"CUSTOMER BEHAVIOR ANALYSIS AND INSIGHTS GENERATION USING SQL"

This project is composed of the following:

Introduction: Provides an overview of the project's objectives and scope.

Objective 01: I conducted a thorough analysis using seven queries to gain a deeper understanding of the "menu_items" table, including its structure, and data distribution.

Objective 02: I performed examination of the "order_details" table by executing a series of six queries to delve into the table's content and structure.

Objective 03: I delved into the world of customer behavior, examining the patterns and trends that shape their interactions with our business. To achieve this, I executed approximately five queries that provided valuable insights

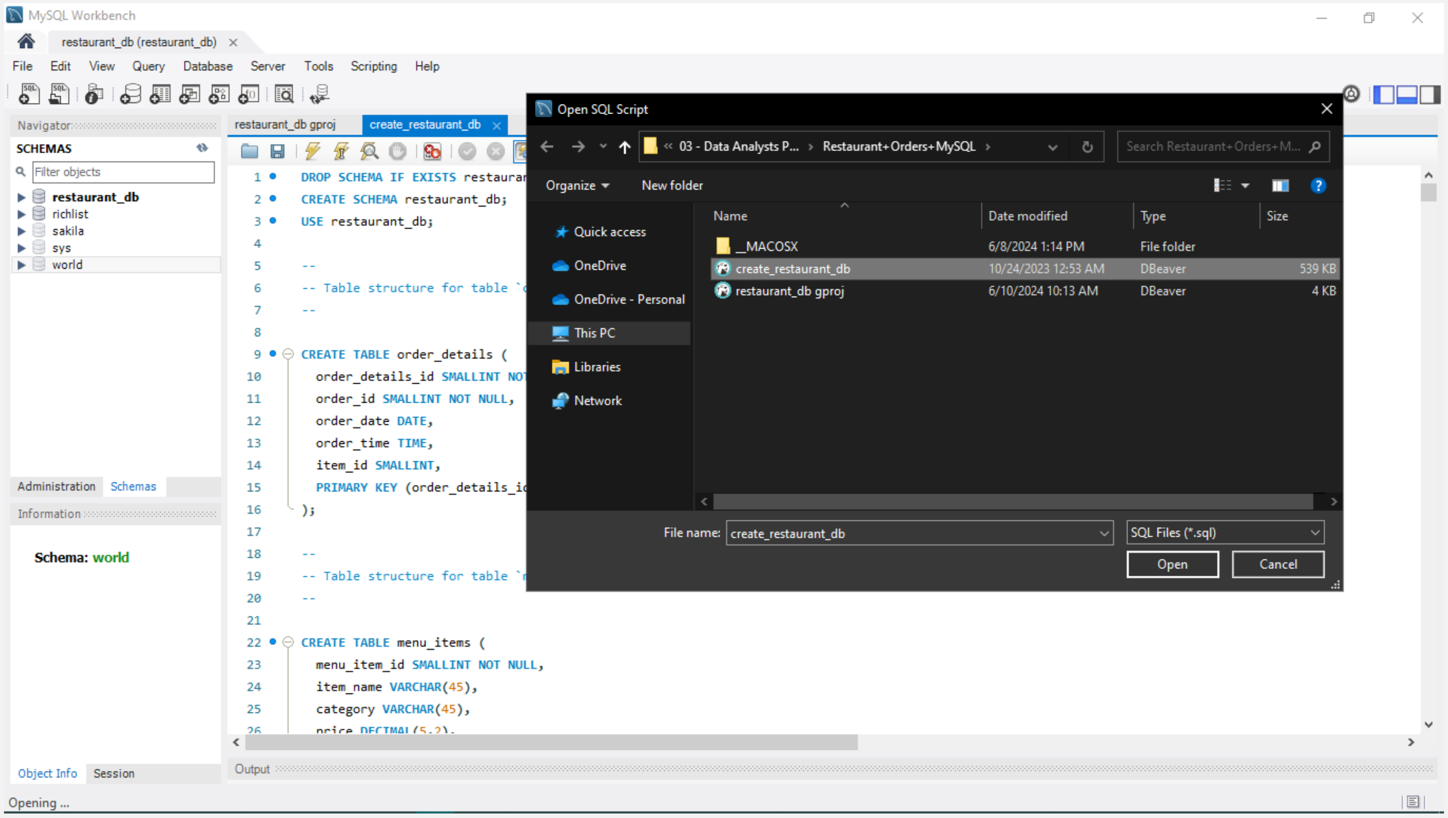
Summary of Findings: I organized a concise overview of the main results derived from SQL queries.

Key Insights: The critical observations or revelations derived from the summary of findings. These insights provide actionable information and guide decision-making.

INTRODUCTION

This project leverages SQL to extract valuable insights from a database by analyzing data stored in two tables: menu_items and order_details. To accomplish this, I utilized MySQL Workbench, a powerful software tool, to execute SQL queries and access the information stored in the database.

The menu_items table contains detailed information about the menu items, including their menu_item_id, item_name, category, and price. This table provides a comprehensive overview of the menu offerings, allowing for analysis of menu structure, pricing, and item diversity. The order_details table, on the other hand, contains records of order_details_id, order_id, order_date, order_time and item_id,

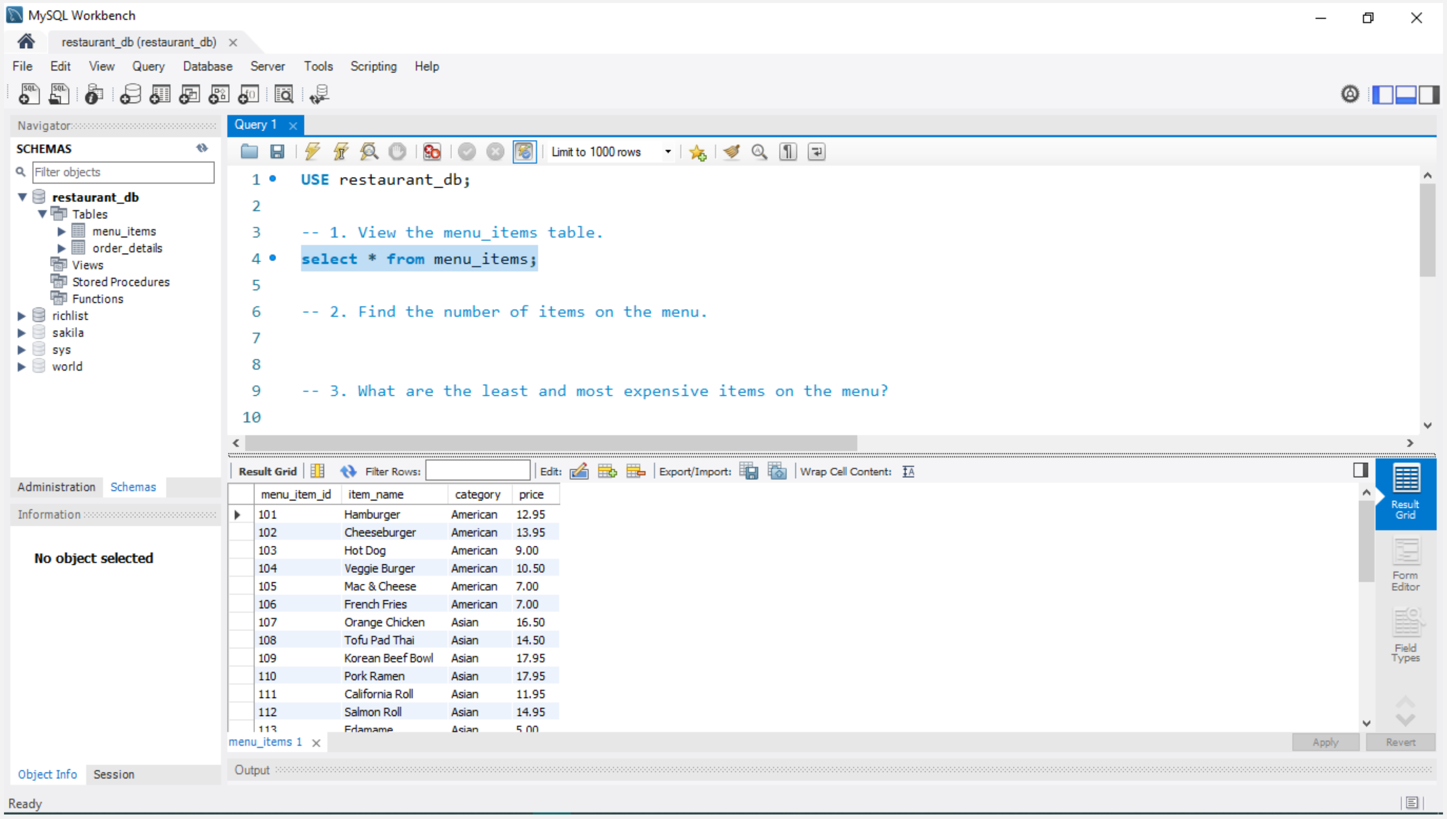


```
DROP SCHEMA IF EXISTS restaurar
CREATE SCHEMA restaurant_db;
USE restaurant_db;

--
-- Table structure for table `c
--

CREATE TABLE order_details (
  order_details_id SMALLINT NOT
  order_id SMALLINT NOT NULL,
  order_date DATE,
  order_time TIME,
  item_id SMALLINT,
  PRIMARY KEY (order_details_ic
);

--
-- Table structure for table `r
--

CREATE TABLE menu_items (
  menu_item_id SMALLINT NOT NULL,
  item_name VARCHAR(45),
  category VARCHAR(45),
  price DECIMAL(5,2),
```

Name	Date modified	Type	Size
__MACOSX	6/8/2024 1:14 PM	File folder	
create_restaurant_db	10/24/2023 12:53 AM	DBeaver	539 KB
restaurant_db gproj	6/10/2024 10:13 AM	DBeaver	4 KB

OBJECTIVE 01:

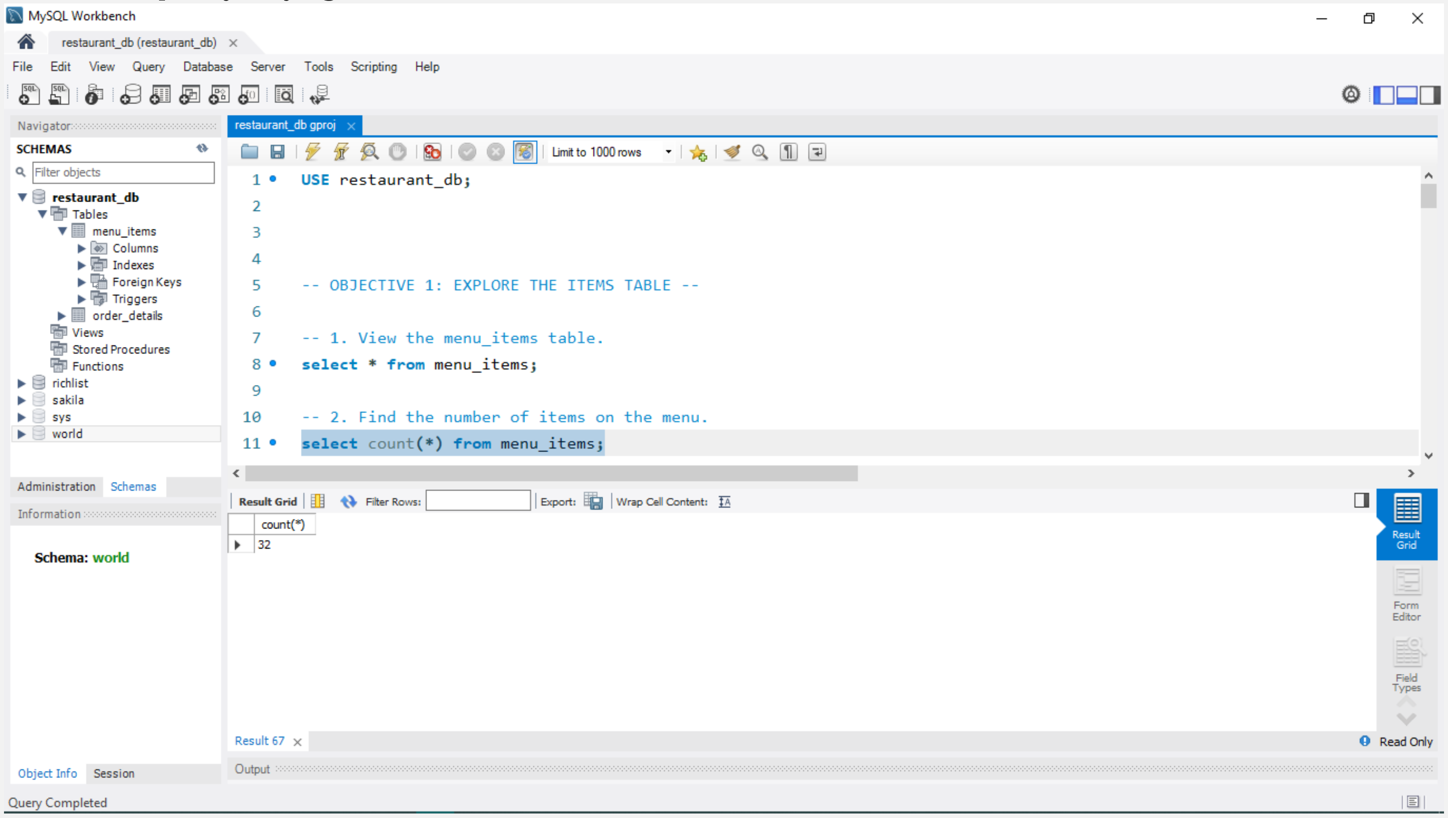
I viewed the content of the “menu_items” table to gain insights into the type of data I’ll be working with.



```sql
USE restaurant_db;

-- 1. View the menu_items table.
select * from menu_items;

-- 2. Find the number of items on the menu.


-- 3. What are the least and most expensive items on the menu?

