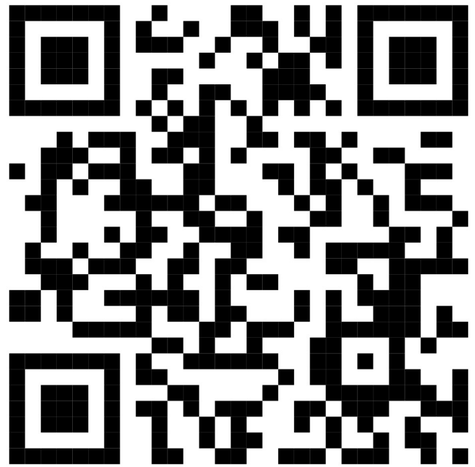
SQL DATA EXTRACTION



CONTENTS

- Knowledge of the database we working on
- Query Snippets Along with Questions

Different Tables in Our Database gdb0041

date	product_code	customer_code	sold_quantity
2017-09-01	A0118150101	70002017	51
2017-09-01	A0118150101	70002018	77
2017-09-01	A0118150101	70003181	17
2017-09-01	A0118150101	70003182	6
2017-09-01	A0118150101	70006157	5
2017-09-01	A0118150101	70006158	7
2017-09-01	A0118150101	70007198	29
2017-09-01	A0118150101	70007199	34
2017-09-01	A0118150101	70008169	22
2017-09-01	A0118150101	70008170	5
2017-09-01	A0118150101	70011193	10
2017-09-01	A0118150101	70011194	4
2017-09-01	A0118150101	70012042	0
2017-09-01	A0118150101	70012043	0
2017-09-01	A0118150101	70013125	1
2017-09-01	A0118150101	70013126	1
2017-09-01	A0118150101	70016178	1
2017-09-01	A0118150101	70022085	20
2017-09-01	A0118150101	70023031	4
2017-09-01	A0118150101	80001019	10
2017-09-01	A0118150101	80006154	10
2017-09-01	A0118150101	80006155	28
2017-09-01	A0118150101	80007195	80
2017-09-01	A0118150101	90001021	1
2017-09-01	A0118150101	90002001	42

"This table captures information about each product sold by every customer during specific months, spanning from fiscal year 2018 to fiscal year 2022."
fact_sales_monthly

date	fiscal_year	product_code	customer_code	forecast_quantity
2017-09-01	2018	A0118150101	70002017	18
2017-09-01	2018	A0118150101	70002018	11
2017-09-01	2018	A0118150101	70003181	9
2017-09-01	2018	A0118150101	70003182	6
2017-09-01	2018	A0118150101	70006157	5
2017-09-01	2018	A0118150101	70006158	6
2017-09-01	2018	A0118150101	70007198	4
2017-09-01	2018	A0118150101	70007199	7
2017-09-01	2018	A0118150101	70008169	7
2017-09-01	2018	A0118150101	70008170	8
2017-09-01	2018	A0118150101	70011193	5
2017-09-01	2018	A0118150101	70011194	7
2017-09-01	2018	A0118150101	70013125	2
2017-09-01	2018	A0118150101	70013126	2
2017-09-01	2018	A0118150101	70022085	12
2017-09-01	2018	A0118150101	70023031	1
2017-09-01	2018	A0118150101	80001019	7
2017-09-01	2018	A0118150101	80006154	21
2017-09-01	2018	A0118150101	80006155	21
2017-09-01	2018	A0118150101	80007195	62
2017-09-01	2018	A0118150101	90001021	2
2017-09-01	2018	A0118150101	90002001	52
2017-09-01	2018	A0118150101	90002002	47
2017-09-01	2018	A0118150101	90002003	56
2017-09-01	2018	A0118150101	90002005	40

"This table consists of forecasted values provided by the supply chain team for each product, outlining the potential demand from each customer for every month, across fiscal years 2018 to 2022."
fact_forecast_monthly

product_code	fiscal_year	gross_price
A0118150101	2018	15.3952
A0118150101	2019	14.4392
A0118150101	2020	16.2323
A0118150101	2021	19.0573
A0118150102	2018	19.5875
A0118150102	2019	18.5595
A0118150102	2020	19.8577
A0118150102	2021	21.4565
A0118150103	2018	19.3630
A0118150103	2019	19.3442
A0118150103	2020	22.1317
A0118150103	2021	21.7795
A0118150103	2022	23.9920
A0118150104	2018	19.5743
A0118150104	2019	18.5072
A0118150104	2020	20.7734
A0118150104	2021	22.9729
A0118150104	2022	23.6298

"This table contains the required gross price for each product across the fiscal year from 2018 to 2022."
fact_gross_price

Different Tables in Our Database gdb0041

market	fiscal_year	freight_pct	other_cost_pct
Australia	2018	0.0188	0.0050
Australia	2019	0.0304	0.0048
Australia	2020	0.0254	0.0043
Australia	2021	0.0254	0.0043
Australia	2022	0.0254	0.0043
Austria	2018	0.0272	0.0053
Austria	2019	0.0292	0.0050
Austria	2020	0.0294	0.0034
Austria	2021	0.0294	0.0034
Austria	2022	0.0294	0.0034
Banglad...	2018	0.0219	0.0058
Banglad...	2019	0.0249	0.0053
Banglad...	2020	0.0258	0.0035
Banglad...	2021	0.0258	0.0035
Banglad...	2022	0.0258	0.0035
Brazil	2018	0.0239	0.0033
Brazil	2019	0.0193	0.0046
Brazil	2020	0.0298	0.0046
Brazil	2021	0.0298	0.0046
Brazil	2022	0.0298	0.0046
Canada	2018	0.0264	0.0054
Canada	2019	0.0217	0.0030
Canada	2020	0.0273	0.0055
Canada	2021	0.0273	0.0055
Canada	2022	0.0273	0.0055

