

Final Report

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The goal of this test is to verify if our database design meets the five provided requirements. We verify the fulfillment of each requirement by designing test data and SQL queries.

To start testing, we need to put test data in the database first. We made up some data that were necessary and wrote the SQL queries to insert these data into the database in each of the test files named “TestX.sql”. Then, below the test data insertion, we write the queries to retrieve the required data. These steps are necessary for each test to run. The file “All_Data.sql” includes all queries that insert the data, which includes data used in this test and some additional data in other fields that this test doesn’t cover, into the database.

We created the following test scenario:

- Patient John Smith has multiple visits containing repeated diagnoses and varied diagnoses.
 - Patient Mary Johnson has multiple visits containing repeated treatments and varied treatment plans.
 - Minor patient Tom Brown’s visits contain treatments that require guardian authorization.
 - Intake clerk handles different visits for the same patient.
- Test 1: Can a patient have different visits with the same diagnosis?
Our database design captures this requirement. Diagnosis information is stored in the Diagnosis table, using (D_code, V_time, V_date, P_id) as the primary key, and different visit records (V_time, V_date) can use the same diagnosis code (D_code). The database design allows a patient to have multiple visits with the same diagnosis. The test result shows that the same diagnosis code (D_code) could show up across different visits for the same patient. Patient John Smith’s two headache diagnoses were successfully retrieved with different visit times.

P_name	D_code	D_name	Visit_DateTime
John Smith	G44.1	Headache	2024/2/1 09:00
John Smith	G44.1	Headache	2024/2/15 14:00

- Test 2: Can a patient have different visits with the same diagnosis?
Our database design captures this requirement. The Treatment table uses (T_code, V_time, V_date, P_id) as the primary key, and it allows the same treatment code to be used for the same patient at different visit times. The database design supports the same treatment across multiple visits for the same patient. The test result shows that the same treatment code (T_code) was shown correctly. Patient Mary Johnson's repeated X-ray treatments were successfully retrieved with different visit times.

P_name	T_code	T_name	Visit_DateTime	Cost
Mary Johnson	2W4GX5Z	X-ray	2024/2/5 10:00	150
Mary Johnson	2W4GX5Z	X-ray	2024/2/20 11:00	150

- Test 3: Can you tell what doctor give what diagnosis(s) for a visit and the prescribed treatments for that visit (if any)?
Our database design captures this requirement. The Visit table records the doctor's (Service_provider_eid, Service_provider_id), the Diagnosis table is associated with specific visits and doctors through foreign keys, the Treatment table is associated with the corresponding diagnosis through visit information, so that we can track the Visit → Doctor → Diagnosis → Treatment relationship chain. The database design allows each diagnosis and associated treatment to be traced back to the doctor responsible for the visit, ensuring complete traceability. Dr. Smith's diagnoses and treatments during visits were accurately retrieved. Since a visit doesn't always need to have a diagnosis or treatment, there are fields with NULL in the retrieved table.

Doctor_Name	Patient_Name	Visit_DateTime	Diagnosis	Treatment
Dr. Smith	John Smith	2024/2/1 09:00	Headache	NULL
Dr. Johnson	Mary Johnson	2024/2/5 10:00	Knee sprain	X-ray
Dr. Smith	Tom Brown	2024/2/10 13:00	Hand injury	X-ray
Dr. Smith	John Smith	2024/2/15 14:00	Headache	NULL
Dr. Johnson	Mary Johnson	2024/2/20 11:00	NULL	X-ray

- Test 4: Can the same clerk do the intake for the same patient on different visits?

Our database design captures this requirement. The Visit table contains the Clerk_id, and there are no constraints that limit the same intake clerk from taking the same patient multiple times, so scenarios where a patient is viewed by the same intake clerk for different visits are fully supported. The database design ensures Clerk_id in the Visit table correctly references the same Intake_clerk entry multiple times. Clerk Davis's multiple interactions with patient John Smith were successfully retrieved.

Clerk_Name	Patient_Name	Visit_Count	Visit_DateTimes
Clerk Davis	John Smith	2	2024-02-01 09:00:00,2024-02-15 14:00:00
Clerk Davis	Mary Johnson	2	2024-02-05 10:00:00,2024-02-20 11:00:00

- Test 5: Can you see who authorized permission for treatment for a minor? Our database design captures this requirement. The Treatment table is associated with the Signature table, the Signature table is associated with the Guardian table through G_id, and the authorization for a minor's treatment can be tracked through the chain. The database design effectively tracks guardians' authorization. Guardian Sarah Brown's authorization for patient Tom Brown's treatment was accurately retrieved.

Patient_Name	Treatment	Treatment_DateTime	Guardian_Name	Guardian_Contact
Tom Brown	X-ray	2024/2/10 13:00	Sarah Brown	555-0104

Our testing checked the database design with five specific requirements, and all requirements can be captured successfully. We didn't find major design flaws during testing. The structure of our database design, including primary keys, foreign keys, and constraints, ensured data integrity and traceability. Right now, our tests only cover checks for required conditions, and there are more fields that we didn't cover, such as Nurses' information, the number of guardians a minor can have, etc. In the future, we can expand the tests to validate more untested features to ensure our design is robust and effective.