```

menu_item_id	item_name	category	price
101	Hamburger	American	12.95
102	Cheeseburger	American	13.95
103	Hot Dog	American	9.00
104	Veggie Burger	American	10.50
105	Mac & Cheese	American	7.00
106	French Fries	American	7.00
107	Orange Chicken	Asian	16.50
108	Tofu Pad Thai	Asian	14.50
109	Korean Beef Bowl	Asian	17.95
110	Pork Ramen	Asian	17.95
111	California Roll	Asian	11.95
112	Salmon Roll	Asian	14.95
113	Edamame	Asian	5.00

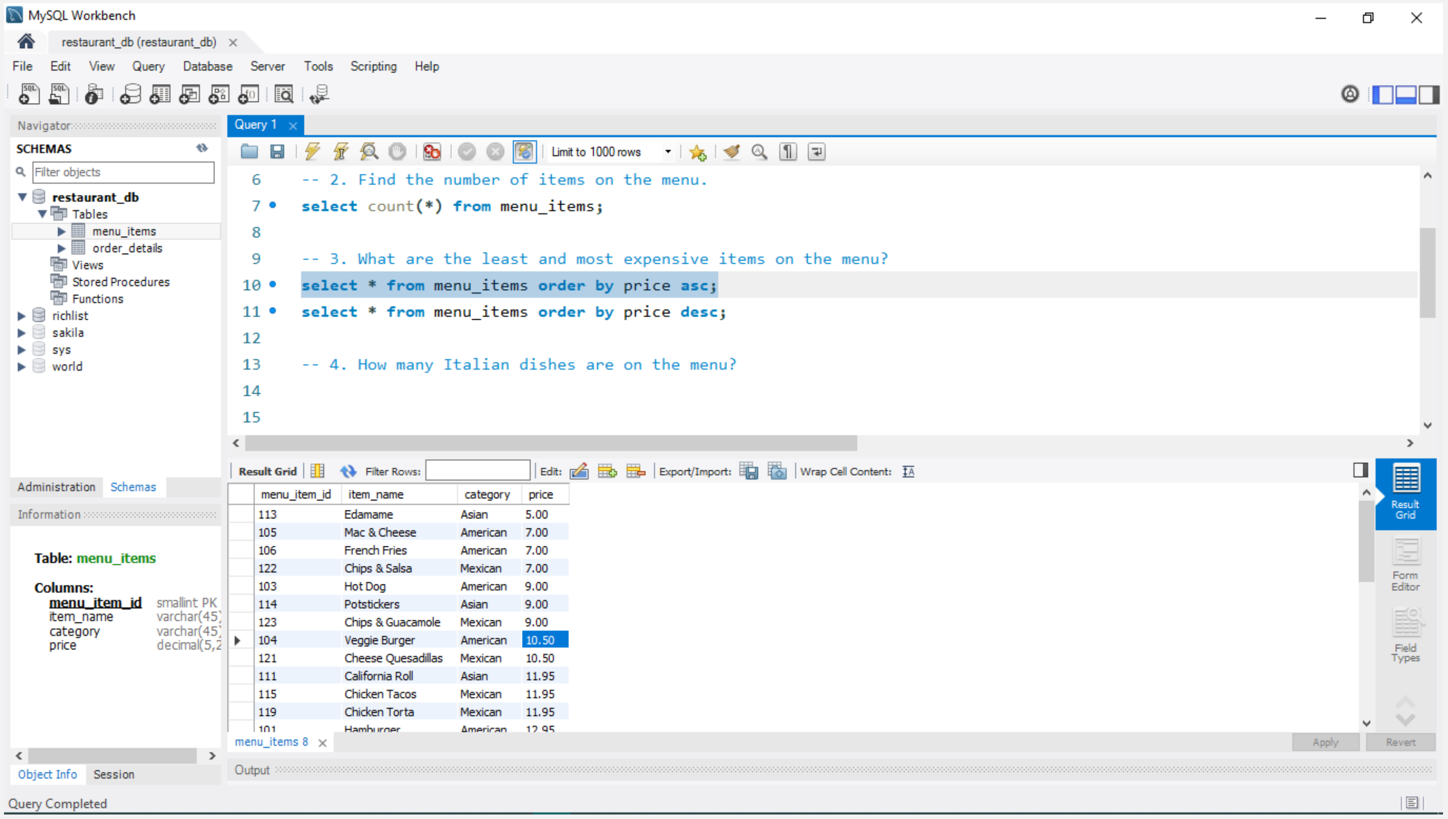
I delved deeper by tallying the number of items on the menu.



```sql
USE restaurant_db;



-- OBJECTIVE 1: EXPLORE THE ITEMS TABLE --

-- 1. View the menu_items table.
select * from menu_items;

-- 2. Find the number of items on the menu.
select count(*) from menu_items;
```

```
count(*)
32
```

I found that “Edamame” and the Asian menu items were the least expensive on the menu.



```
-- 2. Find the number of items on the menu.
select count(*) from menu_items;

-- 3. What are the least and most expensive items on the menu?
select * from menu_items order by price asc;
select * from menu_items order by price desc;

-- 4. How many Italian dishes are on the menu?
```

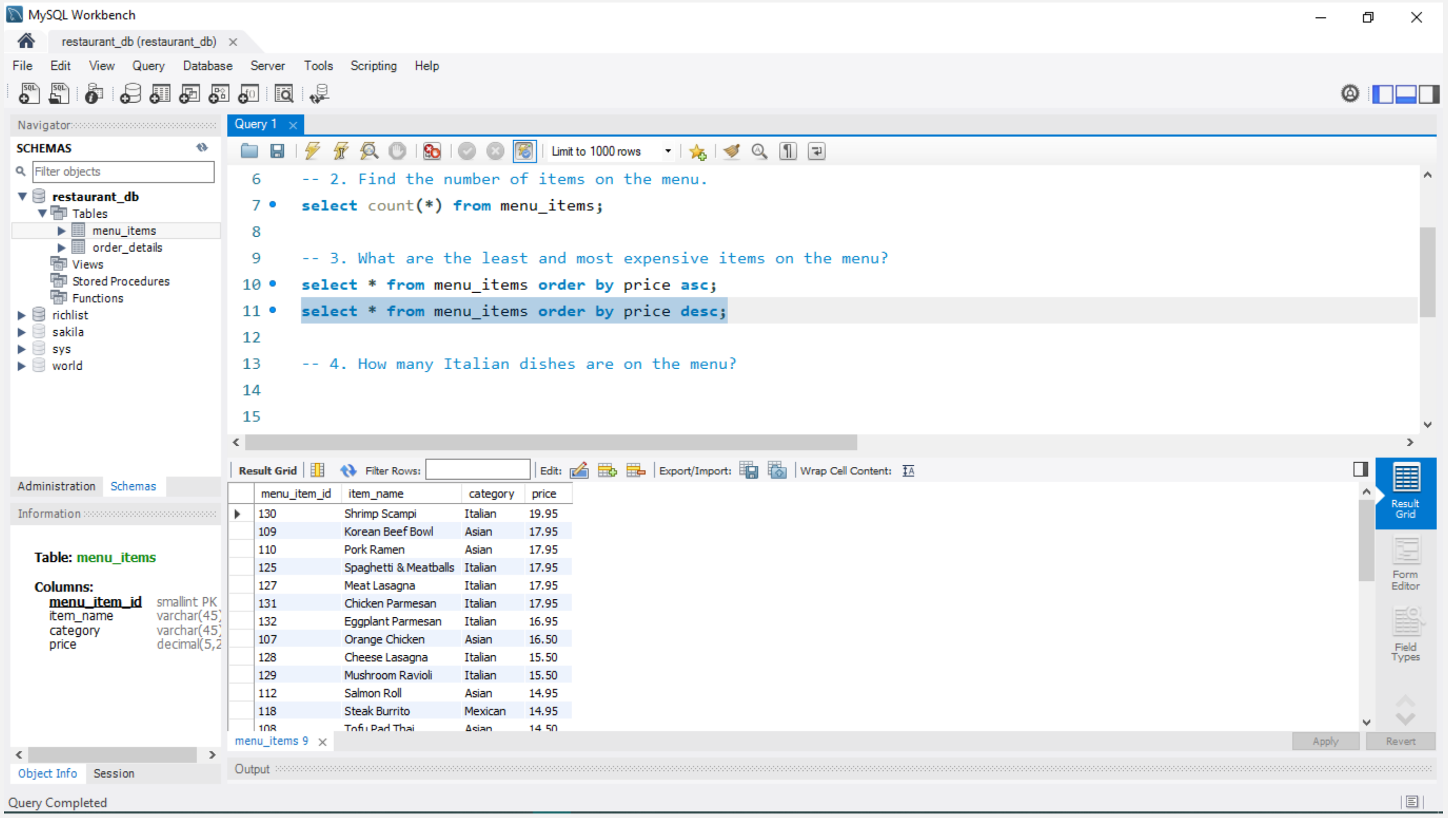
Table: menu_items

Columns:

menu_item_id	smallint PK
item_name	varchar(45)
category	varchar(45)
price	decimal(5,2

menu_item_id	item_name	category	price
113	Edamame	Asian	5.00
105	Mac & Cheese	American	7.00
106	French Fries	American	7.00
122	Chips & Salsa	Mexican	7.00
103	Hot Dog	American	9.00
114	Potstickers	Asian	9.00
123	Chips & Guacamole	Mexican	9.00
104	Veggie Burger	American	10.50
121	Cheese Quesadillas	Mexican	10.50
111	California Roll	Asian	11.95
115	Chicken Tacos	Mexican	11.95
119	Chicken Torta	Mexican	11.95
101	Hamburger	American	12.95

I determined that Shrimp Scampi from the Italian menu was the most expensive item on the menu.



```
-- 2. Find the number of items on the menu.
select count(*) from menu_items;

-- 3. What are the least and most expensive items on the menu?
select * from menu_items order by price asc;
select * from menu_items order by price desc;

-- 4. How many Italian dishes are on the menu?
```

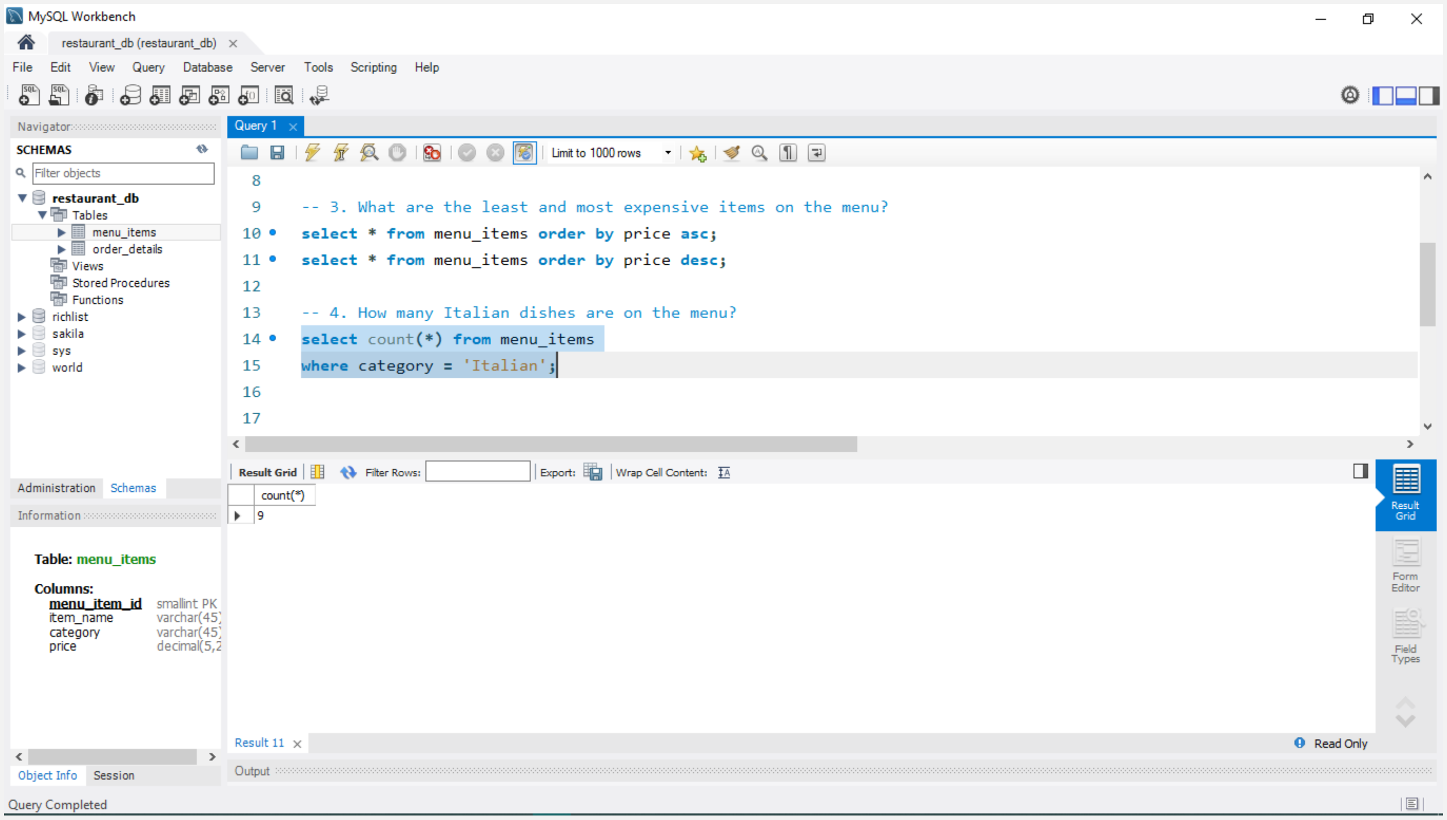
Table: menu_items

Columns:

menu_item_id	smallint PK
item_name	varchar(45)
category	varchar(45)
price	decimal(5,2

menu_item_id	item_name	category	price
130	Shrimp Scampi	Italian	19.95
109	Korean Beef Bowl	Asian	17.95
110	Pork Ramen	Asian	17.95
125	Spaghetti & Meatballs	Italian	17.95
127	Meat Lasagna	Italian	17.95
131	Chicken Parmesan	Italian	17.95
132	Eggplant Parmesan	Italian	16.95
107	Orange Chicken	Asian	16.50
128	Cheese Lasagna	Italian	15.50
129	Mushroom Ravioli	Italian	15.50
112	Salmon Roll	Asian	14.95
118	Steak Burrito	Mexican	14.95
108	Tofu Pad Thai	Asian	14.50

I identified there are 9 Italian dishes out of the 32 total dishes.



```
-- 3. What are the least and most expensive items on the menu?
select * from menu_items order by price asc;
select * from menu_items order by price desc;

-- 4. How many Italian dishes are on the menu?
select count(*) from menu_items
where category = 'Italian';
```

```
count(*)
9
```

