SQL Practice Questions for Hospital Database

Database Practice Exercises

Introduction

This document contains 162 SQL practice questions for a hospital database schema. The questions cover a wide range of SQL concepts from basic to advanced, including DDL, DML, DQL, and administrative commands.

Contents

1 Database Operations

1. Create a new database named "Hospital_Backup_DB"
2. Drop the database named "Hospital_Backup_DB" if it exists
3. Rename the current database from "Hospital_DB" to "Medical_Center_DB"
4. Display the name of the currently selected database
5. Create a temporary table named #temp_patient_vitals with columns: temp_id INT, patient_id VARCHAR(50), blood_pressure VARCHAR(10), temperature DECIMAL(4,2), heart_rate INT

2 Table Operations

6. Create a permanent table named "staff" with columns: staff_id VARCHAR(50) PRIMARY KEY, first_name VARCHAR(100), last_name VARCHAR(100), position VARCHAR(100), department_id VARCHAR(50), hire_date DATE, salary DECIMAL(10,2)
7. Drop the table named "staff" from the database
8. Rename the table "patients" to "clients"

9. Truncate all records from the "lab_results" table but keep the table structure
10. Create a copy of the "doctors" table named "doctors_backup" with all its data

3 SELECT Queries

11. Select all columns for patient with patient_id 'PAT015'
12. Select first_name, last_name, and phone number for patient with last_name 'Al-Fayed'
13. Select all doctors who work in the Cardiology department (department_id 'DEPT001')
14. Select all appointments scheduled for February 15, 2024
15. Select all patients born between January 1, 1990 and December 31, 1995

4 INSERT Operations

16. Insert a new patient with these values: patient_id='PAT051', first_name='Ali', last_name='Hassan', date_of_birth='1988-11-03', gender='Male', address='123 Palm Street, Dubai', phone='971-555-0123', email='ali.hassan@email.com', emergency_contact='Fatima Hassan-971-555-0124', blood_type='B+', allergies='None'
17. Insert three new medicines:
    - ('MED016', 'Paracetamol', 'Pain reliever', 1500, 7.50, '2026-05-31')
    - ('MED017', 'Amoxicillin-Clavulanate', 'Antibiotic', 800, 22.75, '2025-10-15')
    - ('MED018', 'Metoprolol Succinate', 'Beta blocker', 600, 18.25, '2025-11-30')
18. Insert a new appointment for patient 'PAT025' with doctor 'DOC003' on March 10, 2024 at 10:30 AM
19. Insert a new department: department_id='DEPT011', name='Physical Therapy', location='Floor 5, Wing A', phone='555-1011'
20. Insert two new lab tests:
    - ('LAB011', 'HIV Test', 'Test for HIV antibodies', 150.00)
    - ('LAB012', 'Hepatitis Panel', 'Test for Hepatitis A, B, and C', 225.00)

5 UPDATE Operations

21. Update phone number for patient with patient_id 'PAT007' to '966-500-2007'
22. Update status of appointment with appointments_id 'APT012' to 'Completed'
23. Update stock quantity of medicine with medicines_id 'MED005' to 2500
24. Update email address of doctor with doctor_id 'DOC008' to 'lisa.thomas@medicalcenter.com'
25. Update payment status of bill with bills_id 'BILL004' to 'Paid' and paid_amount to 350.00

6 DELETE Operations

26. Delete the patient record for patient_id 'PAT042'
27. Delete all appointments that occurred before January 1, 2020
28. Delete duplicate patient records where multiple patients have the same first_name, last_name, and date_of_birth (keep only the earliest record)
29. Delete all medicines that expired before today's date
30. Delete all lab results for patient with patient_id 'PAT018'

7 WHERE Clause

31. Find all female patients born before 1985
32. Find patients with blood type 'O+' who have no allergies
33. Find all appointments for doctor with doctor_id 'DOC005' that are marked as 'Completed'
34. Find all bills with total_amount greater than $300 and payment_status 'Pending'
35. Find medicines with stock_quantity less than 100 and unit_price greater than $15

8 HAVING Clause

36. Find departments that have more than 3 doctors assigned to them
37. Find doctors who have conducted more than 5 appointments
38. Find patients who have had more than 2 appointments
39. Find medicine types that have an average price greater than $20
40. Find departments that have an average appointment duration longer than 30 minutes

9 ORDER BY Clause

41. List all patients ordered by last_name in ascending order
42. List appointments ordered by appointment_date descending and appointment_time ascending
43. List medicines ordered by unit_price descending, then by name ascending
44. List doctors ordered by specialization ascending, then by last_name ascending
45. List bills ordered by total_amount descending, then by billing_date ascending

