP009', 'William', 'Taylor', 'william.t@example.com', '555-555-9009', '2023-09-30', 'JOB002', 64000, 0.03, 'MNG002', 'DPT004'),
    ->   ('EMP010', 'Olivia', 'Anderson', 'olivia.a@example.com', '555-555-1010', '2023-10-03', 'JOB001', 67000, 0.04, 'MNG002', 'DPT005'),
    ->   ('EMP011', 'Mark', 'Johnson', 'mark.j@example.com', '555-555-1101', '2023-11-10', 'JOB005', 65000, 0.025, 'MNG004', 'DPT005'),
    ->   ('EMP012', 'Laura', 'Smith', 'laura.s@example.com', '555-555-1202', '2023-12-05', 'JOB006', 62000, 0.030, 'MNG004', 'DPT005'),
    ->   ('EMP013', 'Daniel', 'Brown', 'daniel.b@example.com', '555-555-1303', '2023-11-15', 'JOB005', 64000, 0.020, 'MNG005', 'DPT005'),
    ->   ('EMP014', 'Sophia', 'Lee', 'sophia.l@example.com', '555-555-1404', '2023-12-20', 'JOB006', 67000, 0.015, 'MNG005', 'DPT005'),
    ->   ('EMP015', 'Eric', 'Miller', 'eric.m@example.com', '555-555-1505', '2023-11-25', 'JOB005', 66000, 0.025, 'MNG006', 'DPT005'),
    ->   ('EMP016', 'Lily', 'Garcia', 'lily.g@example.com', '555-555-1606', '2023-12-30', 'JOB006', 70000, 0.035, 'MNG006', 'DPT005'),
    ->   ('EMP017', 'Henry', 'Davis', 'henry.d@example.com', '555-555-1707', '2023-11-02', 'JOB005', 67000, 0.020, 'MNG007', 'DPT005'),
    ->   ('EMP018', 'Grace', 'Martinez', 'grace.m@example.com', '555-555-1808', '2023-12-07', 'JOB006', 63000, 0.010, 'MNG007', 'DPT005'),
    ->   ('EMP019', 'Andrew', 'Anderson', 'andrew.a@example.com', '555-555-1909', '2023-11-12', 'JOB005', 64000, 0.015, 'MNG008', 'DPT005'),
    ->   ('EMP020', 'Emma', 'Taylor', 'emma.t@example.com', '555-555-2020', '2023-12-15', 'JOB006', 68000, 0.025, 'MNG008', 'DPT005'),
    ->   ('EMP021', 'Nathan', 'White', 'nathan.w@example.com', '555-555-2121', '2023-11-05', 'JOB007', 70000, 0.040, 'MNG009', 'DPT007'),
    ->   ('EMP022', 'Olivia', 'Harris', 'olivia.h@example.com', '555-555-2222', '2023-12-10', 'JOB007', 72000, 0.035, 'MNG009', 'DPT007'),
    ->   ('EMP023', 'Matthew', 'Moore', 'matthew.m@example.com', '555-555-2323', '2023-11-08', 'JOB007', 71000, 0.030, 'MNG010', 'DPT007'),
    ->   ('EMP024', 'Ava', 'Clark', 'ava.c@example.com', '555-555-2424', '2023-12-12', 'JOB007', 73000, 0.025, 'MNG010', 'DPT007'),
    ->   ('EMP025', 'Sarah', 'Johnson', 'sarah.j@example.com', '555-555-2525', '2023-12-31', 'JOB007', 72000, 0.001, 'MNG010', 'DPT007');
Query OK, 25 rows affected (0.01 sec)
Records: 25  Duplicates: 0  Warnings: 0
```

```
mysql> describe employees;
+---------------+-------------+------+-----+---------+-------+
| Field         | Type        | Null | Key | Default | Extra |
+---------------+-------------+------+-----+---------+-------+
| employee_id   | char(10)    | YES  |     | NULL    |       |
| first_name    | varchar(20) | YES  |     | NULL    |       |
| last_name     | varchar(20) | YES  |     | NULL    |       |
| email         | varchar(60) | YES  |     | NULL    |       |
| phone_number  | char(14)    | YES  |     | NULL    |       |
| hire_date     | date        | YES  |     | NULL    |       |
| job_id        | char(10)    | YES  |     | NULL    |       |
| salary        | int         | YES  |     | NULL    |       |
| commission_pct | decimal(5,3) | YES  |     | NULL    |       |
| manager_id    | char(10)    | YES  |     | NULL    |       |
| department_id | char(10)    | YES  |     | NULL    |       |
+---------------+-------------+------+-----+---------+-------+
11 rows in set (0.00 sec)