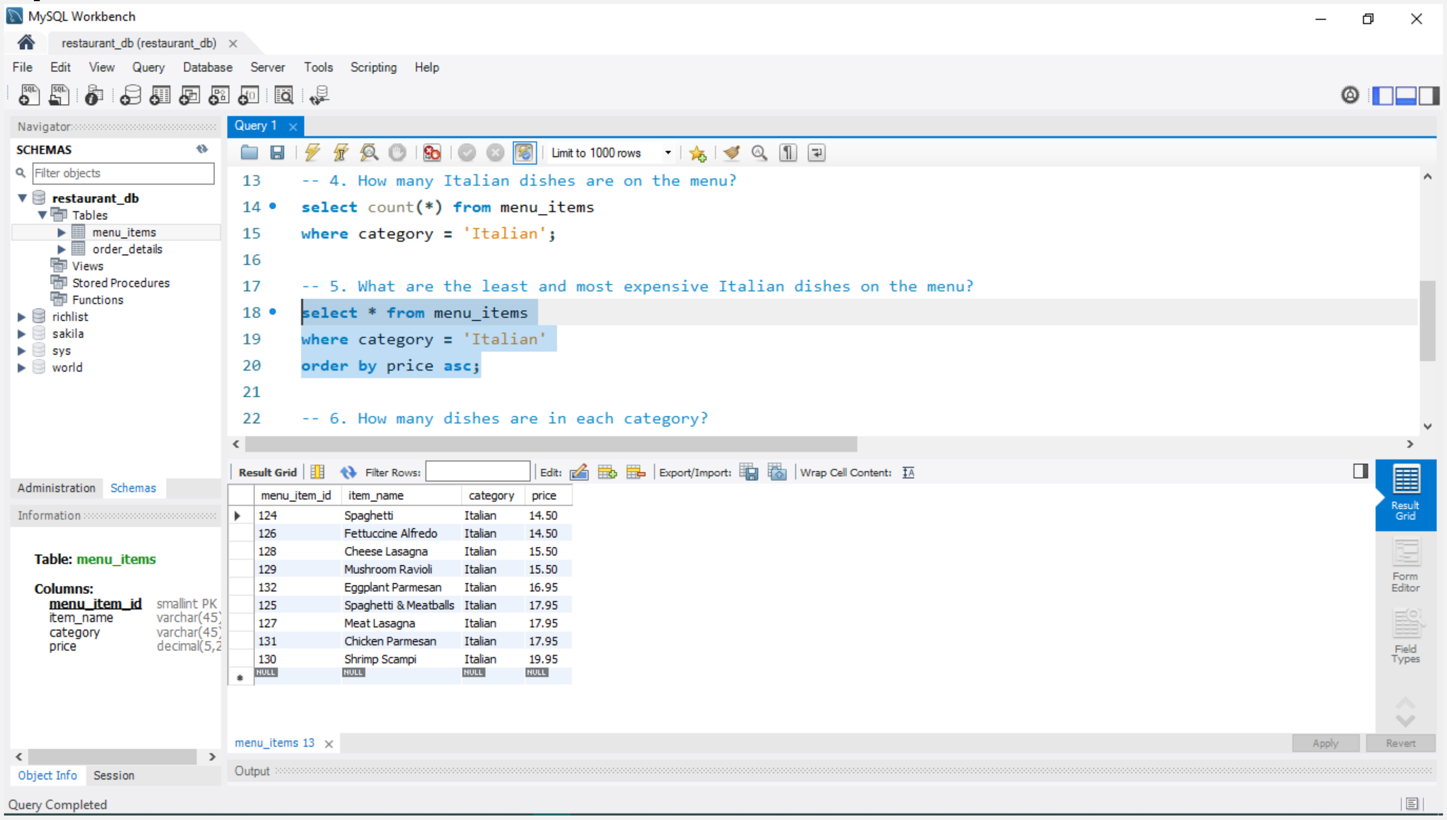
Table: menu_items

Columns:

menu_item_id	smallint PK
item_name	varchar(45)
category	varchar(45)
price	decimal(5,2

Query Completed

I determined that Spaghetti tends to be the least expensive option, while Shrimp Scampi is typically the most expensive.

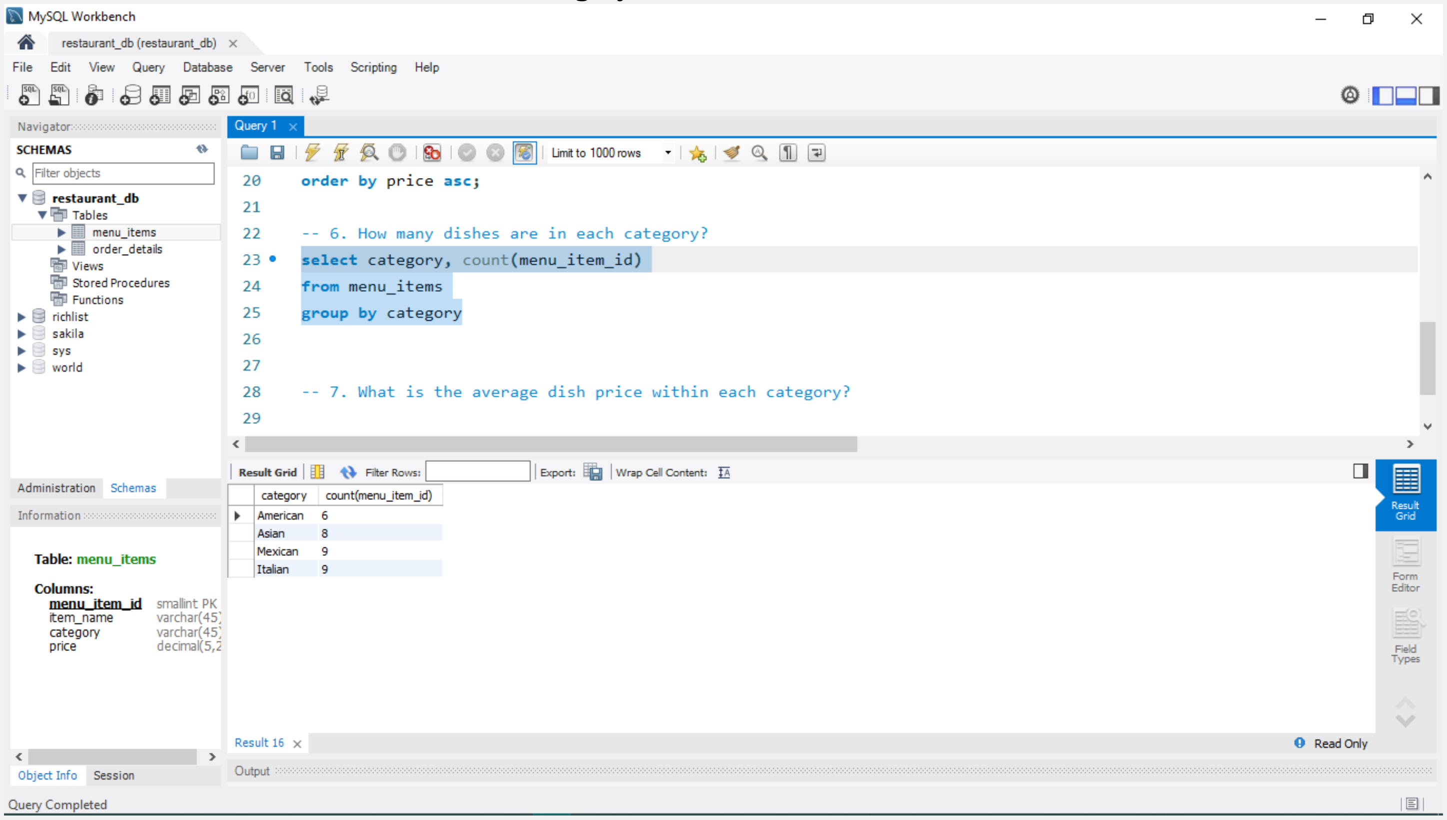


```
-- 4. How many Italian dishes are on the menu?
select count(*) from menu_items
where category = 'Italian';

-- 5. What are the least and most expensive Italian dishes on the menu?
select * from menu_items
where category = 'Italian'
order by price asc;

-- 6. How many dishes are in each category?
```

menu_item_id	item_name	category	price
124	Spaghetti	Italian	14.50
126	Fettuccine Alfredo	Italian	14.50
128	Cheese Lasagna	Italian	15.50
129	Mushroom Ravioli	Italian	15.50
132	Eggplant Parmesan	Italian	16.95
125	Spaghetti & Meatballs	Italian	17.95
127	Meat Lasagna	Italian	17.95
131	Chicken Parmesan	Italian	17.95
130	Shrimp Scampi	Italian	19.95
NULL	NULL	NULL	NULL

Query Completed

I looked for the number of dishes in each category.



```
order by price asc;

-- 6. How many dishes are in each category?
select category, count(menu_item_id)
from menu_items
group by category


-- 7. What is the average dish price within each category?
```

category	count(menu_item_id)
American	6
Asian	8
Mexican	9
Italian	9

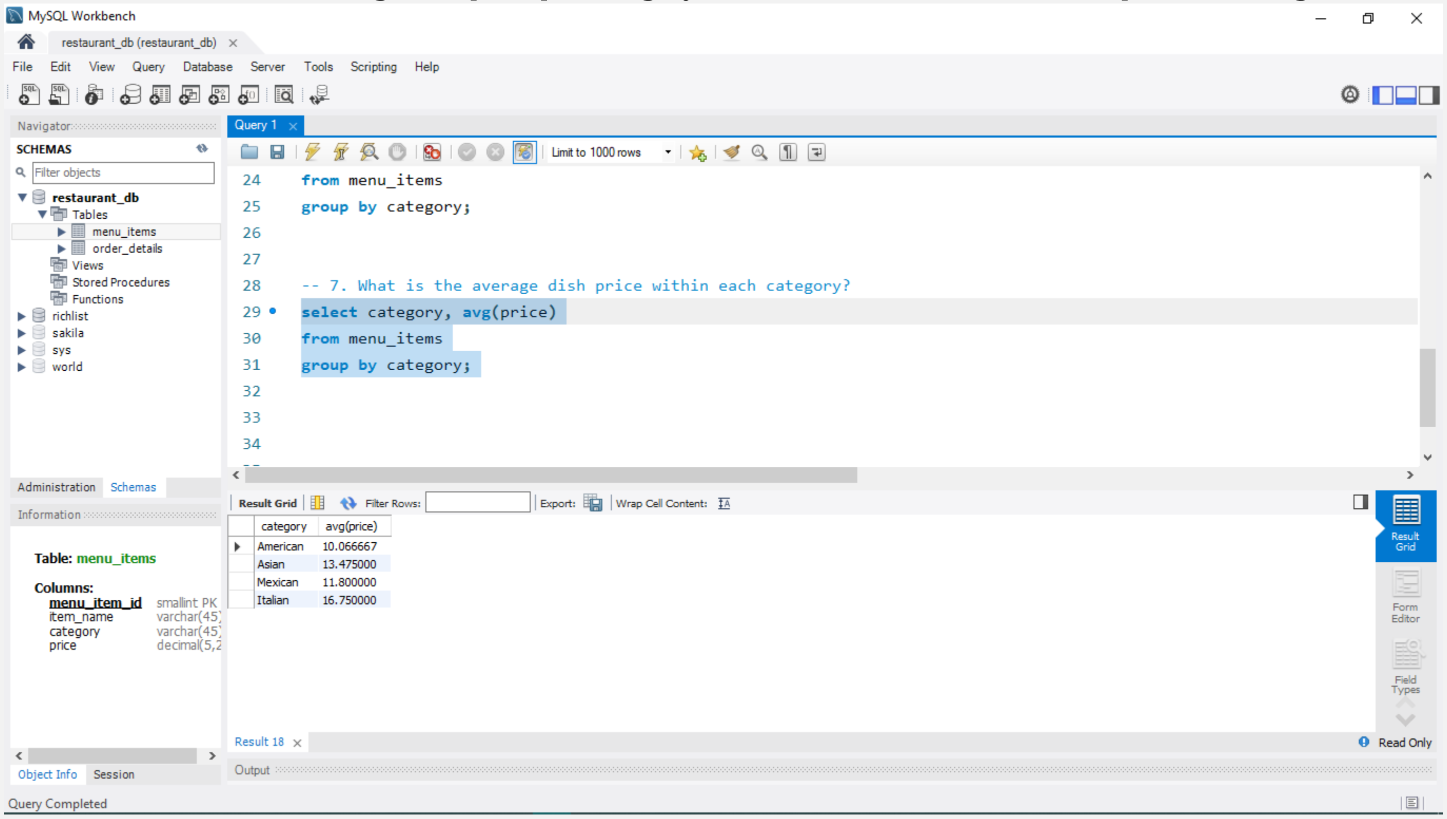
Table: menu_items

Columns:

menu_item_id	smallint PK
item_name	varchar(45)
category	varchar(45)
price	decimal(5,2

Query Completed

I wanted to look for the average dish price per category. I identified the least and most expensive average.



```
from menu_items
group by category;


-- 7. What is the average dish price within each category?
select category, avg(price)
from menu_items
group by category;
```

category	avg(price)
American	10.066667
Asian	13.475000
Mexican	11.800000
Italian	16.750000

Table: menu_items

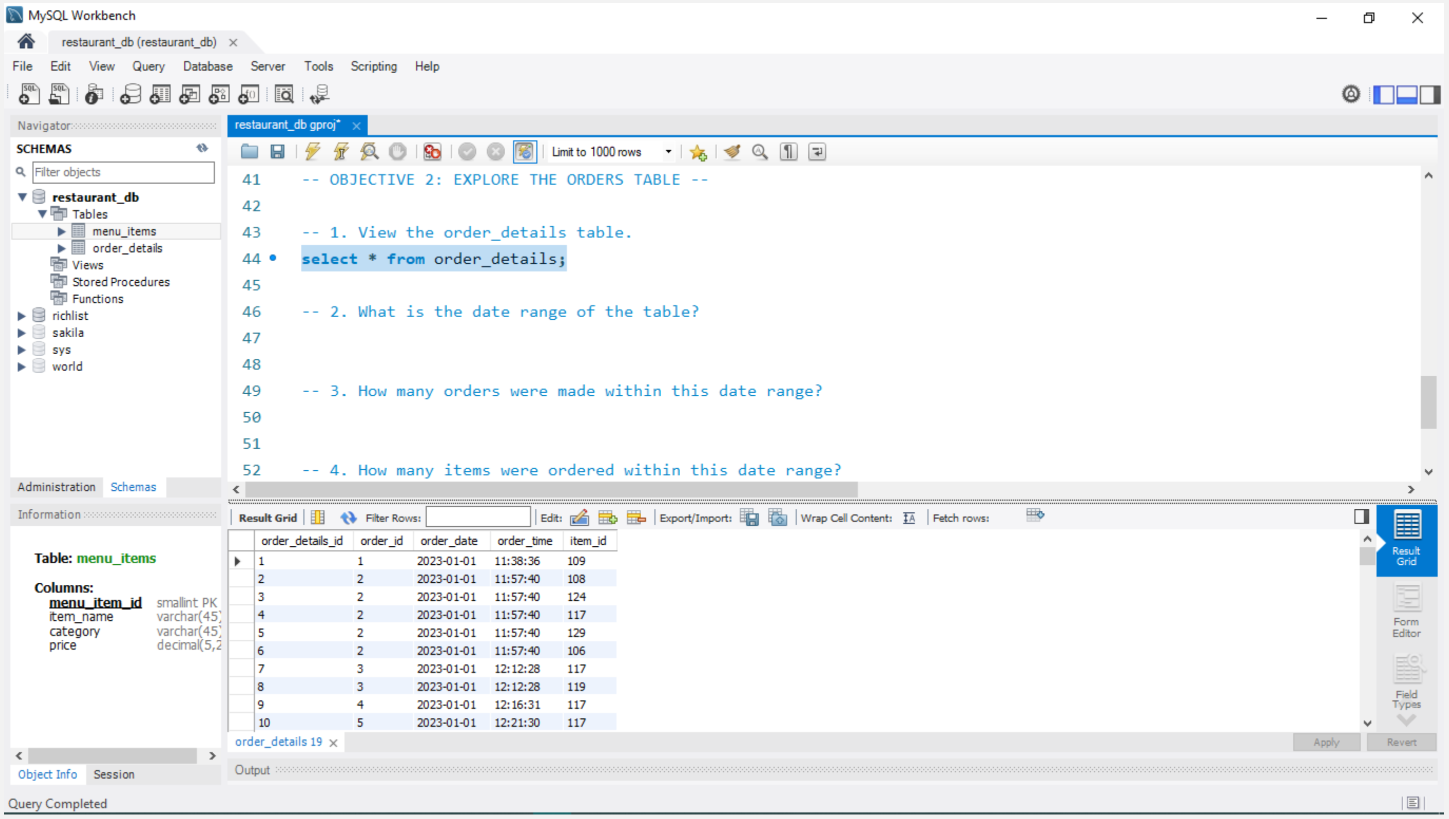
Columns:

menu_item_id	smallint PK
item_name	varchar(45)
category	varchar(45)
price	decimal(5,2

Query Completed

OBJECTIVE 02:

I viewed the content of the “order_details” table to gain insights into the type of data I’ll be working with.

