AMAZON SQL PROJECT PRESENTATION

Overview Of Amazon Sales Data

- The data consists of sales record of three cities/branch in Myanmar which are Naypyitaw, Yangon, Mandalay which took place in first quarter of year 2019 . The data consists of 1000 rows and 17 columns.

Objective of Project

- The major aim of this project is to gain insight into the sales data of Amazon to understand the different factors that affect sales of the different branches

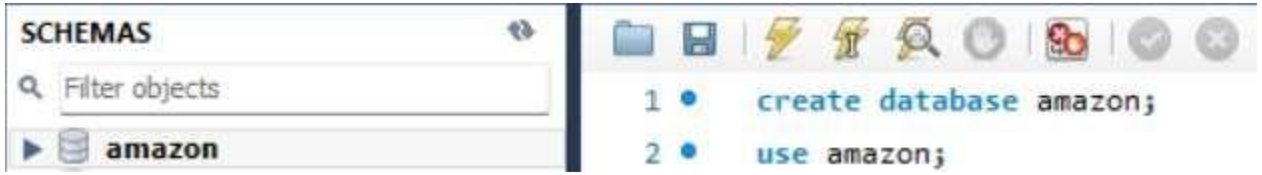
Preview of Amazon Sales Data

Column	Description	Data Type
Invoice Id	Invoice of the sales made	Varchar(30)

Branch	Branch at which sales were made	Varchar(5)
City	The location of the branch	Varchar(30)
Customer Type	The type of the customer	Varchar(30)
Gender	Gender of the customer making purchase	Varchar(10)
Product Line	Product line of the product sold	Varchar(100)
Unit Price	The price of each product	Decimal(10,2)
Quantity	The amount of the product sold	Int
VAT	The amount of tax on the purchase	Float
Total	The total cost of the purchase	Decimal(10,2)
Date	The date on which the purchase was made	Date
Time	The time at which the purchase was made	Time
Payment Method	The total amount paid	Varchar(15)
Cogs	Cost Of Goods sold	Decimal(10,2)
Gross Margin Percentage	Gross margin percentage	Float
Gross Income	Gross Income	Decimal(10,2)
Rating	Rating	Decimal(3,1)

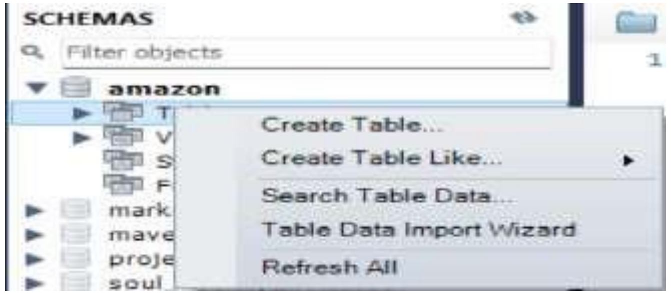
Data Wrangling

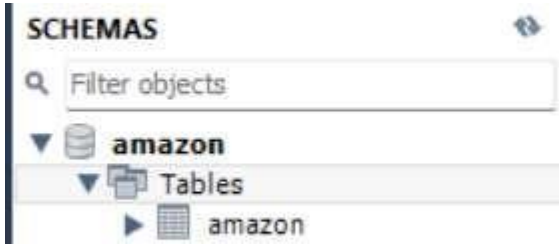
Step [1]: Created a database named Amazon in MySQL.

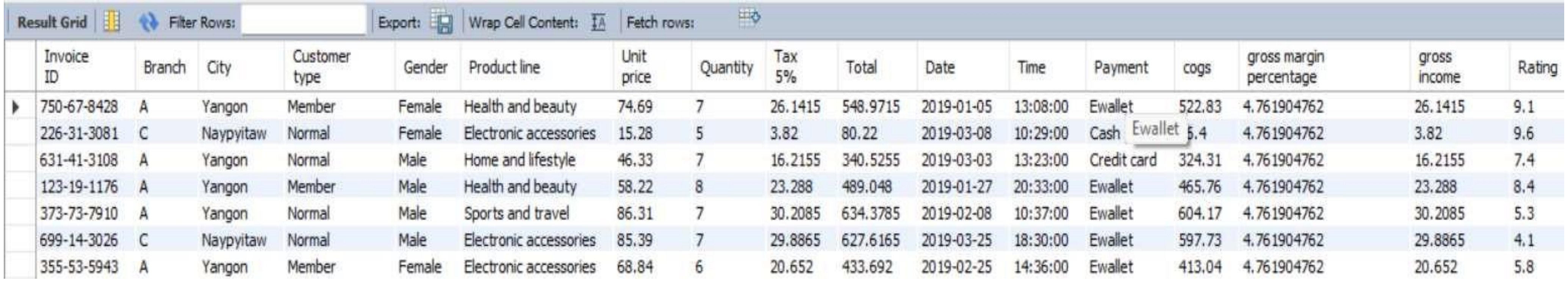


```
create database amazon;
use amazon;
```

Step [2]: Importing data in the form of a demo table named Amazon using table data import wizard.



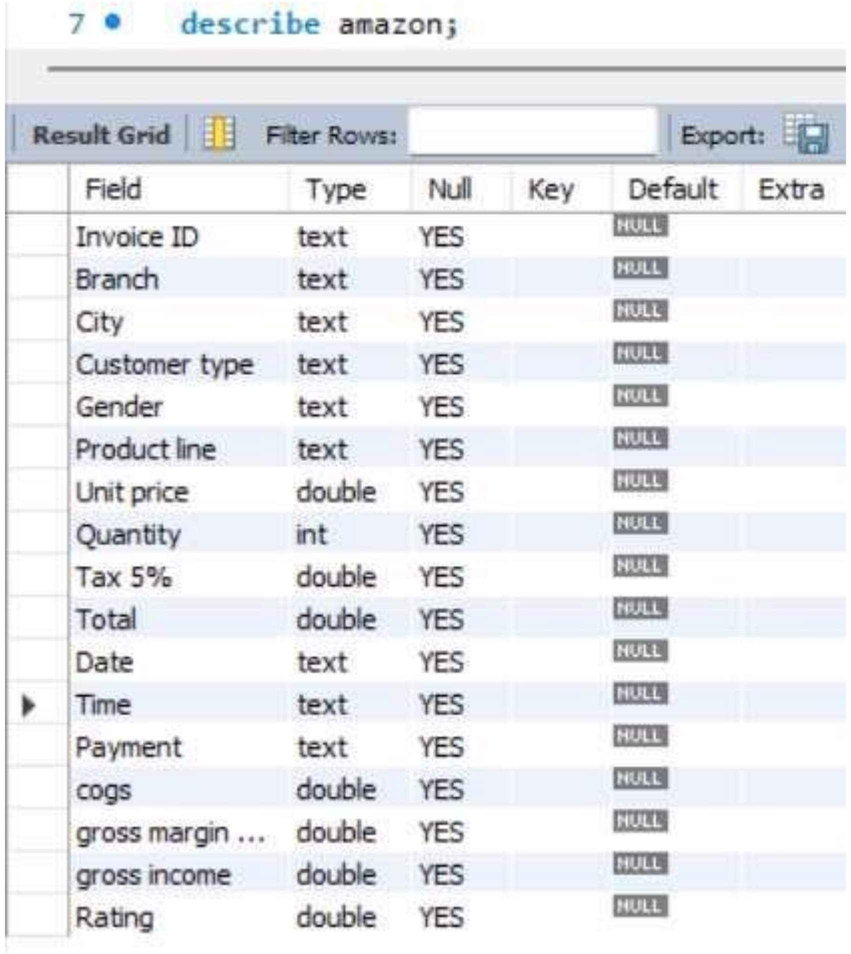




Invoice ID	Branch	City	Customer type	Gender	Product line	Unit price	Quantity	Tax 5%	Total	Date	Time	Payment	cogs	gross margin percentage	gross income	Rating
750-67-8428	A	Yangon	Member	Female	Health and beauty	74.69	7	26.1415	548.9715	2019-01-05	13:08:00	Ewallet	522.83	4.761904762	26.1415	9.1
226-31-3081	C	Naypyitaw	Normal	Female	Electronic accessories	15.28	5	3.82	80.22	2019-03-08	10:29:00	Cash	5.4	4.761904762	3.82	9.6
631-41-3108	A	Yangon	Normal	Male	Home and lifestyle	46.33	7	16.2155	340.5255	2019-03-03	13:23:00	Credit card	324.31	4.761904762	16.2155	7.4
123-19-1176	A	Yangon	Member	Male	Health and beauty	58.22	8	23.288	489.048	2019-01-27	20:33:00	Ewallet	465.76	4.761904762	23.288	8.4
373-73-7910	A	Yangon	Normal	Male	Sports and travel	86.31	7	30.2085	634.3785	2019-02-08	10:37:00	Ewallet	604.17	4.761904762	30.2085	5.3
699-14-3026	C	Naypyitaw	Normal	Male	Electronic accessories	85.39	7	29.8865	627.6165	2019-03-25	18:30:00	Ewallet	597.73	4.761904762	29.8865	4.1
355-53-5943	A	Yangon	Member	Female	Electronic accessories	68.84	6	20.652	433.692	2019-02-25	14:36:00	Ewallet	413.04	4.761904762	20.652	5.8

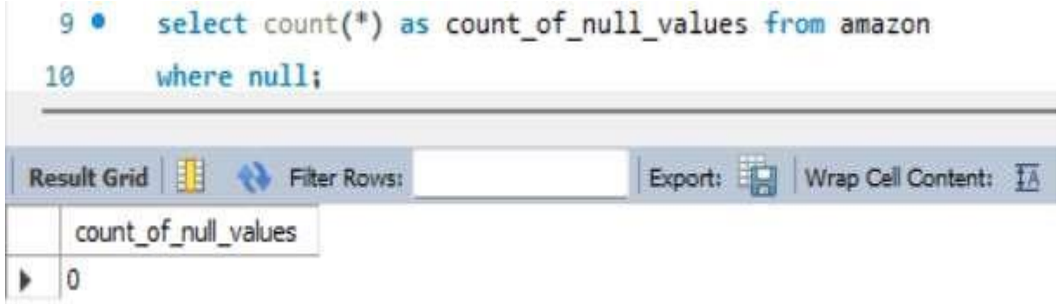
Step [3]: Checking null values and datatypes of columns of demo amazon table.

Note: as observe the datatype are incorrect and column names contain space which is syntactically incorrect, also table has no null values. This correction is done in EDA.



```
describe amazon;
```

Field	Type	Null	Key	Default	Extra
Invoice ID	text	YES		NULL	
Branch	text	YES		NULL	
City	text	YES		NULL	
Customer type	text	YES		NULL	
Gender	text	YES		NULL	
Product line	text	YES		NULL	
Unit price	double	YES		NULL	
Quantity	int	YES		NULL	
Tax 5%	double	YES		NULL	
Total	double	YES		NULL	
Date	text	YES		NULL	
Time	text	YES		NULL	
Payment	text	YES		NULL	
cogs	double	YES		NULL	
gross margin ...	double	YES		NULL	
gross income	double	YES		NULL	
Rating	double	YES		NULL	