"This table contains the freight cost and associated cost percentages for each country in every fiscal year."
fact_freight_cost

product_code	cost_year	manufacturing_cost
A0118150101	2018	4.6190
A0118150101	2019	4.2033
A0118150101	2020	5.0207
A0118150101	2021	5.5172
A0118150102	2018	5.6036
A0118150102	2019	5.3235
A0118150102	2020	5.7180
A0118150102	2021	6.2835
A0118150103	2018	5.9469
A0118150103	2019	5.5306
A0118150103	2020	6.3264
A0118150103	2021	6.5900
A0118150103	2022	7.1831
A0118150104	2018	5.8958
A0118150104	2019	5.4242
A0118150104	2020	6.4789
A0118150104	2021	6.8199
A0118150104	2022	7.3655
A0219150201	2019	5.7250
A0219150201	2020	6.4858
A0219150201	2021	7.0498
A0219150201	2022	7.5433
A0219150202	2019	6.2366
A0219150202	2020	7.0590
A0219150202	2021	7.2031

""This table contains the manufacturing costs associated with each product for every fiscal year."
fact_manufacturing_cost

customer_code	fiscal_year	pre_invoice_discount_pct
70002017	2018	0.0824
70002017	2019	0.0777
70002017	2020	0.0735
70002017	2021	0.0703
70002017	2022	0.1057
70002018	2018	0.2956
70002018	2019	0.2577
70002018	2020	0.2255
70002018	2021	0.2061
70002018	2022	0.2931
70003181	2018	0.0536
70003181	2019	0.0546
70003181	2020	0.0531
70003181	2021	0.0974
70003181	2022	0.0727
70003182	2018	0.2378
70003182	2019	0.2023
70003182	2020	0.1823
70003182	2021	0.2065
70003182	2022	0.2147
70004069	2018	0.0547
70004069	2019	0.0997
70004069	2020	0.0576
70004069	2021	0.1068
70004069	2022	0.0895

"This table contains the pre-invoice deduction percentages associated with each customer for every fiscal year."
fact_pre_invoice_deductions

Different Tables in Our Database gdb0041

customer_code	product_code	date	discounts_pct	other_deductions_pct
70002017	A0118150101	2017-09-01	0.2660	0.0719
70002017	A0118150101	2017-10-01	0.3090	0.0976
70002017	A0118150101	2017-11-01	0.3313	0.0752
70002017	A0118150101	2018-01-01	0.2958	0.0720
70002017	A0118150101	2018-02-01	0.3208	0.0793
70002017	A0118150101	2018-03-01	0.2635	0.1007
70002017	A0118150101	2018-05-01	0.2231	0.0820
70002017	A0118150101	2018-06-01	0.3020	0.0791
70002017	A0118150101	2018-07-01	0.3123	0.0929
70002017	A0118150101	2018-09-01	0.1530	0.1288
70002017	A0118150101	2018-10-01	0.1363	0.1542
70002017	A0118150101	2018-11-01	0.1521	0.1641
70002017	A0118150101	2019-01-01	0.1762	0.1386
70002017	A0118150101	2019-02-01	0.1844	0.1635
70002017	A0118150101	2019-03-01	0.1628	0.1413
70002017	A0118150101	2019-05-01	0.1553	0.1555
70002017	A0118150101	2019-06-01	0.1595	0.1198
70002017	A0118150101	2019-07-01	0.1760	0.1365
70002017	A0118150101	2019-09-01	0.2981	0.1101
70002017	A0118150101	2019-10-01	0.2354	0.0858
70002017	A0118150101	2019-11-01	0.3056	0.1091
70002017	A0118150101	2020-01-01	0.3240	0.0890
70002017	A0118150101	2020-02-01	0.3220	0.1187
70002017	A0118150101	2020-03-01	0.3026	0.1109
70002017	A0118150101	2020-05-01	0.2792	0.1098

"This table contains the post-invoice discounts and other discounts for each customer and each product on a monthly basis, spanning from fiscal year 2018 to 2022."
fact_post_invoice_deductions

