DATA CENTER SCALE COMPUTING - LAB 3

Objective - This lab is designed to have you perform and run queries on Hive by enabling a dataproc cluster. The outcome of this assignment will be

- Learn to enable and run dataproc on gcp
- Learn to create tables, update and query on Hive
- Learn to perform Data Joins.

Please find the tutorial to set up Hive at

- https://cloud.google.com/architecture/using-apache-hive-on-cloud-dataproc#creating-another-cloud-dataproc-cluster

Instructions:

1. You should be setting up Hive and answering the questions that follow.
2. Create a self contained document that has your solutions and the screenshot of the query output(for each query)
3. There will be 5 query executions and two theoretical questions.

The tutorial provides a sample dataset and you may play around with the same. However you should be performing the queries on the dataset that has been shared.
Please find the steps to create a table and query the same.

Copying the datasets (15 points)

In this section, you upload the datasets to your warehouse bucket, create a new Hive table, and run some HiveQL queries on that dataset.

Step 1:
Copy the datasets provided to your warehouse bucket: Run the following command in your cloud shell.

Dataset1 for table **"personal_details"**

```
gsutil cp gs://my-hive-warehouse-ajay/datasets/personal_details/heart01.parquet \
gs://${WAREHOUSE_BUCKET}/datasets/personal_details/heart01.parquet
```

Dataset2 for table **"health_details"**

```
gsutil cp gs://my-hive-warehouse-ajay/datasets/health_details/heart02.parquet \
gs://${WAREHOUSE_BUCKET}/datasets/health_details/heart02.parquet
```

Dataset3 for table **“diet”**

```
gsutil cp gs://my-hive-warehouse-ajay/datasets/diet/heart03.parquet \
gs://${WAREHOUSE_BUCKET}/datasets/diet/heart03.parquet
```

Step 2: Creating the Hive tables (15 points)
Create an external Hive table for the dataset:

Table **“personal_details”**

```
gcloud dataproc jobs submit hive \
   --cluster hive-cluster \
   --region ${REGION} \
   --execute "
     CREATE EXTERNAL TABLE personal_details
     (id INT, AGE DOUBLE, SEX STRING, dataset STRING)
     STORED AS PARQUET
     LOCATION 'gs://${WAREHOUSE_BUCKET}/datasets/personal_details';"
```

Table **“health_details”**

```
gcloud dataproc jobs submit hive \
   --cluster hive-cluster \
   --region ${REGION} \
   --execute "
     CREATE EXTERNAL TABLE health_details
     (id INT,cp STRING,trestbps DOUBLE,chol DOUBLE,fbs STRING,restecg STRING, weight
INT)
     STORED AS PARQUET
     LOCATION 'gs://${WAREHOUSE_BUCKET}/datasets/health_details';"
```

Table “**diet”**

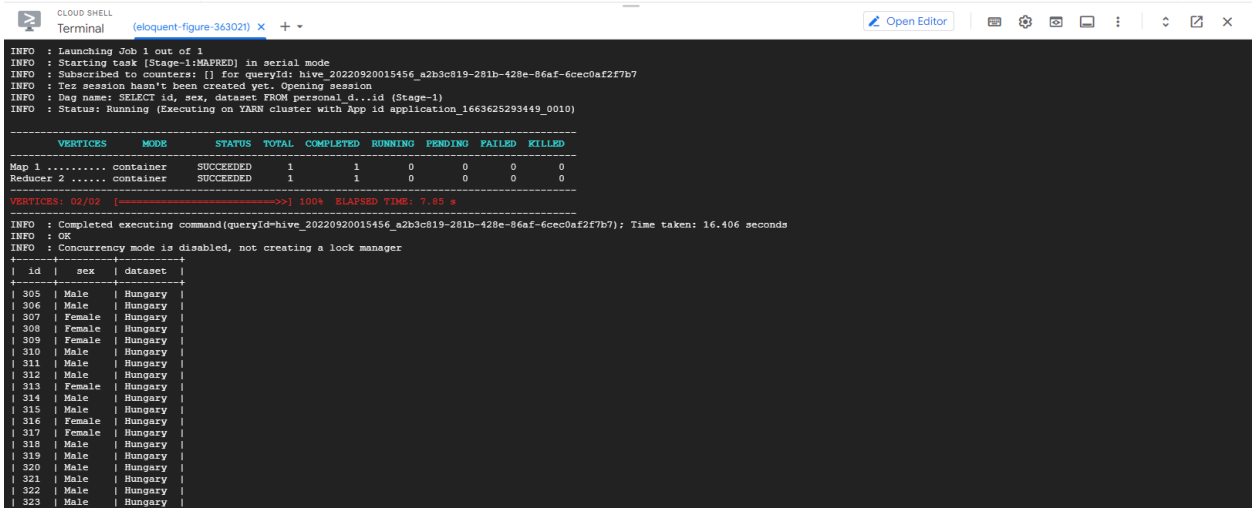
```
gcloud dataproc jobs submit hive \
   --cluster hive-cluster \
   --region ${REGION} \
   --execute "
     CREATE EXTERNAL TABLE diet
```

```
    (weight INT,diet STRING)
    STORED AS PARQUET
    LOCATION 'gs://${WAREHOUSE_BUCKET}/datasets/diet';"
```

Sample query - Querying Hive with the Dataproc Jobs API

```
gcloud dataproc jobs submit hive \
    --cluster hive-cluster \
    --region ${REGION} \
    --execute "
      SELECT *
      FROM personal_details
      LIMIT 10;"
```

Sample Screenshot



Questions. (10 points each)

1. Write a Hive query to retrieve id, age and dataset where the dataset value is “*Hungary”.*
2. Write a Hive query to retrieve id, age, dataset, chol and fbs and sort the values in ascending order of *id.*
3. Modify the query in Q2 by using “DISTRIBUTE BY” and explain the difference.
4. Modify the query in Q2 by using “CLUSTER BY” and explain the difference between Q2, Q3 and Q4.
5. Write a query to join tables *personal_details, health_details* and *diet*. Observe the results and point out the error/issue if any.

Theory Questions - (10 points each)

1. In your own words, describe the working of Hive. (Hint - how hive is on top of hadoop and internally what techniques are used for querying)
2. List out the advantages and disadvantages of HIVE