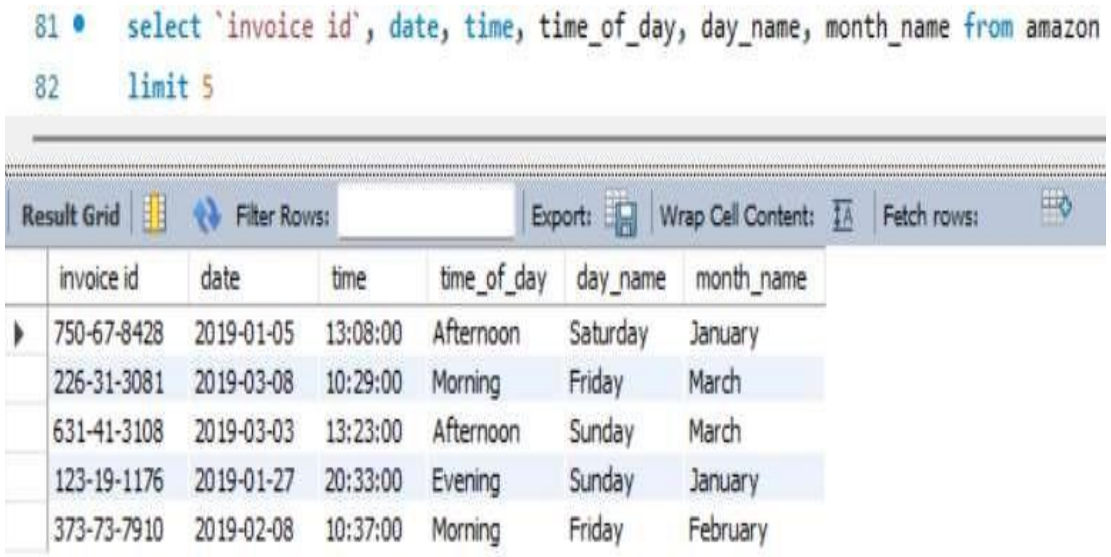


```
select count(*) as count_of_null_values from amazon
where null;
```

count_of_null_values
0

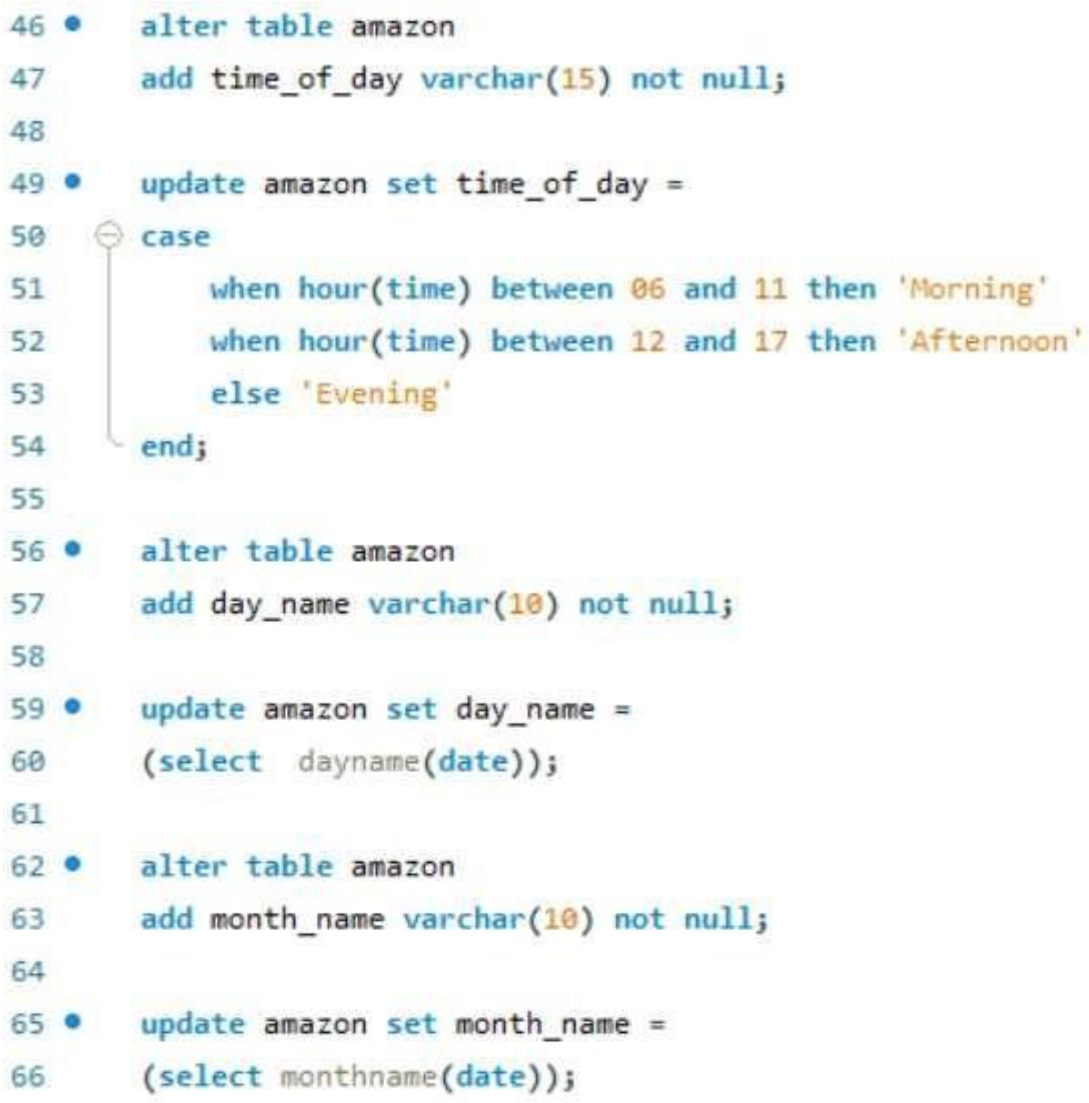
Feature Engineering

In this step we are creating new columns named **timeofday**, **dayname**, **monthname** by extracting values from date and time column. This will help us to analyse and answer sales based on time-of-day (Morning, Afternoon, Evening), day-of-week (Sunday to Saturday) and month (Jan-March).



```sql
select `invoice id`, date, time, time_of_day, day_name, month_name from amazon
limit 5
```

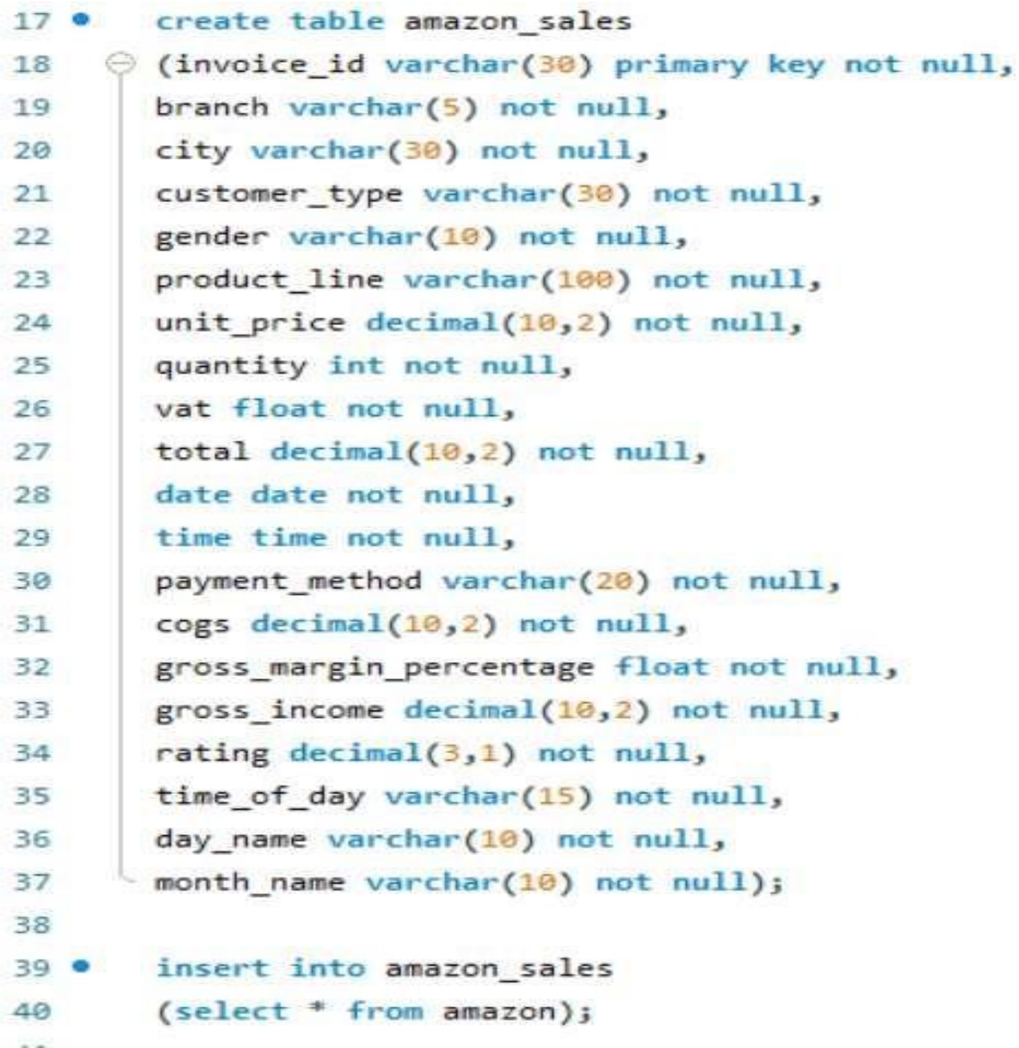
invoice id	date	time	time_of_day	day_name	month_name
750-67-8428	2019-01-05	13:08:00	Afternoon	Saturday	January
226-31-3081	2019-03-08	10:29:00	Morning	Friday	March
631-41-3108	2019-03-03	13:23:00	Afternoon	Sunday	March
123-19-1176	2019-01-27	20:33:00	Evening	Sunday	January
373-73-7910	2019-02-08	10:37:00	Morning	Friday	February



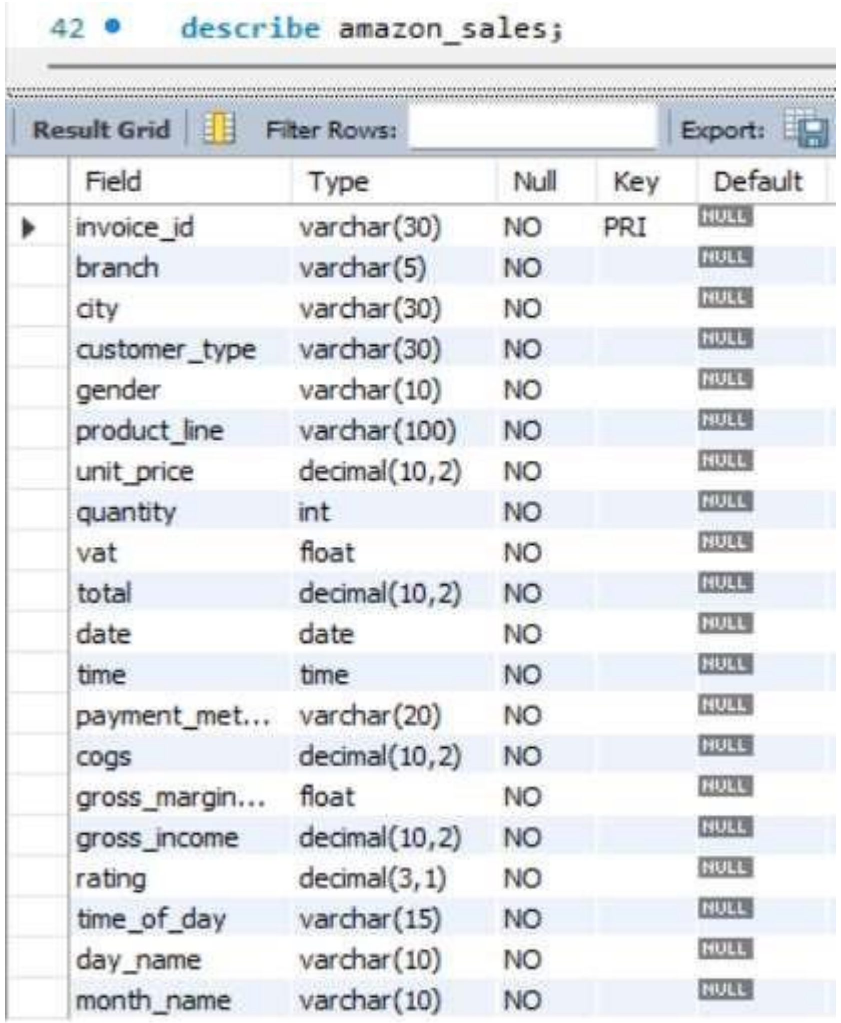
```sql
alter table amazon
add time_of_day varchar(15) not null;

update amazon set time_of_day =
case
    when hour(time) between 06 and 11 then 'Morning'
    when hour(time) between 12 and 17 then 'Afternoon'
    else 'Evening'
end;

alter table amazon
add day_name varchar(10) not null;

update amazon set day_name =
(select  dayname(date));

alter table amazon
add month_name varchar(10) not null;

update amazon set month_name =
(select monthname(date));
```

Exploratory Data Analysis

Step [1]: Creating new table named **Amazon Sales** by adding correct column names, datatypes, constraints while copying values from demo table Amazon.



