SPRINT 4

CREACIÓ DE BASE DE DADES

Designing and creating database starting from some CSV files.

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LEVEL 1

Download the CSV files, study them, and design a database with a star schema that has at least 4 tables.

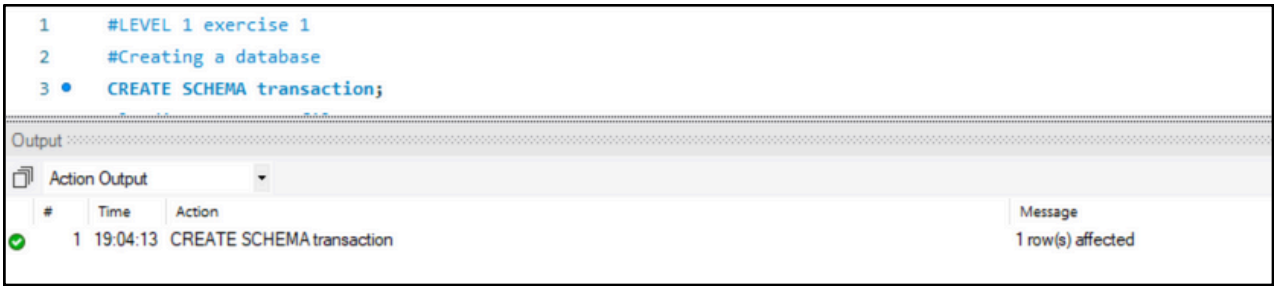


Figure 1.0.1 Creating a Database

EXPLANATION:

After analyzing the CSV files, I created a database named **transaction**, as all the tables are similar to those from Sprint 3. I ensured that I was aware of this change to avoid confusion when retrieving data from the tables.

To create the database, I used the **CREATE SCHEMA** command to create a database named **transaction.**

LEVEL 1

Download the CSV files, study them, and design a database with a star schema that has at least 4 tables.

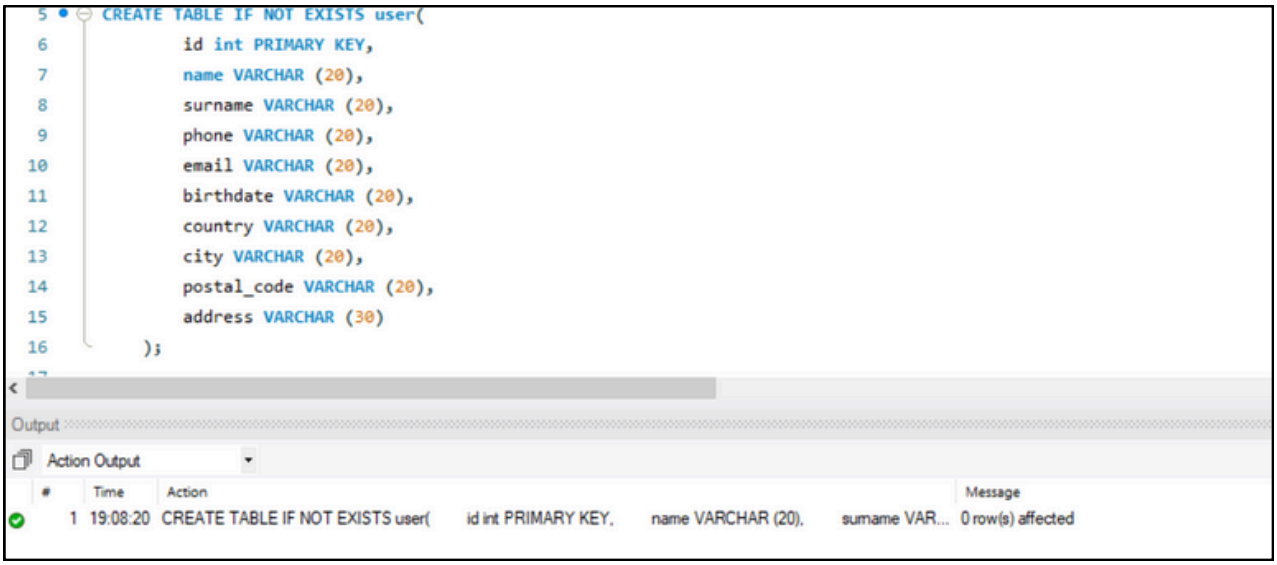


Figure 1.0.2 Creating user table

EXPLANATION:

After analyzing the CSV files by viewing them like an Excel file, I created tables based on the data presented using the CREATE TABLE command. Add all the column names and their corresponding data types. For instance, the user table has the following columns and corresponding data types:

- **id INT PRIMARY KEY:** I use the INT data type because id consists of numbers.
- **name VARCHAR(20):** name contains letters, and I limit it to 20 characters because it's unlikely to have a name longer than that.
- **surname VARCHAR(20):** surname contains letters, and I limit it to 20 characters because it's unlikely to have a surname longer than that.
- **phone VARCHAR(50):** I use VARCHAR here because the phone number can include special characters like -, (, and).
- **email VARCHAR(50):** email contains alphanumeric and special characters, so I use VARCHAR.
- **birthdate VARCHAR(20):** To accommodate various date formats safely, I use VARCHAR.
- **country VARCHAR(20):** country contains letters, so I use VARCHAR.
- **city VARCHAR(50):** Similar to country, city contains letters, so I use VARCHAR.
- **postal_code VARCHAR(20):** Due to the presence of alphanumeric characters, I use VARCHAR.
- **address VARCHAR(100):** Because address includes alphanumeric characters, I use VARCHAR.