10 GROUP BY Clause

46. Count the number of patients by gender
47. Count the number of appointments by status
48. Calculate the total bill amount by payment_status
49. Count patients by blood_type
50. Calculate the average appointment duration by department

11 LIMIT Clause

51. Select the first 5 patients when ordered by date_of_birth ascending
52. Select the 10 most expensive medicines (by unit_price)
53. Select the 5 most recent appointments
54. Select the 3 doctors with the most appointments
55. Select the 5 highest bill amounts

12 DISTINCT Clause

56. Find all distinct specializations from the doctors table
57. Find all distinct blood types from the patients table
58. Find all distinct appointment statuses from the appointments table
59. Find all distinct payment methods from the bills table
60. Find all distinct allergy values from the patients table

13 FETCH

61. Fetch the first 10 patients when ordered by date_of_birth descending
62. Fetch the next 5 appointments after skipping the first 10, ordered by appointment_date
63. Fetch the top 3 most expensive medicines (by unit_price)
64. Fetch the first 5 bills with the highest amounts
65. Fetch the first 10 doctors when ordered by last_name ascending

14 Aliases

66. Display patient first_name and last_name as "Full Name"
67. Display appointment_date as "Visit Date" and appointment_time as "Visit Time"
68. Display doctor first_name and last_name as "Physician Name" and specialization as "Specialty"
69. Display bill total_amount as "Total Charge" and paid_amount as "Amount Paid"
70. Display medicine name as "Drug Name" and unit_price as "Price per Unit"

15 AND Operator

71. Find female patients with blood type 'A+' who have no allergies
72. Find appointments for Cardiology department (department_id 'DEPT001') with status 'Completed' that occurred in January 2024
73. Find bills with total_amount greater than $500 and payment_status 'Pending' that were billed in the last 30 days
74. Find doctors in Surgery department (department_id 'DEPT007') with last name starting with 'S' who have a specialization containing 'Surgeon'
75. Find patients born between 1980-1990 with no allergies who have 'O' blood type

16 OR Operator

76. Find patients with blood type 'O+' or 'O-'
77. Find appointments for Cardiology (department_id 'DEPT001') or Neurology (department_id 'DEPT002') departments
78. Find bills with payment_status 'Paid' or 'Partial'
79. Find doctors with specialization 'Cardiologist' or 'Neurologist'
80. Find patients with allergies to 'Penicillin' or 'Aspirin'

17 Logical Operators

81. Find patients who are not male (i.e., female or other)
82. Find appointments that are not in 'Completed' status
83. Find bills that are not fully paid (paid_amount ¡ total_amount)
84. Find medicines that are not expired (expiry_date ¿ current date)
85. Find doctors who are not in the Surgery department (department_id != 'DEPT007')

18 LIKE Operator

86. Find patients with last name starting with 'Al-'
87. Find doctors with first name ending with 'a'
88. Find medicines with name containing 'cin'
89. Find departments with location containing 'Floor 1'
90. Find patients with email from 'gmail.com' domain

19 IN Operator

91. Find patients from cities 'Riyadh', 'Dubai', or 'Doha' (based on address field)
92. Find doctors with specialization in 'Cardiologist', 'Neurologist', or 'Pediatrician'
93. Find appointments with status 'Scheduled', 'Completed', or 'Cancelled'
94. Find medicines with unit_price between $10 and $50
95. Find bills with payment_method 'Credit Card', 'Debit Card', or 'Cash'

20 NOT Operator

96. Find patients not from Riyadh (address not containing 'Riyadh')
97. Find doctors not in Cardiology department (department_id != 'DEPT001')
98. Find appointments not scheduled for the current month
99. Find medicines not costing between $10 and $50
100. Find bills not paid by insurance (payment_method != 'Insurance')

21 IS NULL Operator

101. Find all patients who have not provided an emergency contact (emergency_contact IS NULL)
102. Find all appointments where no doctor has been assigned yet (doctor_id IS NULL)
103. List all bills where no payment method has been recorded (payment_method IS NULL)
104. Find medical records that have no diagnosis notes (diagnosis IS NULL)
105. Find patients who have no allergies listed (allergies IS NULL)

22 UNION, UNION ALL, and EXCEPT Operators

106. Get a combined list of all first names from both the patients and doctors tables (remove duplicates)

107. Get a combined list of all last names from both the patients and doctors tables (include duplicates)

108. Find all patient IDs who have never had an appointment (using EXCEPT)

109. Using UNION, create a list of all person IDs and names from both patients and doctors tables with a type column identifying them as either 'Patient' or 'Doctor'

110. Find all medicine IDs that are present in the medicines table but have never been prescribed (i.e., not in prescription_medicines), using EXCEPT