customer_code	customer	platform	channel	market	sub_zone	region
70002017	Atliq Exclusive	Brick & Mortar	Direct	India	India	APAC
70002018	Atliq e Store	E-Commerce	Direct	India	India	APAC
70003181	Atliq Exclusive	Brick & Mortar	Direct	Indonesia	ROA	APAC
70003182	Atliq e Store	E-Commerce	Direct	Indonesia	ROA	APAC
70004069	Atliq Exclusive	Brick & Mortar	Direct	Japan	ROA	APAC
70004070	Atliq e Store	E-Commerce	Direct	Japan	ROA	APAC
70005163	Atliq e Store	E-Commerce	Direct	Pakistan	ROA	APAC
70006157	Atliq Exclusive	Brick & Mortar	Direct	Philiphines	ROA	APAC
70006158	Atliq e Store	E-Commerce	Direct	Philiphines	ROA	APAC
70007198	Atliq Exclusive	Brick & Mortar	Direct	South Korea	ROA	APAC
70007199	Atliq e Store	E-Commerce	Direct	South Korea	ROA	APAC
70008169	Atliq Exclusive	Brick & Mortar	Direct	Australia	ANZ	APAC
70008170	Atliq e Store	E-Commerce	Direct	Australia	ANZ	APAC
70009133	Atliq Exclusive	Brick & Mortar	Direct	Newzealand	ANZ	APAC
70009134	Atliq e Store	E-Commerce	Direct	Newzealand	ANZ	APAC
70010047	Atliq Exclusive	Brick & Mortar	Direct	Bangladesh	ROA	APAC
70010048	Atliq e Store	E-Commerce	Direct	Bangladesh	ROA	APAC
70011193	Atliq Exclusive	Brick & Mortar	Direct	France	SE	EU
70011194	Atliq e Store	E-Commerce	Direct	France	SE	EU
70012042	Atliq Exclusive	Brick & Mortar	Direct	Germany	NE	EU
70012043	Atliq e Store	E-Commerce	Direct	Germany	NE	EU
70013125	Atliq Exclusive	Brick & Mortar	Direct	Italy	SE	EU
70013126	Atliq e Store	E-Commerce	Direct	Italy	SE	EU
70014142	Atliq Exclusive	Brick & Mortar	Direct	Netherlands	NE	EU
70014143	Atliq e Store	E-Commerce	Direct	Netherlands	NE	EU

"This table contains various details for each customer based on their customer code, including the customer's name, the platform channel market to which they belong, as well as their subzone and region."
dim_customer

product_code	division	segment	category	product	variant
A0118150101	P & A	Peripherals	Internal HDD	AQ Dracula HDD – 3.5 Inch SATA 6 Gb/s 5400 RPM 256 MB Cache	Standard
A0118150102	P & A	Peripherals	Internal HDD	AQ Dracula HDD – 3.5 Inch SATA 6 Gb/s 5400 RPM 256 MB Cache	Plus
A0118150103	P & A	Peripherals	Internal HDD	AQ Dracula HDD – 3.5 Inch SATA 6 Gb/s 5400 RPM 256 MB Cache	Premium
A0118150104	P & A	Peripherals	Internal HDD	AQ Dracula HDD – 3.5 Inch SATA 6 Gb/s 5400 RPM 256 MB Cache	Premium Plus
A0219150201	P & A	Peripherals	Internal HDD	AQ WereWolf NAS Internal Hard Drive HDD – 8.89 cm	Standard
A0219150202	P & A	Peripherals	Internal HDD	AQ WereWolf NAS Internal Hard Drive HDD – 8.89 cm	Plus
A0220150203	P & A	Peripherals	Internal HDD	AQ WereWolf NAS Internal Hard Drive HDD – 8.89 cm	Premium
A0320150301	P & A	Peripherals	Internal HDD	AQ Zion Saga	Standard
A0321150302	P & A	Peripherals	Internal HDD	AQ Zion Saga	Plus
A0321150303	P & A	Peripherals	Internal HDD	AQ Zion Saga	Premium
A0418150101	P & A	Peripherals	Graphic Card	AQ Mforce Gen X	Standard 1
A0418150102	P & A	Peripherals	Graphic Card	AQ Mforce Gen X	Standard 2
A0418150103	P & A	Peripherals	Graphic Card	AQ Mforce Gen X	Standard 3
A0418150104	P & A	Peripherals	Graphic Card	AQ Mforce Gen X	Plus 1
A0418150105	P & A	Peripherals	Graphic Card	AQ Mforce Gen X	Plus 2
A0418150106	P & A	Peripherals	Graphic Card	AQ Mforce Gen X	Plus 3
A0418150107	P & A	Peripherals	Graphic Card	AQ Mforce Gen X	Premium 1
A0418150108	P & A	Peripherals	Graphic Card	AQ Mforce Gen X	Premium 2
A0519150201	P & A	Peripherals	Graphic Card	AQ Mforce Gen Y	Standard 1
A0519150202	P & A	Peripherals	Graphic Card	AQ Mforce Gen Y	Standard 2
A0519150203	P & A	Peripherals	Graphic Card	AQ Mforce Gen Y	Standard 3
A0519150204	P & A	Peripherals	Graphic Card	AQ Mforce Gen Y	Plus 1
A0519150205	P & A	Peripherals	Graphic Card	AQ Mforce Gen Y	Plus 2
A0519150206	P & A	Peripherals	Graphic Card	AQ Mforce Gen Y	Plus 3
A0519150207	P & A	Peripherals	Graphic Card	AQ Mforce Gen Y	Premium 1

"This table contains various information about products based on their product code, including the product name, division, segment category, and variant name."
dim_product

"QUERY SNIPPETS ALONG WITH QUESTIONS"

Question 1

Generate a report of individual product sales (aggregated on a monthly basis at the product code level) for Croma India customer for FY-2021

