```
mysql> create database empdata
    -> ;
Query OK, 1 row affected (0.00 sec)

mysql> use empdata
Database changed
mysql> CREATE TABLE employees (employee_id INT PRIMARY KEY, first_name VARCHAR(50),
last_name VARCHAR(50), department_id INT, salary DECIMAL(10, 2), hire_date DATE,
manager_id INT);
Query OK, 0 rows affected (0.02 sec)

mysql> CREATE TABLE departments (
    ->  department_id INT PRIMARY KEY,
    ->  department_name VARCHAR(50)
    -> );
Query OK, 0 rows affected (0.02 sec)

mysql> CREATE TABLE projects (
    ->  project_id INT PRIMARY KEY,
    ->  project_name VARCHAR(50),
    ->  project_manager_id INT
    -> )
    -> ;
Query OK, 0 rows affected (0.02 sec)

mysql> INSERT INTO employees VALUES (1, 'John', 'Doe', 1, 60000.00, '2023-01-01',
3);
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO employees VALUES (2, 'Jane', 'Smith', 2, 75000.00, '2023-02-15',
4);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO departments VALUES (1, 'Sales');
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO departments VALUES (2, 'IT');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO projects VALUES (101, 'Project A', 3);
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO projects VALUES (102, 'Project B', 4);
Query OK, 1 row affected (0.00 sec)

mysql> SELECT * FROM employees
    -> ;
+-------------+------------+-----------+---------------+----------+------------+---
----------+
| employee_id | first_name | last_name | department_id | salary   | hire_date  |
```

```
manager_id |
+-------------+------------+-----------+---------------+----------+------------+---
---------+
|           1 | John       | Doe       |             1 | 60000.00 | 2023-01-01 |
      3 |
|           2 | Jane       | Smith     |             2 | 75000.00 | 2023-02-15 |
      4 |
+-------------+------------+-----------+---------------+----------+------------+---
---------+
2 rows in set (0.00 sec)

mysql> SELECT first_name, last_name FROM employees;
+------------+-----------+
| first_name | last_name |
+------------+-----------+
| John       | Doe       |
| Jane       | Smith     |
+------------+-----------+
2 rows in set (0.00 sec)

mysql> SELECT * FROM employees WHERE department_id = (SELECT department_id FROM
departments WHERE department_name = 'Sales');
+-------------+------------+-----------+---------------+----------+------------+---
---------+
| employee_id | first_name | last_name | department_id | salary   | hire_date  |
manager_id |
+-------------+------------+-----------+---------------+----------+------------+---
---------+
|           1 | John       | Doe       |             1 | 60000.00 | 2023-01-01 |
      3 |
+-------------+------------+-----------+---------------+----------+------------+---
---------+
1 row in set (0.00 sec)

mysql> SELECT * FROM employees WHERE salary > 50000;
+-------------+------------+-----------+---------------+----------+------------+---
---------+
| employee_id | first_name | last_name | department_id | salary   | hire_date  |
manager_id |
+-------------+------------+-----------+---------------+----------+------------+---
---------+
|           1 | John       | Doe       |             1 | 60000.00 | 2023-01-01 |
      3 |
|           2 | Jane       | Smith     |             2 | 75000.00 | 2023-02-15 |
      4 |
+-------------+------------+-----------+---------------+----------+------------+---
---------+
2 rows in set (0.00 sec)

mysql> SELECT * FROM employees ORDER BY hire_date DESC;
```

```
+------------+------------+-----------+---------------+----------+------------+------------+
| employee_id | first_name | last_name | department_id | salary   | hire_date  | manager_id |
+------------+------------+-----------+---------------+----------+------------+------------+
|          2 | Jane       | Smith     |             2 | 75000.00 | 2023-02-15 |          4 |
|          1 | John       | Doe       |             1 | 60000.00 | 2023-01-01 |          3 |
+------------+------------+-----------+---------------+----------+------------+------------+
2 rows in set (0.00 sec)

mysql> SELECT * FROM employees ORDER BY salary DESC LIMIT 5;
+------------+------------+-----------+---------------+----------+------------+------------+
| employee_id | first_name | last_name | department_id | salary   | hire_date  | manager_id |
+------------+------------+-----------+---------------+----------+------------+------------+
|          2 | Jane       | Smith     |             2 | 75000.00 | 2023-02-15 |          4 |
