Analyzing Netflix User Data with SQL and Custom Functions

1. Company

We explored Netflix user data using SQL, aiming to unearth meaningful patterns, trends, and correlations that can significantly impact strategic decision-making and amplify the overall user experience. As a seminal force in the realm of entertainment, Netflix, an American video-on-demand over-the-top streaming service, has not only revolutionized the way audiences consume content but has also emerged as a global cultural phenomenon [1]. At the core of Netflix's success lies its unparalleled ability to deliver a diverse array of original and acquired movies, TV shows, and exclusive content to an expansive subscriber base, spanning diverse demographics and geographical locations. This analysis is positioned at the intersection of technology, entertainment, and data, seeking to provide a nuanced understanding of user engagement, content preferences, and the evolving dynamics of the streaming landscape [2].

Netflix's strategic prowess is underscored by its data-driven approach, leveraging insights gleaned from user behavior to inform content creation, curation, and platform optimization. By harnessing the power of data analytics, Netflix continues to refine its recommendation algorithms, tailor content libraries, and introduce innovative features that resonate with its global audience. Through this project, we endeavor to contribute to this ongoing narrative by peeling back layers of data to reveal actionable intelligence that aligns with Netflix's commitment to pushing the boundaries of storytelling and providing an immersive streaming experience for its users [3]. Our analysis not only seeks to unravel the intricate tapestry of user preferences but also serves as a testament to the evolving landscape of on-demand entertainment in the digital age, where data insights become the compass guiding strategic decisions for industry leaders like Netflix.

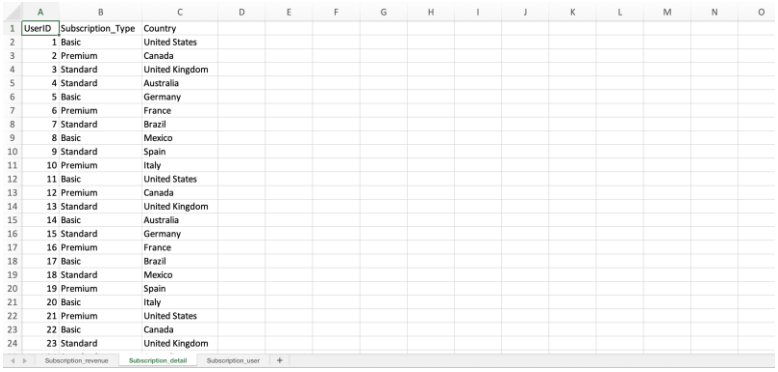
2. Tables

Our dataset, sourced from Kaggle (https://www.kaggle.com/datasets/arnavsmayan/netflix-userbase-dataset), constitutes a synthetic yet comprehensive representation of a simulated Netflix user base, encompassing 2500 rows, each uniquely identified by a User ID. Within this dataset, a rich tapestry of user-centric information unfolds, featuring key attributes such as subscription type (Basic, Standard, or Premium), monthly revenue, join date, last payment date, country of residence, and detailed demographics including age and gender. This multifaceted dataset extends its scope to include additional dimensions such as Device Type (e.g., Smart TV, Mobile, Desktop, Tablet) and Account Status, contributing nuanced insights into user behaviors and preferences.

To facilitate a nuanced and efficient analysis, we have meticulously organized the data into three distinct tables, each with a specific focus: "Subscription_detail"(Fig2.1) provides a condensed snapshot with UserID, Subscription Type, and Country, offering an initial lens into user subscriptions. "Subscription_revenue" (Fig2.2) delves into the financial aspects, including UserID, Monthly Revenue,

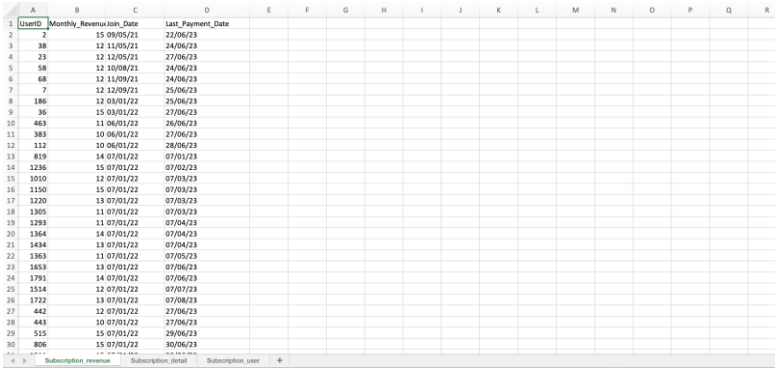
Join Date, and Last Payment Date, enabling a detailed exploration of revenue-related metrics. Meanwhile, "Subscription_user"(Fig2.3) broadens the perspective, incorporating UserID, Age, Gender, Device, and Plan Duration, thus affording a comprehensive view of user demographics and behavior patterns.

It is imperative to clarify that our dataset, while robust and insightful, is a synthetic representation, deliberately designed to not disclose any actual Netflix user data. The carefully structured tables not only lay the foundation for our exploration but also serve as integral tools for unraveling user trends, preferences, and the intricacies of revenue generation within this hypothetical Netflix user base.



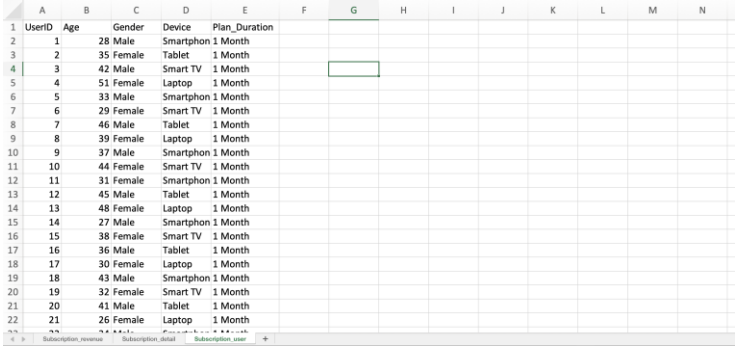
UserID	Subscription_Type	Country
1	Basic	United States
2	Premium	Canada
3	Standard	United Kingdom
4	Standard	Australia
5	Basic	Germany
6	Premium	France
7	Standard	Brazil
8	Basic	Mexico
9	Standard	Spain
10	Premium	Italy
11	Basic	United States
12	Premium	Canada
13	Standard	United Kingdom
14	Basic	Australia
15	Standard	Germany
16	Premium	France
17	Basic	Brazil
18	Standard	Mexico
19	Premium	Spain
20	Basic	Italy
21	Premium	United States
22	Basic	Canada
23	Standard	United Kingdom