"The report requires the following fields: month, product name, variant, sold quantity, gross price per item, and total gross price."

```sql
select s.date,s.product_code,p.product,p.variant,s.sold_quantity,gp.gross_price,gp.gross_price*sold_quantity as total_gross
 from fact_sales_monthly as s
 join dim_product as p on s.product_code=p.product_code
 join fact_gross_price as gp on gp.product_code=s.product_code and gp.fiscal_year=fiscal_year(s.date)
 where fiscal_year(date)=2021 and customer_code=(select customer_code from dim_customer where customer="croma")
 order by date asc ;
```

"We join the dim_product table with the fact_sales_monthly table using product_code to retrieve the product name and variant. Similarly, we join the fact_gross_price table with the fact_sales_monthly table by product_code and fiscal year to obtain the gross price of the product. Next, we apply a WHERE clause to specify both the fiscal year and the customer using the customer_code. Since we do not have the customer_code for Croma, we utilize a subquery to return the customer code based on the provided store name from the dim_customer table.
gross price of a product=sold quantity*gross price of that product
Additionally, you will notice an undefined function known as fiscal_year, which calculates the fiscal year based on the date provided to the function."

```sql
CREATE DEFINER=`root`@`localhost` FUNCTION `fiscal_year`(
calender_date date) RETURNS int
    DETERMINISTIC
BEGIN
declare fiscal_year int;
set fiscal_year=year(date_add(calender_date ,interval 4 month));
RETURN fiscal_year;
END
```

Question 2

Monthly Gross Sales Report for Croma India
Report Fields:

Month: Month of the sale
Total Gross Sales Amount: Total revenue generated from sales to Croma India in the month

```
select s.date,round(sum(g.gross_price*sold_quantity),2) as total_gross from fact_sales_monthly s
join fact_gross_price g
on s.product_code=g.product_code and fiscal_year(s.date)=g.fiscal_year
join dim_product p on p.product_code=s.product_code
where s.customer_code=(select customer_code from dim_customer where customer="croma")
 GROUP BY
    s.date
   order by s.date asc;
```

"We join the fact_gross_price table with the fact_sales_monthly table by product_code and fiscal_year to obtain the gross price of each product. Next, we apply a WHERE clause to the customer using the customer_code. Since we do not have the customer_code for Croma, we utilize a subquery to return the customer code based on the provided store name from the dim_customer table. Additionally, we group the data by date, which allows us to aggregate the gross prices for each individual date using the SUM function."

gross price of a product=sold quantity*gross price of that product

```
1  CREATE DEFINER=`root`@`localhost` FUNCTION `fiscal_year`(
2  calender_date date) RETURNS int
3      DETERMINISTIC
4  BEGIN
5  declare fiscal_year int;
6  set fiscal_year=year(date_add(calender_date ,interval 4 month));
7  RETURN fiscal_year;
8  END
```

Question 3

Yearly Gross Sales Report for Croma India

Report Fields:

Fiscal Year: Year of the sale
Total Gross Sales Amount: Total revenue generated from sales to Croma India in the fiscal year

```sql
select fiscal_year(date) as fiscal_year,round(sum(g.gross_price*sold_quantity),2) as total_gross from fact_sales_monthly s
join fact_gross_price g
on s.product_code=g.product_code and fiscal_year(s.date)=g.fiscal_year
join dim_product p on p.product_code=s.product_code
where s.customer_code=(select customer_code from dim_customer where customer="croma")
 group by fiscal_year(s.date)
   order by fiscal_year asc;
```

"We join the fact_gross_price table with the fact_sales_monthly table by product_code and fiscal_year to obtain the gross price of each product. Next, we apply a WHERE clause to the customer using the customer_code. Since we do not have the customer_code for Croma, we utilize a subquery to return the customer code based on the provided store name from the dim_customer table. Additionally, we group the data by fiscal year of the date, which allows us to aggregate the gross prices for each individual fiscal year using the SUM function."

gross price of a product=sold quantity*gross price of that product

```sql
CREATE DEFINER=`root`@`localhost` FUNCTION `fiscal_year`(
calender_date date) RETURNS int
    DETERMINISTIC
BEGIN
declare fiscal_year int;
set fiscal_year=year(date_add(calender_date ,interval 4 month));
RETURN fiscal_year;
END
```

Question 4

"Write a SQL query to find the top ten customers who have the highest net sales market share, including their market percentages and total net sales in millions."

```sql
with hresult as(select s.date,s.product_code,s.customer_code,s.sold_quantity,s.fiscal_year,g.gross_price,
g.gross_price*sold_quantity as tot_gross,
pre.pre_invoice_discount_pct*gross_price*sold_quantity as tot_preinvoice from fact_sales_monthly s
join fact_gross_price g
on g.product_code=s.product_code
and g.fiscal_year=s.fiscal_year
join fact_pre_invoice_deductions pre
on pre.customer_code=s.customer_code
and s.fiscal_year=pre.fiscal_year
),
net_invoice_value as (
select hr.date,hr.customer_code,hr.product_code,hr.sold_quantity,hr.fiscal_year,hr.gross_price,hr.tot_gross,hr.tot_preinvoice,tot_gross-tot_preinvoice as net_invoice from hresult hr),
post_invoice_value as( select inv.product_code,inv.customer_code,inv.sold_quantity,inv.fiscal_year,inv.gross_price,inv.tot_gross,inv.tot_preinvoice,inv.net_invoice,
(inv.net_invoice*pos.discounts_pct+inv.net_invoice*other_deductions_pct) as tot_post from net_invoice_value inv
join fact_post_invoice_deductions pos
on pos.customer_code=inv.customer_code and pos.product_code=inv.product_code and inv.date=pos.date
),
top_customer as (select c.customer,round(sum((pos.net_invoice-pos.tot_post)/1000000),2) as net_sales_Million from post_invoice_value pos
join dim_customer c on c.customer_code=pos.customer_code
where fiscal_year=2021
group by customer,fiscal_year
order by net_sales_Million desc
),
chart1 as (select *,round((net_sales_Million)*100/sum(net_sales_Million) over(),2)  as netsales_percent from top_customer)

select * from chart1
limit 10;
```