|          1 | John       | Doe       |             1 | 60000.00 | 2023-01-01 |          3 |
+------------+------------+-----------+---------------+----------+------------+------------+
2 rows in set (0.00 sec)

mysql> SELECT AVG(salary) AS average_salary FROM employees;
+----------------+
| average_salary |
+----------------+
|   67500.000000 |
+----------------+
1 row in set (0.00 sec)

mysql> SELECT department_id, COUNT(*) AS num_employees FROM employees GROUP BY department_id;
+---------------+---------------+
| department_id | num_employees |
+---------------+---------------+
|             1 |             1 |
|             2 |             1 |
+---------------+---------------+
2 rows in set (0.00 sec)

mysql> SELECT e.*, d.department_name FROM employees e JOIN departments d ON e.department_id = d.department_id;
+------------+------------+-----------+---------------+----------+------------+---
```

```
  ---------+-----------------+
| employee_id | first_name | last_name | department_id | salary   | hire_date  |
manager_id | department_name |
+-------------+------------+-----------+---------------+----------+------------+---
---------+-----------------+
|           1 | John       | Doe       |             1 | 60000.00 | 2023-01-01 |
      3 | Sales           |
|           2 | Jane       | Smith     |             2 | 75000.00 | 2023-02-15 |
      4 | IT              |
+-------------+------------+-----------+---------------+----------+------------+---
---------+-----------------+
2 rows in set (0.00 sec)

mysql> SELECT e1.first_name AS employee, e2.first_name AS manager
    -> FROM employees e1
    -> LEFT JOIN employees e2
    -> ON e1.manager_id = e2.employee_id;
+----------+---------+
| employee | manager |
+----------+---------+
| John     | NULL    |
| Jane     | NULL    |
+----------+---------+
2 rows in set (0.00 sec)

mysql> SELECT department_id, SUM(salary) AS total_salary_expense FROM employees
GROUP BY department_id;
+---------------+----------------------+
| department_id | total_salary_expense |
+---------------+----------------------+
|             1 |             60000.00 |
|             2 |             75000.00 |
+---------------+----------------------+
2 rows in set (0.00 sec)

mysql> SELECT department_id
    -> FROM employees
    -> GROUP BY department_id
    -> ORDER BY AVG(salary) DESC
    -> LIMIT 1;
+---------------+
| department_id |
+---------------+
|             2 |
+---------------+
1 row in set (0.00 sec)

mysql> SELECT * FROM employees WHERE salary > (SELECT AVG(salary) FROM employees);
+-------------+------------+-----------+---------------+----------+------------+---
---------+
```

```
| employee_id | first_name | last_name | department_id | salary   | hire_date  | manager_id |
+-------------+------------+-----------+---------------+----------+------------+------------+
|           2 | Jane       | Smith     |             2 | 75000.00 | 2023-02-15 |          4 |
+-------------+------------+-----------+---------------+----------+------------+------------+
1 row in set (0.00 sec)

mysql> SELECT * FROM employees WHERE manager_id IS NULL;
Empty set (0.00 sec)

mysql> UPDATE employees SET salary = salary * 1.10 WHERE department_id = (SELECT
department_id FROM departments WHERE department_name = 'IT');
Query OK, 1 row affected (0.00 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> DELETE FROM employees WHERE salary < 40000;
Query OK, 0 rows affected (0.00 sec)

mysql> CREATE TABLE projects (
    ->     project_id INT PRIMARY KEY,
    ->     project_name VARCHAR(50),
    ->     project_manager_id INT
    -> );
ERROR 1050 (42S01): Table 'projects' already exists
mysql> ALTER TABLE employees ADD CONSTRAINT unique_email UNIQUE (email);
ERROR 1072 (42000): Key column 'email' doesn't exist in table
mysql> ALTER TABLE employees ADD CONSTRAINT unique_email UNIQUE email;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that
corresponds to your MySQL server version for the right syntax to use near '' at
line 1
mysql> ALTER TABLE employees ADD email VARCHAR(100);
Query OK, 0 rows affected (0.08 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> ALTER TABLE employees ADD CONSTRAINT unique_email UNIQUE email;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that
corresponds to your MySQL server version for the right syntax to use near '' at
line 1
mysql> ALTER TABLE employees ADD CONSTRAINT unique_email UNIQUE (email);
Query OK, 0 rows affected (0.02 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql>
```