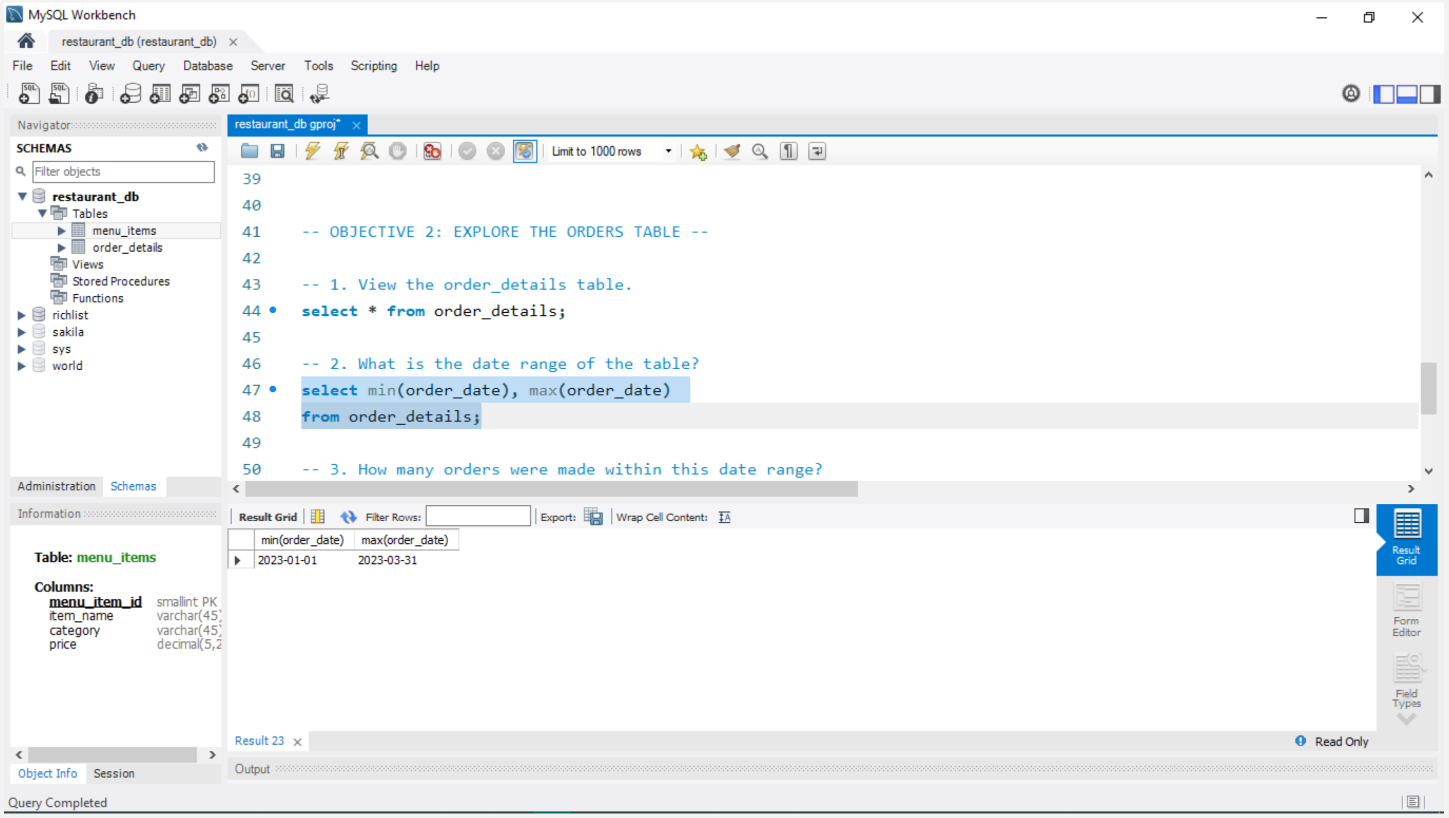


```
-- OBJECTIVE 2: EXPLORE THE ORDERS TABLE --

-- 1. View the order_details table.
select * from order_details;

-- 2. What is the date range of the table?


-- 3. How many orders were made within this date range?


-- 4. How many items were ordered within this date range?
```

order_details_id	order_id	order_date	order_time	item_id
1	1	2023-01-01	11:38:36	109
2	2	2023-01-01	11:57:40	108
3	2	2023-01-01	11:57:40	124
4	2	2023-01-01	11:57:40	117
5	2	2023-01-01	11:57:40	129
6	2	2023-01-01	11:57:40	106
7	3	2023-01-01	12:12:28	117
8	3	2023-01-01	12:12:28	119
9	4	2023-01-01	12:16:31	117
10	5	2023-01-01	12:21:30	117

Query Completed

I searched for the specific date and time when each order was placed.

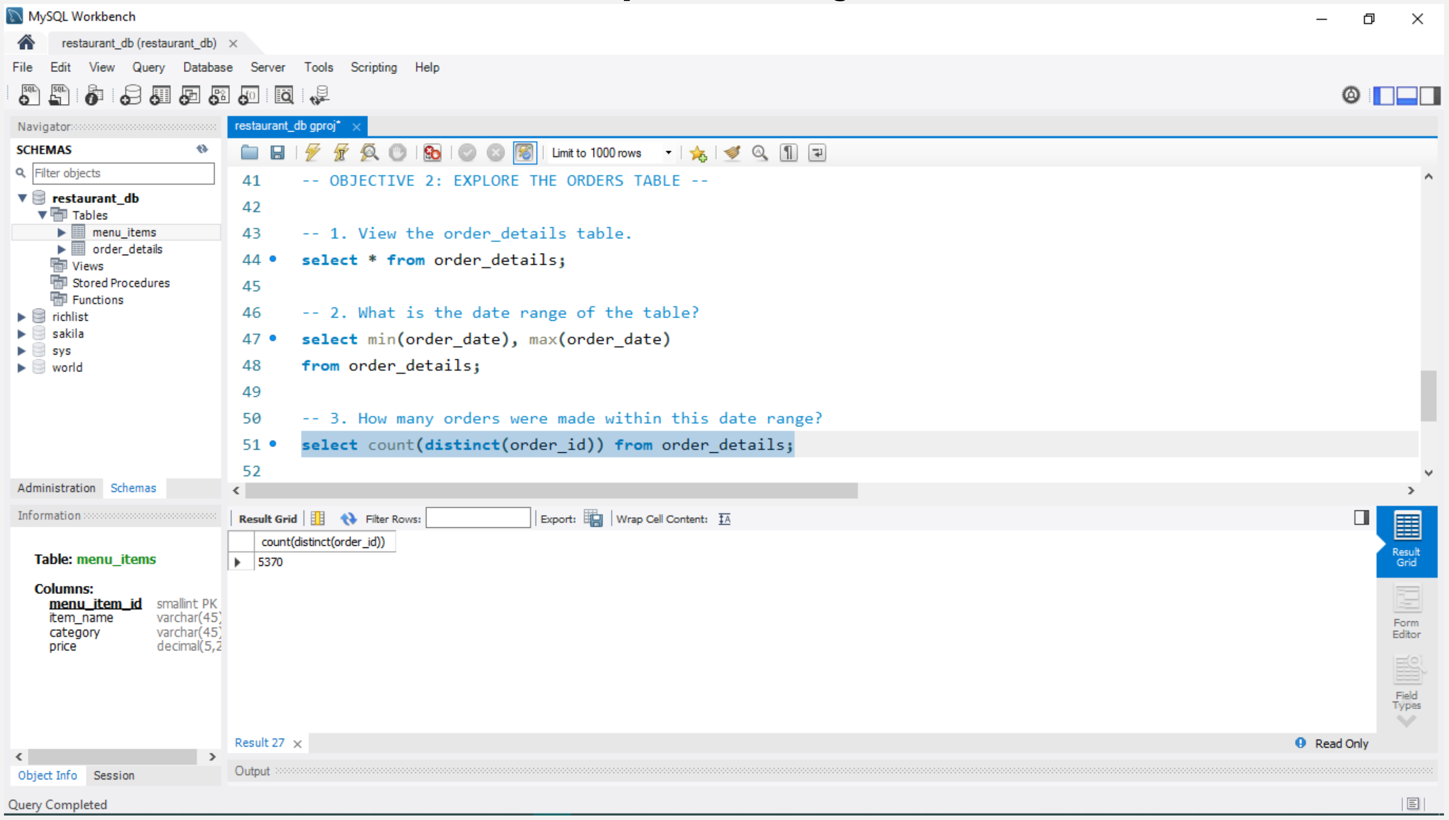


```
-- OBJECTIVE 2: EXPLORE THE ORDERS TABLE --

-- 1. View the order_details table.
select * from order_details;

-- 2. What is the date range of the table?
select min(order_date), max(order_date)
from order_details;

-- 3. How many orders were made within this date range?
```

min(order_date)	max(order_date)
2023-01-01	2023-03-31

Query Completed

A total of 5,370 orders were recorded within the specified date range.



```sql
-- OBJECTIVE 2: EXPLORE THE ORDERS TABLE --

-- 1. View the order_details table.
select * from order_details;

-- 2. What is the date range of the table?
select min(order_date), max(order_date)
from order_details;

-- 3. How many orders were made within this date range?
select count(distinct(order_id)) from order_details;
```

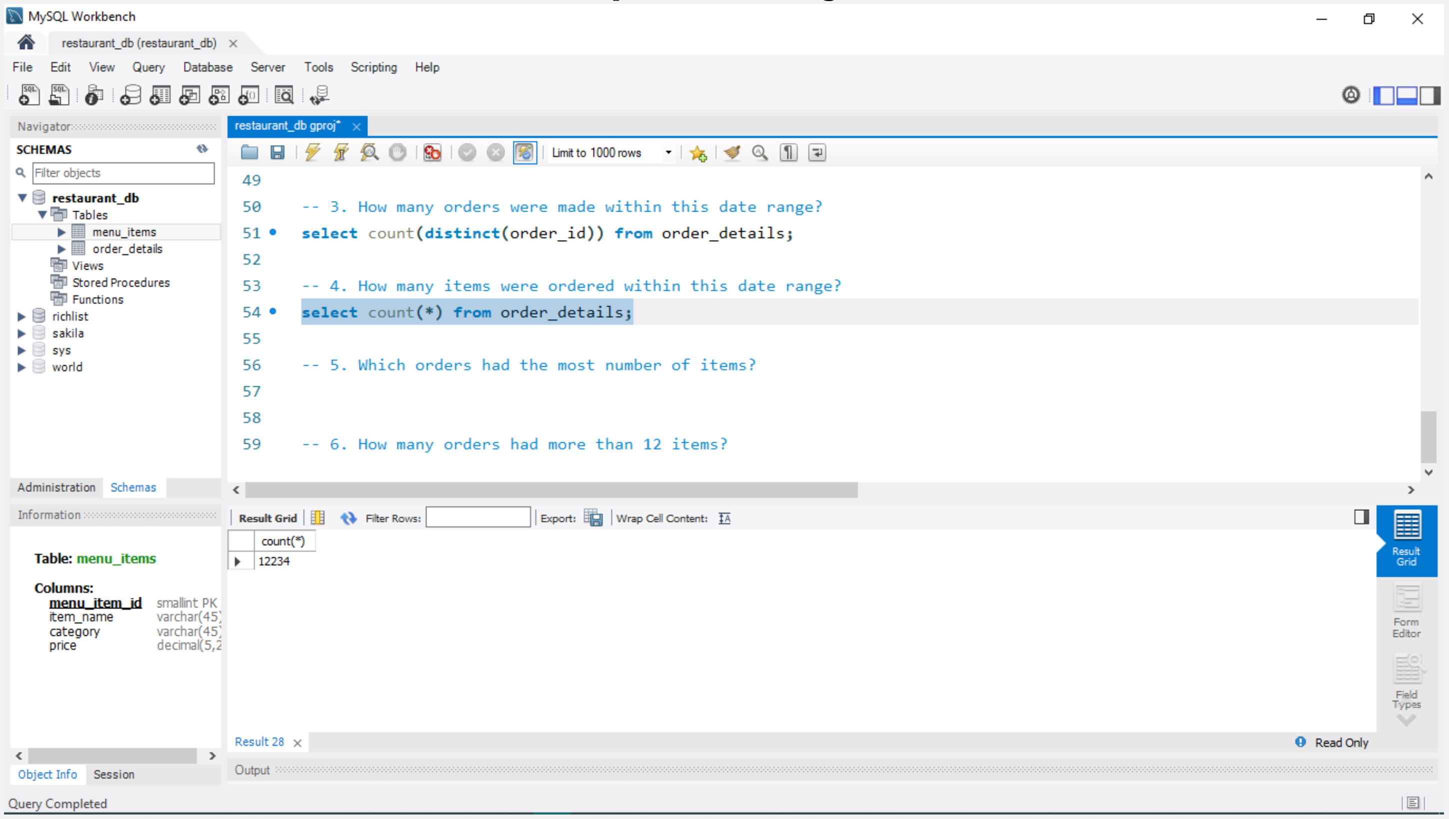
```
count(distinct(order_id))
5370
```

Table: menu_items

Columns:

menu_item_id	smallint PK
item_name	varchar(45)
category	varchar(45)
price	decimal(5,2