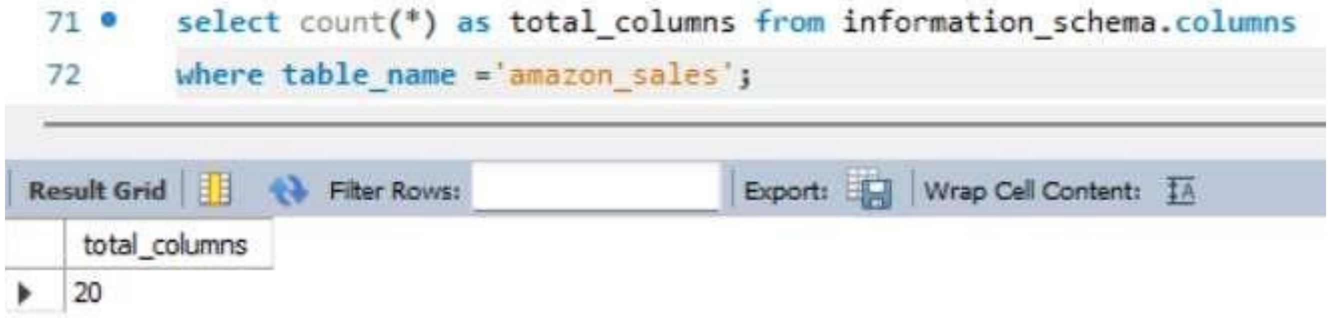
```sql
create table amazon_sales
(invoice_id varchar(30) primary key not null,
branch varchar(5) not null,
city varchar(30) not null,
customer_type varchar(30) not null,
gender varchar(10) not null,
product_line varchar(100) not null,
unit_price decimal(10,2) not null,
quantity int not null,
vat float not null,
total decimal(10,2) not null,
date date not null,
time time not null,
payment_method varchar(20) not null,
cogs decimal(10,2) not null,
gross_margin_percentage float not null,
gross_income decimal(10,2) not null,
rating decimal(3,1) not null,
time_of_day varchar(15) not null,
day_name varchar(10) not null,
month_name varchar(10) not null);

insert into amazon_sales
(select * from amazon);
```



```
describe amazon_sales;
```

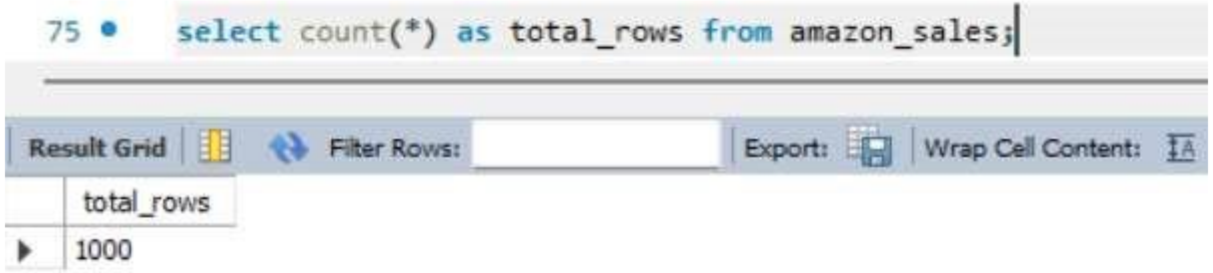
Field	Type	Null	Key	Default
invoice_id	varchar(30)	NO	PRI	NULL
branch	varchar(5)	NO		NULL
city	varchar(30)	NO		NULL
customer_type	varchar(30)	NO		NULL
gender	varchar(10)	NO		NULL
product_line	varchar(100)	NO		NULL
unit_price	decimal(10,2)	NO		NULL
quantity	int	NO		NULL
vat	float	NO		NULL
total	decimal(10,2)	NO		NULL
date	date	NO		NULL
time	time	NO		NULL
payment_met...	varchar(20)	NO		NULL
cogs	decimal(10,2)	NO		NULL
gross_margin...	float	NO		NULL
gross_income	decimal(10,2)	NO		NULL
rating	decimal(3,1)	NO		NULL
time_of_day	varchar(15)	NO		NULL
day_name	varchar(10)	NO		NULL
month_name	varchar(10)	NO		NULL

Step [2]: Checking size of table, count of null values, unique values in columns.



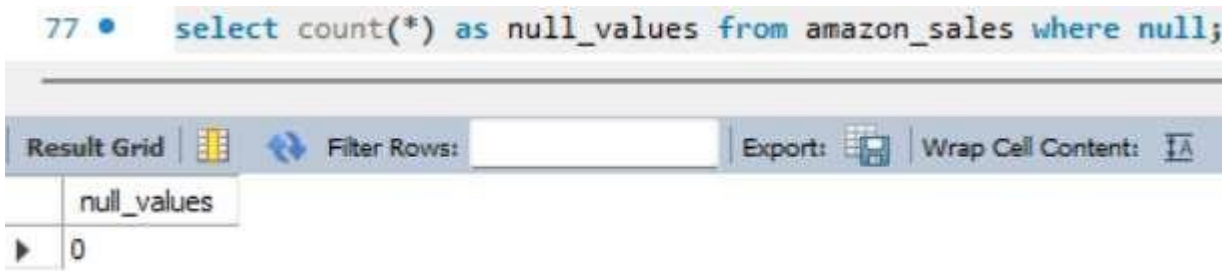
```sql
select count(*) as total_columns from information_schema.columns
where table_name ='amazon_sales';
```

total_columns
20



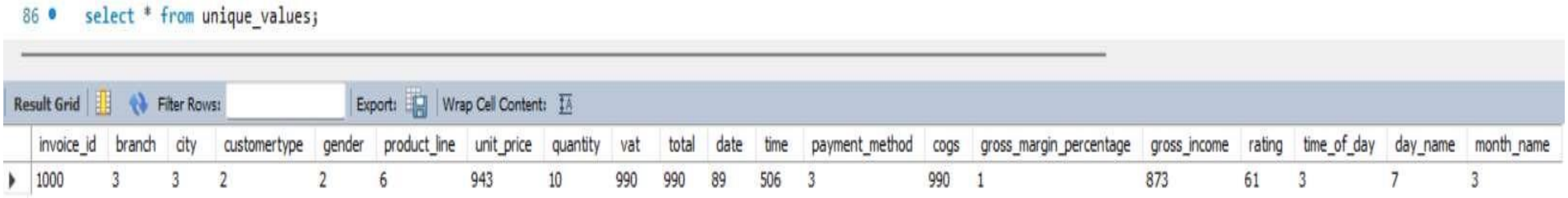
```sql
select count(*) as total_rows from amazon_sales;
```

total_rows
1000



```sql
select count(*) as null_values from amazon_sales where null;
```

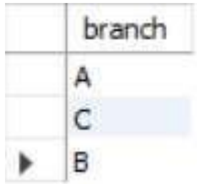
null_values
0



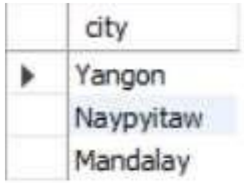
```sql
select * from unique_values;
```

invoice_id	branch	city	customertype	gender	product_line	unit_price	quantity	vat	total	date	time	payment_method	cogs	gross_margin_percentage	gross_income	rating	time_of_day	day_name	month_name
1000	3	3	2	2	6	943	10	990	990	89	506	3	990	1	873	61	3	7	3

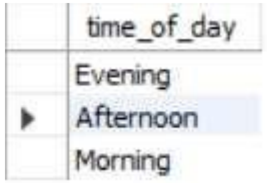
Step [3]: Checking the unique values in each categorical column. There are 10 categorical columns **[invoice_id, branch, city, customer_type, gender, product_line, payment_method, time_of_day, day_name, month_name]**



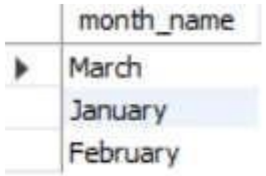
branch
A
C
B



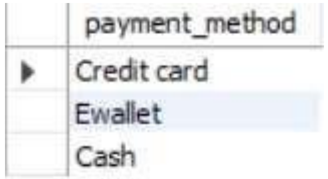
city
Yangon
Naypyitaw
Mandalay



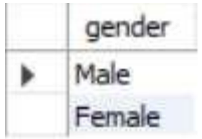
time_of_day
Evening
Afternoon
Morning



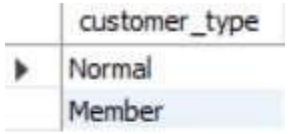
month_name
March
January
February



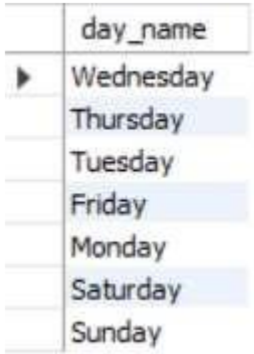
payment_method
Credit card
Ewallet
Cash



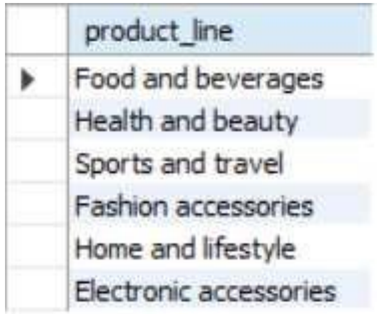
gender
Male
Female



customer_type
Normal
Member



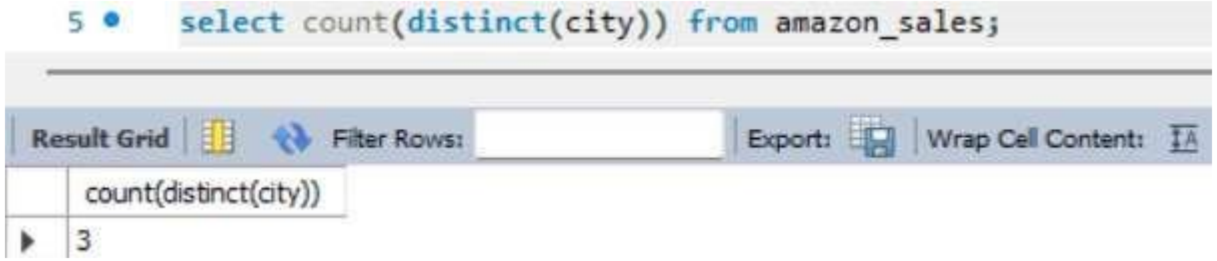
day_name
Wednesday
Thursday
Tuesday
Friday
Monday
Saturday
Sunday



product_line
Food and beverages
Health and beauty
Sports and travel
Fashion accessories
Home and lifestyle
Electronic accessories

Answering Business Questions

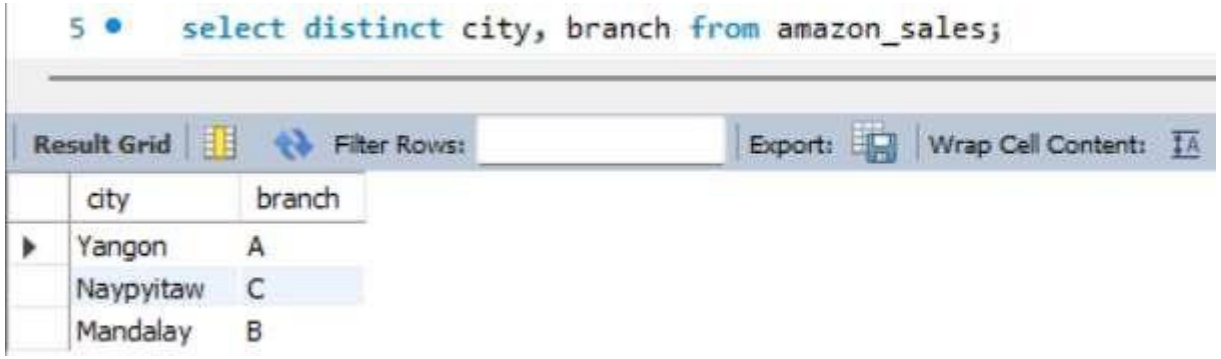
Q.1] What is the count of distinct cities in the dataset?



```
select count(distinct(city)) from amazon_sales;
```