Fig2.1 “Subscription_detail” Table



UserID	Monthly_Revenu	Join_Date	Last_Payment_Date
2	15	09/05/21	22/06/23
38	12	11/05/21	24/06/23
23	12	12/05/21	27/06/23
58	12	10/08/21	24/06/23
68	12	11/09/21	24/06/23
7	12	12/09/21	25/06/23
186	12	03/01/22	25/06/23
36	15	03/01/22	27/06/23
463	11	06/01/22	26/06/23
383	10	06/01/22	27/06/23
112	10	06/01/22	28/06/23
819	14	07/01/22	07/01/23
1236	15	07/01/22	07/02/23
1010	12	07/01/22	07/03/23
1150	15	07/01/22	07/03/23
1220	13	07/01/22	07/03/23
1305	11	07/01/22	07/03/23
1293	11	07/01/22	07/04/23
1364	14	07/01/22	07/04/23
1434	13	07/01/22	07/04/23
1363	11	07/01/22	07/05/23
1653	13	07/01/22	07/06/23
1791	14	07/01/22	07/06/23
1514	12	07/01/22	07/07/23
1722	13	07/01/22	07/08/23
442	12	07/01/22	27/06/23
443	10	07/01/22	27/06/23
515	15	07/01/22	29/06/23
806	15	07/01/22	30/06/23

Fig2.2 “Subscription_revenue” Table



UserID	Age	Gender	Device	Plan_Duration
1	28	Male	Smartphon	1 Month
2	35	Female	Tablet	1 Month
3	42	Male	Smart TV	1 Month
4	51	Female	Laptop	1 Month
5	33	Male	Smartphon	1 Month
6	29	Female	Smart TV	1 Month
7	46	Male	Tablet	1 Month
8	39	Female	Laptop	1 Month
9	37	Male	Smartphon	1 Month
10	44	Female	Smart TV	1 Month
11	31	Female	Smartphon	1 Month
12	45	Male	Tablet	1 Month
13	48	Female	Laptop	1 Month
14	27	Male	Smartphon	1 Month
15	38	Female	Smart TV	1 Month
16	36	Male	Tablet	1 Month
17	30	Female	Laptop	1 Month
18	43	Male	Smartphon	1 Month
19	32	Female	Smart TV	1 Month
20	41	Male	Tablet	1 Month
21	26	Female	Laptop	1 Month

Fig2.3 “Subscription_user” Table

3. Views

We first retrieve all columns and rows from three tables in the "Netflix" database: "Subscription_detail," (Fig3.1), "Subscription_revenue," (Fig3.2), and "Subscription_user." (Fig3.3). These queries offer a comprehensive snapshot of user subscription details, and demographic information, providing essential data for analysis and exploration.

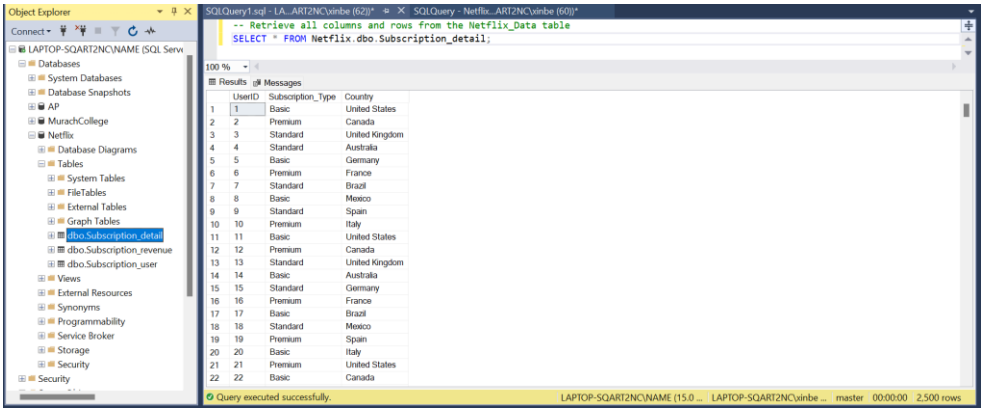


Fig3.1 “Subscription_detail” Table Retrieving

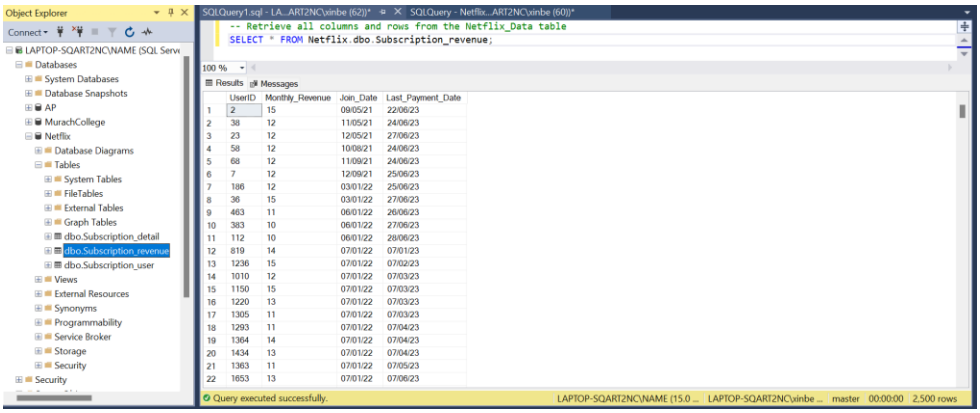


Fig3.2 “Subscription_revenue” Table Retrieving

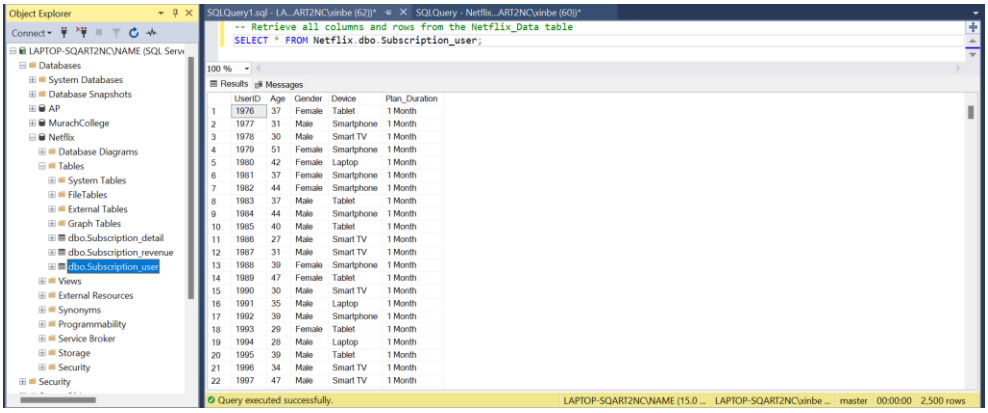


Fig3.3 “Subscription_user” Table Retrieving

We calculate the total revenue for each country in the Netflix dataset by summing the monthly revenue, presenting the results in descending order, as Fig3.4 shows. It achieves this by joining the "Subscription_detail" and "Subscription_revenue" tables based on the common "UserID" column. The SELECT statement retrieves the "country" column and computes the sum of monthly revenue for each country, aliasing it as "total_revenue." The GROUP BY clause organizes the results by country, allowing for distinct aggregations. The final ORDER BY clause arranges the outcomes in descending order of total revenue, providing a ranked overview of countries contributing the most to the Netflix revenue stream. The result shows that United States owns the highest total revenue while Mexico owns the lowest.