A total of 12,234 items were ordered within the specified date range.



```sql
-- 3. How many orders were made within this date range?
select count(distinct(order_id)) from order_details;

-- 4. How many items were ordered within this date range?
select count(*) from order_details;

-- 5. Which orders had the most number of items?


-- 6. How many orders had more than 12 items?
```

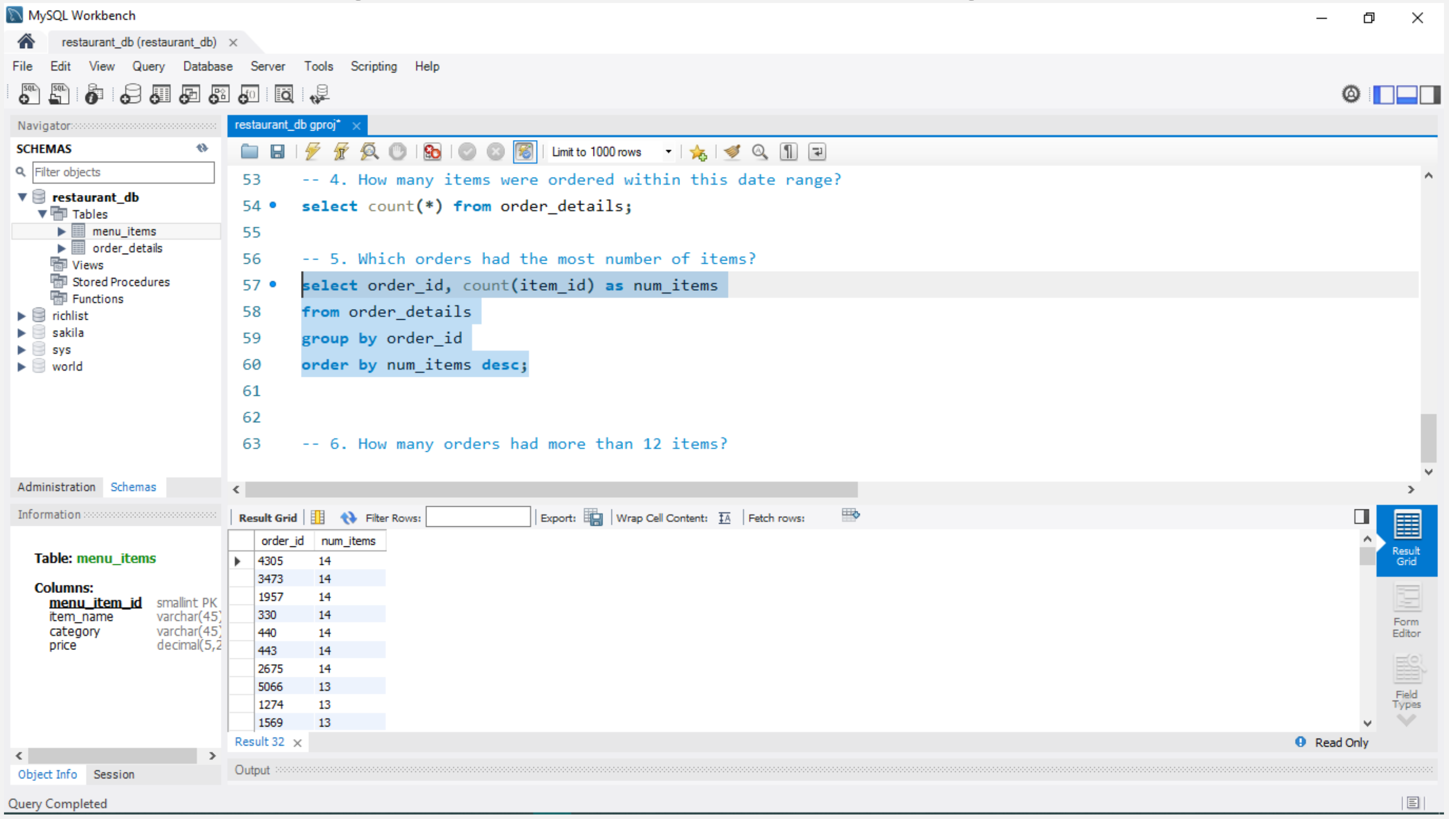
```
count(*)
12234
```

Table: menu_items

Columns:

menu_item_id	smallint PK
item_name	varchar(45)
category	varchar(45)
price	decimal(5,2

Seven order IDs have the highest number of items, with each order containing 14 items.



```
-- 4. How many items were ordered within this date range?
select count(*) from order_details;

-- 5. Which orders had the most number of items?
select order_id, count(item_id) as num_items
from order_details
group by order_id
order by num_items desc;


-- 6. How many orders had more than 12 items?
```

```
order_id  num_items
4305      14
3473      14
1957      14
330       14
440       14
443       14
2675      14
5066      13
1274      13
1569      13
```

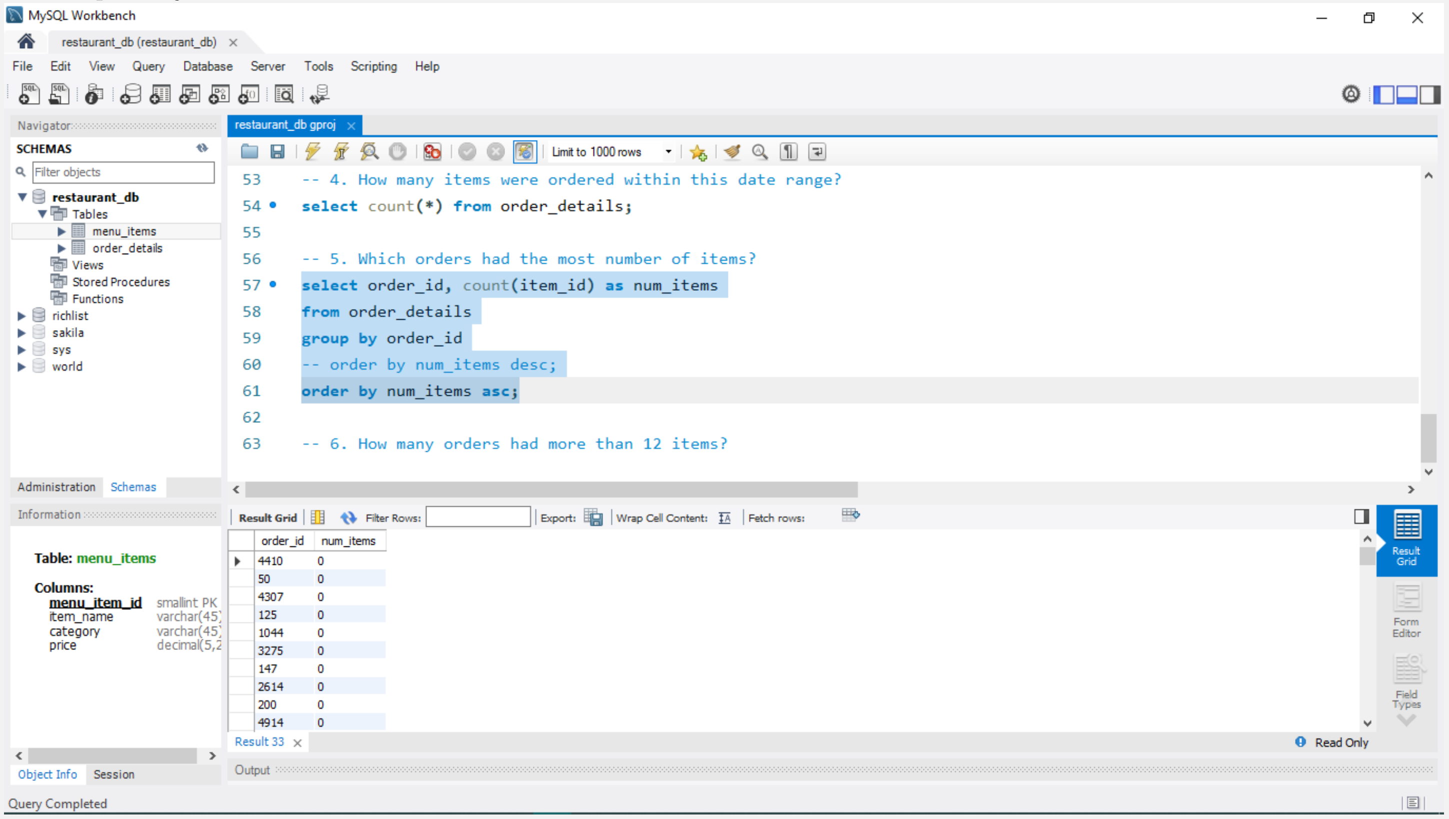
Table: menu_items

Columns:

menu_item_id	smallint PK
item_name	varchar(45)
category	varchar(45)
price	decimal(5,2

Query Completed

By reversing the order of the results using the ‘asc’ keyword instead of ‘desc’, I discovered that there are orders with a quantity of zero items.



```
-- 4. How many items were ordered within this date range?
select count(*) from order_details;

-- 5. Which orders had the most number of items?
select order_id, count(item_id) as num_items
from order_details
group by order_id
-- order by num_items desc;
order by num_items asc;

-- 6. How many orders had more than 12 items?
```

```
order_id  num_items
4410      0
50        0
4307      0
125       0
1044      0
3275      0
147       0
2614      0
200       0
4914      0
```

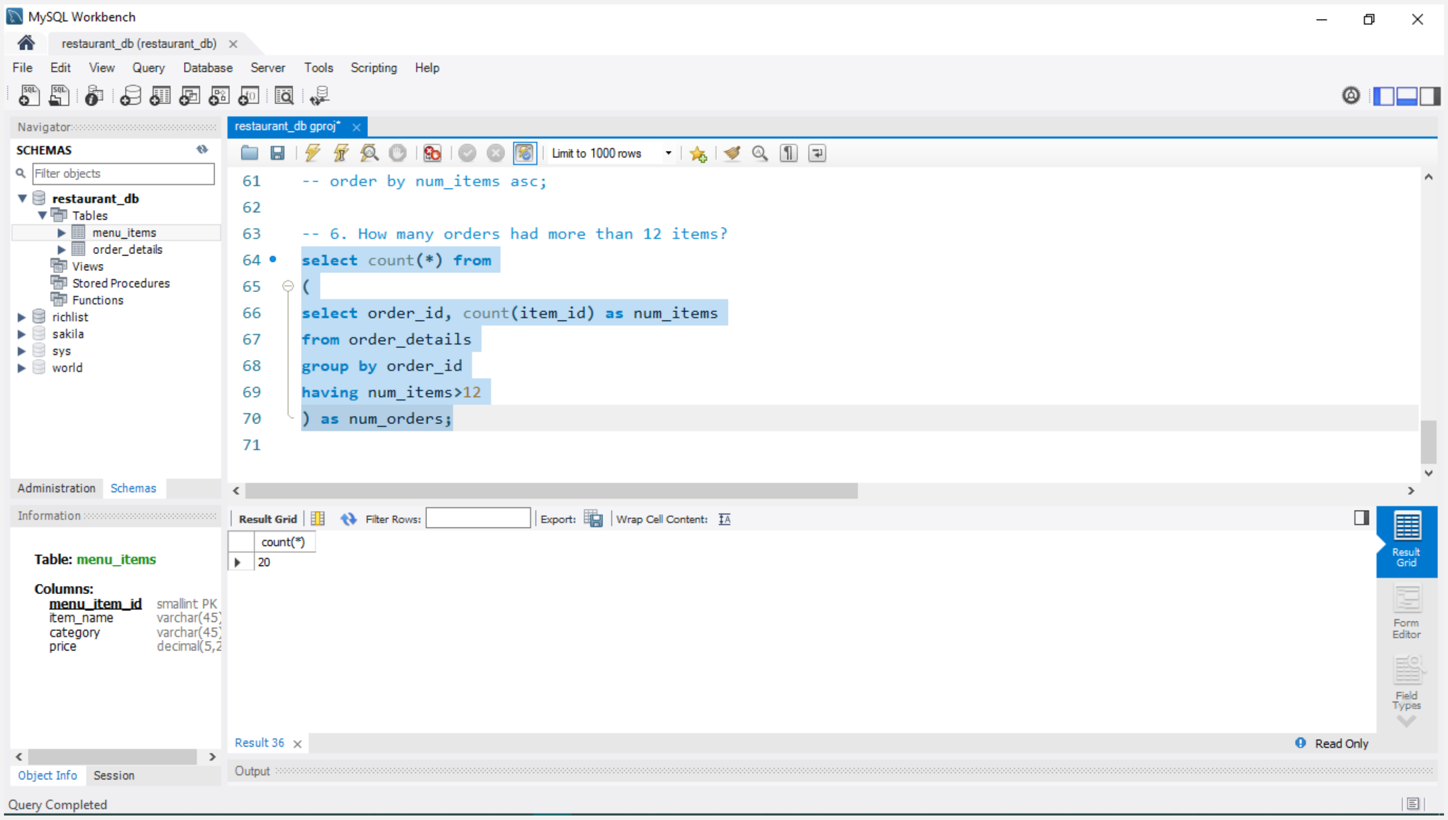
Table: menu_items

Columns:

menu_item_id	smallint PK
item_name	varchar(45)
category	varchar(45)
price	decimal(5,2

Query Completed

I sought to identify the number of orders that contained more than 12 items. Upon analysis, I found that there were 20 orders that exceeded this threshold.



```
-- order by num_items asc;

-- 6. How many orders had more than 12 items?
select count(*) from
(
select order_id, count(item_id) as num_items
from order_details
group by order_id
having num_items>12
) as num_orders;
```

```
count(*)
20
```