In the first Common Table Expression (CTE) named hresult, we calculate the total gross price of products sold on a specific date by customers, using the fact_sales_monthly table. We also compute the pre-invoice amount for the corresponding sales. The fact_gross_price is joined through the fiscal year and product code, while the fact_pre_invoice_deductions table is joined using the customer code and fiscal year. Since our fact table does not contain a fiscal year, we add a calculated column to the fact_sales_monthly table to determine the fiscal year based on the sale date, allowing us to accurately identify when the sales transactions occurred. This calculation of the fiscal year is performed prior to the execution of the hresult CTE.

In the second Common Table Expression (CTE) net_invoice_value, we calculate the net_invoice by subtracting the total pre-invoice amount, calculated in the hresult CTE, from the total gross price.

"In the third CTE, post_invoice_value, we join the fact_post_invoice_deductions table using the date, customer_code, and product_code to compute the total post-invoice amount. Furthermore, we join this CTE with the dim_customer table to obtain the customer name based on the customer_code. We then group the results by customer and fiscal year, incorporating a WHERE clause to specify the fiscal year. Finally, we apply the SUM aggregate function to calculate the total, which is derived from the net invoice amount minus the post-invoice amount"

"Additionally, we form another CTE by joining the third CTE with the dim_customer table to retrieve the customer name associated with the customer_code. In this step, we also group the results by customer and fiscal year, using a WHERE clause to specify the fiscal year, while again employing the SUM aggregate function to calculate the net sales, which is based on the net invoice minus the postinvoice amount."

Question 5

"Write a SQL query to find the top 5 markets who have the highest net sales in Millions"

```sql
with hresult as(select s.date,s.product_code,s.customer_code,s.sold_quantity,s.fiscal_year,g.gross_price,
g.gross_price*sold_quantity as tot_gross,
pre.pre_invoice_discount_pct*gross_price*sold_quantity as tot_preinvoice from fact_sales_monthly s
join fact_gross_price g
on g.product_code=s.product_code
and g.fiscal_year=s.fiscal_year
join fact_pre_invoice_deductions pre
on pre.customer_code=s.customer_code
and s.fiscal_year=pre.fiscal_year
join fact_post_invoice_deductions pos
on pos.customer_code=s.customer_code
and pos.product_code=s.product_code
and s.date=pos.date
),
net_invoice_value as (
select hr.date,hr.customer_code,hr.product_code,hr.sold_quantity,hr.fiscal_year,hr.gross_price,hr.tot_gross,hr.tot_preinvoice,
tot_gross-tot_preinvoice as net_invoice from hresult hr),
post_invoice_value as( select inv.customer_code,inv.sold_quantity,inv.fiscal_year,inv.gross_price,inv.tot_gross,inv.tot_preinvoice,inv.net_invoice,
(inv.net_invoice*pos.discounts_pct+inv.net_invoice*other_deductions_pct) as tot_post from net_invoice_value inv
join fact_post_invoice_deductions pos
on pos.customer_code=inv.customer_code and pos.product_code=inv.product_code and inv.date=pos.date
),

top_market as (select pos.fiscal_year,c.market,round(sum((pos.net_invoice-pos.tot_post)/1000000),2) as net_salesM from post_invoice_value pos
join dim_customer c on c.customer_code=pos.customer_code
where fiscal_year=2021
group by market,fiscal_year
order by net_salesM desc limit 5
)
select * from top_market;
```

In the first Common Table Expression (CTE) named hresult, we calculate the total gross price of products sold on a specific date by customers, using the fact_sales_monthly table. We also compute the pre-invoice amount for the corresponding sales. The fact_gross_price is joined through the fiscal year and product code, while the fact_pre_invoice_deductions table is joined using the customer code and fiscal year. Since our fact table does not contain a fiscal year, we add a calculated column to the fact_sales_monthly table to determine the fiscal year based on the sale date, allowing us to accurately identify when the sales transactions occurred. This calculation of the fiscal year is performed prior to the execution of the hresult CTE.

In the second Common Table Expression (CTE) net_invoice_value, we calculate the net_invoice by subtracting the total pre-invoice amount, calculated in the hresult CTE, from the total gross price.