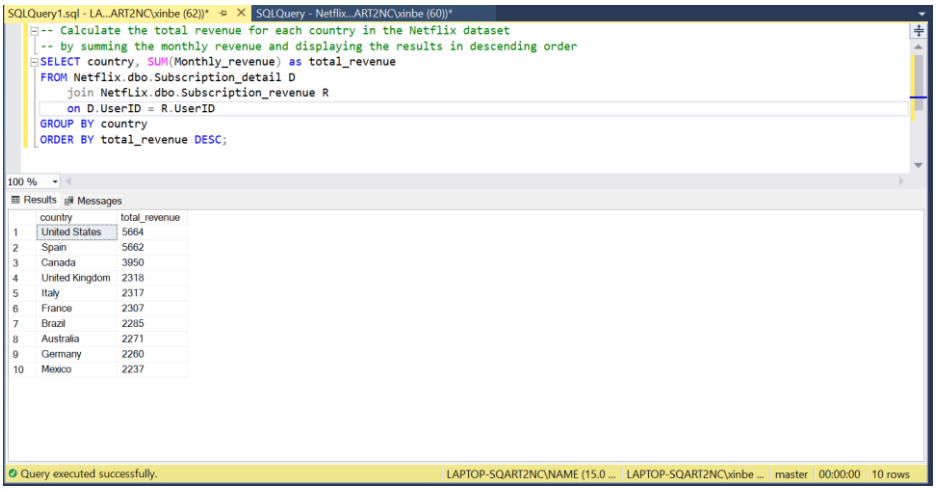


Fig3.4 Calculating Total Revenue for Each Country

We extract information on gender and count the number of premium subscriptions for each gender in the Netflix dataset as Fig3.5 shows. Utilizing a join operation between the "Subscription_user" and "Subscription_detail" tables based on the common "UserID" column, the query filters for premium subscriptions and groups the results by gender. The result shows that the number of premium subscriptions for males and females are very close while males have a little larger number of premium subscriptions.

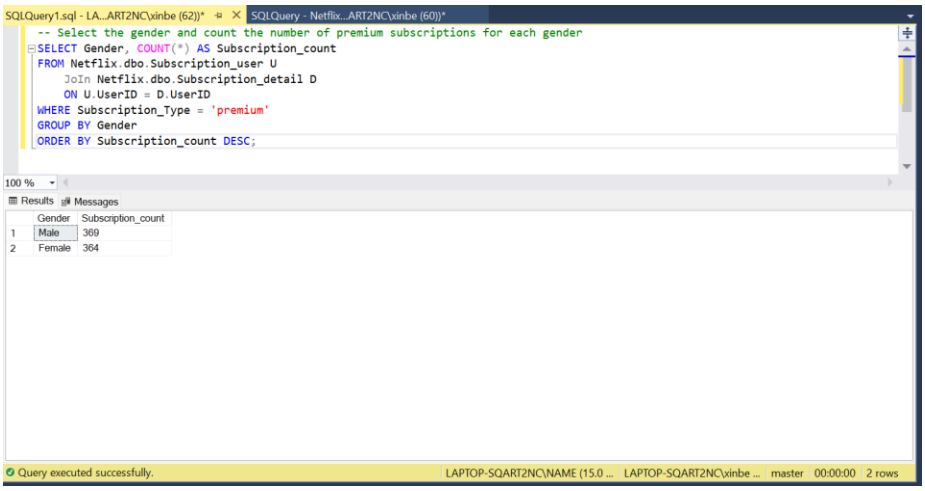


Fig3.5 Counting Premium Subscriptions for Different Genders

We extract data on device types and calculate the subscribers for each device type in the Netflix dataset as Fig3.6 shows. The results show that most of the subscribers use laptops while the least of subscribers use smart TVs.

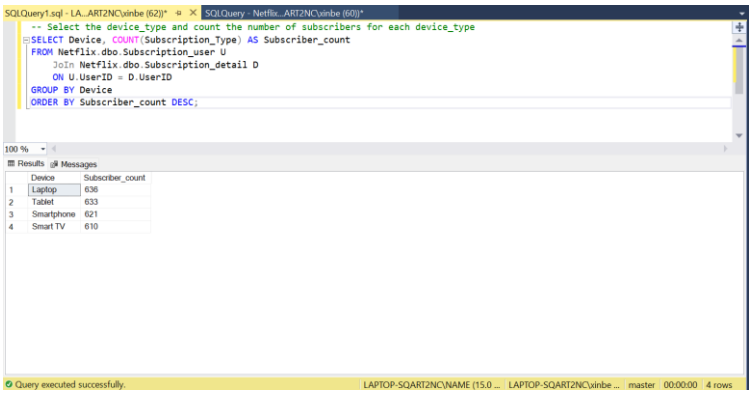


Fig3.6 Counting Subscribers for Different Device Types

We select the gender and count the number of subscribers for each gender in the Netflix dataset as Fig3.7 shows. Results show that Females have larger subscriptions than males.

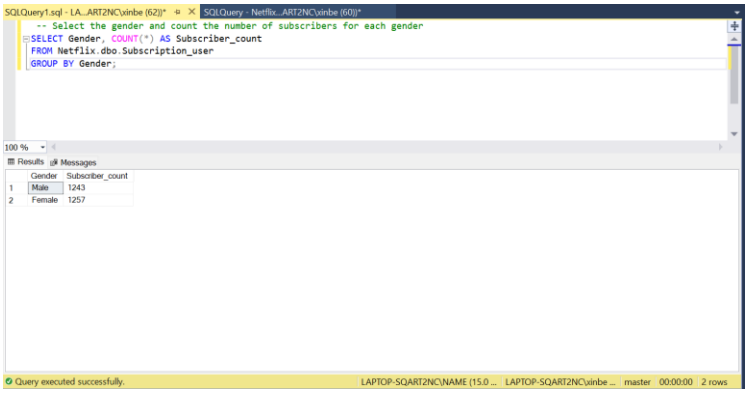


Fig3.7 Counting Subscribers for Each Gender

We check for subscribers who joined in 2021 and are still active in the Netflix dataset as Fig3.8 shows.