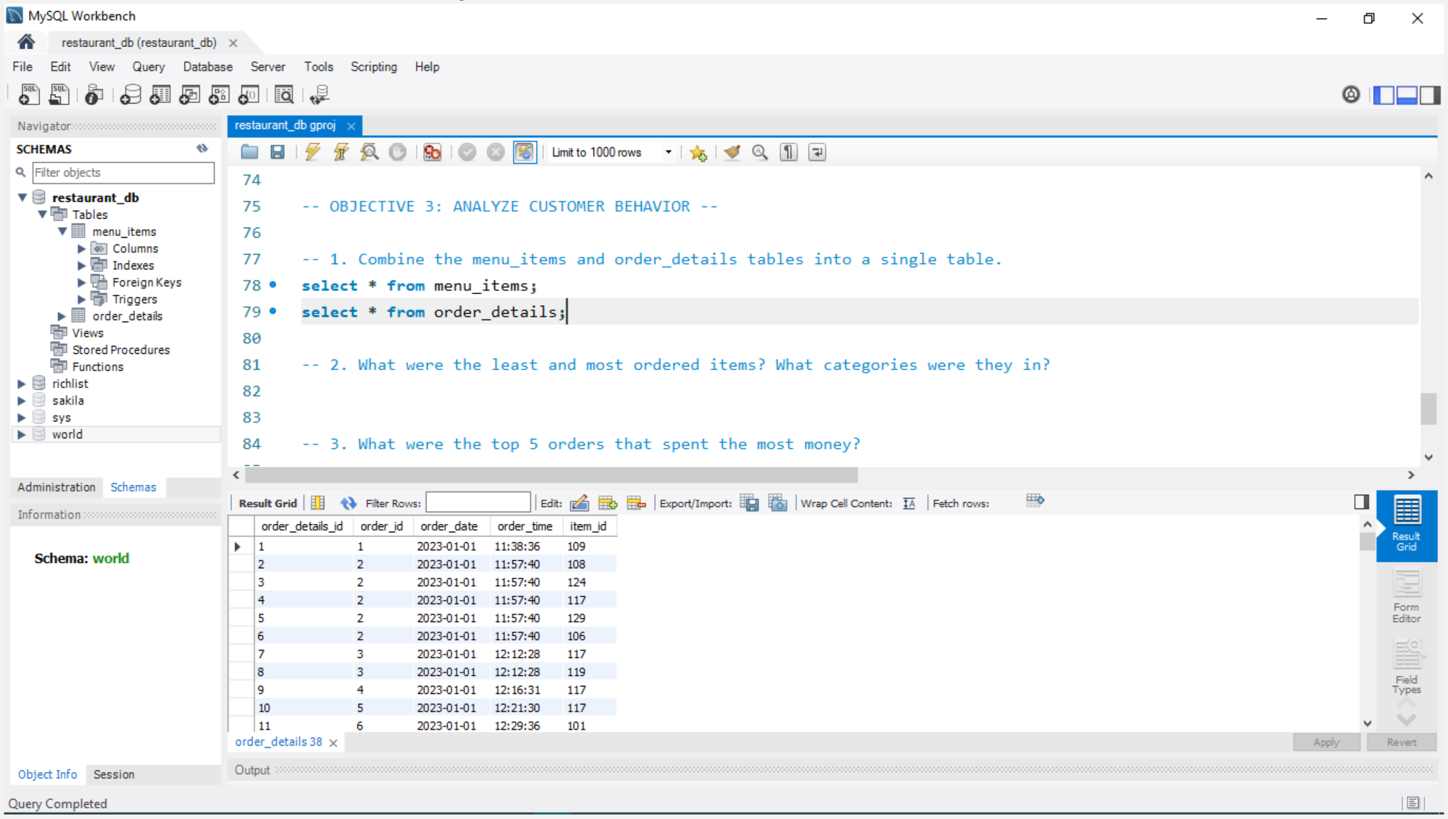
Table: menu_items

Columns:

menu_item_id	smallint PK
item_name	varchar(45)
category	varchar(45)
price	decimal(5,2

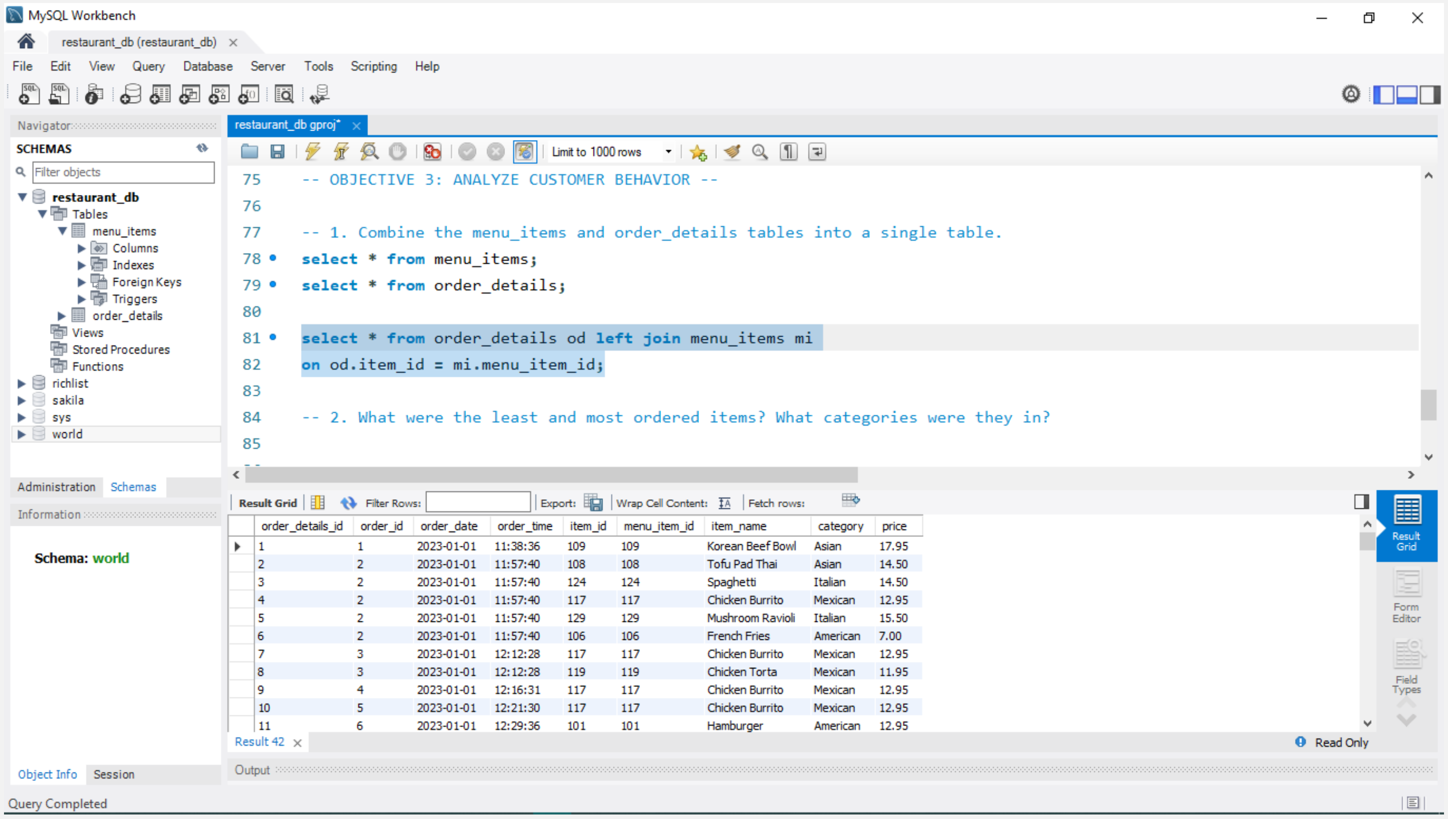
OBJECTIVE 03:

I revisited the menu_items and order_details tables to identify the common attributes that connect them. By joining these tables based on their shared linking point, I was able to create a unified view of the data, allowing for more effective visualization and analysis.



```
-- OBJECTIVE 3: ANALYZE CUSTOMER BEHAVIOR --

-- 1. Combine the menu_items and order_details tables into a single table.
select * from menu_items;
select * from order_details;

-- 2. What were the least and most ordered items? What categories were they in?


-- 3. What were the top 5 orders that spent the most money?
```

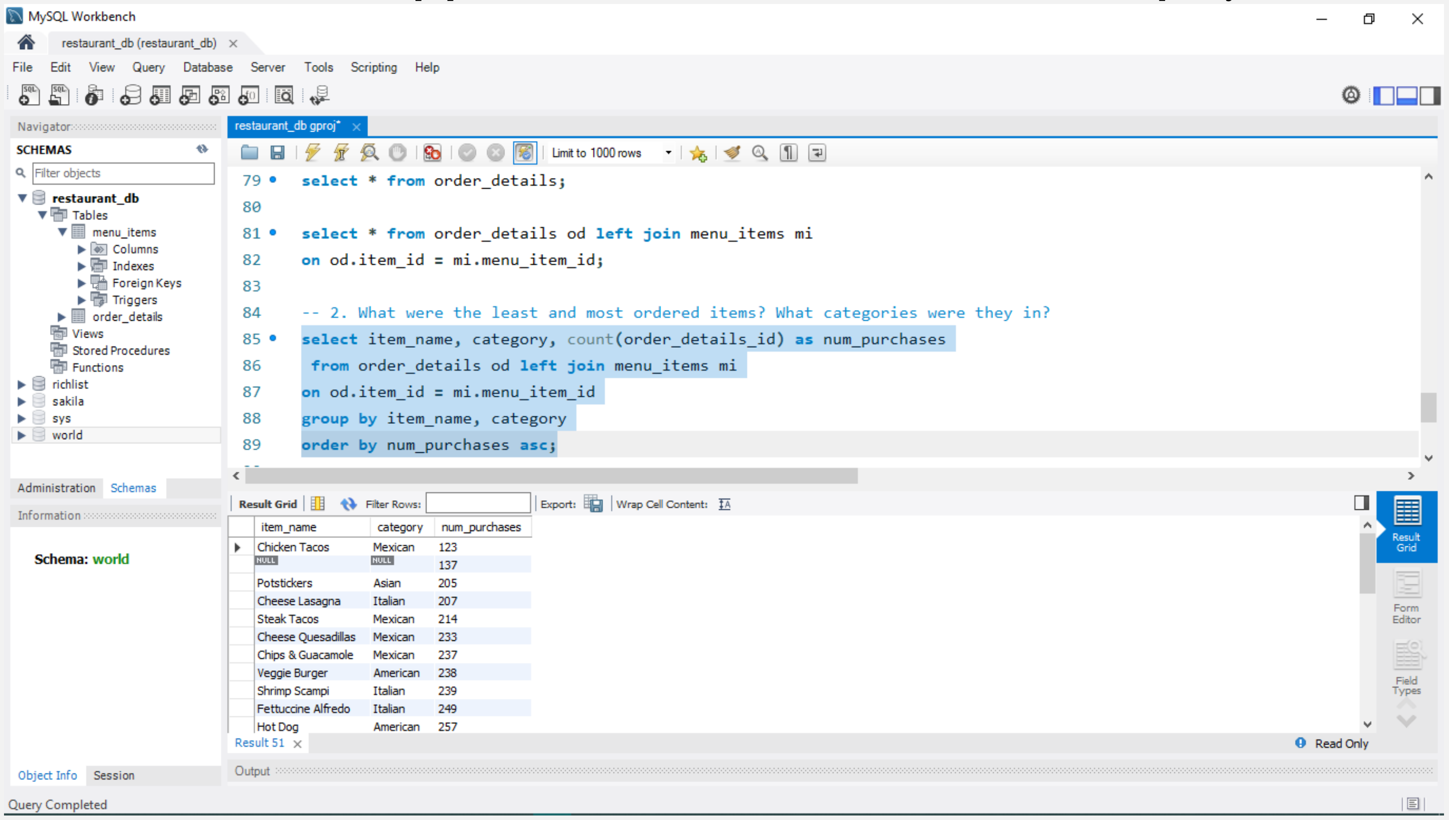
order_details_id	order_id	order_date	order_time	item_id
1	1	2023-01-01	11:38:36	109
2	2	2023-01-01	11:57:40	108
3	2	2023-01-01	11:57:40	124
4	2	2023-01-01	11:57:40	117
5	2	2023-01-01	11:57:40	129
6	2	2023-01-01	11:57:40	106
7	3	2023-01-01	12:12:28	117
8	3	2023-01-01	12:12:28	119
9	4	2023-01-01	12:16:31	117
10	5	2023-01-01	12:21:30	117
11	6	2023-01-01	12:29:36	101



```
-- OBJECTIVE 3: ANALYZE CUSTOMER BEHAVIOR --

-- 1. Combine the menu_items and order_details tables into a single table.
select * from menu_items;
select * from order_details;

select * from order_details od left join menu_items mi
on od.item_id = mi.menu_item_id;

-- 2. What were the least and most ordered items? What categories were they in?
```

order_details_id	order_id	order_date	order_time	item_id	menu_item_id	item_name	category	price
1	1	2023-01-01	11:38:36	109	109	Korean Beef Bowl	Asian	17.95
2	2	2023-01-01	11:57:40	108	108	Tofu Pad Thai	Asian	14.50
3	2	2023-01-01	11:57:40	124	124	Spaghetti	Italian	14.50
4	2	2023-01-01	11:57:40	117	117	Chicken Burrito	Mexican	12.95
5	2	2023-01-01	11:57:40	129	129	Mushroom Ravioli	Italian	15.50
6	2	2023-01-01	11:57:40	106	106	French Fries	American	7.00
7	3	2023-01-01	12:12:28	117	117	Chicken Burrito	Mexican	12.95
8	3	2023-01-01	12:12:28	119	119	Chicken Torta	Mexican	11.95
9	4	2023-01-01	12:16:31	117	117	Chicken Burrito	Mexican	12.95
10	5	2023-01-01	12:21:30	117	117	Chicken Burrito	Mexican	12.95
11	6	2023-01-01	12:29:36	101	101	Hamburger	American	12.95

I identified the Chicken Tacos, a popular Mexican dish, as the item with the lowest order frequency.