mysql> SELECT * FROM employees;
+-------------+------------+-----------+-----------------------+--------------+------------+--------+--------+----------------+------------+---------------+
| employee_id | first_name | last_name | email                 | phone_number | hire_date  | job_id | salary | commission_pct | manager_id | department_id |
+-------------+------------+-----------+-----------------------+--------------+------------+--------+--------+----------------+------------+---------------+
| EMP001      | John       | Doe       | john.doe@example.com  | 555-555-1001 | 2023-01-15 | JOB001 |  60000 |          0.050 | MNG001     | DPT001        |
| EMP002      | Jane       | Smith     | jane.smith@example.com | 555-555-2002 | 2023-02-20 | JOB002 |  75000 |          0.030 | MNG001     | DPT002        |
| EMP003      | Michael    | Johnson   | michael.j@example.com | 555-555-3003 | 2023-03-25 | JOB003 |  55000 |          0.020 | MNG002     | DPT001        |
| EMP004      | Emily      | Brown     | emily.b@example.com   | 555-555-4004 | 2023-04-10 | JOB002 |  70000 |          0.030 | MNG002     | DPT003        |
| EMP005      | David      | Wilson    | david.w@example.com   | 555-555-5005 | 2023-05-05 | JOB001 |  62000 |          0.040 | MNG003     | DPT002        |
| EMP006      | Sara       | Garcia    | sara.g@example.com    | 555-555-6006 | 2023-06-12 | JOB004 |  58000 |          0.010 | MNG003     | DPT004        |
| EMP007      | Robert     | Martinez  | robert.m@example.com  | 555-555-7007 | 2023-07-18 | JOB005 |  68000 |          0.020 | MNG001     | DPT005        |
| EMP008      | Amanda     | Miller    | amanda.m@example.com  | 555-555-8008 | 2023-08-21 | JOB003 |  72000 |          0.030 | MNG001     | DPT006        |
| EMP009      | William    | Taylor    | william.t@example.com | 555-555-9009 | 2023-09-30 | JOB002 |  64000 |          0.030 | MNG002     | DPT004        |
| EMP010      | Olivia     | Anderson  | olivia.a@example.com  | 555-555-1010 | 2023-10-03 | JOB001 |  67000 |          0.040 | MNG002     | DPT005        |
| EMP011      | Mark       | Johnson   | mark.j@example.com    | 555-555-1101 | 2023-11-10 | JOB005 |  65000 |          0.025 | MNG004     | DPT005        |
| EMP012      | Laura      | Smith     | laura.s@example.com   | 555-555-1202 | 2023-12-05 | JOB006 |  62000 |          0.030 | MNG004     | DPT005        |
| EMP013      | Daniel     | Brown     | daniel.b@example.com  | 555-555-1303 | 2023-11-15 | JOB005 |  64000 |          0.020 | MNG005     | DPT005        |
| EMP014      | Sophia     | Lee       | sophia.l@example.com  | 555-555-1404 | 2023-12-20 | JOB006 |  67000 |          0.015 | MNG005     | DPT005        |
| EMP015      | Eric       | Miller    | eric.m@example.com    | 555-555-1505 | 2023-11-25 | JOB005 |  66000 |          0.025 | MNG006     | DPT005        |
| EMP016      | Lily       | Garcia    | lily.g@example.com    | 555-555-1606 | 2023-12-30 | JOB006 |  70000 |          0.035 | MNG006     | DPT005        |
| EMP017      | Henry      | Davis     | henry.d@example.com   | 555-555-1707 | 2023-11-02 | JOB005 |  67000 |          0.020 | MNG007     | DPT005        |
| EMP018      | Grace      | Martinez  | grace.m@example.com   | 555-555-1808 | 2023-12-07 | JOB006 |  63000 |          0.010 | MNG007     | DPT005        |
| EMP019      | Andrew     | Anderson  | andrew.a@example.com  | 555-555-1909 | 2023-11-12 | JOB005 |  64000 |          0.015 | MNG008     | DPT005        |
| EMP020      | Emma       | Taylor    | emma.t@example.com    | 555-555-2020 | 2023-12-15 | JOB006 |  68000 |          0.025 | MNG008     | DPT005        |
| EMP021      | Nathan     | White     | nathan.w@example.com  | 555-555-2121 | 2023-11-05 | JOB007 |  70000 |          0.040 | MNG009     | DPT007        |
| EMP022      | Olivia     | Harris    | olivia.h@example.com  | 555-555-2222 | 2023-12-10 | JOB007 |  72000 |          0.035 | MNG009     | DPT007        |
| EMP023      | Matthew    | Moore     | matthew.m@example.com | 555-555-2323 | 2023-11-08 | JOB007 |  71000 |          0.030 | MNG010     | DPT007        |
| EMP024      | Ava        | Clark     | ava.c@example.com     | 555-555-2424 | 2023-12-12 | JOB007 |  73000 |          0.025 | MNG010     | DPT007        |
| EMP025      | Sarah      | Johnson   | sarah.j@example.com   | 555-555-2525 | 2023-12-31 | JOB007 |  72000 |          0.001 | MNG010     | DPT007        |
+-------------+------------+-----------+-----------------------+--------------+------------+--------+--------+----------------+------------+---------------+
25 rows in set (0.00 sec)
```

Q1. Find the **first_name, last_name, email, phone_number, hire_date** and **department_id** of all the employees with the latest **hire_date**.

COMMAND:

```
SELECT first_name, last_name, email, phone_number, hire_date, department_id
FROM employees
ORDER BY hire_date ASC;
```

```
mysql> SELECT first_name, last_name, email, phone_number, hire_date, department_id
    -> FROM employees
    -> ORDER BY hire_date ASC;
+------------+-----------+-----------------------+--------------+------------+---------------+
| first_name | last_name | email                 | phone_number | hire_date  | department_id |
+------------+-----------+-----------------------+--------------+------------+---------------+
| John       | Doe       | john.doe@example.com  | 555-555-1001 | 2023-01-15 | DPT001        |
| Jane       | Smith     | jane.smith@example.com | 555-555-2002 | 2023-02-20 | DPT002        |
| Michael    | Johnson   | michael.j@example.com | 555-555-3003 | 2023-03-25 | DPT001        |
| Emily      | Brown     | emily.b@example.com   | 555-555-4004 | 2023-04-10 | DPT003        |
| David      | Wilson    | david.w@example.com   | 555-555-5005 | 2023-05-05 | DPT002        |
| Sara       | Garcia    | sara.g@example.com    | 555-555-6006 | 2023-06-12 | DPT004        |
| Robert     | Martinez  | robert.m@example.com  | 555-555-7007 | 2023-07-18 | DPT005        |
| Amanda     | Miller    | amanda.m@example.com  | 555-555-8008 | 2023-08-21 | DPT006        |
| William    | Taylor    | william.t@example.com | 555-555-9009 | 2023-09-30 | DPT004        |
| Olivia     | Anderson  | olivia.a@example.com  | 555-555-1010 | 2023-10-03 | DPT005        |
| Henry      | Davis     | henry.d@example.com   | 555-555-1707 | 2023-11-02 | DPT005        |
| Nathan     | White     | nathan.w@example.com  | 555-555-2121 | 2023-11-05 | DPT007        |
| Matthew    | Moore     | matthew.m@example.com | 555-555-2323 | 2023-11-08 | DPT007        |
| Mark       | Johnson   | mark.j@example.com    | 555-555-1101 | 2023-11-10 | DPT005        |
| Andrew     | Anderson  | andrew.a@example.com  | 555-555-1909 | 2023-11-12 | DPT005        |
| Daniel     | Brown     | daniel.b@example.com  | 555-555-1303 | 2023-11-15 | DPT005        |
| Eric       | Miller    | eric.m@example.com    | 555-555-1505 | 2023-11-25 | DPT005        |
| Laura      | Smith     | laura.s@example.com   | 555-555-1202 | 2023-12-05 | DPT005        |
| Grace      | Martinez  | grace.m@example.com   | 555-555-1808 | 2023-12-07 | DPT005        |
| Olivia     | Harris    | olivia.h@example.com  | 555-555-2222 | 2023-12-10 | DPT007        |
| Ava        | Clark     | ava.c@example.com     | 555-555-2424 | 2023-12-12 | DPT007        |
| Emma       | Taylor    | emma.t@example.com    | 555-555-2020 | 2023-12-15 | DPT005        |
| Sophia     | Lee       | sophia.l@example.com  | 555-555-1404 | 2023-12-20 | DPT005        |
| Lily       | Garcia    | lily.g@example.com    | 555-555-1606 | 2023-12-30 | DPT005        |
| Sarah      | Johnson   | sarah.j@example.com   | 555-555-2525 | 2023-12-31 | DPT007        |
+------------+-----------+-----------------------+--------------+------------+---------------+
25 rows in set (0.00 sec)
```

Q2. Find the ***first_name, last_name, employee_id, phone_number, salary*** and ***department_id*** of all the employees with the lowest **salary** in each department.

COMMAND:

```
SELECT e1.first_name, e1.last_name, e1.employee_id, e1.phone_number, e1.salary,
e1.department_id
```

```
FROM employees e1
JOIN ( SELECT department_id, MIN(salary) AS min_salary
        FROM employees
        GROUP BY department_id) e2
ON e1.department_id = e2.department_id
AND e1.salary = e2.min_salary;
```

```
mysql> SELECT e1.first_name, e1.last_name, e1.employee_id, e1.phone_number, e1.salary, e1.department_id
    -> FROM employees e1
    -> JOIN ( SELECT department_id, MIN(salary) AS min_salary
    -> FROM employees
    -> GROUP BY department_id) e2
    -> ON e1.department_id = e2.department_id
    -> AND e1.salary = e2.min_salary;
+------------+-----------+-------------+--------------+--------+---------------+
| first_name | last_name | employee_id | phone_number | salary | department_id |
+------------+-----------+-------------+--------------+--------+---------------+
| Michael    | Johnson   | EMP003      | 555-555-3003 |  55000 | DPT001        |
| Emily      | Brown     | EMP004      | 555-555-4004 |  70000 | DPT003        |
| David      | Wilson    | EMP005      | 555-555-5005 |  62000 | DPT002        |
| Sara       | Garcia    | EMP006      | 555-555-6006 |  58000 | DPT004        |
| Amanda     | Miller    | EMP008      | 555-555-8008 |  72000 | DPT006        |
| Laura      | Smith     | EMP012      | 555-555-1202 |  62000 | DPT005        |
| Nathan     | White     | EMP021      | 555-555-2121 |  70000 | DPT007        |
+------------+-----------+-------------+--------------+--------+---------------+
7 rows in set (0.00 sec)
```

Q3. Find the ***first_name***, ***last_name***, ***employee_id***, ***commission_pct*** *and* ***department_id*** of all the employees in the department 'DPT007' who have a lower commission_pct than all of the employees of the department 'DPT005'.

COMMAND:

```
SELECT e1.first_name, e1.last_name, e1.employee_id, e1.commission_pct,
e1.department_id
FROM employees e1
WHERE e1.department_id = 'DPT007' AND e1.commission_pct < ALL (
   SELECT e2.commission_pct
   FROM employees e2
   WHERE e2.department_id = 'DPT005'
);
```

```
mysql> SELECT e1.first_name, e1.last_name, e1.employee_id, e1.commission_pct, e1.department_id
    -> FROM employees e1
    -> WHERE e1.department_id = 'DPT007' AND e1.commission_pct < ALL (
    ->     SELECT e2.commission_pct
    ->     FROM employees e2
    ->     WHERE e2.department_id = 'DPT005'
    -> );
+------------+-----------+-------------+----------------+---------------+
| first_name | last_name | employee_id | commission_pct | department_id |
+------------+-----------+-------------+----------------+---------------+
| Sarah      | Johnson   | EMP025      |          0.001 | DPT007        |
+------------+-----------+-------------+----------------+---------------+
1 row in set (0.00 sec)
```

Q4. Find the **department_id** and total number of employees of each department which does not have a single employee under it with a **salary** more than 30,000.

COMMAND:

```
SELECT department_id, COUNT(*) AS total_employees
FROM employees
GROUP BY department_id
HAVING MAX(salary) > 30000 AND COUNT(*) > 1;
```

```
mysql> SELECT department_id, COUNT(*) AS total_employees
    -> FROM employees
    -> GROUP BY department_id
    -> HAVING MAX(salary) > 30000 AND COUNT(*) > 1;
+---------------+-----------------+
| department_id | total_employees |
+---------------+-----------------+
| DPT001        |               2 |
| DPT002        |               2 |
| DPT004        |               2 |
| DPT005        |              12 |
| DPT007        |               5 |
+---------------+-----------------+
5 rows in set (0.00 sec)
```

Q5. For each of the departments, find the ***department_id***, ***job_id*** and ***commission_pct*** with ***commission_pct*** less than at least one other ***job_id*** in that department.

COMMAND:

```
SELECT e.department_id, e.job_id, e.commission_pct
FROM employees e
WHERE e.commission_pct < ANY (
   SELECT commission_pct
   FROM employees e2
   WHERE e2.department_id = e.department_id AND e2.job_id <> e.job_id
);
```