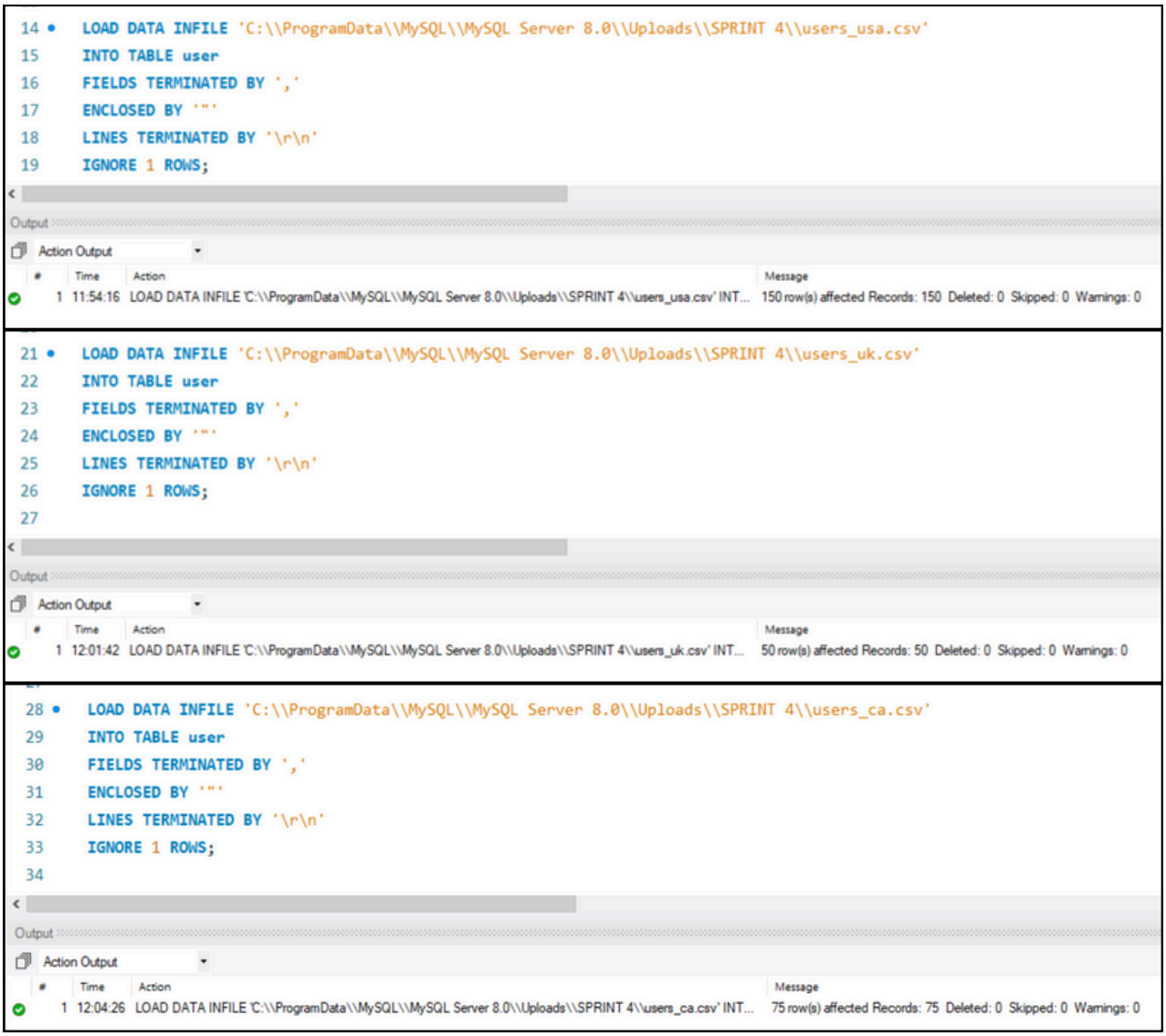


Figure 1.0.3 Loading users csv files

EXPLANATION:

After analyzing the CSV files **users_ca, users_uk, and users_usa,** I found that they have the same columns and data types. Merging them into one table will make the database more organized and cleaner.

Using the **LOAD DATA INFILE command**, I loaded the data from the locations where the CSV files are saved and inserted it into the user table in MySQL Workbench.

File Path Issue

I encountered a problem importing the CSV files due to their file location. The files should be stored where the MySQL Workbench files are stored. To find this location, I used the following command:

SHOW VARIABLES LIKE "secure_file_priv";

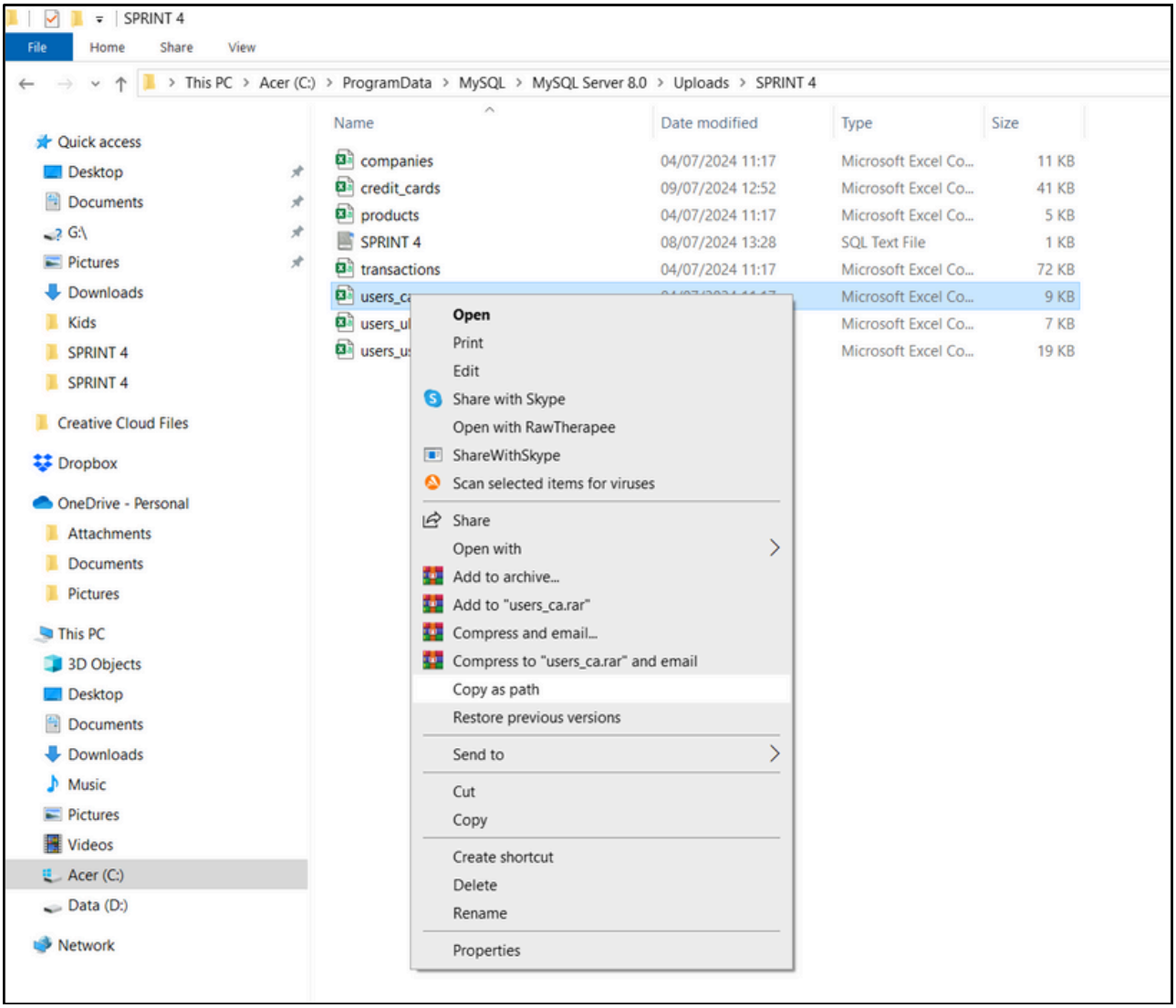
C:\ProgramData\MySQL\MySQL Server 8.0\Uploads\