count(distinct(city))
3

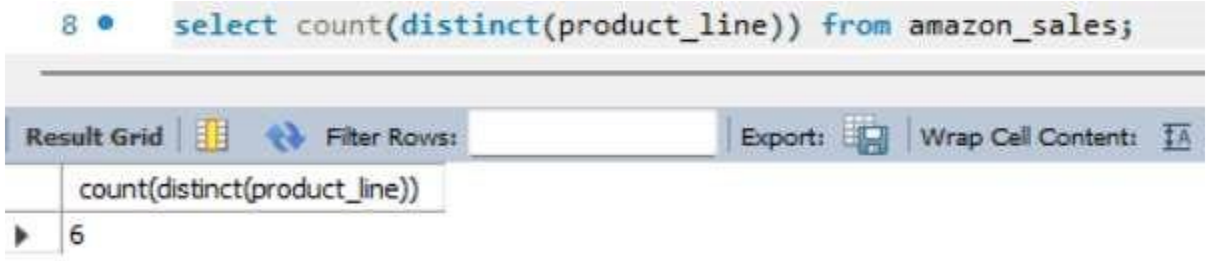
Q.2] For each branch, what is corresponding city?



```
select distinct city, branch from amazon_sales;
```

city	branch
Yangon	A
Naypyitaw	C
Mandalay	B

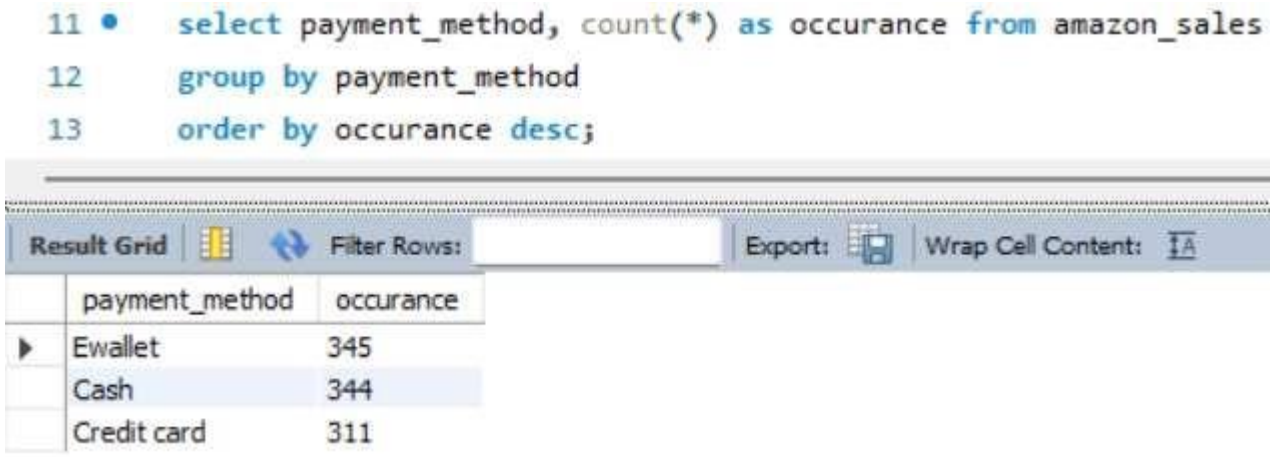
Q.3] What is the count of distinct product lines in the dataset?



```
select count(distinct(product_line)) from amazon_sales;
```

count(distinct(product_line))
6

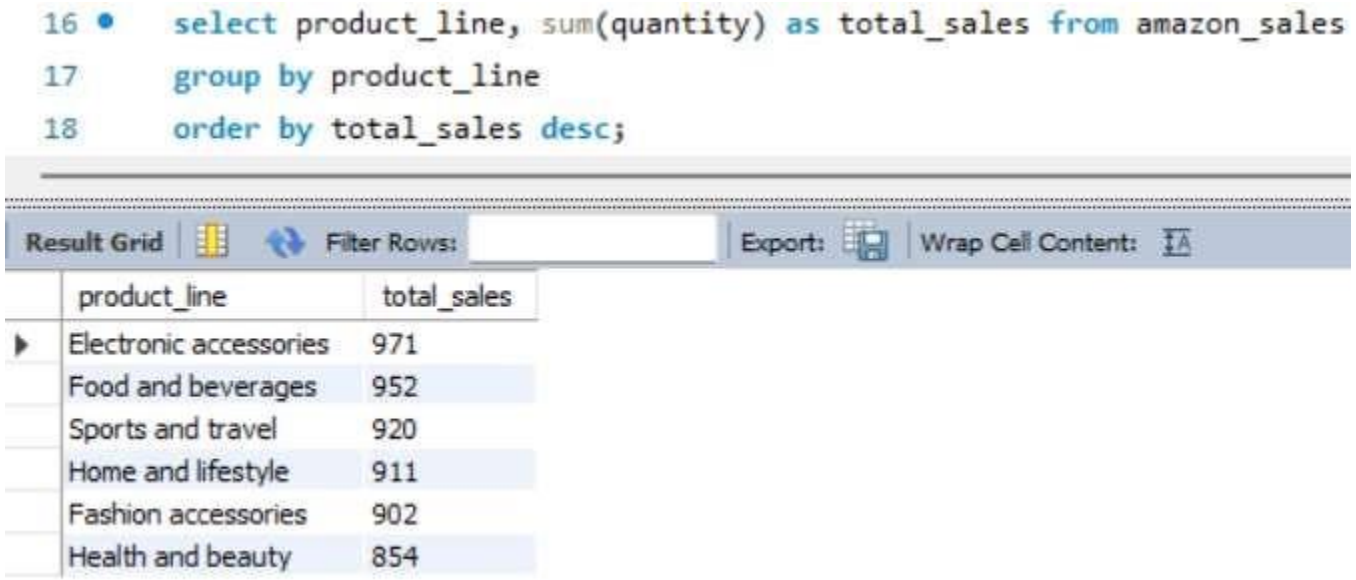
Q.4] Which payment method occurs most frequently?



```
select payment_method, count(*) as occurance from amazon_sales
group by payment_method
order by occurance desc;
```

payment_method	occurance
Ewallet	345
Cash	344
Credit card	311

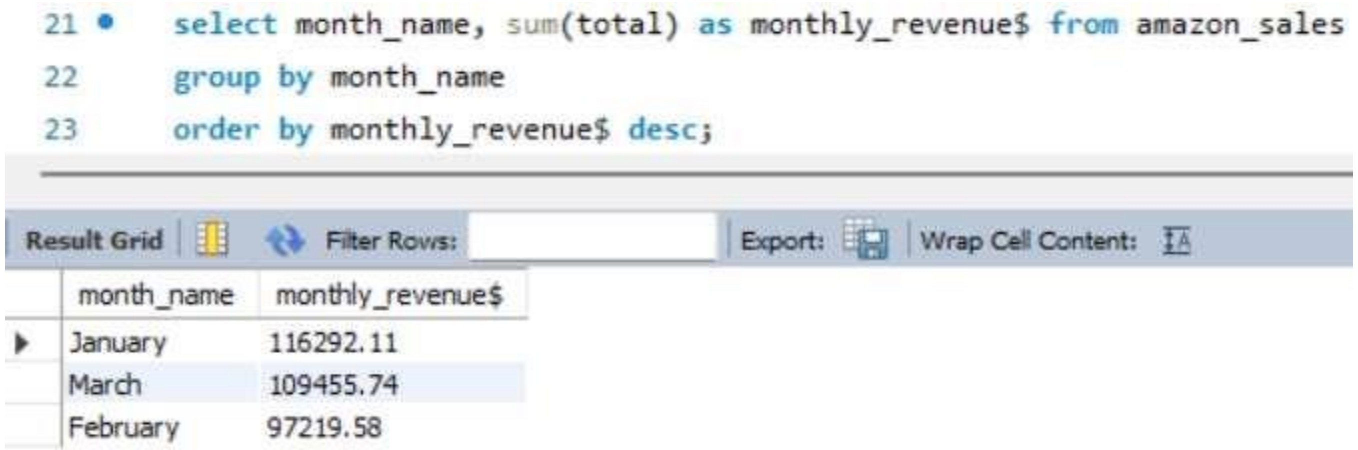
Q.5] Which product line has the highest sales?



```
select product_line, sum(quantity) as total_sales from amazon_sales
group by product_line
order by total_sales desc;
```

product_line	total_sales
Electronic accessories	971
Food and beverages	952
Sports and travel	920
Home and lifestyle	911
Fashion accessories	902
Health and beauty	854

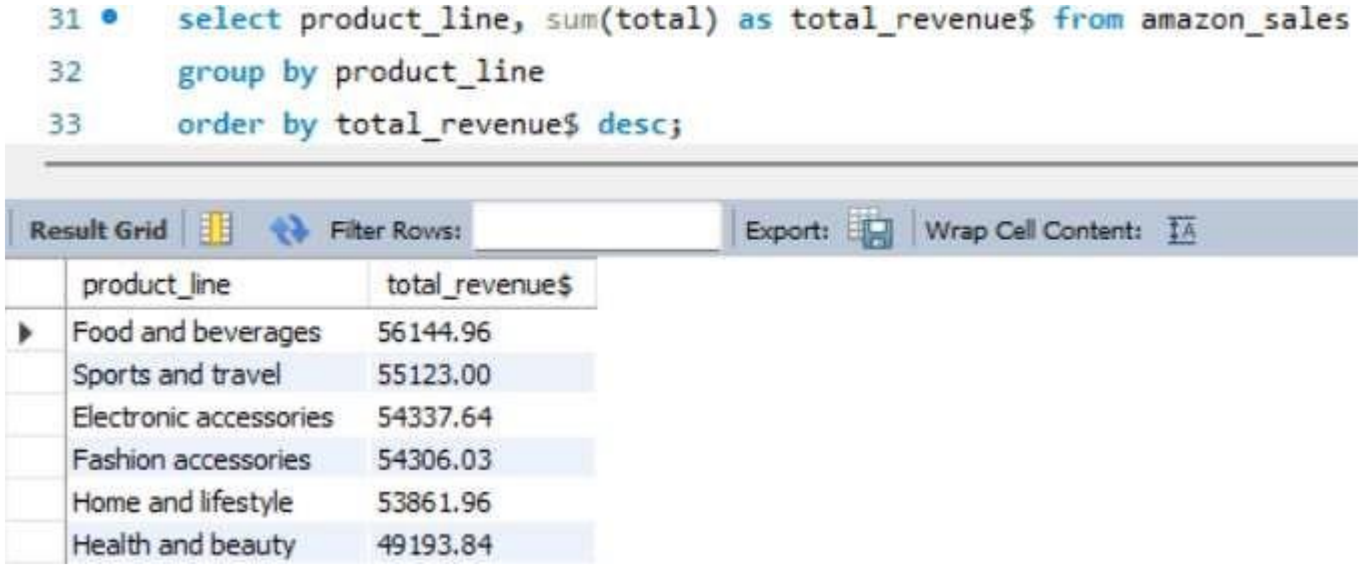
Q.6] How much revenue is generated each month?



```sql
select month_name, sum(total) as monthly_revenue$ from amazon_sales
group by month_name
order by monthly_revenue$ desc;
```

month_name	monthly_revenue$
January	116292.11
March	109455.74
February	97219.58

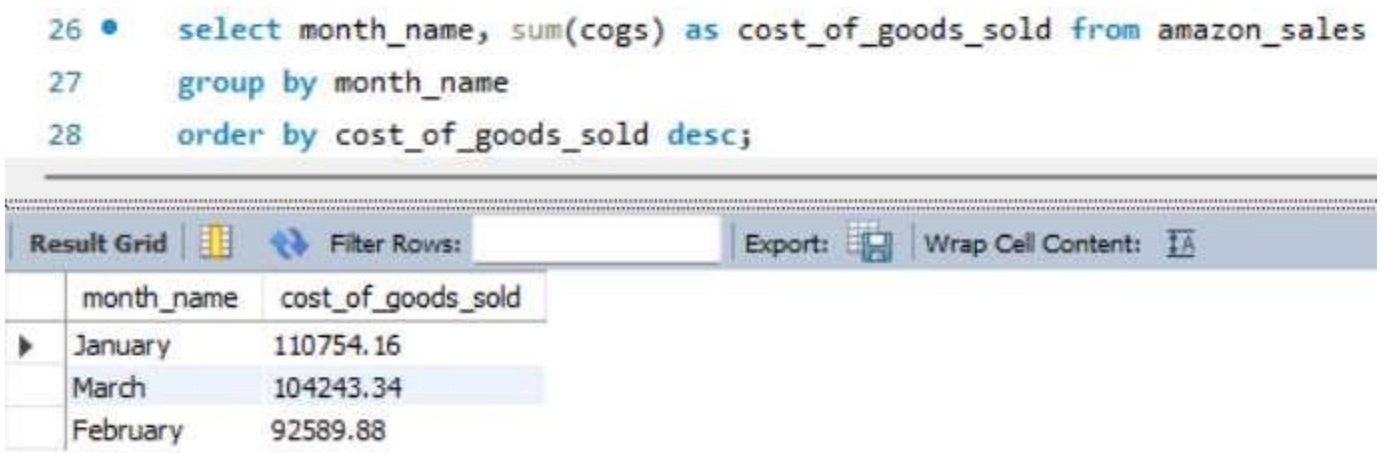
Q.7] Which product line generated highest revenue?



```sql
select product_line, sum(total) as total_revenue$ from amazon_sales
group by product_line
order by total_revenue$ desc;
```

product_line	total_revenue$
Food and beverages	56144.96
Sports and travel	55123.00
Electronic accessories	54337.64
Fashion accessories	54306.03
Home and lifestyle	53861.96
Health and beauty	49193.84