"In the third CTE, post_invoice_value, we join the fact_post_invoice_deductions table using the date, customer_code, and product_code to compute the total post-invoice amount. Furthermore, we join this CTE with the dim_customer table to obtain the customer name based on the customer_code. We then group the results by customer and fiscal year, incorporating a WHERE clause to specify the fiscal year. Finally, we apply the SUM aggregate function to calculate the total, which is derived from the net invoice amount minus the post-invoice amount"

"Additionally, we form another CTE by joining the third CTE with the dim_customer table to retrieve the Market associated with the customer_code. In this step, we also group the results by market and fiscal year, using a WHERE clause to specify the fiscal year, while again employing the SUM aggregate function to calculate the netsales, which is based on the net invoice minus the post invoice amount."

Question 6

"Write a SQL query to find the top 5 sold products along with their division and segment who have the highest net sales in Millions"

```sql
with hresult as(select s.date,s.product_code,s.customer_code,s.sold_quantity,s.fiscal_year,g.gross_price,
g.gross_price*sold_quantity as tot_gross,
pre.pre_invoice_discount_pct*gross_price*sold_quantity as tot_preinvoice from fact_sales_monthly s
join fact_gross_price g
on g.product_code=s.product_code
and g.fiscal_year=s.fiscal_year
join fact_pre_invoice_deductions pre
on pre.customer_code=s.customer_code
and s.fiscal_year=pre.fiscal_year
join fact_post_invoice_deductions pos
on pos.customer_code=s.customer_code
and pos.product_code=s.product_code
and s.date=pos.date
),
net_invoice_value as (
select hr.date,hr.customer_code,hr.product_code,hr.sold_quantity,hr.fiscal_year,hr.gross_price,hr.tot_gross,
hr.tot_preinvoice,tot_gross-tot_preinvoice as net_invoice from hresult hr),
post_invoice_value as( select inv.product_code,inv.customer_code,inv.sold_quantity,inv.fiscal_year,inv.gross_price,inv.tot_gross,
inv.tot_preinvoice,inv.net_invoice,
(inv.net_invoice*pos.discounts_pct+inv.net_invoice*other_deductions_pct) as tot_post from net_invoice_value inv
join fact_post_invoice_deductions pos
on pos.customer_code=inv.customer_code and pos.product_code=inv.product_code and inv.date=pos.date
),
top_product as (select p.division,p.segment,p.product,round(sum((pos.net_invoice-pos.tot_post)/1000000),2) as net_salesM from post_invoice_value pos
join dim_product p on p.product_code=pos.product_code
where fiscal_year=2021
group by division,segment,product
order by net_salesM desc limit 5
)
select * from top_product;
```

In the first Common Table Expression (CTE) named hresult, we calculate the total gross price of products sold on a specific date by customers, using the fact_sales_monthly table. We also compute the pre-invoice amount for the corresponding sales. The fact_gross_price is joined through the fiscal year and product code, while the fact_pre_invoice_deductions table is joined using the customer code and fiscal year. Since our fact table does not contain a fiscal year, we add a calculated column to the fact_sales_monthly table to determine the fiscal year based on the sale date, allowing us to accurately identify when the sales transactions occurred. This calculation of the fiscal year is performed prior to the execution of the hresult CTE.

In the second Common Table Expression (CTE) net_invoice_value, we calculate the net_invoice by subtracting the total pre-invoice amount, calculated in the hresult CTE, from the total gross price.

"In the third CTE, post_invoice_value, we join the fact_post_invoice_deductions table using the date, customer_code, and product_code to compute the total post-invoice amount. Furthermore, we join this CTE with the dim_customer table to obtain the customer name based on the customer_code. We then group the results by customer and fiscal year, incorporating a WHERE clause to specify the fiscal year. Finally, we apply the SUM aggregate function to calculate the total, which is derived from the net invoice amount minus the post-invoice amount"

Furthermore, we join the dim_product table to the latest CTE using product_code to retrieve the division and segment names of the products. We also use the SUM aggregate function to aggregate the net sales amount and group the results by division, segment, and product to identify the top five products."

Question 7

"Write a SQL Query to find of the top three Markets in a region by their gross sales in Millions and Display them along with their position in fiscal year 2021"

```sql
with cte as(select m.market,m.region,round(sum(s.sold_quantity*g.gross_price)/1000000,2) as total_gross from fact_sales_monthly s
join fact_gross_price g on
g.fiscal_year=s.fiscal_year and g.product_code=s.product_code
join dim_customer m
on m.customer_code=s.customer_code
where s.fiscal_year=2021
group by market,region
 ),
cte2 as(select *,dense_rank() over(partition by region order by total_gross desc)  as Position from cte)
select * from cte2
where
Position<=3
```

"As you can see, in the first CTE, the fact_sales_monthly table is joined with the fact_gross_price table by fiscal_year and product_code to determine the gross price of the products sold. Additionally, the fact_sales_monthly table is joined with the dim_customer table to aggregate the gross price in terms of market and region by grouping them, while applying a WHERE clause to specify the fiscal year.

Subsequently, another CTE is utilized to calculate the dense rank of different countries within a region based on gross price. We then display the market region along with the gross price and their position, filtering for those ranked third or lower. This allows us to identify the top three countries in a region based on their gross price."