HOW TO GET THE FILE PATH LINK

To get the file path after saving the CSV files where the MySQL Workbench files are located, follow these steps:

1. STEP 1: Click SHIFT and right-click on the file you want to get the file path for.
2. STEP 2: Select "Copy as path" from the context menu.

This will copy the file path to your clipboard, making it easy to use in your MySQL commands.



Handling Line Termination

The line LINES TERMINATED BY '\r\n' ensures that the query proceeds to the next line, even if there is a special character at the end of the line of values.

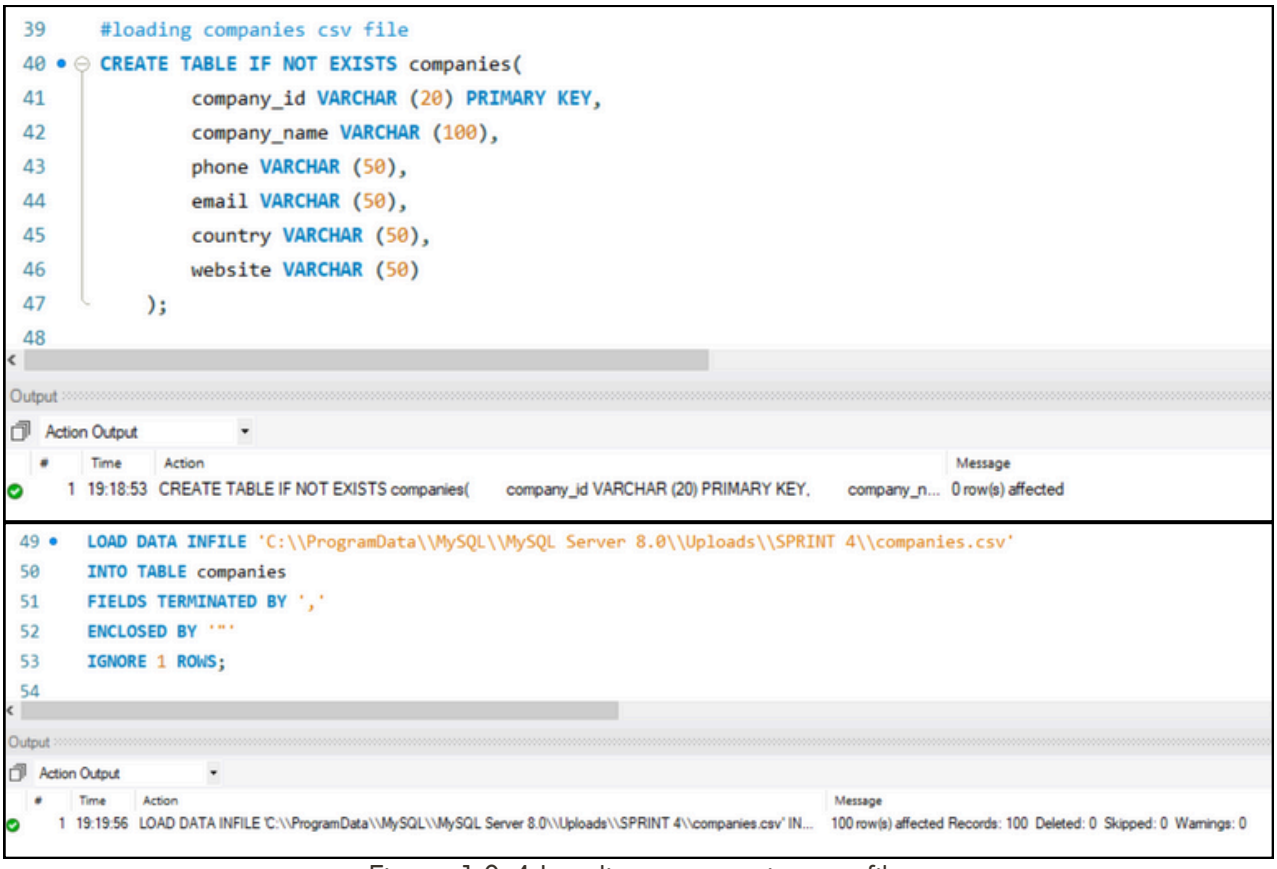


Figure 1.0.4 Loading companies csv file

EXPLANATION:

After analyzing the companies csv file by viewing it like an excel file, create a table after based from the data presented using CREATE TABLE command. Add all the column names and its data types. In this case, companies table has this following columns and corresponding data types:

- **company_id VARCHAR (20) PRIMARY KEY:** This column has special characters and numbers that's why VARCHAR is the best data type choice.
- **company_name VARCHAR (100):** This contains letters of the alphabet.
- **phone VARCHAR (50):** I use VARCHAR here because the phone number can include special characters like -, (, and).
- **email VARCHAR (50):**email contains alphanumeric and special characters, so I use VARCHAR.
- **country VARCHAR (50):** country contains letters, so I use VARCHAR.
- **website VARCHAR (50):** websites contain alphanumeric and special characters, so I use VARCHAR.