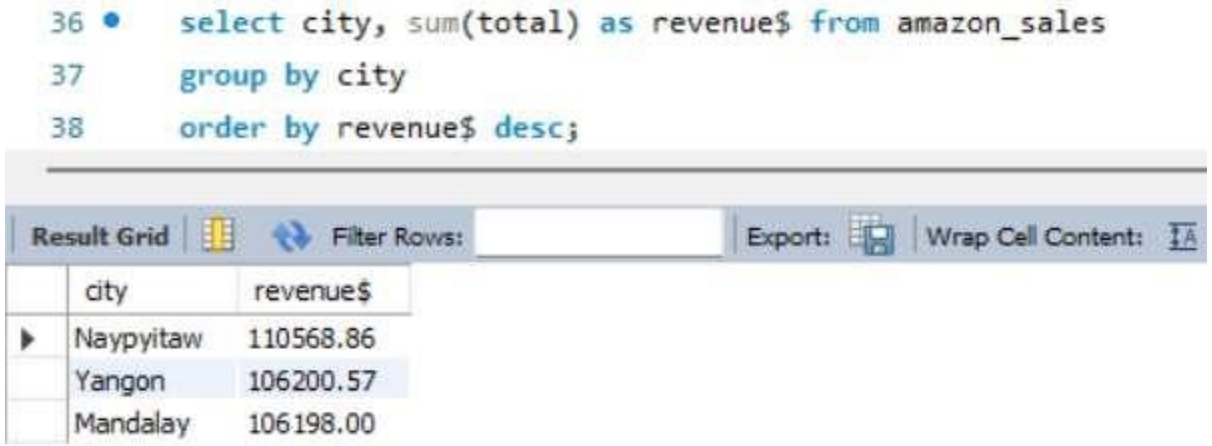
Q.8] In which month cost of goods sold reach its peak?



```
select month_name, sum(cogs) as cost_of_goods_sold from amazon_sales
group by month_name
order by cost_of_goods_sold desc;
```

month_name	cost_of_goods_sold
January	110754.16
March	104243.34
February	92589.88

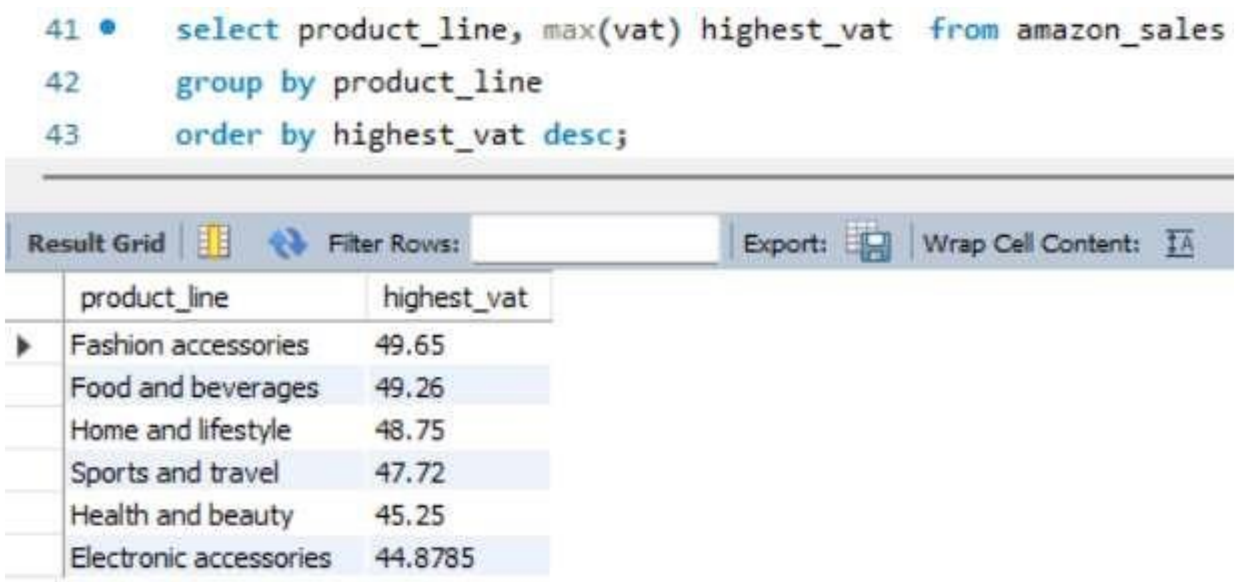
Q.9] Which city has the highest revenue recorded?



```
select city, sum(total) as revenue$ from amazon_sales
group by city
order by revenue$ desc;
```

city	revenue$
Naypyitaw	110568.86
Yangon	106200.57
Mandalay	106198.00

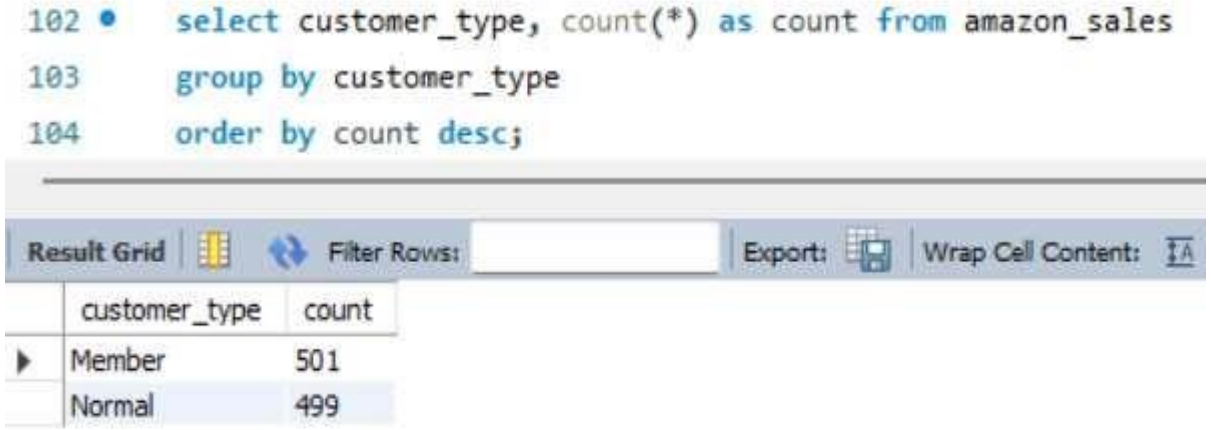
Q.10] Which product line incurred the highest value added tax?



```
select product_line, max(vat) highest_vat  from amazon_sales
group by product_line
order by highest_vat desc;
```

product_line	highest_vat
Fashion accessories	49.65
Food and beverages	49.26
Home and lifestyle	48.75
Sports and travel	47.72
Health and beauty	45.25
Electronic accessories	44.8785

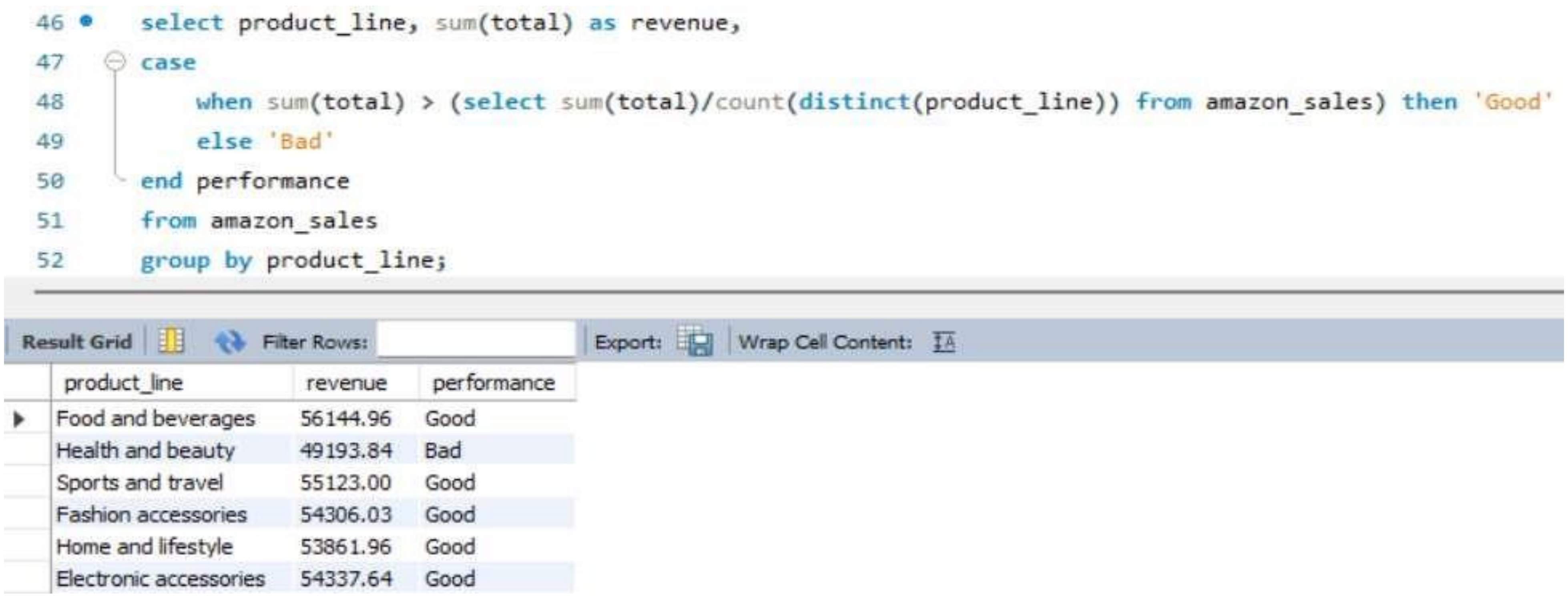
Q.11] Which customer type occurs most frequently?



```
select customer_type, count(*) as count from amazon_sales
group by customer_type
order by count desc;
```

customer_type	count
Member	501
Normal	499

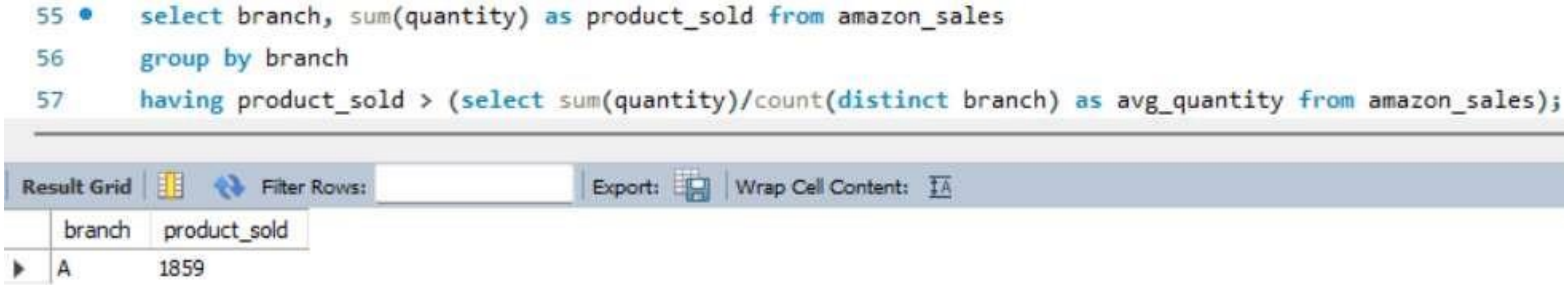
Q.12] For each product line, add a column indicating "Good" if its sales are above average, otherwise "Bad."



```sql
select product_line, sum(total) as revenue,
case
    when sum(total) > (select sum(total)/count(distinct(product_line)) from amazon_sales) then 'Good'
    else 'Bad'
end performance
from amazon_sales
group by product_line;
```

product_line	revenue	performance
Food and beverages	56144.96	Good
Health and beauty	49193.84	Bad
Sports and travel	55123.00	Good
Fashion accessories	54306.03	Good
Home and lifestyle	53861.96	Good
Electronic accessories	54337.64	Good

