Luis Medina

Data Management – D597

Task 1: Relational Database Design and Implementation

**Part 1: Design Document**

**Part A:**

1. Describe a business problem that can be solved with a database solution and is in alignment with the chosen scenario.

HealthFit Innovations has been experiencing some challenges with its increasing volume, variety and velocity of health-related data collected. The way the platform collects data is through various sources that include wearables, electronic health records (EHR’s), medical imaging systems, and patient-reported outcomes. With the current way it is, it lacks the ability to scale and flexibility, which can lead to problems. For example, problems with integration and data processing failures.

1. Purpose a data structure to solve the identified business problem.

The best way to solve this problem is to use an Entity Relationship Diagram (ERD), it will help support a scalable, secure, flexible integration of the data, that is being collected. This will benefit HealthFit Innovations as it will give it the ability to identify relationships that may exist between the data.

1. Justify why a database solution will solve the identified business problem.

Using a database solution will provide HealthFit Innovations with scalable, structured, and integrated solutions for managing lots of data, that will be collected from the wearables. It will also, improve performance and provide support with any analytical work for the future.

1. Explain how the business data will be used within the database solution.

All the data collected from the wearables that the customers are wearing, will have a fast and reliable way to store all the data that is gathered. It will also make easy to access the data using SQL commands to retrieve information that an analyst will need.

**Part B: Data Model**

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AI-generated content may be incorrect.**

**Part C: Objects and Storage**

We created a total of 7 different tables, all of them with primary keys, and most of them with foreign keys to connect all the tables together. The seven tables created were, User, Device, HealthMetric, ActivityLog, MedicalRecord, HealthInsight, and Alert.

The first table is Users with 6 columns titled UserID as the primary key. Then columns FullName, Gender, Email, PhoneNumber all VARCHAR character types. Lastly, DOB as date. The second table is Device with column DeviceID as the primary key and UserID as foreign key to connect it to the Users table. Other columns are DeviceType, Manufacturer, and SerialNumber, which all are VARCHAR datatypes. The third table created was HealthMetric, with MetricID as the primary key and DeviceID as foreign key to connect to the Device table. The other columns used are MetricType and Unit as VARCHAR datatype, Timestamp as Timestamp datatype, and MetricValue as Float decimial(6,2) datatype.

The fourth table ActivityLog with column LogID as the primary key and DeviceID as the foreign key to connect it with the Device table. The next columns are ActivityType as VARCHAR datatype, then StartTime and EndTime as TIMESTAMP datatype, lastly Duration as an Interval datatype. The fifth table is MedicalRecord with column RecordID as primary key and UserID as foreign key to connect it with the Users table. Next columns are, RecordType (VARCHAR), RecordDate (DATE), Summary (TEXT). The sixth table is HealthInsight with column InsightID as the primary key and UserID as the foreign key to connect the two tables. The next columns are, GenereatedDate (TIMESTAMP), InsightType (VARCHAR), Description (TEXT). The last and seventh table is Alert with column AlertID as the primary key and two foreign keys with columns, UserID and MetricID. The rest of the columns of the table are AlertType (VARCHAR), CreatedAt (TIMESTAMP), and Status (VARCHAR).

**Part D: Scalability**

Like I mentioned before that as HealthFit’s user base continues to grow and the value collected from the devices increases, it’s extremely important that the database supports both vertical and horizontal scalability. As, the data continues to flow in from the devices the ERDs offer a great opportunity through the tables created can make the data more manageable, then with primary keys and foreign keys, all the tables will be connected making easy to gather or combine data. Another example is with the tables Health\_metric and activity\_log can be partitioned independently, as they will grow quickly.

**Part E: Privacy and Security**

Privacy and security are going to be one of the most important parts that need to be addressed, as the data being used is going to be personal and health-related data. Since, the data is sensitive data there needs to be limited access to the database, so that not just anyone can see private information.

**Part 2: Implementation**

**F1: Database Instance**

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**F2: Insert Records**