Using the **LOAD DATA INFILE** command recalls the data from where the companies csv file is saved. Then inserted to the companies table in MySQL workbench.

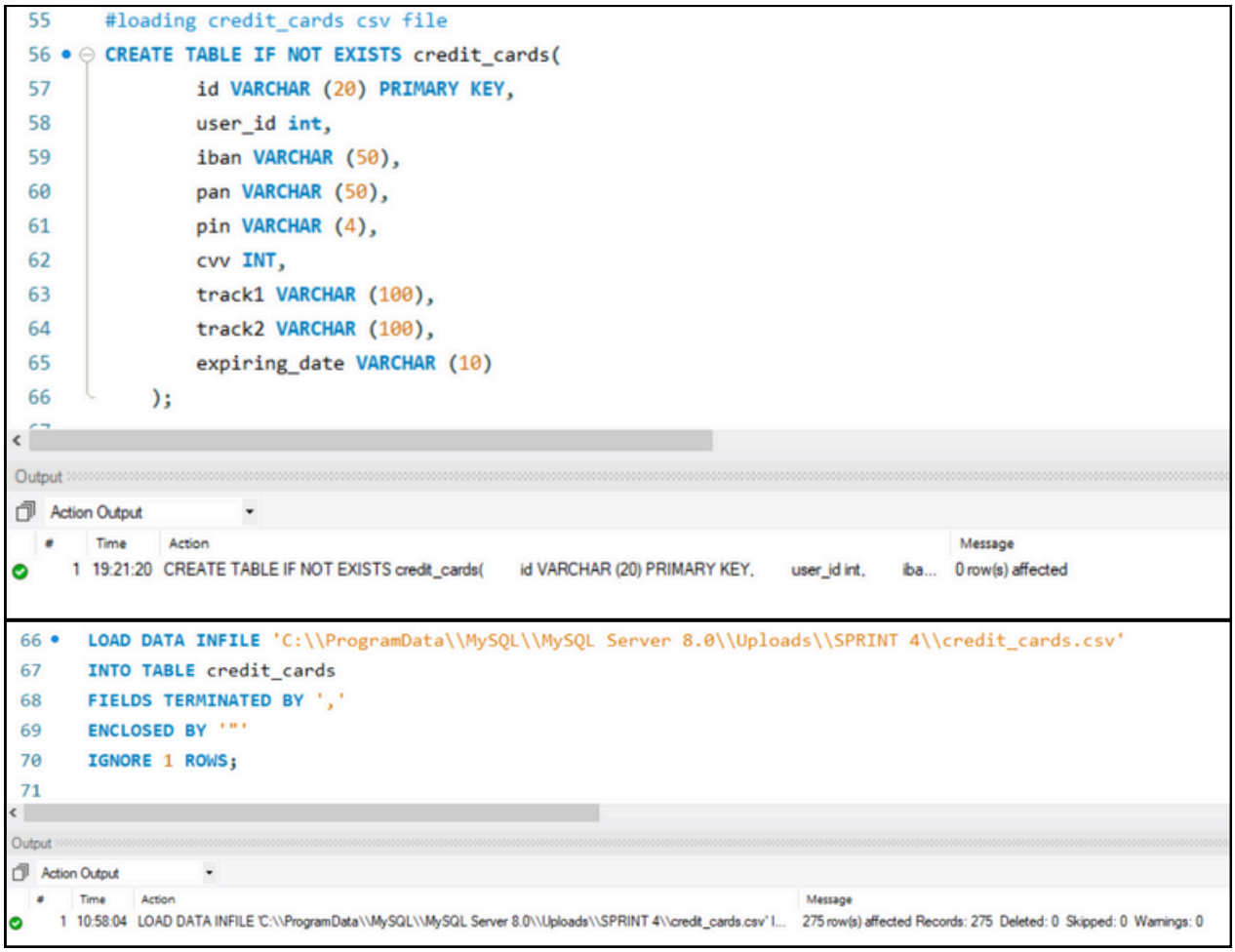


Figure 1.0.5 Loading credit_cards csv file

EXPLANATION:

After analyzing the credit_cards csv file by viewing it like an excel file, create a table after based from the data presented using CREATE TABLE command. Add all the column names and its data types. In this case, credit_cards table has this following columns and corresponding data types:

- **id VARCHAR (20) PRIMARY KEY:** This column has special characters and numbers that's why VARCHAR is the best data type choice.
- **user_id int:** I use the INT data type because id consists of numbers and it should be the same as the mother table.
- **iban VARCHAR (50):** It contains alphanumeric and special characters, so I use VARCHAR.
- **pan VARCHAR (50):** It contains alphanumeric and special characters, so I use VARCHAR.
- **pin VARCHAR (4):** I use the INT data type because id consists of numbers.
- **cvv INT:** I use the INT data type because id consists of numbers.

- **track1 VARCHAR (100):** It contains alphanumeric and special characters, so I use VARCHAR.
- **track2 VARCHAR (100):** It contains alphanumeric and special characters, so I use VARCHAR.
- **expiring_date VARCHAR (10):** To accommodate various date formats safely, I use VARCHAR.

Using the **LOAD DATA INFILE** command recalls the data from where the credit_cards csv file is saved. Then inserted to the credit_cards table in MySQL workbench.