Question 8

"Write an SQL query to find out the Top 3 products sold in a Division by their quantity in Fiscal Year 2021.Print those products along with division,segment category and position"

```sql
with cte as(select p.division,p.segment,p.category,p.product,sum(sold_quantity) as total from fact_sales_monthly s
join dim_product p on s.product_code=p.product_code
where fiscal_year=2021
group by p.division,p.segment,p.category,p.product),
cte2 as(select *,(dense_rank() over(partition by division order by total desc)) as position from cte)
select * from cte2
where position<=3
```

"As you can see in the first CTE, we join the fact_sales_monthly table with the dim_product table on product_code to retrieve the product name, segment, category, and division. We then group the results by division, segment, category, and product. Even though products may share the same division, category, and segment, we include them in the GROUP BY clause since they cannot be aggregated directly. We utilize the SUM aggregate function to aggregate the sold_quantity.

In the next CTE, we apply the DENSE_RANK function to rank the products within each division based on their sold quantity. We then display the top three products according to their rank, allowing us to identify the leading products in each division."

Question 9

"Requirement for a report that will show the forecast accuracy for all customers in 2021 fiscal year. The report should include the following fields:

Customer Code, Name, and Market
Total Sold Quantity
Total Forecast Quantity
Net Error
Absolute Error
Forecast Accuracy %"

```sql
select count(*) from fact_sales_monthly;
select count(*) from fact_forecast_monthly;
select count(*) from fact_sales_monthly s join fact_forecast_monthly f
on s.date=f.date and s.product_code=f.product_code and s.customer_code=f.customer_code;
create table fact_act_est as(
select s.date,s.product_code,s.customer_code,s.sold_quantity,f.forecast_quantity
 from fact_sales_monthly s
left join fact_forecast_monthly f
on s.date=f.date and f.product_code=s.product_code and f.customer_code=s.customer_code
union
select f.date,f.product_code,f.customer_code,s.sold_quantity,f.forecast_quantity
 from fact_sales_monthly s
right join fact_forecast_monthly f
on s.date=f.date and f.product_code=s.product_code and f.customer_code=s.customer_code
);
```

"The fact_sales_monthly table consists of 1,425,706 records, while the fact_forecast_monthly table contains 1,885,841 records. The union of these two tables results in 1,390,837 records. From this, we identified that some records in fact_sales_monthly do not have corresponding forecast quantities, and some records in fact_forecast_monthly lack sales quantities.

To address this, we decided to perform a full outer join by unioning the results of left and right joins between the fact_sales_monthly and fact_forecast_monthly tables. In the left join, fact_sales_monthly serves as the left table and fact_forecast_monthly as the right. All matching forecast quantities are retrieved, and where no match is found, NULL is returned. These tables are joined using the date, product_code, and customer_code.

Similarly, in the right join, fact_sales_monthly is the left table, and fact_forecast_monthly is the right. Here, we retrieve the matching sales quantities, returning NULL for any missing matches. The results from both the left and right joins are then unioned to form the final table, fact_act_est."

```sql
alter table fact_act_est
add column fiscal_year int
generated always as (year(date_add(date ,interval 4 month))) stored;
update fact_act_est
set sold_quantity=0
where sold_quantity is null;
update fact_act_est
set forecast_quantity=0
where forecast_quantity is null;
select * from fact_act_est;
```

"Next, we add a calculated column, fiscal_year, to the newly created table. Since the company's fiscal year starts in September, we adjust the dates by adding 4 months. After adjusting the date, we extract the year from the updated date to determine the correct fiscal_year."

"Next, we update the sold_quantity and forecast_quantity columns, setting any NULL values to 0. This is a common practice in the industry when handling missing values, ensuring that analyses can proceed without gaps in the data."

```
DELIMITER $$
CREATE TRIGGER before_insert_sales
BEFORE INSERT ON fact_sales_monthly
FOR EACH ROW
BEGIN
INSERT INTO fact_act_est (date, product_code, customer_code, sold_quantity)
VALUES (NEW.date, NEW.product_code, NEW.customer_code, NEW.sold_quantity)
ON DUPLICATE KEY UPDATE
sold_quantity = VALUES(sold_quantity);
END$$
DELIMITER ;
DELIMITER $$
CREATE TRIGGER before_insert_forecast
BEFORE INSERT ON fact_forecast_monthly
FOR EACH ROW
BEGIN
INSERT INTO fact_act_est (date, product_code, customer_code, forecast_quantity)
VALUES (NEW.date, NEW.product_code, NEW.customer_code, NEW.forecast_quantity)
ON DUPLICATE KEY UPDATE
forecast_quantity = VALUES(forecast_quantity);
END$$
DELIMITER ;
```

"Now, we create triggers such that whenever a new entry is made into either the fact_sales_monthly or fact_forecast_monthly table, the trigger is automatically activated. This ensures that the corresponding record is also inserted into the fact_act_est table, keeping it updated in real time."

```sql
show triggers;
with cte1 as(select fiscal_year,customer_code,sum(sold_quantity) as sold_quantity,sum(forecast_quantity) as forecast_quantity,
sum((cast(forecast_quantity as signed int)-cast(sold_quantity as signed int))) as net_error,
sum((cast(forecast_quantity as signed int)-cast(sold_quantity as signed int)))*100/sum(forecast_quantity) as net_error_pct,
sum(abs(cast(forecast_quantity as signed int)-cast(sold_quantity as signed int))) as abs_error,
sum(abs(cast(forecast_quantity as signed int)-cast(sold_quantity as signed int)))*100/sum(forecast_quantity) as abs_error_pct from fact_act_est

group by fiscal_year,customer_code

 )
```

"In the first CTE (cte1), we calculate the net_error, net_error_percentage, abs_error, and abs_error_percentage using the fact_act_est table.