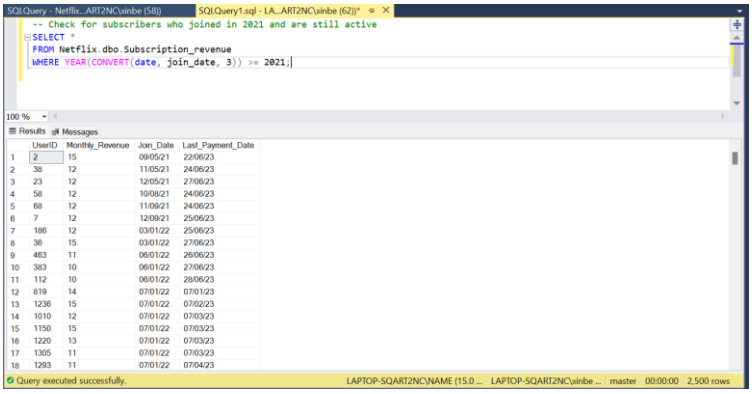


Fig3.8 Checking Subscribers Joining in 2021

We identify the most common subscription type among users in the Netflix dataset. The query provides a clear view of the distribution of subscription types, highlighting the most common type at the top of the list based on user counts. As Fig3.9 shows that most people choose the basic subscription type while fewer people choose the premium subscription type.

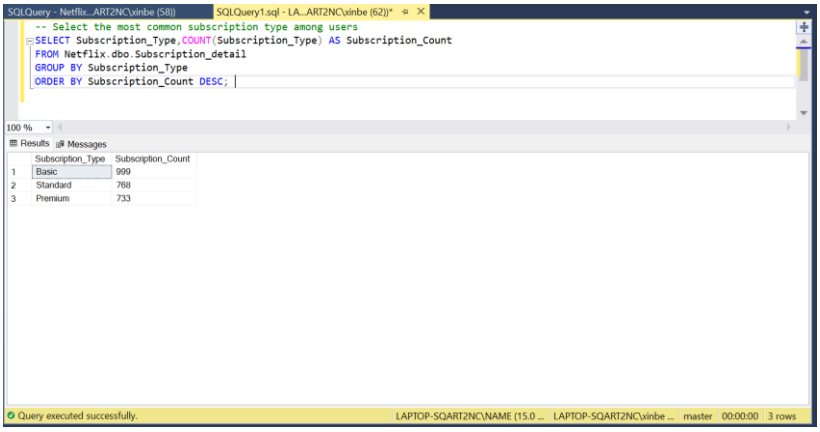


Fig3.9 Most Common Subscription Type

We count the number of users from the United States in the Netflix dataset. As Fig3.10 shows We find that there are a total of 451 users from the United States.

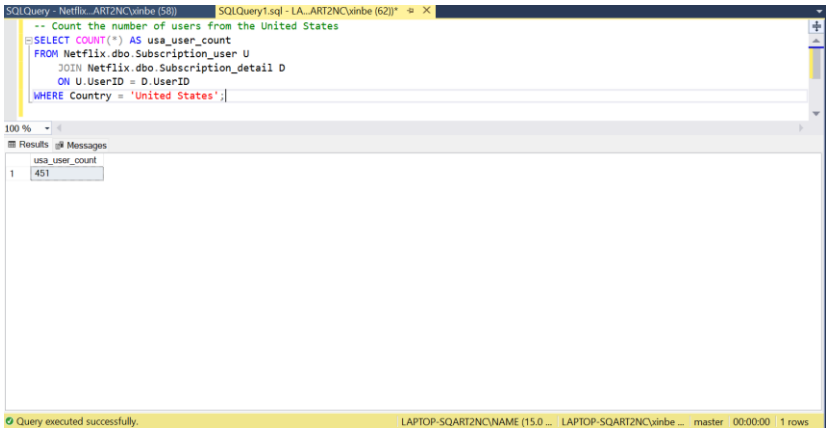


Fig3.10 Counting Users from United States

We calculate the average age of users as Fig3.11 shows. This query offers a concise metric for understanding the central tendency of user ages in the analyzed subscription data. The result shows that the average age is 38.8.

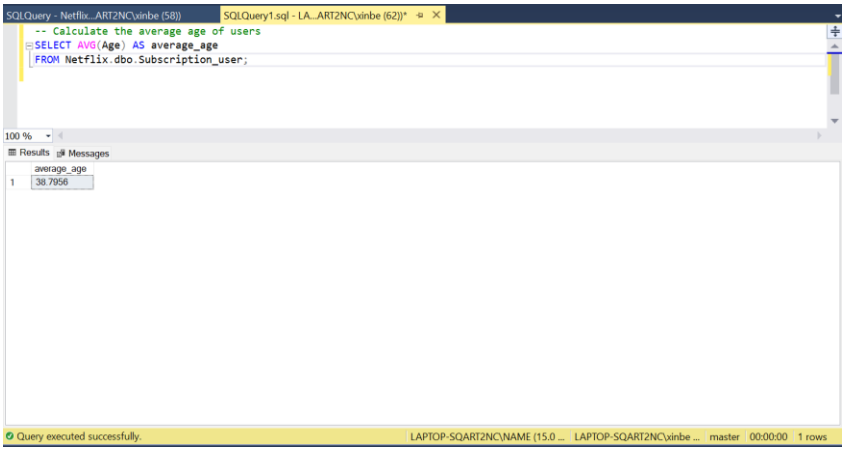


Fig3.11 Calculating Average Age of Users

We identify the country with the highest monthly revenue as Fig3.12 shows. As a result, the query provides a clear view that the United States contributes the highest monthly revenue to Netflix based on the aggregated data while Mexico contributes the lowest.