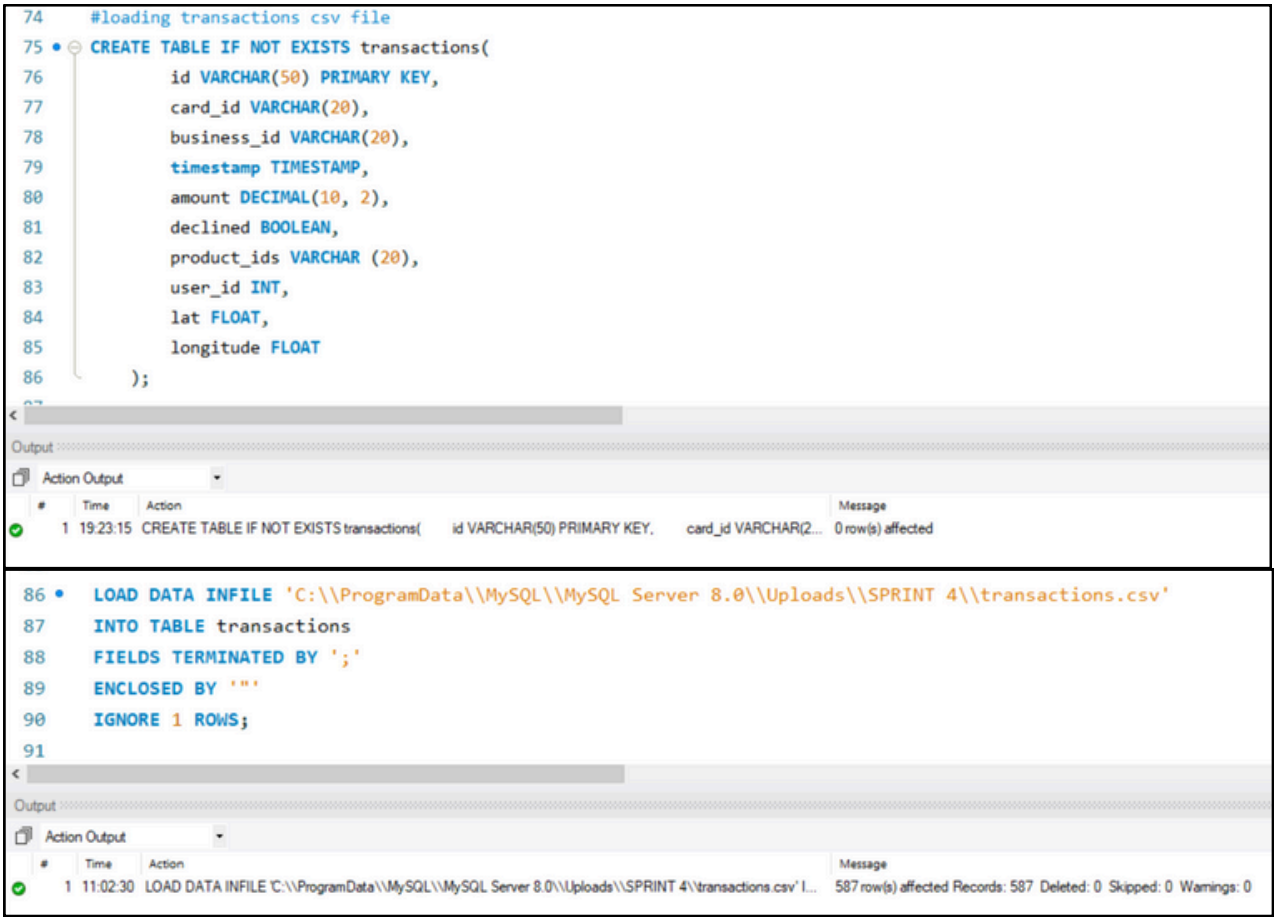


Figure 1.0.6 Loading transactions csv file

EXPLANATION:

After analyzing the transactions csv file by viewing it like an excel file, create a table after based from the data presented using **CREATE TABLE command.** Add all the column names and its data types. In this case, transactions table has this following columns and corresponding data types:

- **id VARCHAR(50) PRIMARY KEY:** This column includes special characters and numbers, making VARCHAR the ideal data type choice.
- **card_id VARCHAR(20):** This column also contains special characters and numbers, making VARCHAR the best data type choice.
- **business_id VARCHAR(20):** Similar to card_id, this column includes special characters and numbers, making VARCHAR suitable.
- **timestamp TIMESTAMP:** This data type is used because the column stores date and time information.
- **amount DECIMAL(10, 2):** This is used for monetary values, allowing storage of 10-digit numbers with 2 decimal places.
- **declined BOOLEAN:** This column accepts inputs of 0 and 1, representing true or false values.
- **product_ids VARCHAR(20):** Contains alphanumeric characters and special characters.

- **user_id INT:** This data type is used for numerical user IDs, ensuring consistency with the primary key of the parent table.
- **lat FLOAT:** This data type is chosen due to the wide range of numerical values expected for latitude.
- **longitude FLOAT:** Similarly, FLOAT is used for longitude due to its ability to handle a wide range of numerical values.

Using the **LOAD DATA INFILE** command recalls the data from where the transactions csv file is saved. Then inserted to the transactions table in MySQL workbench.

NOTE: The transactions csv file, each value is terminated by a semi-colon (;) this should be noted in the query to retrieve the data without an error.

