

# SQL Internship – Task 12 Solution

## Advanced Constraints & Data Validation

This document demonstrates the use of advanced SQL constraints to ensure strong data validation and data quality. It includes CHECK, DEFAULT, UNIQUE constraints and examples of constraint violations.

### SQL Script:

```
-- Create table with multiple constraints
CREATE TABLE employees (
    emp_id INT PRIMARY KEY,
    emp_name VARCHAR(100) NOT NULL,
    email VARCHAR(150) UNIQUE,
    age INT CHECK (age BETWEEN 18 AND 60),
    salary INT CHECK (salary > 0),
    department VARCHAR(50) DEFAULT 'General',
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP
);

-- Insert valid data
INSERT INTO employees (emp_id, emp_name, email, age, salary, department)
VALUES (1, 'Aaryan', 'aaryan@example.com', 22, 30000, 'IT');

-- Test constraint violation (age < 18)
INSERT INTO employees (emp_id, emp_name, email, age, salary)
VALUES (2, 'Test User', 'test@example.com', 15, 20000);

-- Test UNIQUE constraint violation
INSERT INTO employees (emp_id, emp_name, email, age, salary)
VALUES (3, 'User2', 'aaryan@example.com', 25, 25000);

-- Remove constraint example
ALTER TABLE employees DROP CONSTRAINT employees_email_key;
```

### Constraint Best Practices:

- Use CHECK constraints for numeric ranges and valid values.
- Use UNIQUE for fields like email or phone number.
- Use DEFAULT for timestamps and default column values.
- Combine multiple constraints for stronger validation.
- Database-level validation ensures consistent data quality.

Interview Questions & Answers: 1. What is CHECK constraint? A CHECK constraint restricts values that can be stored in a column. 2. Why use DEFAULT? DEFAULT assigns a value automatically when no value is provided. 3. Can constraints be removed later? Yes, constraints can be dropped using ALTER TABLE. 4. UNIQUE vs PRIMARY KEY? PRIMARY KEY is unique and not null; UNIQUE allows null values. 5. Database vs Application validation? Database validation ensures consistent data integrity, while application validation improves user experience.