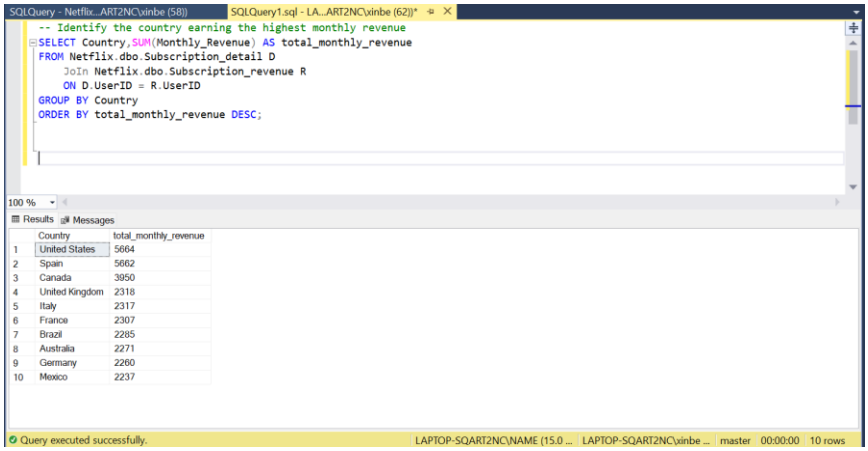


Fig3.12 Identifying Country Earning Highest Monthly Revenue

Moreover, we use three user-defined functions for analysis within the context of Netflix user data. The first function(Fig 3.13), CalculateAge, determines a user's age based on their join date and last payment date, employing intricate date calculations to yield accurate results. The second function(Fig 3.14) calculates the total revenue for a specified subscription type, enhancing the ability to analyze revenue metrics dynamically. The third function(Fig 3.15) computes the average age of users from a specified country, showcasing the versatility of scalar functions in extracting nuanced demographic insights. These functions are then applied by providing calculated ages, GetMonthly_Revenue offering a monthly revenue metric for the 'Basic' subscription type, and GetAverageAgeByCountryV2 yielding the average age for users from the United States. The functions contribute to a more detailed and dynamic exploration of user demographics and subscription-based financial metrics within the dataset.