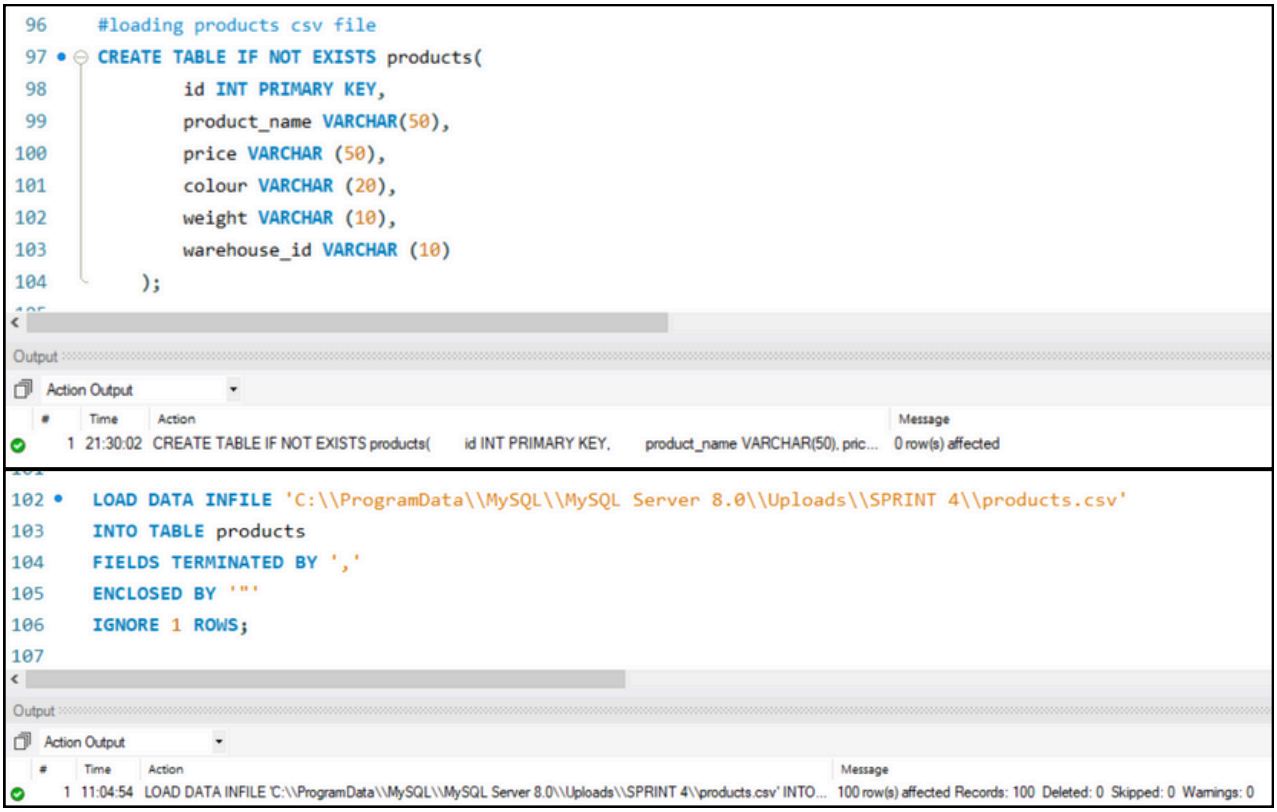


Figure 1.0.7 Loading products csv file

EXPLANATION:

After analyzing the products csv file by viewing it like an excel file, create a table after based from the data presented using CREATE TABLE command. Add all the column names and its data types. In this case, products table has this following columns and corresponding data types:

- **id INT PRIMARY KEY**
- **product_name VARCHAR(50)**
- **price VARCHAR (50)**
- **colour VARCHAR (20)**
- **weight VARCHAR (10)**
- **warehouse_id VARCHAR (10)**

Using the LOAD DATA INFILE command recalls the data from where the products csv file is saved. Then inserted to the products table in MySQL workbench.

ADDING FOREIGN KEYS:

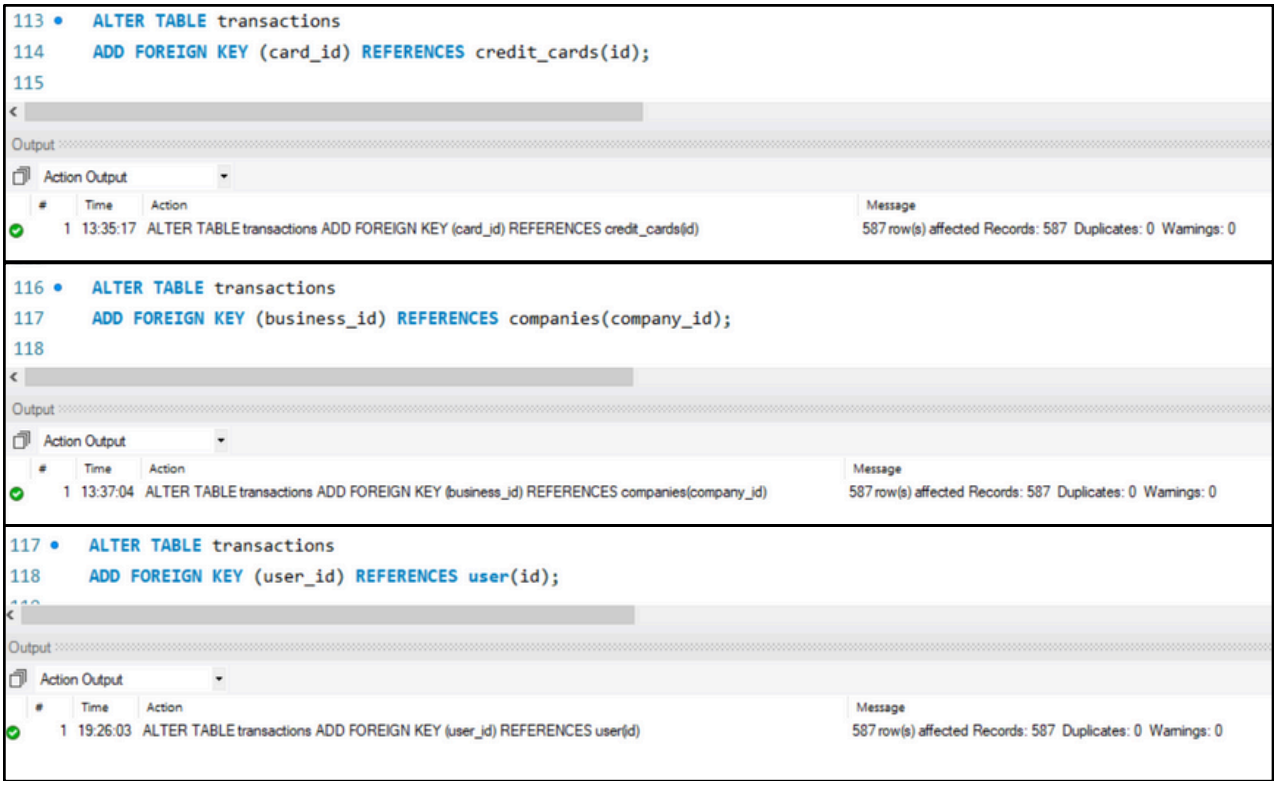


Figure 1.0.7 Foreign Keys

EXPLANATION:

After creating all the tables, analyze the data input in each table and decide the connections of the tables. In this case, the transaction table has a card_id column which is the id column in credit_cards. Moreover, it consists the business_id column, which is the company_id in companies table. In addition, user_id column in transactions is the id column in the user table.