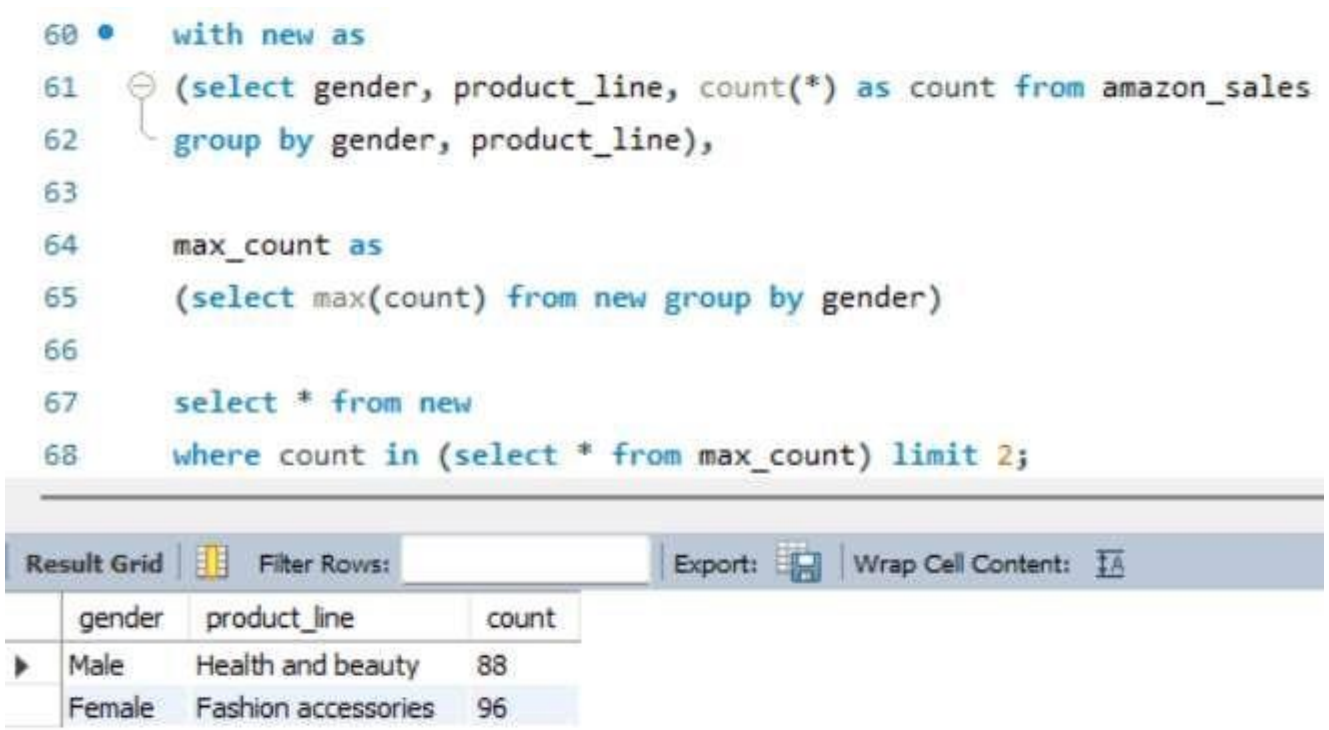
Q.13] Which branch exceeded the average number of product sold?



```sql
select branch, sum(quantity) as product_sold from amazon_sales
group by branch
having product_sold > (select sum(quantity)/count(distinct branch) as avg_quantity from amazon_sales);
```

branch	product_sold
A	1859

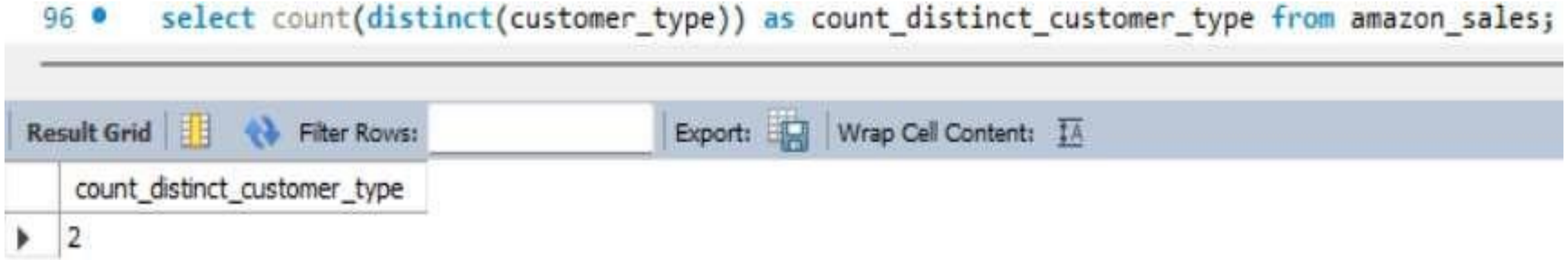
Q.14] Which product line is most frequently associated with each gender?



```sql
with new as
(select gender, product_line, count(*) as count from amazon_sales
group by gender, product_line),

max_count as
(select max(count) from new group by gender)

select * from new
where count in (select * from max_count) limit 2;
```

gender	product_line	count
Male	Health and beauty	88
Female	Fashion accessories	96

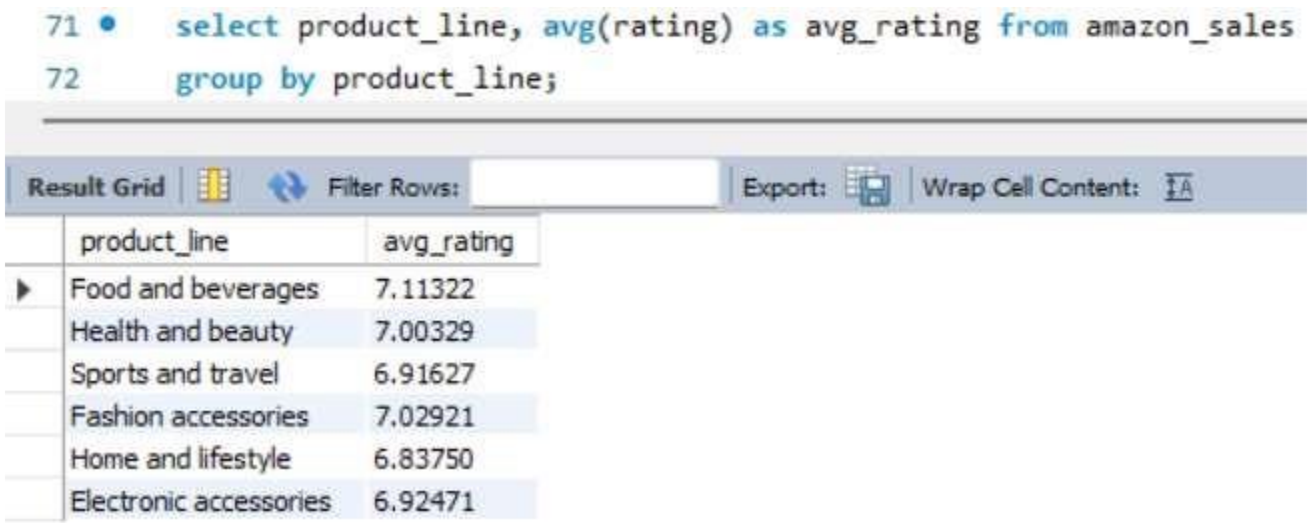
Q.15] What is the count of distinct customer types in the dataset?



```sql
select count(distinct(customer_type)) as count_distinct_customer_type from amazon_sales;
```

count_distinct_customer_type
2

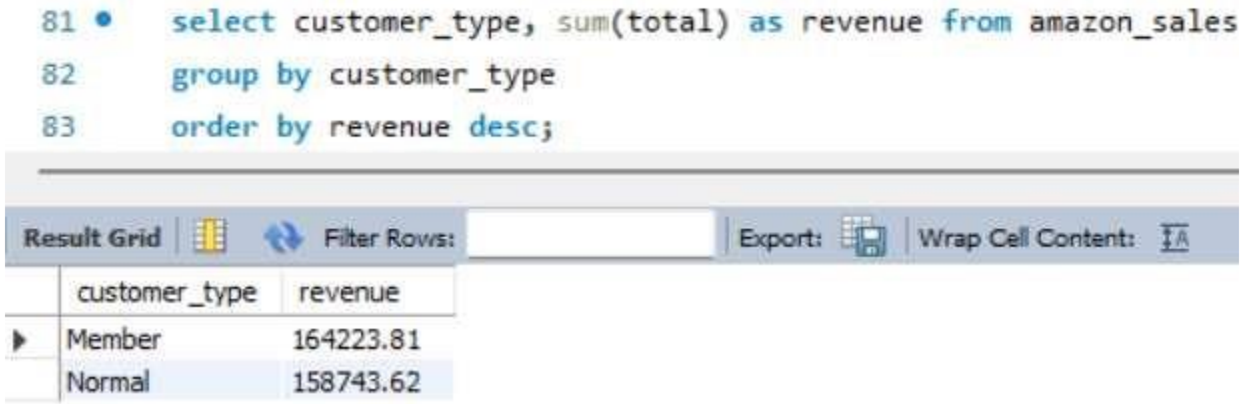
Q.16] Calculate the average rating for each product line.



```sql
select product_line, avg(rating) as avg_rating from amazon_sales
group by product_line;
```

product_line	avg_rating
Food and beverages	7.11322
Health and beauty	7.00329
Sports and travel	6.91627
Fashion accessories	7.02921
Home and lifestyle	6.83750
Electronic accessories	6.92471

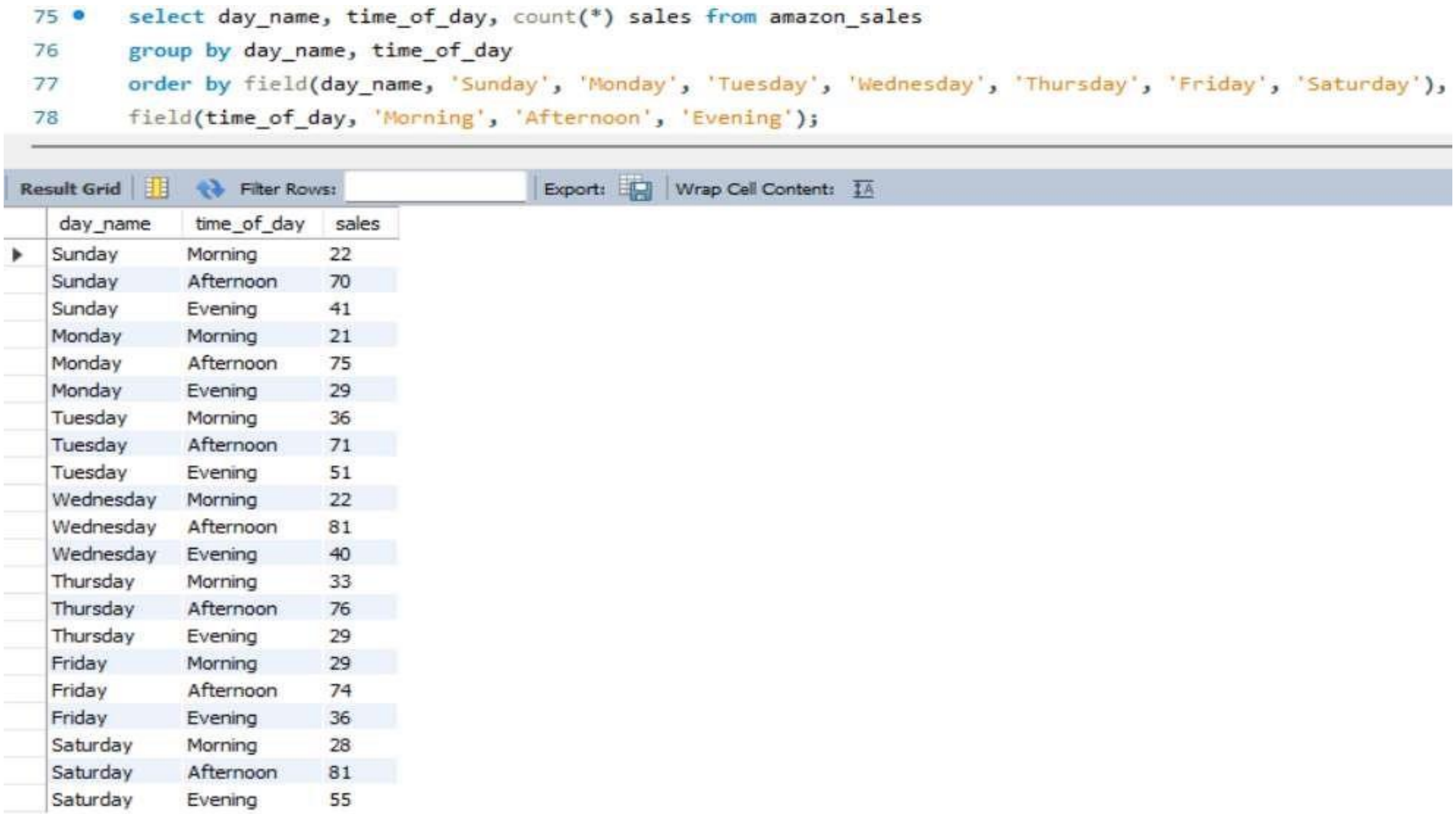
Q.17] Identify the customer type contributing the highest revenue.



```sql
select customer_type, sum(total) as revenue from amazon_sales
group by customer_type
order by revenue desc;
```