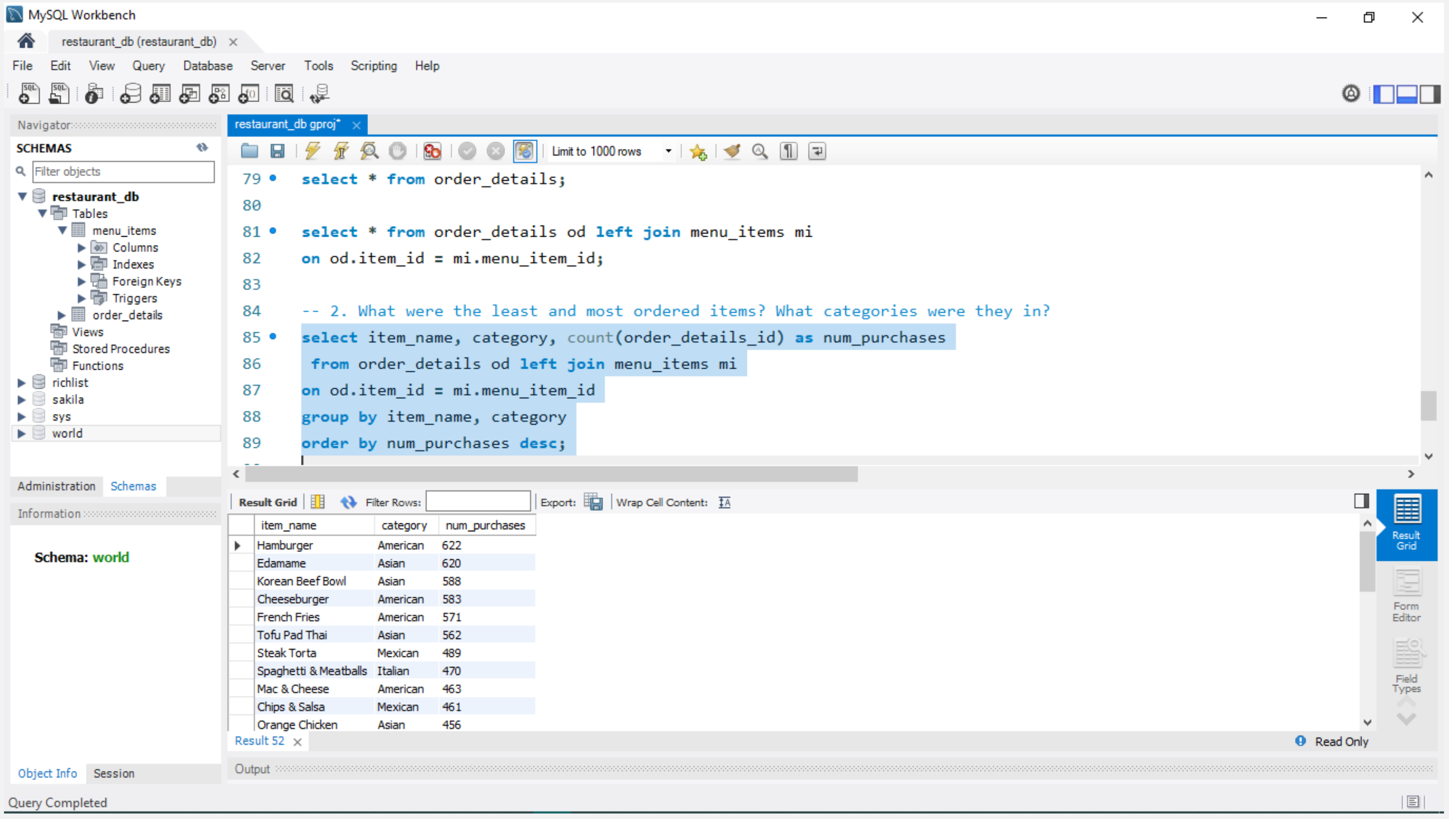
```sql
select * from order_details;

select * from order_details od left join menu_items mi
on od.item_id = mi.menu_item_id;

-- 2. What were the least and most ordered items? What categories were they in?
select item_name, category, count(order_details_id) as num_purchases
 from order_details od left join menu_items mi
on od.item_id = mi.menu_item_id
group by item_name, category
order by num_purchases asc;
```

item_name	category	num_purchases
Chicken Tacos	Mexican	123
NULL	NULL	137
Potstickers	Asian	205
Cheese Lasagna	Italian	207
Steak Tacos	Mexican	214
Cheese Quesadillas	Mexican	233
Chips & Guacamole	Mexican	237
Veggie Burger	American	238
Shrimp Scampi	Italian	239
Fettuccine Alfredo	Italian	249
Hot Dog	American	257

Result 51

Query Completed

I discovered that the Hamburger, a classic American dish, is the most frequently ordered item.



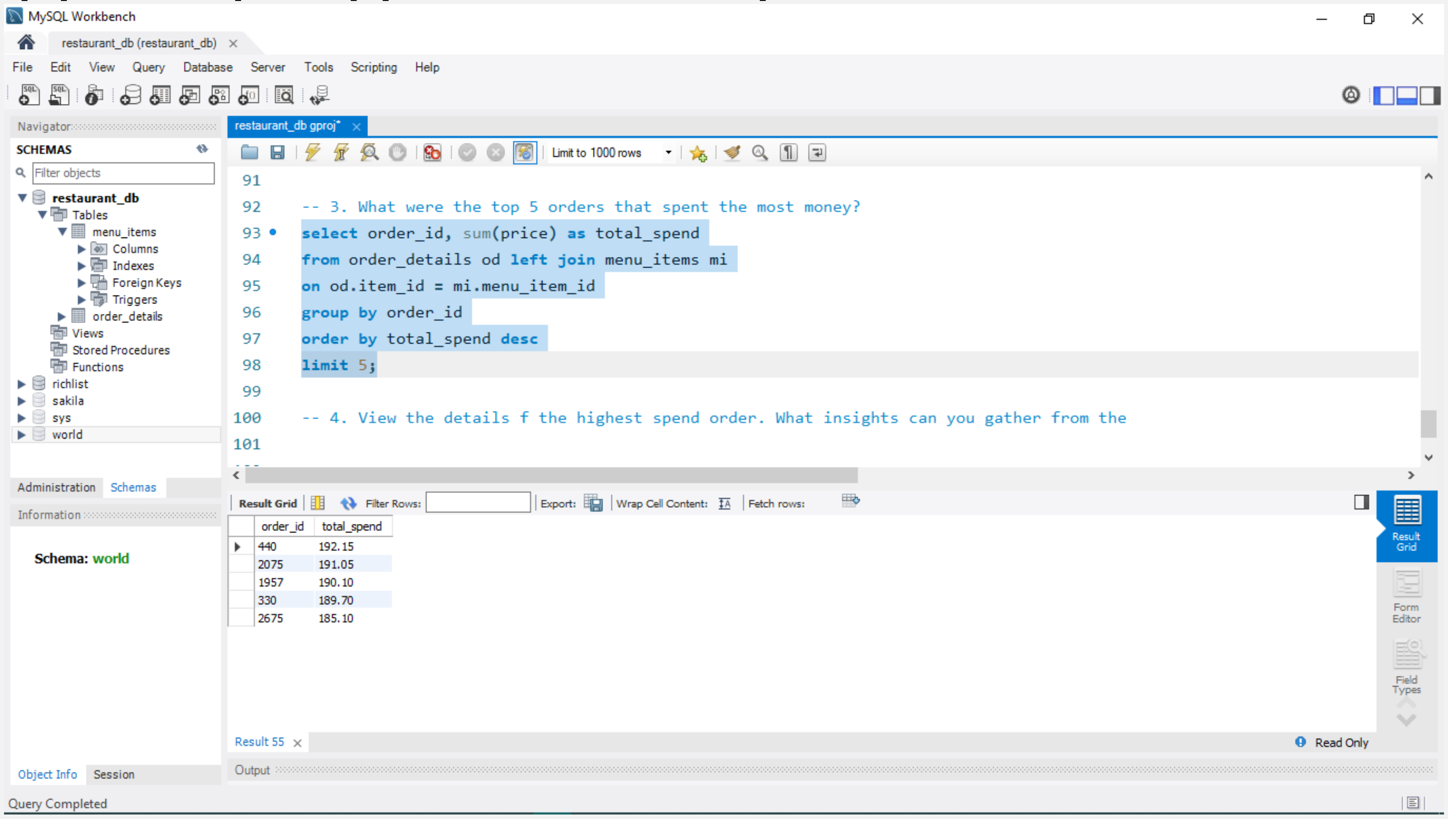
```sql
select * from order_details;

select * from order_details od left join menu_items mi
on od.item_id = mi.menu_item_id;

-- 2. What were the least and most ordered items? What categories were they in?
select item_name, category, count(order_details_id) as num_purchases
 from order_details od left join menu_items mi
on od.item_id = mi.menu_item_id
group by item_name, category
order by num_purchases desc;
```

item_name	category	num_purchases
Hamburger	American	622
Edamame	Asian	620
Korean Beef Bowl	Asian	588
Cheeseburger	American	583
French Fries	American	571
Tofu Pad Thai	Asian	562
Steak Torta	Mexican	489
Spaghetti & Meatballs	Italian	470
Mac & Cheese	American	463
Chips & Salsa	Mexican	461
Orange Chicken	Asian	456

Result 52

Query Completed

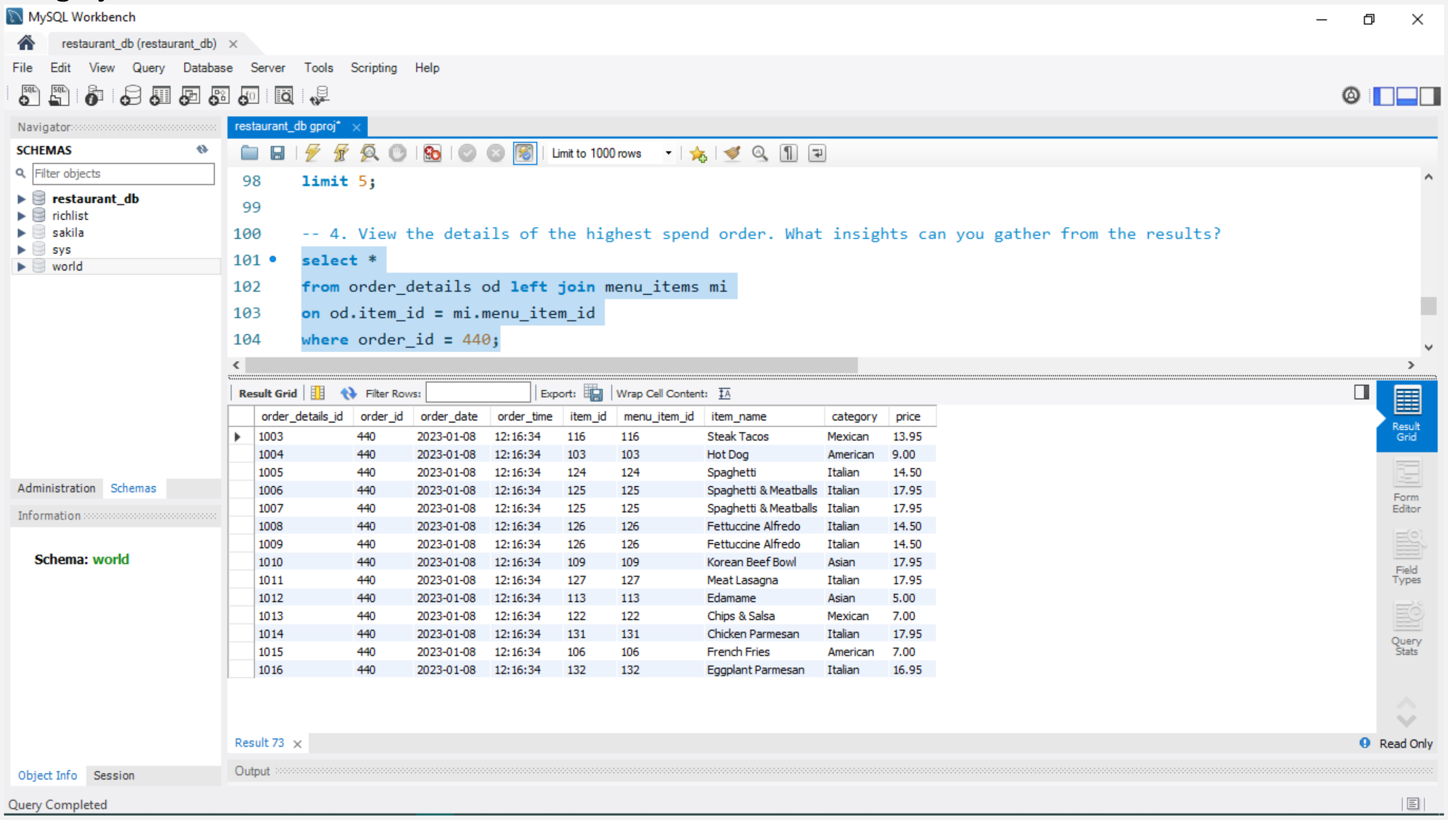
I pinpointed the top 5 most popular orders in terms of total spend.



```
-- 3. What were the top 5 orders that spent the most money?
select order_id, sum(price) as total_spend
from order_details od left join menu_items mi
on od.item_id = mi.menu_item_id
group by order_id
order by total_spend desc
limit 5;

-- 4. View the details f the highest spend order. What insights can you gather from the
```

order_id	total_spend
440	192.15
2075	191.05
1957	190.10
330	189.70
2675	185.10

I delved deeper into the details of order_id 440 and found that Italian dishes are the most frequently ordered category.

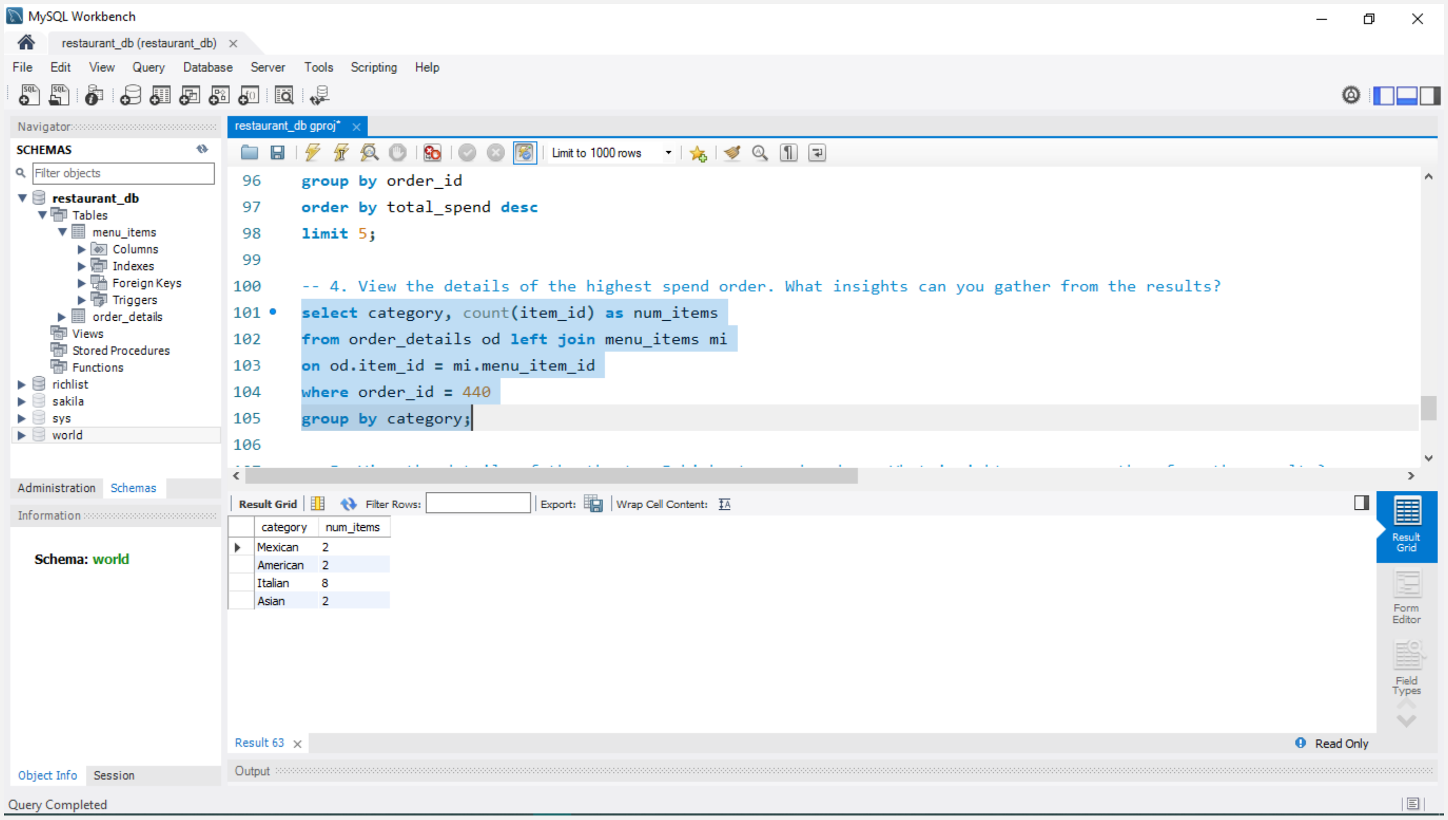


```sql
limit 5;

-- 4. View the details of the highest spend order. What insights can you gather from the results?
select *
from order_details od left join menu_items mi
on od.item_id = mi.menu_item_id
where order_id = 440;
```