To assign foreign keys, it's necessary to identify the table that needs to be altered in this case, the transactions table. Then using the ADD FOREIGN KEY command, identify the column which has the same values and use the table where the same same values are found as a reference, and identify the name of the column in the referenced table.

NOTE: The product_ids column in transactions has more than one product_id. In this case, establishing relationship won't be possible without creating a new table.

TABLE RELATIONSHIPS:

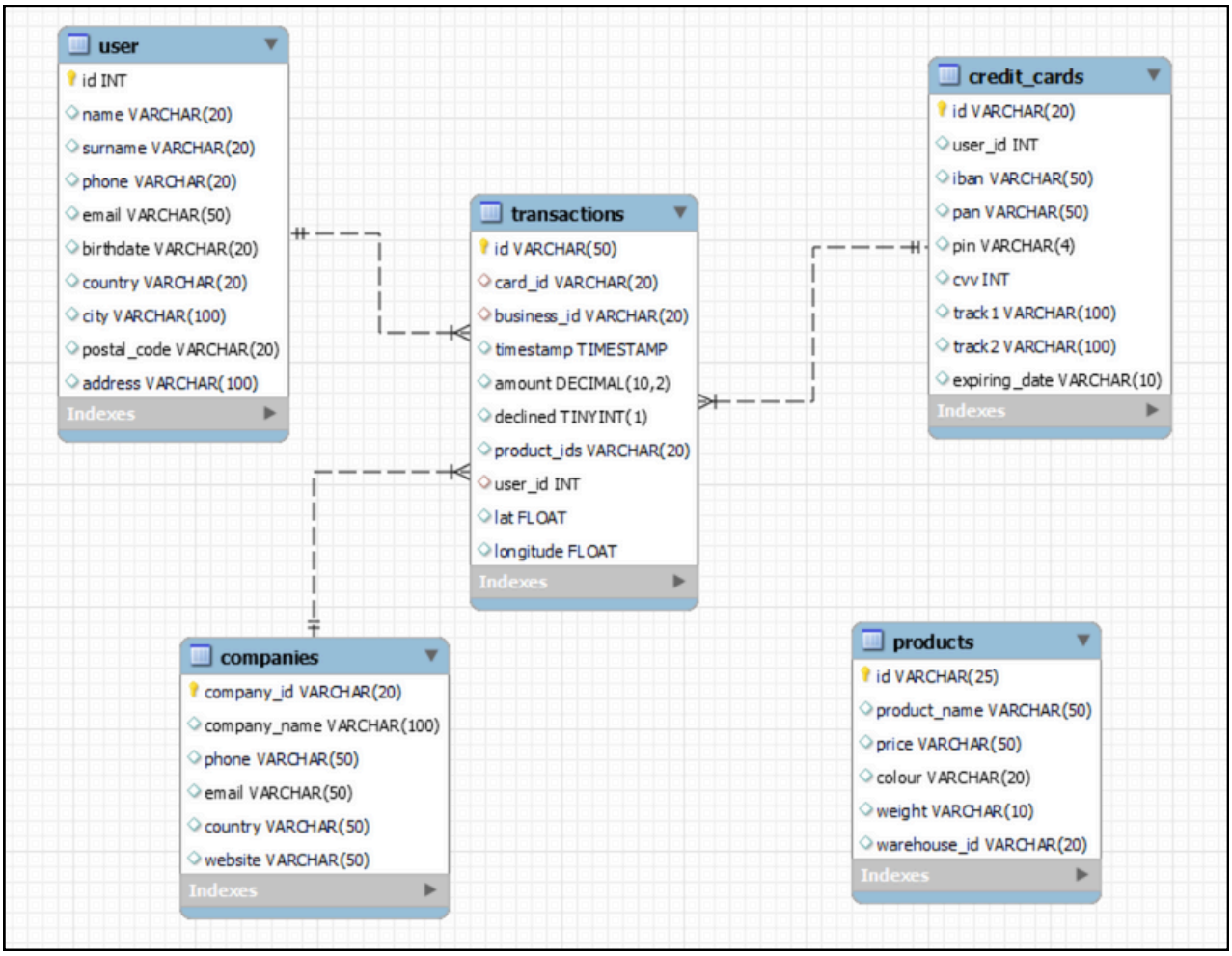


Figure 1.0.8 Relationships

EXPLANATION:

OVERALL RELATIONSHIPS: The database structure resembles a star schema, where the transactions table serves as the fact table because it contains more records and multiple foreign keys. Each of the companies, user, and credit_cards tables has a natural key.

ONE-TO-MANY RELATIONSHIPS:

- **Company to Transaction:** A company can have one or more transactions.
- **User to Transaction:** A user can have one or more transactions.
- **Credit Card to Transaction:** A credit card can be used in one or more transactions.

NOT ESTABLISHED RELATIONSHIP

The products table and transactions table don't have a well-established relationship due to the product_ids column. This column contains more than one ID from the products table. To establish a relationship, creating a new table that will serve as a bridge to connect these tables is necessary.

LEVEL 1

Exercise 1:

Do a subquery that shows all users with more than 30 transactions using at least 2 tables.

