

# THAM KHẢO NHANH MYSQL

Databases, bảng, CRUD, joins, indexes, users

## Cơ Sở Dữ Liệu & Bảng

### Quản Lý Database

```
CREATE DATABASE shop;
USE shop;
SHOW DATABASES;
DROP DATABASE shop;
```

### Tạo Bảng

```
CREATE TABLE users (
  id INT AUTO INCREMENT PRIMARY KEY,
  name VARCHAR(100) NOT NULL,
  email VARCHAR(255) UNIQUE NOT NULL,
  age INT,
  active BOOLEAN DEFAULT TRUE,
  created TIMESTAMP DEFAULT CURRENT_TIMESTAMP
);
```

### Sửa Đổi Bảng

```
ALTER TABLE users ADD COLUMN city VARCHAR(100);
ALTER TABLE users MODIFY COLUMN age TINYINT;
ALTER TABLE users DROP COLUMN city;
ALTER TABLE users RENAME TO customers;
TRUNCATE TABLE users; -- remove all rows, keep table
DROP TABLE users;
```

## CRUD

### INSERT

```
INSERT INTO users (name, email, age)
VALUES ('Alice', 'alice@example.com', 30);

INSERT INTO users (name, email)
VALUES ('Bob', 'bob@example.com'),
('Carol', 'carol@example.com');
```

### SELECT

```
SELECT * FROM users;
SELECT name, email FROM users WHERE age > 25;
SELECT * FROM users ORDER BY name ASC LIMIT 10;
SELECT * FROM users WHERE name LIKE 'A%';
SELECT DISTINCT city FROM users;
```

### UPDATE

```
UPDATE users SET age = 31 WHERE name = 'Alice';
UPDATE users SET active = FALSE WHERE age < 18;
```

### DELETE

```
DELETE FROM users WHERE name = 'Alice';
DELETE FROM users WHERE active = FALSE;
```

## Loc & Sắp Xếp

### Mệnh Đề WHERE

```
WHERE age BETWEEN 18 AND 30
WHERE name IN ('Alice', 'Bob', 'Carol')
WHERE email IS NOT NULL
WHERE name LIKE '%smith%' -- contains
WHERE name REGEXP '^A' -- regex
```

### Sắp Xếp & Giới Hạn

```
ORDER BY age DESC, name ASC
LIMIT 10
LIMIT 10 OFFSET 20 -- pagination
LIMIT 20, 10 -- offset, count
```

### Hàm Tổng Hợp

<b>COUNT(*)</b>	Đếm tất cả hàng
<b>COUNT(col)</b>	Đếm giá trị không NULL
<b>SUM(col)</b>	Tổng giá trị số
<b>AVG(col)</b>	Giá trị trung bình
<b>MAX(col) / MIN(col)</b>	Giá trị lớn nhất / nhỏ nhất
<b>GROUP_CONCAT(col)</b>	Nối chuỗi trong nhóm

## Joins

### Các Loại JOIN

```
-- INNER JOIN
SELECT u.name, o.total
FROM users u
JOIN orders o ON u.id = o.user_id;

-- LEFT JOIN
SELECT u.name, o.total
FROM users u
LEFT JOIN orders o ON u.id = o.user_id;

-- Multiple joins
SELECT u.name, p.title, c.body
FROM users u
JOIN posts p ON p.user_id = u.id
JOIN comments c ON c.post_id = p.id;
```

### Các Loại JOIN

**INNER JOIN** Chỉ các hàng có match ở cả hai bảng  
**LEFT JOIN** Tất cả từ bảng trái, NULL nếu không match  
**RIGHT JOIN** Tất cả từ bảng phải, NULL nếu không match  
**CROSS JOIN** Tích Cartesian

## GROUP BY & HAVING

### Tổng Hợp Theo Nhóm

```
SELECT city, COUNT(*) AS total
FROM users
GROUP BY city
ORDER BY total DESC;

SELECT user_id, SUM(amount) AS revenue
FROM orders
GROUP BY user_id
HAVING revenue > 1000;
```

## Subqueries

### Subquery Cơ Bản

```
SELECT name FROM users
WHERE id IN (SELECT user_id FROM orders);
```

```
SELECT name,
(SELECT COUNT(*) FROM orders WHERE user_id = u.id) AS
order_count
FROM users u;
```

## CTEs

```
WITH active_users AS (
  SELECT * FROM users WHERE active = TRUE
)
SELECT * FROM active_users WHERE age > 25;
```

## Indexes

### Tạo & Quản Lý Index

```
CREATE INDEX idx_email ON users (email);
CREATE UNIQUE INDEX idx_unique_email ON users (email);
CREATE INDEX idx_city_age ON users (city, age);
SHOW INDEXES FROM users;
DROP INDEX idx_email ON users;
```

### EXPLAIN

```
EXPLAIN SELECT * FROM users WHERE email = 'alice@example.com';
EXPLAIN ANALYZE SELECT ...; -- MySQL 8+
```

## Stored Procedures & Triggers

### Stored Procedure

```
DELIMITER //
CREATE PROCEDURE GetUserOrders(IN uid INT)
BEGIN
  SELECT * FROM orders WHERE user_id = uid;
END //
DELIMITER ;

CALL GetUserOrders(42);
```

### Trigger

```
CREATE TRIGGER before_insert_users
BEFORE INSERT ON users
FOR EACH ROW
SET NEW.created = NOW();
```

## Users & Quyền

### Quản Lý User

```
CREATE USER 'alice'@'localhost' IDENTIFIED BY 'password';
GRANT ALL PRIVILEGES ON shop.* TO 'alice'@'localhost';
GRANT SELECT, INSERT ON shop.users TO 'bob'@'%';
REVOKE INSERT ON shop.users FROM 'bob'@'%';
DROP USER 'alice'@'localhost';
FLUSH PRIVILEGES;
```

### Quyền Phổ Biến

<b>ALL PRIVILEGES</b>	Toàn quyền trên database
<b>SELECT / INSERT / UPDATE / DELETE</b>	Quyền DML
<b>CREATE / DROP / ALTER</b>	Quyền DDL
<b>GRANT OPTION</b>	Cho phép cấp quyền cho người khác

## Mẫu Phổ Biến

### Upsert

```
INSERT INTO users (id, name, email)
VALUES (1, 'Alice', 'alice@example.com')
ON DUPLICATE KEY UPDATE
  name = VALUES(name),
  email = VALUES(email);
```

### JSON (MySQL 5.7+)

```
SELECT JSON_EXTRACT(data, '$.name') FROM logs;
SELECT data->>'$.name' FROM logs; -- unquoted
WHERE data->>'$.status' = 'active'
```

### Window Functions (MySQL 8)

```
SELECT name, salary,
RANK() OVER (PARTITION BY dept ORDER BY salary DESC) AS rnk,
SUM(salary) OVER (PARTITION BY dept) AS dept_total
FROM employees;
```