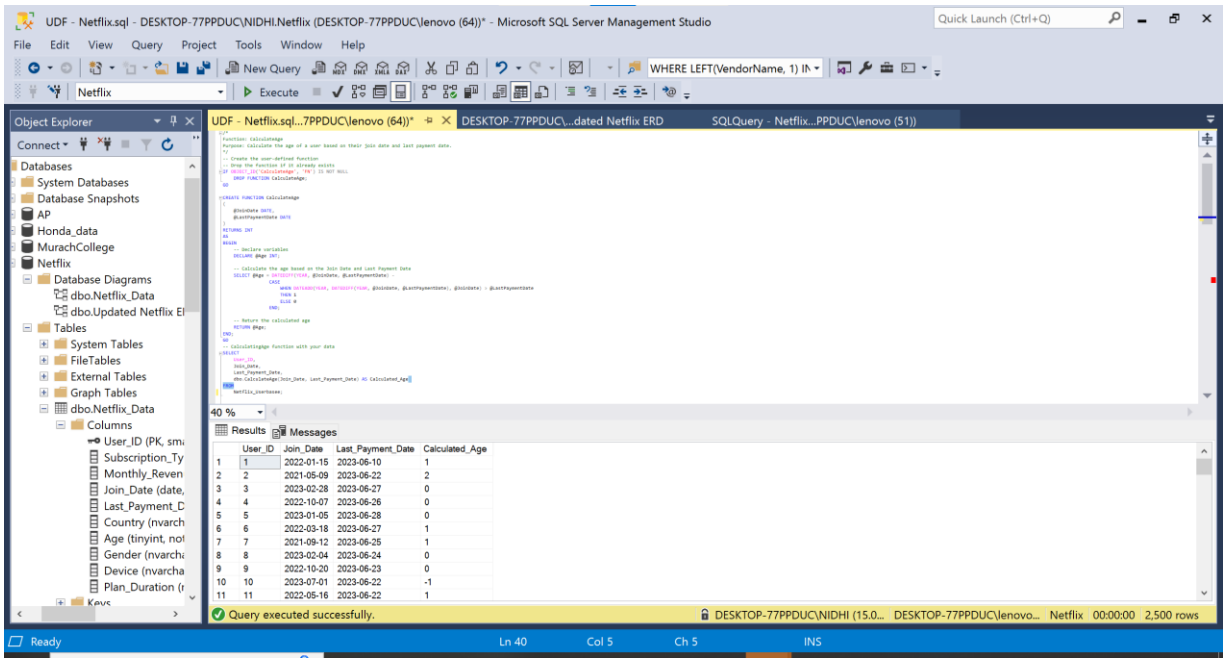


Fig3.13 CalculateAge Function

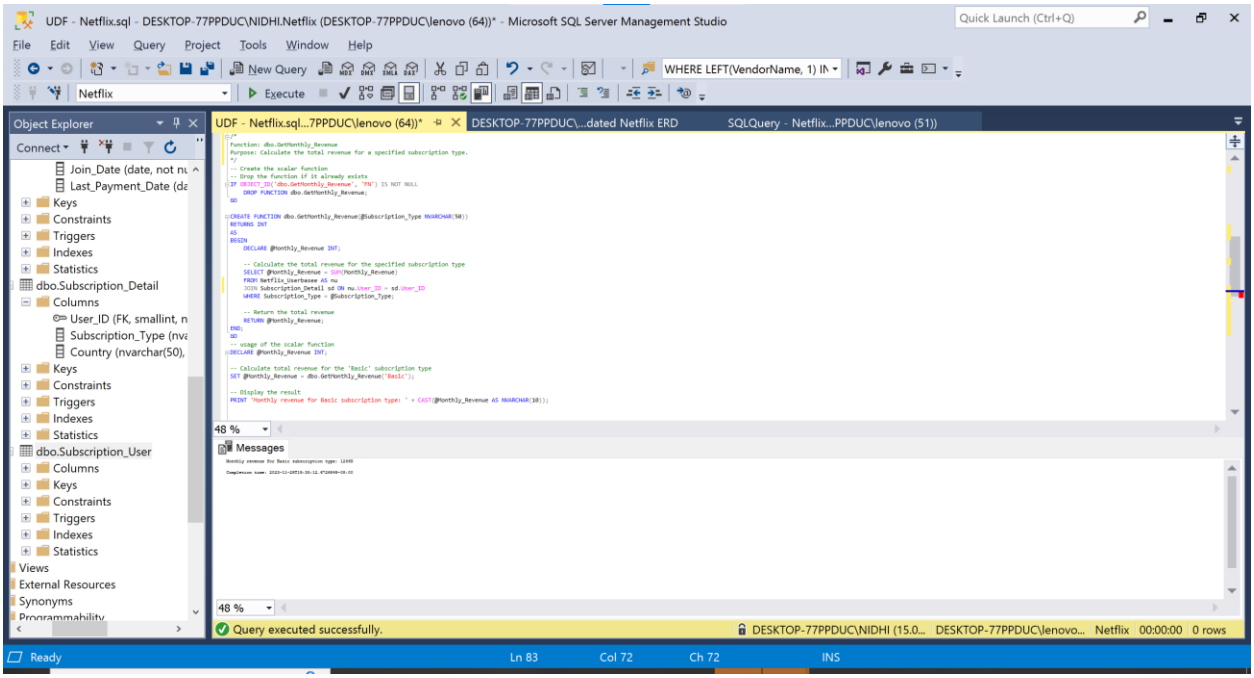


Fig3.14 Calculating Total Revenue Function

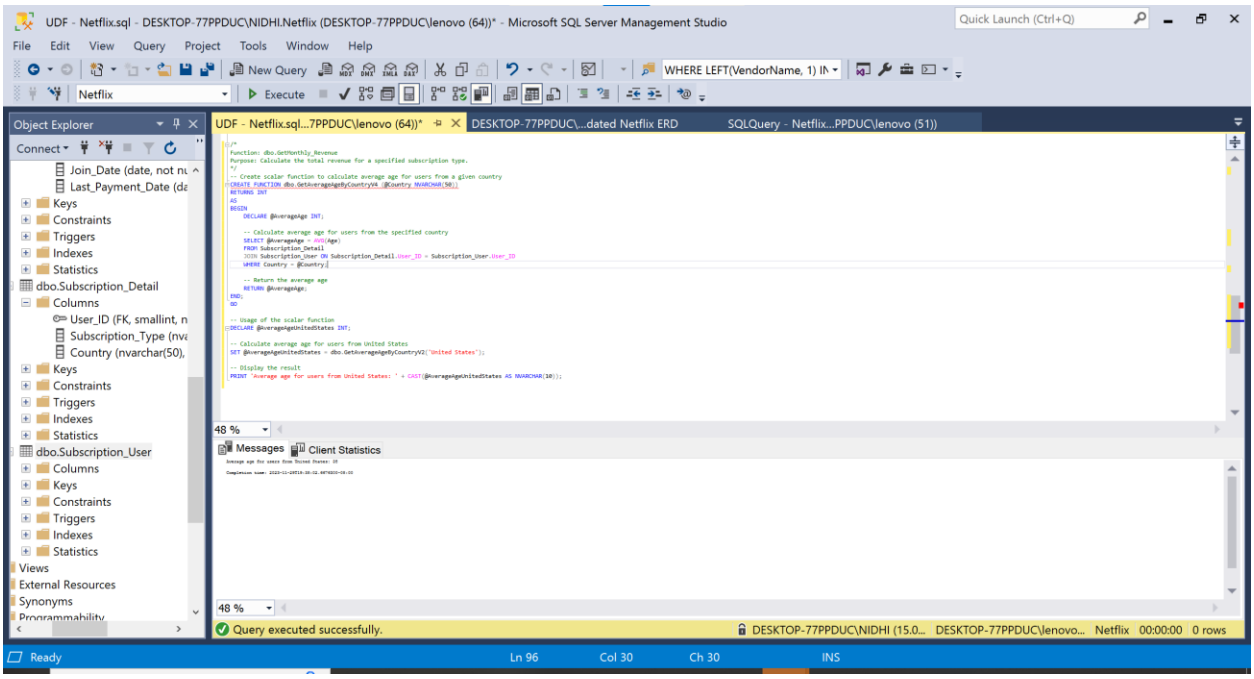


Fig3.15 Computing Average Age Function

We also use stored procedures presented to serve specific analytical purposes within the Netflix user dataset. The first procedure(Fig3.16) retrieves user information based on specified country and subscription types. The second(Fig 3.17) identifies users with premium subscriptions before a specified date, enabling temporal analyses. The third(Fig3.18) allows for targeted exploration by extracting user data with a specified subscription type and age range. The fourth(Fig3.19) aggregates revenue metrics based on user age. The fifth(Fig3.20) provides a multidimensional approach by extracting country and gender-specific data within a given age range. These procedures offer a tailored suite of functionalities for focused and meaningful analyses aligned with specific research objectives within the Netflix user dataset.

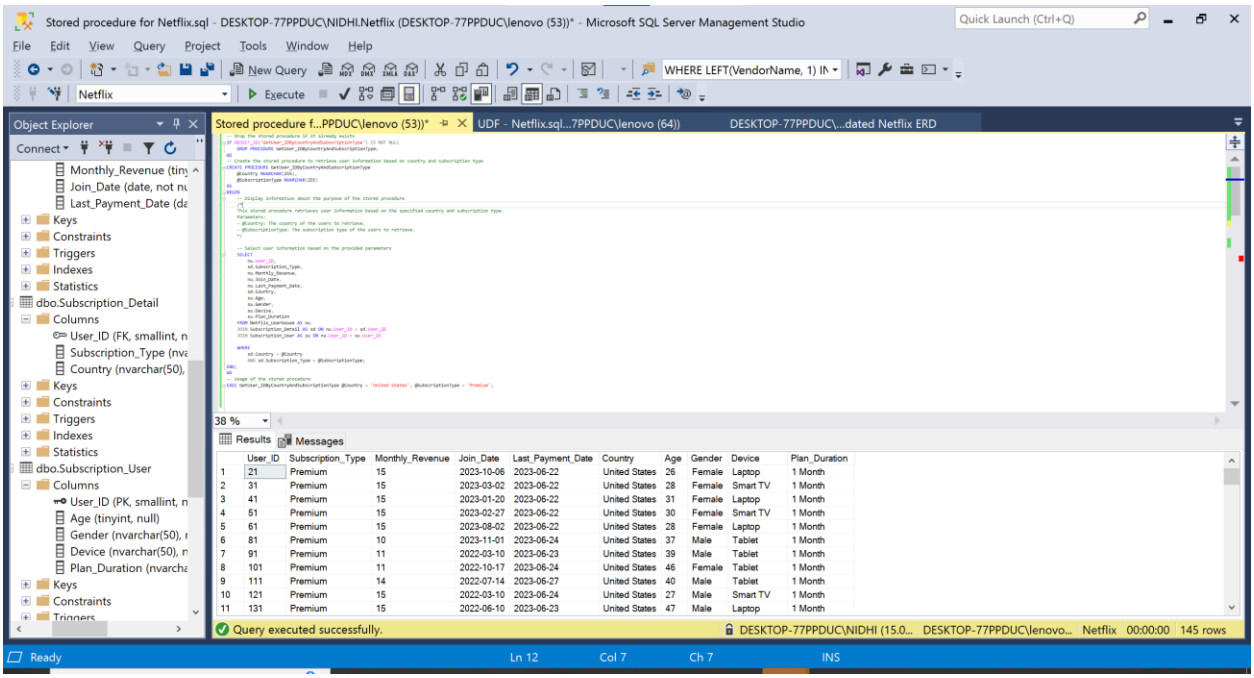


Fig3.16 Retrieving User Information Based on Specific Country and Subscription Type