customer_type	revenue
Member	164223.81
Normal	158743.62

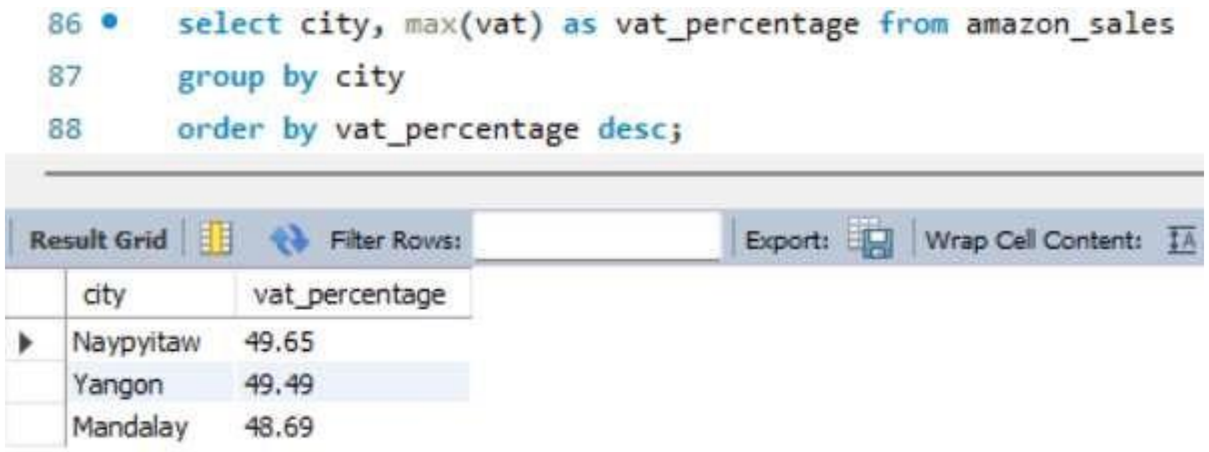
Q.18] Count the sales occurrences for each time of day on every weekday.



```sql
select day_name, time_of_day, count(*) sales from amazon_sales
group by day_name, time_of_day
order by field(day_name, 'Sunday', 'Monday', 'Tuesday', 'Wednesday', 'Thursday', 'Friday', 'Saturday'),
field(time_of_day, 'Morning', 'Afternoon', 'Evening');
```

day_name	time_of_day	sales
Sunday	Morning	22
Sunday	Afternoon	70
Sunday	Evening	41
Monday	Morning	21
Monday	Afternoon	75
Monday	Evening	29
Tuesday	Morning	36
Tuesday	Afternoon	71
Tuesday	Evening	51
Wednesday	Morning	22
Wednesday	Afternoon	81
Wednesday	Evening	40
Thursday	Morning	33
Thursday	Afternoon	76
Thursday	Evening	29
Friday	Morning	29
Friday	Afternoon	74
Friday	Evening	36
Saturday	Morning	28
Saturday	Afternoon	81
Saturday	Evening	55

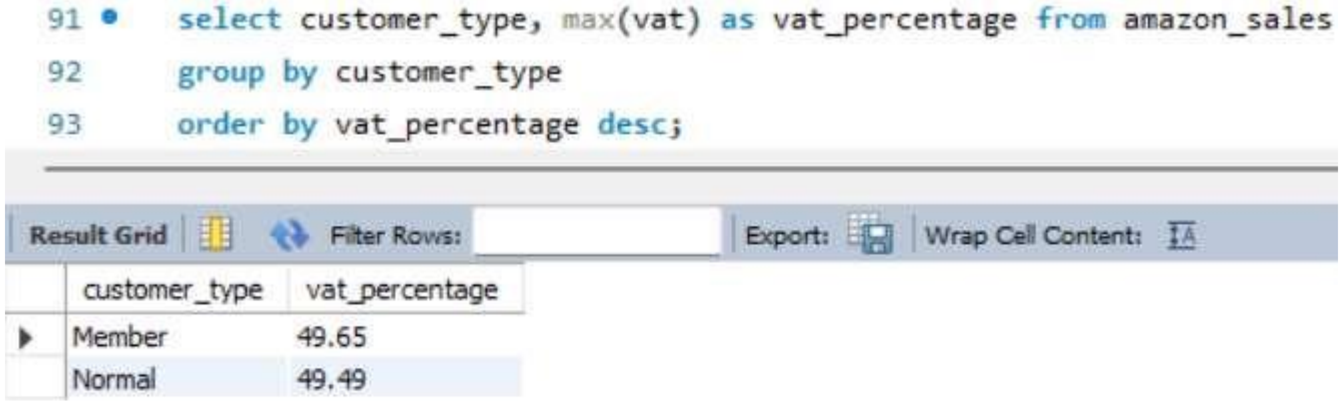
Q.19] Determine city with highest VAT percentage.



```sql
select city, max(vat) as vat_percentage from amazon_sales
group by city
order by vat_percentage desc;
```

city	vat_percentage
Naypyitaw	49.65
Yangon	49.49
Mandalay	48.69

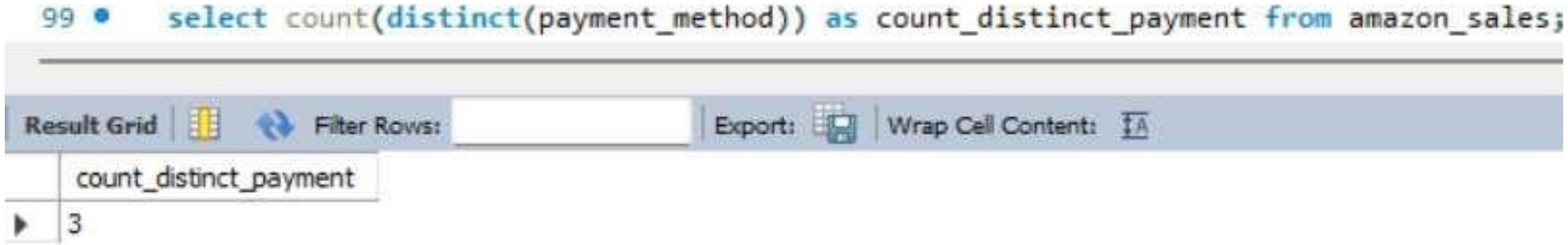
Q.20] Identify the customer type with the highest VAT payments.



```sql
select customer_type, max(vat) as vat_percentage from amazon_sales
group by customer_type
order by vat_percentage desc;
```

customer_type	vat_percentage
Member	49.65
Normal	49.49

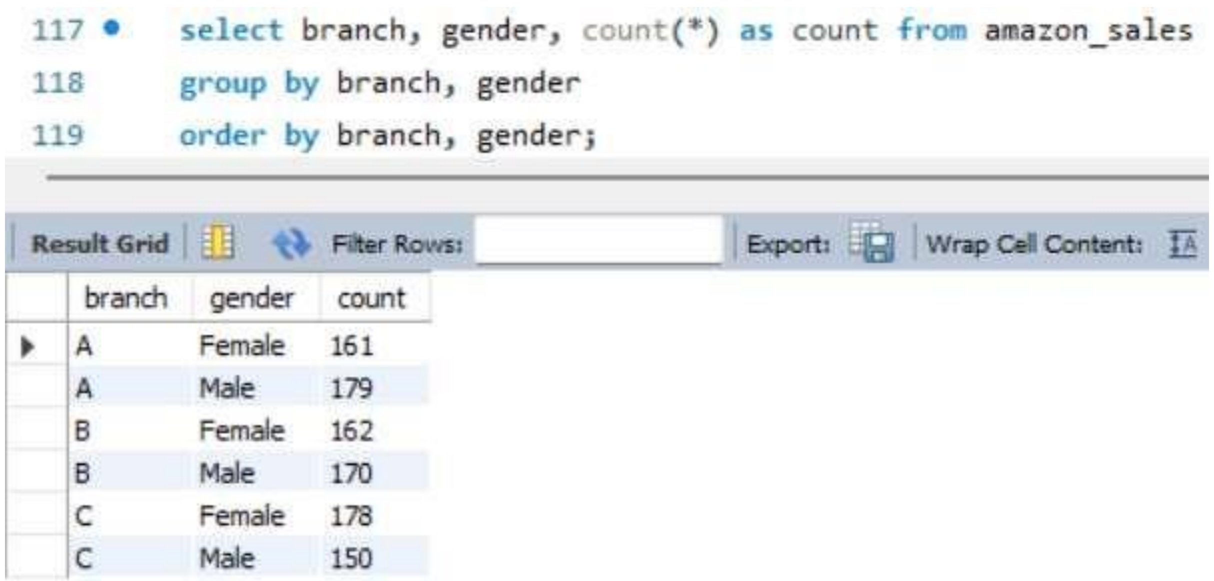
Q.21] What is the count of distinct payment methods in the dataset?



```sql
select count(distinct(payment_method)) as count_distinct_payment from amazon_sales;
```

count_distinct_payment
3

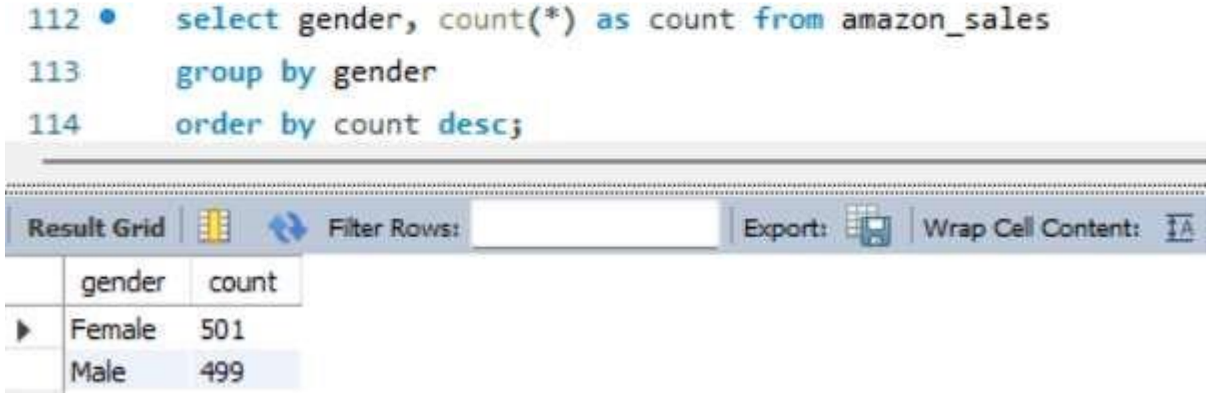
Q.22] Examine distribution of gender within each branch.



```sql
select branch, gender, count(*) as count from amazon_sales
group by branch, gender
order by branch, gender;
```

branch	gender	count
A	Female	161
A	Male	179
B	Female	162
B	Male	170
C	Female	178
C	Male	150