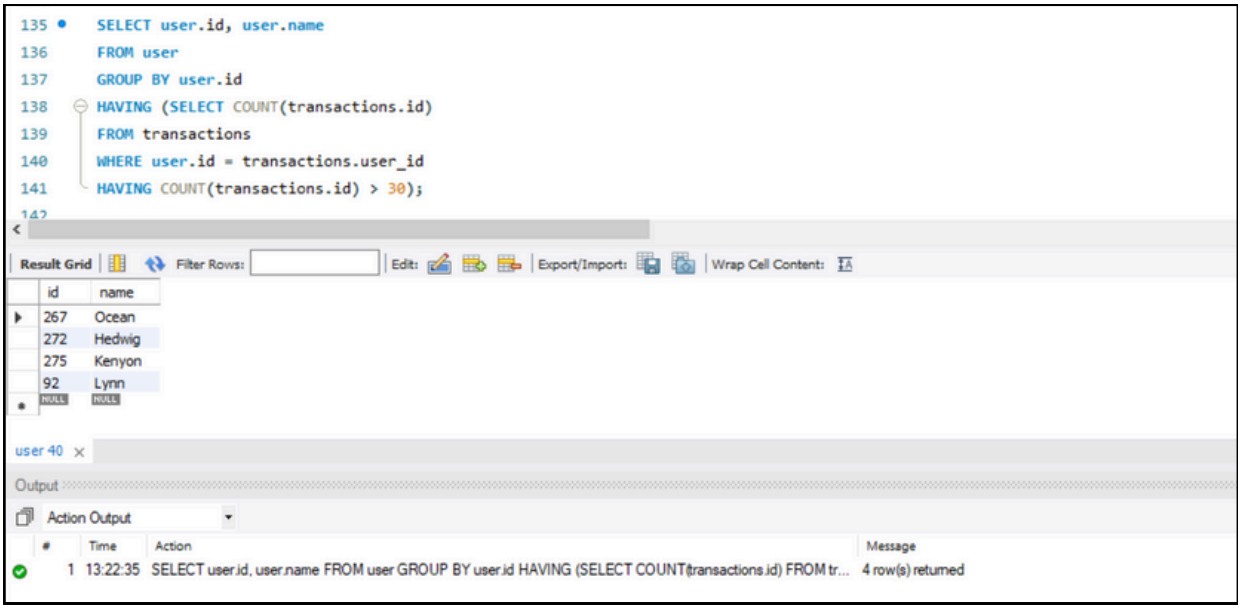


Figure 1.1.1 Query + Result

EXPLANATION:
I fetched the results by selecting data from the user table and grouping the results by the user.id. Then I filtered these groups to only include users who have more than 30 transactions.

HAVING COMMAND
I used this to filter the groups based on a condition.

(SELECT COUNT(transactions.id) FROM transactions WHERE user.id = transactions.user_id):
This subquery counts the number of transactions for each user.

HAVING COUNT(transactions.id) > 30: I only included users who have more than 30 transactions.

LEVEL 1

Exercise 2:

Show the average amount per IBAN of credit cards at the company Donec Ltd, using at least 2 tables.

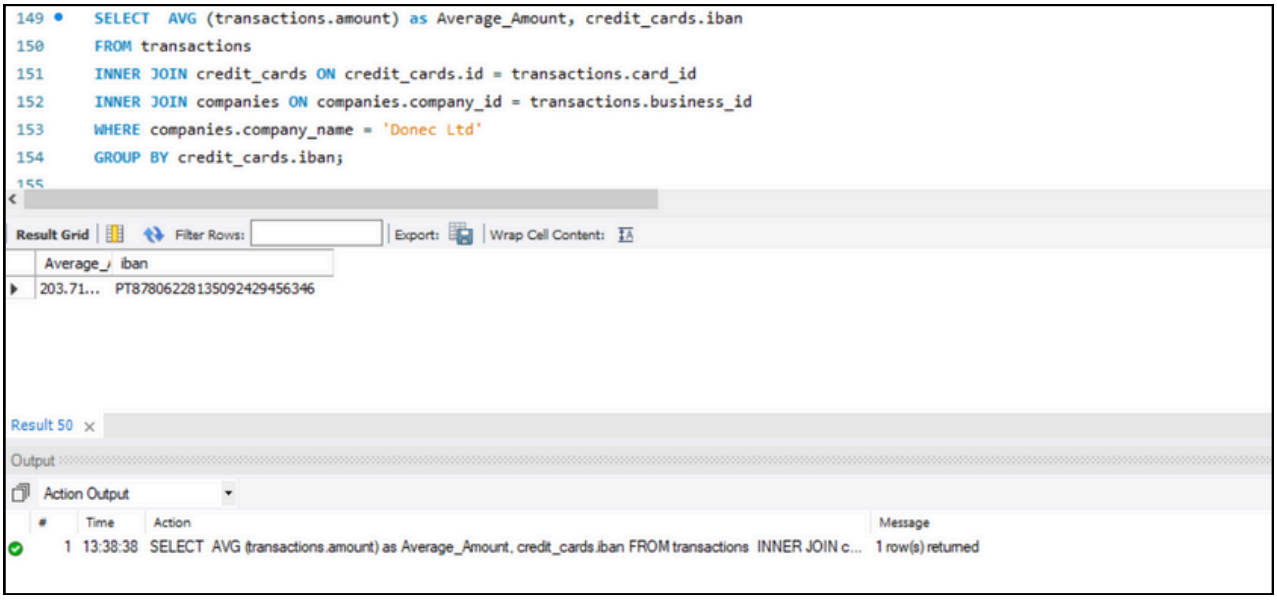


Figure 1.2.1 Query + Result

EXPLANATION:

I got the results by creating a query that calculates the average transaction amount for each credit card used in transactions with a specific company, 'Donec Ltd'. I started by selecting the average transaction amount from the transactions table, rounding this value to two decimal places and labeling it as Average_Amount. Additionally, the query retrieved the IBAN (International Bank Account Number) from the credit_cards table.

INNER JOIN credit_cards ON credit_cards.id = transactions.card_id:

I joined the transactions table with the credit_cards table using the card_id to match transactions to their respective credit cards.

INNER JOIN companies ON companies.company_id = transactions.business_id:

I joined the transactions table with the companies table using the business_id to identify the company involved in the transactions.

I filtered the results to include only those transactions where the company name is 'Donec Ltd'. Finally, the results are grouped by the IBAN, so the average transaction amount is calculated for each unique credit card.