Net_error is the difference between forecast_quantity and sold_quantity.
Abs_error represents the real error, calculated by taking the absolute difference between forecast_quantity and sold_quantity for each product sold per day. For example, if the net_error is 1, -1, 1, -1 over four days, the total net_error is 0, but the abs_error becomes 4 as it takes the absolute values (1, 1, 1, 1).
Net_error_percentage is the net difference between forecast and sold quantities, multiplied by 100 and divided by the forecast quantity.
Abs_error_percentage is similar but uses the absolute difference instead.
Casting forecast_quantity and sold_quantity as signed integers ensures correct handling of negative values in these calculations."

```sql
select cte1.fiscal_year,c.customer,c.customer_code,c.market,cte1.sold_quantity,cte1.forecast_quantity,net_error,net_error_pct,abs_error,abs_error_pct,
case
when abs_error_pct is null then null
when abs_error_pct is not null then (100-abs_error_pct)
end as forecast_accuracy
from cte1 join dim_customer c
on c.customer_code=cte1.customer_code
where fiscal_year=2021
order by forecast_accuracy desc;
```

"Since we have already grouped the values by fiscal_year and customer_code, we now join the CTE with the dim_customer table on customer_code to retrieve the customer name and market. Next, we check if the abs_error_percentage or net_error_percentage is null. If not, we calculate the forecast accuracy by subtracting the abs_error_percentage from 100."

Question 10

"Requirement for a report that will show all customers whos forecast accuracy 2021 is lesser than 2020 following fields:

Customer_code,csutomer,market, forecast_accuracy_2021 and forecast_accuracy_2020

```
with cte1 as(select fiscal_year,customer_code,sum(sold_quantity) as sold_quantity,sum(forecast_quantity) as forecast_quantity,
sum((cast(forecast_quantity as signed int)-cast(sold_quantity as signed int))) as net_error,
sum((cast(forecast_quantity as signed int)-cast(sold_quantity as signed int)))*100/sum(forecast_quantity) as net_error_pct,
sum(abs(cast(forecast_quantity as signed int)-cast(sold_quantity as signed int))) as abs_error,
sum(abs(cast(forecast_quantity as signed int)-cast(sold_quantity as signed int)))*100/sum(forecast_quantity) as abs_error_pct from fact_act_est

group by fiscal_year,customer_code

 ),

cte2 as(select cte1.fiscal_year,c.customer,c.customer_code,c.market,cte1.sold_quantity,cte1.forecast_quantity,net_error,net_error_pct,abs_error,abs_error_pct,
case
when abs_error_pct is null then null
when abs_error_pct is not null then (100-abs_error_pct)
end as forecast_accuracy
from cte1 join dim_customer c
on c.customer_code=cte1.customer_code
where fiscal_year=2021
order by forecast_accuracy desc),
cte3 as (select cte1.fiscal_year,c.customer,c.customer_code,c.market,cte1.sold_quantity,cte1.forecast_quantity,net_error,net_error_pct,abs_error,abs_error_pct,
case
when abs_error_pct is null then null
when abs_error_pct is not null then (100-abs_error_pct)
end as forecast_accuracy
from cte1 join dim_customer c
on c.customer_code=cte1.customer_code
where fiscal_year=2020
order by forecast_accuracy desc)
select c2.customer_code,c2.customer,c2.market,c3.forecast_accuracy as forecast_accuracy_2020,c2.forecast_accuracy as forecast_accuracy_2021 from cte2 c2 join cte3 c3
on c2.customer_code=c3.customer_code
where c2.forecast accuracy<c3.forecast accuracy;
```

"In the first CTE (cte1), we calculate the net_error, net_error_percentage, abs_error, and abs_error_percentage using the fact_act_est table.

Net_error is the difference between forecast_quantity and sold_quantity.
Abs_error represents the real error, calculated by taking the absolute difference between forecast_quantity and sold_quantity for each product sold per day. For example, if the net_error is 1, -1, 1, -1 over four days, the total net_error is 0, but the abs_error becomes 4 as it takes the absolute values (1, 1, 1, 1).
Net_error_percentage is the net difference between forecast and sold quantities, multiplied by 100 and divided by the forecast quantity.
Abs_error_percentage is similar but uses the absolute difference instead.
Casting forecast_quantity and sold_quantity as signed integers ensures correct handling of negative values in these calculations."

"Since we have already grouped the values by fiscal_year and customer_code, we now join the CTE with the dim_customer table on customer_code to retrieve the customer name and market to form another cte. Next, we check if the abs_error_percentage or net_error_percentage is null. If not, we calculate the forecast accuracy by subtracting the abs_error_percentage from 100. For fiscal_year 2021 by using a where clause"
"Next, we create a third CTE that includes the values for the fiscal year 2020."

"We then join cte2 with cte3 on customer_code to compare forecast accuracy for 2020 and 2021. We display the forecast accuracy for both years, along with the customer_code, customer name, and market, where the forecast accuracy for 2020 is greater than that of 2021."