Jeremy Beard – MSDS 610 – 20220522 – Week 3 Assignment

* What are some of the different SQL databases, and what are pros and cons?

There are a few ways to classify databases and Structured Query Language (SQL) databases. They can be broken down into SQL (relational) and NoSQL (non-relational) databases. Both have their niche and one is not better than the other. SQL databases are appropriate for more complex queries while NoSQL databases are more appropriate for horizontal scaling and flexible requirements.

Some of the more popular databases today are MySQL, MariaDB, MongoDB, Redis, and PostgreSQL. MySQL is an open-source SQL (relational) database. It is popular in web development stacks. Pros are that it is open-source (free) and it has high performance when dealing with large databases. Cons are that it is difficult to create incremental backups, and that it also has no support for Extensible Markup Language (XML) or Online Analytical Processing (OLAP).

MariaDB is a variation of MySQL after MySQL was purchased by the Oracle Corporation. Pros are that it is scalable and its performance is good, and it implements encryption at multiple levels. Cons are that migration of the data is not always so simple.

MongoDB is actually NoSQL (non-relational) but is a tool for database management application. It is free and open-source which is a pro for users. It is a document-oriented database and is an appropriate choice for semi-structured data such as text documents, news headlines, etc. It has support for JSON and is high performance for large amounts of data. Some cons of MongoDB are that it uses a lot of memory, has limited default security, and has limited nesting of files.

Redis is a new tool and means “Remote Dictionary Server”. It is also open-source, like so many of the other tools listed. It is also NoSQL in addition to MongoDB and Redis is actually very similar to MongoDB. It is primarily used for key-value stores. Pros are that it is high speed and configuration is easy. Many data types are supported. Some cons are that it takes a high amount of memory to run and has no support for join queries.

PostgreSQL is a tool that primarily utilizes object-relational DBMS. It is highly scalable and supports JSON format. Some cons are that it is not straightforward to configure, and doesn’t necessarily have high performance at high-usage.

* Why is it useful to know SQL?

It is useful to know SQL because, put simply, it is relevant in many circles of the data science and data engineering world. SQL is a very popular language for data analytics and any engineer or person who knows the SQL language will find themselves more desirable than one who does not.

* What is database normalization and why is it important?

Database normalization is essentially organizing a database. It involves creating tables and relationships between those tables in order to protect the data and at the same time make it more flexible. There are “normal forms” that describe how the data has been normalized according to the few rules for data normalization. The data can be said to be in its first normal form if the first rule of normalization has been followed. Third normal form is the highest level of normalization necessary for applications. Database normalization is important because it organizes the data and reduces redundancy. It is an iterative process and breaks down a large table into smaller more manageable units.

* What is the difference between using Hive and something like PostgreSQL?

With respect to Hive, PostgreSQL is the preferred tool overall. It has many more features and plugins and is easy to setup. There have also been some reviews stating that Hive is a bit slow compared to other languages. Hive is built on Hadoop so it may be a better choice for those with existing Hadoop experience. It has also been stated that Hive handles complicated data more effectively than SQL. SQL would be better suited for less-complicated data sets. Hive is not a free service either, so that must be considered.

Also submit SQL code (.sql files with comments explaining what you are doing in the code) for querying the SQL database to find the following from the readychef.sql database:

1. Get the average, min and max price for each meal type.
2. Using the WHERE clause, write a new SELECT statement that returns all rows where Campaign\_ID is equal to FB .
3. Write a query to get the count of just the users who came from Facebook.
4. Now, count the number of users coming from each service. Here you'll have to group by the column you're selecting with a GROUP BY clause.
5. Write a query to get one table that joins the events table with the users table (on userid).

References

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