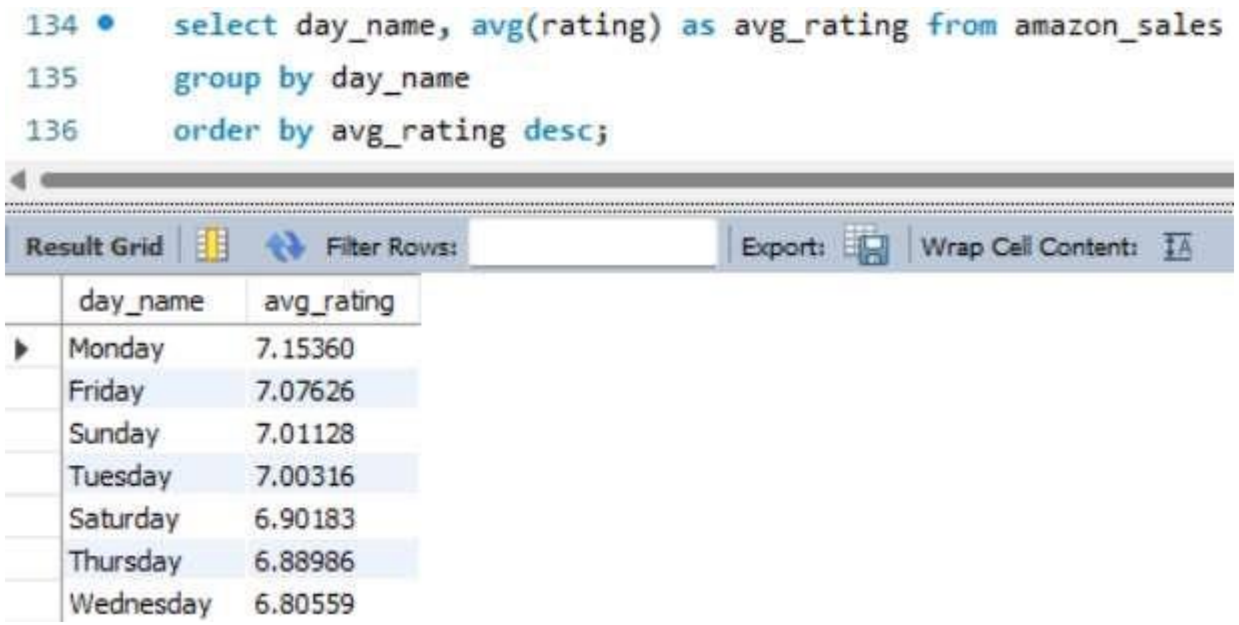
Q.23] Determine predominant gender among customer.



```sql
select gender, count(*) as count from amazon_sales
group by gender
order by count desc;
```

gender	count
Female	501
Male	499

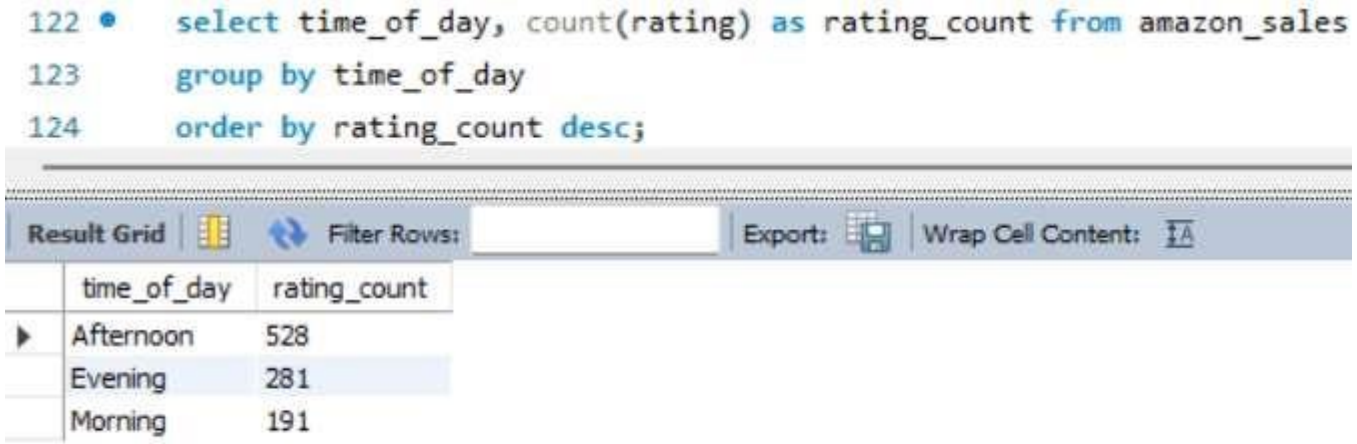
Q.24] Identify the day of the week with the highest average ratings.



```sql
select day_name, avg(rating) as avg_rating from amazon_sales
group by day_name
order by avg_rating desc;
```

```
day_name    avg_rating
Monday      7.15360
Friday      7.07626
Sunday      7.01128
Tuesday     7.00316
Saturday    6.90183
Thursday    6.88986
Wednesday   6.80559
```

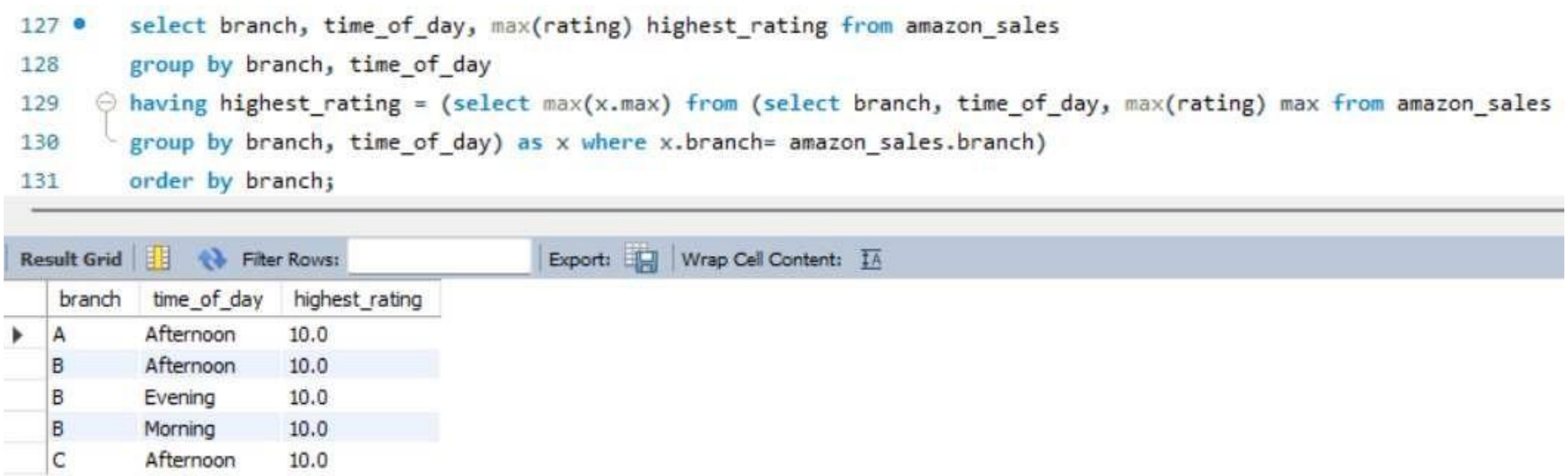
Q.25] Identify the time of day when customer provide most ratings.



```sql
select time_of_day, count(rating) as rating_count from amazon_sales
group by time_of_day
order by rating_count desc;
```

```
time_of_day   rating_count
Afternoon     528
Evening       281
Morning       191
```

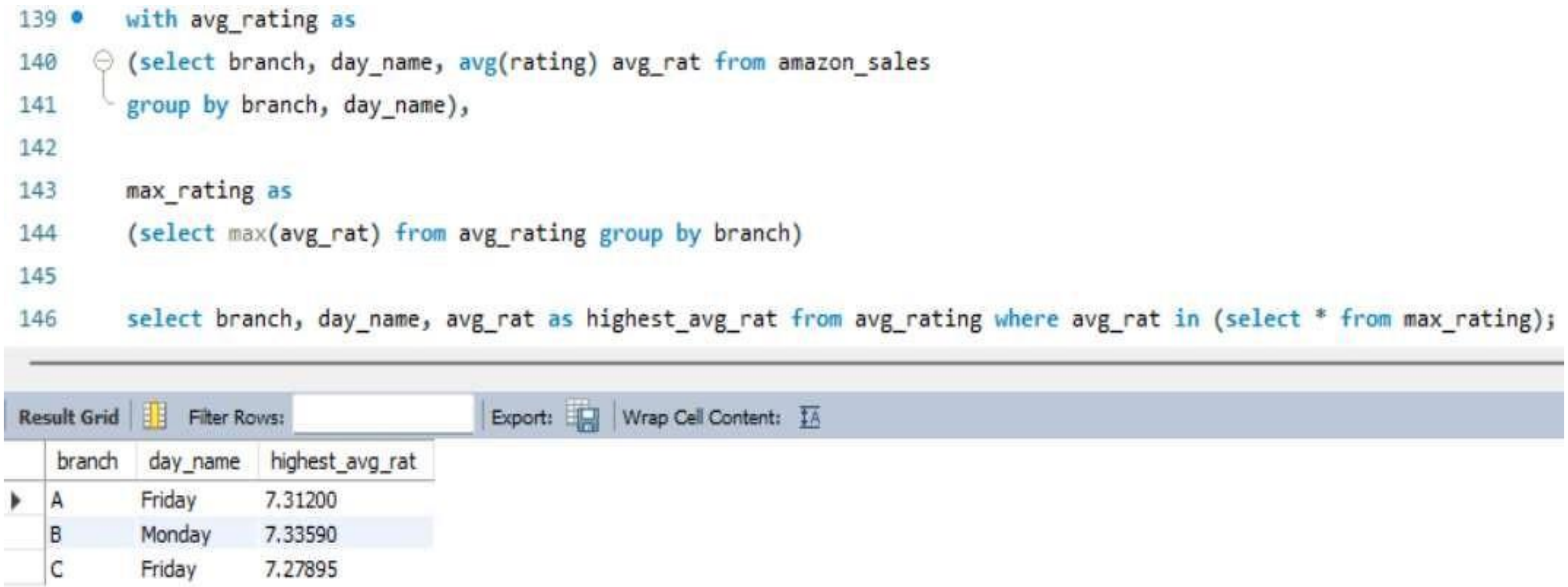
Q.26] Determine the time of day with the highest customer ratings for each branch.



```sql
select branch, time_of_day, max(rating) highest_rating from amazon_sales
group by branch, time_of_day
having highest_rating = (select max(x.max) from (select branch, time_of_day, max(rating) max from amazon_sales
group by branch, time_of_day) as x where x.branch= amazon_sales.branch)
order by branch;
```

branch	time_of_day	highest_rating
A	Afternoon	10.0
B	Afternoon	10.0
B	Evening	10.0
B	Morning	10.0
C	Afternoon	10.0

Q.27]. Determine the day of the week with the highest average ratings for each branch.



```
with avg_rating as
(select branch, day_name, avg(rating) avg_rat from amazon_sales
group by branch, day_name),

max_rating as
(select max(avg_rat) from avg_rating group by branch)

select branch, day_name, avg_rat as highest_avg_rat from avg_rating where avg_rat in (select * from max_rating);
```

```
branch  day_name  highest_avg_rat
A       Friday    7.31200
B       Monday    7.33590
C       Friday    7.27895
```

Key Findings

Product Analysis:

- Highest Sales Product Line: **Electronic Accessories (Units Sold:971)**
- Highest Revenue Product Line: **Food and Beverages ($ 56144.96)**
- Lowest Sales Product Line: **Health and Beauty (Unit Sold: 854)**
- Lowest Revenue Product Line: **Health and Beauty ($ 49193.84)**

Sales Analysis:

- Month With Highest Revenue: **January ($ 116292.11)**
- City & Branch With Highest Revenue: **Naypyitaw[C] ($ 110568.86)**
- Month With Lowest Revenue: **February ($ 97219.58)**
- City & Branch With Lowest Revenue: **Mandalay[B] ($ 106198.00)**
- Peak Sales Time Of Day: **Afternoon**
- Peak Sales Day Of Week: **Saturday**

Customer Analysis:

- Most Predominant Gender: **Female**
- Most Predominant Customer Type: **Member**
- Highest Revenue Gender: **Female ($ 167883.26)**
- Highest Revenue Customer Type: **Member ($ 164223.81)**
- Most Popular Product Line (Male): **Health and Beauty**
- Most Popular Product Line (Female): **Fashion Accessories**
- Distribution Of Members Based On Gender: **Male(240) Female(261)**

- Sales Male: **2641 units**
- Sales Female: **2869 units**

THANK YOU