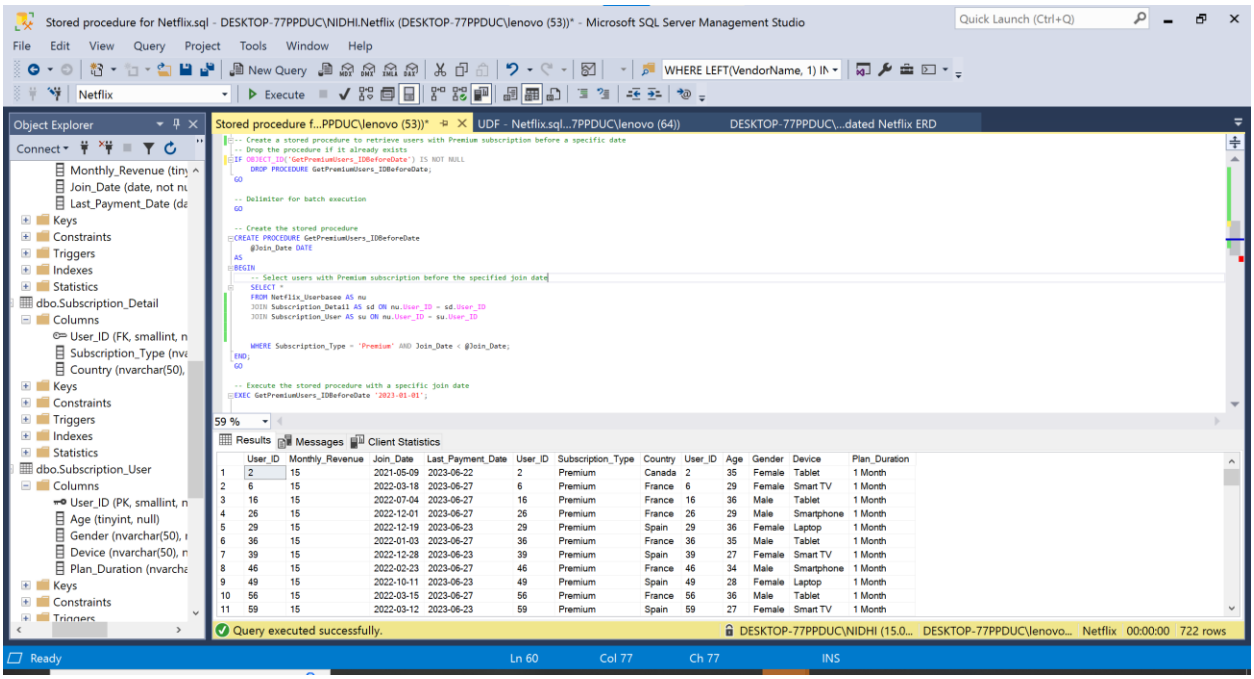


Fig3.17 Identifying Users with Premium Subscriptions Before a Specified Date

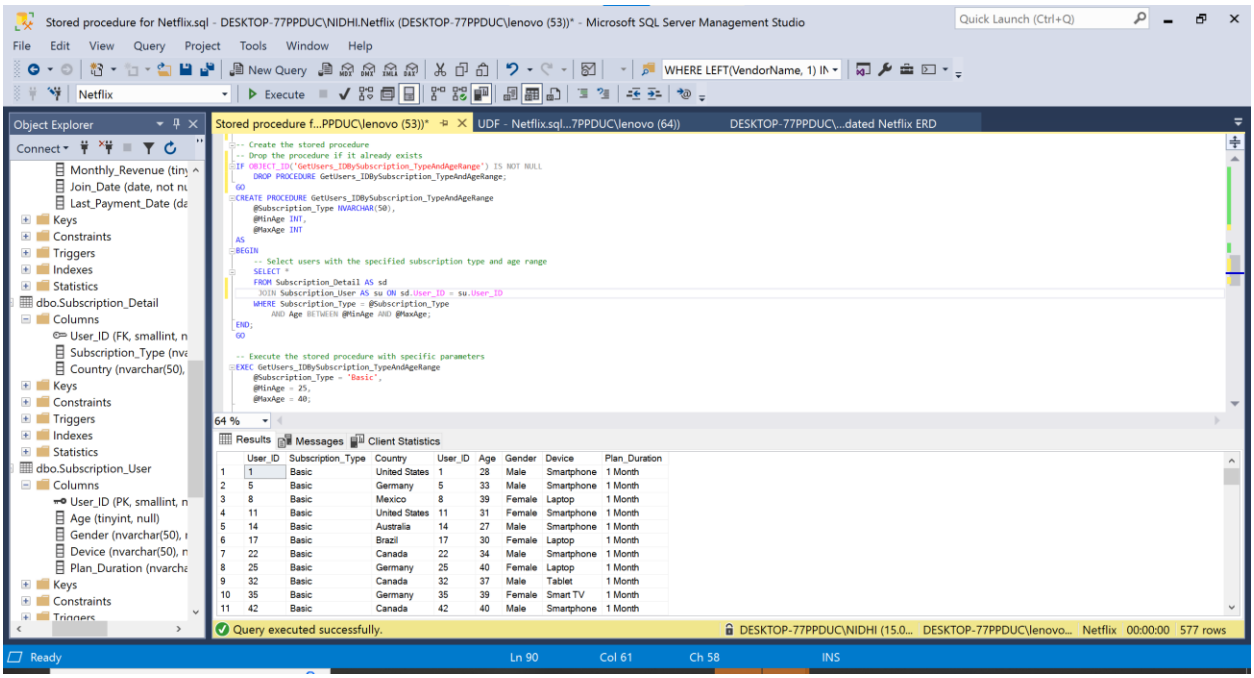


Fig3.18 Extracting User Data with a Specified Subscription Type and Age Range

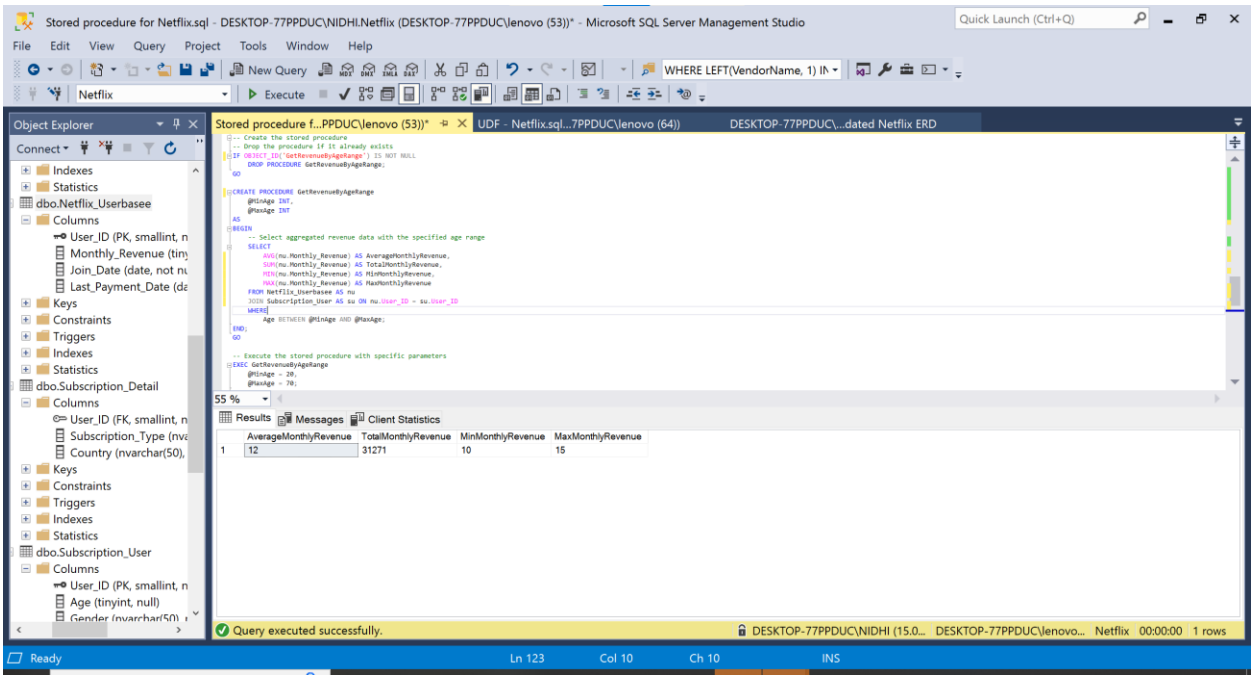


Fig3.19Aggregating Revenue Metrics based on User Age

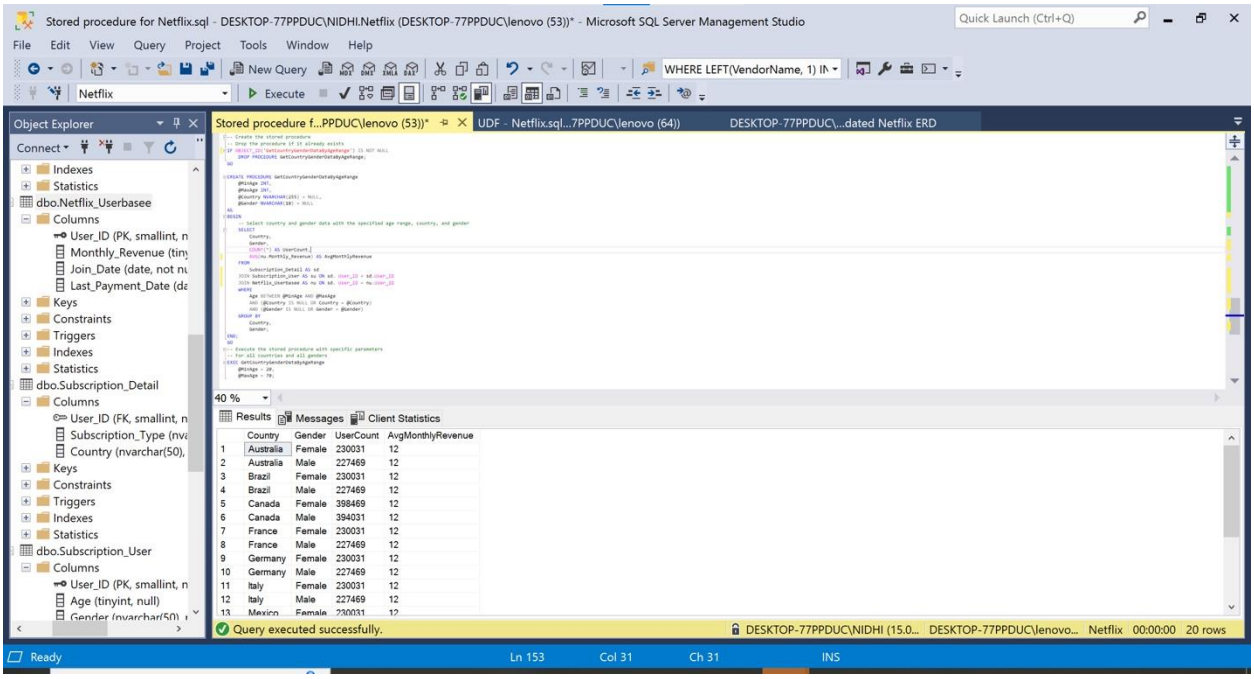


Fig3.20 Extracting Country and Gender-specific Data

4. Summaries

In this comprehensive exploration of Netflix user data using SQL, we initiated our analysis by retrieving all columns and rows from tables, offering a holistic snapshot of user subscription details and demographic information. Subsequent queries delved into revenue analysis, demographic insights on gender and premium subscriptions, device usage patterns, and user subscriptions based on gender, providing nuanced perspectives on user behavior. Examining subscribers who joined in 2021 and their activity status added a temporal dimension to our analysis. Identifying the most common subscription type sheds light on user preferences, revealing a prevalent inclination towards the basic subscription type. Furthermore, we quantified the number of U.S. users, calculated the average user age, and pinpointed the country contributing the highest monthly revenue. These findings collectively form a comprehensive narrative, offering insights into user preferences, revenue dynamics, and regional contributions, contributing to a nuanced understanding of Netflix's diverse user base.

5. Assumptions