```
mysql> SELECT e.department_id, e.job_id, e.commission_pct
    -> FROM employees e
    -> WHERE e.commission_pct < ANY (
    ->     SELECT commission_pct
    ->     FROM employees e2
    ->     WHERE e2.department_id = e.department_id AND e2.job_id <> e.job_id
    -> );
+---------------+--------+----------------+
| department_id | job_id | commission_pct |
+---------------+--------+----------------+
| DPT002        | JOB002 |          0.030 |
| DPT001        | JOB003 |          0.020 |
| DPT004        | JOB004 |          0.010 |
| DPT005        | JOB005 |          0.020 |
| DPT005        | JOB005 |          0.025 |
| DPT005        | JOB006 |          0.030 |
| DPT005        | JOB005 |          0.020 |
| DPT005        | JOB006 |          0.015 |
| DPT005        | JOB005 |          0.025 |
| DPT005        | JOB006 |          0.035 |
| DPT005        | JOB005 |          0.020 |
| DPT005        | JOB006 |          0.010 |
| DPT005        | JOB005 |          0.015 |
| DPT005        | JOB006 |          0.025 |
+---------------+--------+----------------+
14 rows in set (0.00 sec)
```

Q6. Find the ***manager_id*** who does not have any employee under them with a ***salary*** less than 3500.

COMMAND:

```
SELECT DISTINCT manager_id
FROM employees
WHERE manager_id IS NOT NULL
AND manager_id NOT IN (
   SELECT DISTINCT manager_id
   FROM employees
```

```
   WHERE salary < 3500
);
```

```
mysql> SELECT DISTINCT manager_id
    -> FROM employees
    -> WHERE manager_id IS NOT NULL
    -> AND manager_id NOT IN (
    ->     SELECT DISTINCT manager_id
    ->     FROM employees
    ->     WHERE salary < 3500
    -> );
+------------+
| manager_id |
+------------+
| MNG001     |
| MNG002     |
| MNG003     |
| MNG004     |
| MNG005     |
| MNG006     |
| MNG007     |
| MNG008     |
| MNG009     |
| MNG010     |
+------------+
10 rows in set (0.00 sec)
```

Q7. Find the ***first_name***, ***last_name***, ***employee_id***, ***email, salary, department_id*** *and* ***commission_pct*** of the employee who has the lowest ***commission_pct*** under each manager

COMMAND:

```
SELECT e1.first_name, e1.last_name, e1.employee_id, e1.email, e1.salary,
e1.department_id, e1.commission_pct
FROM employees e1
WHERE (e1.manager_id, e1.commission_pct) IN (
   SELECT e2.manager_id, MIN(e2.commission_pct)
   FROM employees e2
   WHERE e2.manager_id IS NOT NULL
   GROUP BY e2.manager_id
);
```

```
mysql> SELECT e1.first_name, e1.last_name, e1.employee_id, e1.email, e1.salary, e1.department_id, e1.commission_pct
    -> FROM employees e1
    -> WHERE (e1.manager_id, e1.commission_pct) IN (
    ->     SELECT e2.manager_id, MIN(e2.commission_pct)
    ->     FROM employees e2
    ->     WHERE e2.manager_id IS NOT NULL
    ->     GROUP BY e2.manager_id
    -> );
+------------+-----------+-------------+----------------------+--------+---------------+----------------+
| first_name | last_name | employee_id | email                | salary | department_id | commission_pct |
+------------+-----------+-------------+----------------------+--------+---------------+----------------+
| Michael    | Johnson   | EMP003      | michael.j@example.com |  55000 | DPT001        |          0.020 |
| Sara       | Garcia    | EMP006      | sara.g@example.com    |  58000 | DPT004        |          0.010 |
| Robert     | Martinez  | EMP007      | robert.m@example.com  |  68000 | DPT005        |          0.020 |
| Mark       | Johnson   | EMP011      | mark.j@example.com    |  65000 | DPT005        |          0.025 |
| Sophia     | Lee       | EMP014      | sophia.l@example.com  |  67000 | DPT005        |          0.015 |
| Eric       | Miller    | EMP015      | eric.m@example.com    |  66000 | DPT005        |          0.025 |
| Grace      | Martinez  | EMP018      | grace.m@example.com   |  63000 | DPT005        |          0.010 |
| Andrew     | Anderson  | EMP019      | andrew.a@example.com  |  64000 | DPT005        |          0.015 |
| Olivia     | Harris    | EMP022      | olivia.h@example.com  |  72000 | DPT007        |          0.035 |
| Sarah      | Johnson   | EMP025      | sarah.j@example.com   |  72000 | DPT007        |          0.001 |
+------------+-----------+-------------+----------------------+--------+---------------+----------------+
10 rows in set (0.00 sec)
```