order_details_id	order_id	order_date	order_time	item_id	menu_item_id	item_name	category	price
1003	440	2023-01-08	12:16:34	116	116	Steak Tacos	Mexican	13.95
1004	440	2023-01-08	12:16:34	103	103	Hot Dog	American	9.00
1005	440	2023-01-08	12:16:34	124	124	Spaghetti	Italian	14.50
1006	440	2023-01-08	12:16:34	125	125	Spaghetti & Meatballs	Italian	17.95
1007	440	2023-01-08	12:16:34	125	125	Spaghetti & Meatballs	Italian	17.95
1008	440	2023-01-08	12:16:34	126	126	Fettuccine Alfredo	Italian	14.50
1009	440	2023-01-08	12:16:34	126	126	Fettuccine Alfredo	Italian	14.50
1010	440	2023-01-08	12:16:34	109	109	Korean Beef Bowl	Asian	17.95
1011	440	2023-01-08	12:16:34	127	127	Meat Lasagna	Italian	17.95
1012	440	2023-01-08	12:16:34	113	113	Edamame	Asian	5.00
1013	440	2023-01-08	12:16:34	122	122	Chips & Salsa	Mexican	7.00
1014	440	2023-01-08	12:16:34	131	131	Chicken Parmesan	Italian	17.95
1015	440	2023-01-08	12:16:34	106	106	French Fries	American	7.00
1016	440	2023-01-08	12:16:34	132	132	Eggplant Parmesan	Italian	16.95

Result 73

Query Completed



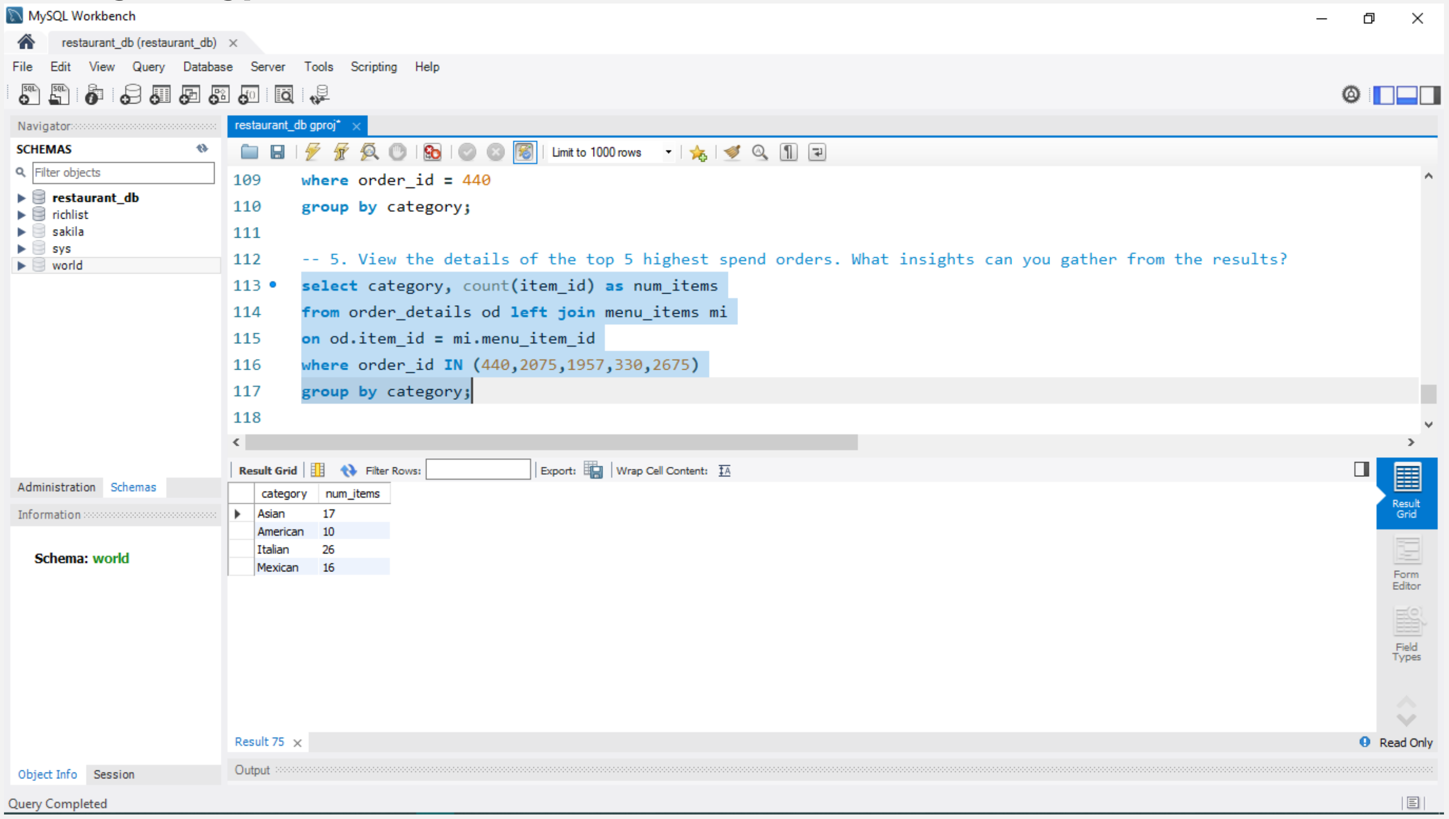
```sql
group by order_id
order by total_spend desc
limit 5;

-- 4. View the details of the highest spend order. What insights can you gather from the results?
select category, count(item_id) as num_items
from order_details od left join menu_items mi
on od.item_id = mi.menu_item_id
where order_id = 440
group by category;
```

category	num_items
Mexican	2
American	2
Italian	8
Asian	2

Result 63

Query Completed

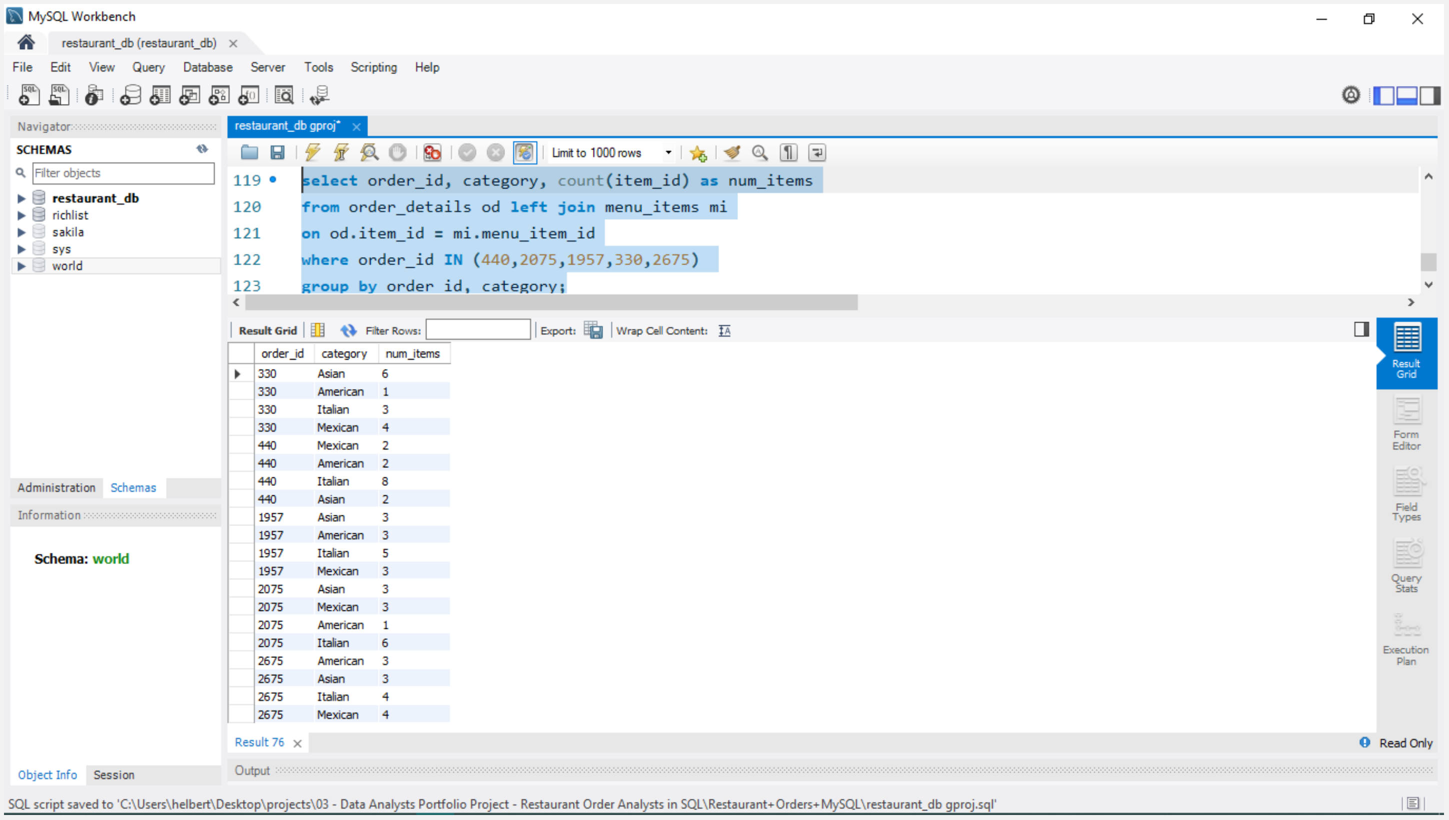
An analysis of the order data reveals that Italian food is the most popular choice among customers. Upon further examination of individual order IDs, it was found that four out of five order IDs consistently order Italian dishes, indicating a strong preference for this dish.



```
where order_id = 440
group by category;

-- 5. View the details of the top 5 highest spend orders. What insights can you gather from the results?
select category, count(item_id) as num_items
from order_details od left join menu_items mi
on od.item_id = mi.menu_item_id
where order_id IN (440,2075,1957,330,2675)
group by category;
```

category	num_items
Asian	17
American	10
Italian	26
Mexican	16

Query Completed



```
select order_id, category, count(item_id) as num_items
from order_details od left join menu_items mi
on od.item_id = mi.menu_item_id
where order_id IN (440,2075,1957,330,2675)
group by order_id, category;
```

order_id	category	num_items
330	Asian	6
330	American	1
330	Italian	3
330	Mexican	4
440	Mexican	2
440	American	2
440	Italian	8
440	Asian	2
1957	Asian	3
1957	American	3
1957	Italian	5
1957	Mexican	3
2075	Asian	3
2075	Mexican	3
2075	American	1
2075	Italian	6
2675	American	3
2675	Asian	3
2675	Italian	4
2675	Mexican	4

SQL script saved to 'C:\Users\helbert\Desktop\projects\03 - Data Analysts Portfolio Project - Restaurant Order Analysts in SQL\Restaurant+Orders+MySQL\restaurant_db gproj.sql'

SUMMARY OF FINDINGS:

1. **Menu Insights (Objective 01):**
    - Edamame and Asian menu items are the least expensive.
    - Shrimp Scampi (from the Italian menu) is the most expensive item.
    - There are 9 Italian dishes out of a total of 32 dishes.
    - Spaghetti tends to be the least expensive option, while Shrimp Scampi is typically the most expensive.
2. **Order Details Insights (Objective 02):**
    - 5,370 orders were recorded within the specified date range.
    - A total of 12,234 items were ordered.
    - Seven order IDs contain 14 items each.
    - Some orders have zero items.
    - There were 20 orders with more than 12 items.
3. **Common Attributes (Objective 03):**
    - Chicken Tacos (a popular Mexican dish) has the lowest order frequency.
    - The Hamburger (a classic American dish) is the most frequently ordered item.
    - The top 5 orders in terms of total spend were identified.
4. **Italian Food Popularity:**
    - Order ID 440 consistently orders Italian dishes, indicating a strong preference for Italian food among customers.

These insights provide valuable information for optimizing menu offerings, understanding customer preferences, and managing inventory.

KEY INSIGHTS:

1. **Menu Insights:**

    - **Pricing Strategy:** The fact that “Edamame” and Asian menu items are the least expensive suggests that these items could serve as attractive options for cost-conscious customers. Consider promoting them as value-for-money choices.

    - **Upselling Opportunity:** On the other hand, “Shrimp Scampi” being the most expensive item presents an opportunity for upselling. Train staff to recommend this premium dish to customers who are willing to splurge.

    - **Italian Cuisine Focus:** With 9 out of 32 dishes belonging to Italian cuisine, it’s clear that Italian food is popular. Consider expanding the Italian menu or featuring Italian specials prominently.

2. **Order Details Insights:**

    - **Order Volume Trends:** The 5,370 recorded orders indicate a steady flow of business. Monitor order volume over time to identify peak hours and allocate resources accordingly.

    - **Zero-Item Orders:** Investigate why some orders had zero items. Are these cancellations or system errors? Address any issues to improve customer experience.

    - **Large Group Orders:** The 20 orders with more than 12 items likely represent group dining. Consider offering group discounts or special packages to attract such gatherings.

3. **Common Attributes:**

    - **Chicken Tacos vs. Hamburger:** The contrast between low-frequency “Chicken Tacos” and high-frequency “Hamburger” orders highlights customer preferences. Consider promoting the Hamburger further or experimenting with Chicken Tacos variations.

    - **Top 5 High-Spend Orders:** Analyze the top 5 orders based on total spend. Are they special occasions, corporate events, or regular customers? Tailor marketing efforts accordingly.

4. **Italian Food Popularity:**

    - **Customer Segmentation:** Order ID 440 consistently preferring Italian dishes suggests a specific customer segment. Create targeted marketing campaigns for Italian food enthusiasts.

    - **Menu Optimization:** Given the popularity of Italian cuisine, ensure that Italian dishes are well-represented on the menu and maintain their quality.