In our analysis, several underlying assumptions have been considered to contextualize and interpret the results effectively. We assume that the dataset maintains a high level of consistency and integrity, free from significant anomalies or errors and that foreign key relationships between tables are appropriately established. Additionally, our analysis presumes that the "Subscription_Type" column primarily consists of categories such as 'Basic,' 'Standard,' and 'Premium,' excluding other potential subscription types. The definition of 'active' users in the query assessing subscribers who joined in 2021 is assumed to be contingent upon the absence of specific deactivation or termination status. Moreover, the "Device" column in queries

related to device analysis is assumed to represent consistent and distinct device types without variations. Our revenue calculations rely on the accuracy of the "Monthly_Revenue" column, while queries involving country-specific analysis assume that the "Country" column accurately reflects user geography. Other assumptions encompass gender classification, join date format, data representativeness as a synthetic sample, and accurate user age data. It is crucial to acknowledge and document these assumptions, as they shape the context in which our analysis unfolds and influence the interpretations derived from the dataset.

6. References

[1] Netflix. "About Netflix." (https://about.netflix.com/en)

[2] Dredge, S. (2017, August 24). "How Netflix's Recommendation System Works." The Guardian.

[3] Holloway, D. (2019, January 2). "How Netflix Is Using Big Data." Forbes.