23 BETWEEN Operator

111. Select all appointments scheduled for the first week of March 2024 (between '2024-03-01' AND '2024-03-07')

112. Find all patients born between 1980 and 1990 (inclusive)

113. List all bills issued between February 1, 2024, and February 29, 2024, with a total amount between $200 and $500

114. Find all medicines with a unit price between $10 and $25

115. Select lab tests that cost between $50 and $100

24 ALL/ANY Operators

116. Find patients who are older than ALL patients from the city of Dubai

117. List doctors who have more appointments than ANY doctor in the Neurology department

118. Find medicines that are more expensive than ALL medicines in the 'Pain Reliever' category

119. Select bills where the total amount is greater than ANY bill paid by insurance

120. Find appointments that took less time than ALL appointments for patient 'PAT001'

25 EXISTS Operator

121. Find all doctors for whom there exists at least one appointment in the 'Completed' status

122. List all patients who have at least one unpaid bill (EXISTS with a correlated subquery on the bills table)

123. Select medicines that have been prescribed at least once (EXISTS with the prescription_medicines table)

124. Find departments that have no doctors assigned (NOT EXISTS with the doctors table)

125. Find patients who have never had an appointment (NOT EXISTS with the appointments table)

26 Aggregate Functions

126. COUNT: How many male patients are in the database?

127. SUM: What is the total outstanding balance (total_amount - paid_amount) for all bills?

128. MIN: What is the price of the least expensive medicine?

129. MAX: What is the highest bill amount ever issued?

130. AVG: What is the average cost of a lab test?

27 JOINs (INNER, LEFT, RIGHT, FULL)

131. INNER JOIN: List all appointments along with the full name of the patient and the doctor for each

132. LEFT JOIN: Show all patients and their appointments, including patients who have no appointments

133. RIGHT JOIN: Show all doctors and the appointments they have, including doctors who have no appointments scheduled

134. FULL JOIN: List all combinations of patients and doctors, showing connections where they have appointments and also showing unconnected patients and doctors

135. Multi-table JOIN: For a specific appointment ID ('APT005'), show the patient name, doctor name, department name, diagnosis, and total bill amount

28 Date Functions

136. Extract the year of birth for all patients

137. Calculate the age of each patient based on their date_of_birth

138. Find all appointments that happened on a Monday

139. Add 30 days to the billing_date of each bill to calculate a due date

140. Find the number of days between the appointment_date and the current date for future appointments

29 String Functions

141. UPPER: Display all patient last names in uppercase
142. CONCAT: Concatenate the first and last name of doctors into a single "Full Name" column
143. SUBSTRING: Extract the first three characters of all patient blood types
144. LTRIM/RTRIM: Display patient addresses after removing any leading or trailing spaces
145. REPLACE: In the allergies field, replace the word 'None' with 'No Known Allergies'

30 Views

146. CREATE VIEW: Create a view named vPatientAppointments that shows patient names, appointment dates, and doctor names
147. UPDATE VIEW: Insert a new record into the underlying patients table and then query the vPatientAppointments view to confirm it reflects the change
148. RENAME VIEW: Rename the view vPatientAppointments to vPatientVisits
149. DROP VIEW: Delete the view vPatientVisits from the database
150. Create a view that shows the total revenue collected (paid_amount) per day

31 Subqueries

151. Single-Row Subquery: Find the name of the doctor who has the highest salary (assuming a salary column was added to the doctors table)
152. Multi-Row Subquery: List the names of all patients who have an appointment with a doctor from the 'Cardiology' department (DEPT001)
153. Correlated Subquery: List all medicines where the unit price is above the average unit price of all other medicines in the same stock quantity category
154. Subquery in SELECT: Show a list of all appointments (appointment_id, date). Include an additional column that shows the total number of appointments the patient has ever had
155. Subquery with EXISTS: Find all departments that have at least one doctor with a specialization containing 'Surgeon'
156. Subquery with NOT EXISTS: Find all patients who have never had a bill with a 'Pending' status
157. Subquery in HAVING: Find doctors who have conducted more appointments than the average number of appointments per doctor
158. Subquery with IN and another table: List the names of all medicines that have been prescribed in a prescription for patient 'PAT001'

159. Subquery in UPDATE: Increase the stock quantity by 50 for all medicines that have been prescribed more than 10 times in the last month

160. Subquery in DELETE: Delete all lab tests that have never been performed (i.e., there is no lab_result record for them)

32 Backup and Restore

161. Generate a Backup Command: Write the SQL Server command to create a full backup of the Hospital_DB database. Save the backup file to D:\Backups\Hospital_DB_Full.bak and use the name Hospital_DB_Full_Backup for the backup set

162. Generate a Restore Command: Write the SQL Server command to restore the Hospital_DB database from the backup file D:\Backups\Hospital_DB_Full.bak. The restore should overwrite the existing database