Sales and Inventory Optimization System

PostgreSQL

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Top 5 Performing Products based on category

QUERY

```
SELECT  category,region,sum(units_sold) as Units_Sold
FROM inventory
GROUP BY category,region,units_sold
ORDER BY units_sold
DESC LIMIT 5;
```

RESULT

	category character varying (100)	region character varying (100)	units_sold bigint
1	Clothing	West	4005
2	Electronics	West	3740
3	Clothing	East	3735
4	Clothing	West	3564
5	Clothing	West	3504

Demand Forecast vs Inventory

Which category products have a demand forecast higher than inventory level **QUERY:**

```
SELECT category,region,inventory_level,
demand_forecast,(demand_forecast-inventory_level)
AS Forecast_Gap
FROM inventory
WHERE demand_forecast > inventory_level
ORDER BY Forecast_Gap DESC LIMIT 10;
```

RESULT

	category character varying (100)	region character varying (100)	inventory_level integer	demand_forecast numeric (10,3)	forecast_gap numeric
1	Clothing	North	59	78.970	19.970
2	Clothing	West	121	140.960	19.960
3	Clothing	West	64	83.950	19.950
4	Toys	West	109	128.870	19.870
5	Furniture	East	499	518.550	19.550
6	Toys	West	88	107.480	19.480
7	Clothing	North	196	215.420	19.420
8	Electronics	West	122	141.370	19.370
9	Furniture	West	82	101.280	19.280
10	Toys	East	127	146.270	19.270

Units Sold Based on Wheather Condition

In which wheather condition the units are mostly sold

Sunny,Snowy,Rainy,Cloudy.

QUERY

```
SELECT wheather_condition,sum(units_sold)/100000
AS Total_units_sold_in_Lakhs
FROM inventory
GROUP BY wheather_condition
ORDER BY Total_units_sold_in_Lakhs DESC;
```

Result

	wheather_condition character varying (100)	total_units_sold_in_lakhs bigint
1	Sunny	25
2	Snowy	24
3	Rainy	24
4	Cloudy	24

Units Sold Based on Region

How much units sold on each region

Query

```
SELECT region,sum(units_sold)/10000 AS total_units_sold_in_thousands
FROM inventory GROUP BY region;
```

Result

	region character varying (100)	total_units_sold_in_thousands bigint
1	South	250
2	West	247
3	North	248
4	East	251

Holiday & Promotion Impact on Sales and Inventory

QUERY

```
SELECT holiday_promotion,sum(units_sold)/100000 as
Total_units_sold_lakhs, sum(units_ordered)/100000 as
total_units_ordered_lakhs,sum(inventory_level)/100000
as total_inventory_level_in_lakhs

FROM inventory

GROUP BY holiday_promotion;
```

Result

	holiday_promotion integer	total_units_sold_lakhs bigint	total_units_ordered_lakhs bigint	total_inventory_level_in_lakhs bigint
1	0	50	40	100
2	1	49	40	99

Units_Sold_Based_on_Season

How much units sold in each season **QUERY**

```
SELECT seasonality , sum(units_sold)/100000
```

```
AS Total_units_sold_in_lakhs
FROM inventory
GROUP BY seasonality;
```

Result

	seasonality character varying (50)	total_units_sold_in_lakhs bigint
1	Spring	24
2	Winter	25
3	Summer	24
4	Autumn	25

Region-Wise Demand vs Inventory Status

Identifies whether each region is adequately stocked or at risk of stock-outs by comparing total demand forecasts against available inventory.

QUERY

```
SELECT region,ROUND(sum(inventory_level)/100000,2) AS
total_inventory_in_lakhs,
```

```
ROUND(sum(demand_forecast)/100000,2) AS
total_demand_forecast_in_lakhs,

CASE WHEN sum(demand_forecast)>sum(inventory_level) THEN
'out_stock'

 ELSE 'in_stock'

 END AS inventory_status

FROM inventory

GROUP BY region;
```

Result

	region character varying (100)	total_inventory_in_lakhs numeric	total_demand_forecast_in_lakhs numeric	inventory_status text
1	South	50.00	26.01	in_stock
2	West	49.00	25.64	in_stock
3	North	50.00	25.77	in_stock
4	East	50.00	26.01	in_stock

Recommendations Based on the Analysis

1. Category & Region Sales

Clothing is selling well in the West and East, while Electronics shows potential mainly in the West.

Recommendation: Keep strong stock for Clothing in West

and East, and work on boosting Electronics sales in East with promotions or bundles.

2. Inventory vs. Demand Forecast

Some products, especially Clothing in North and West, have demand forecasts higher than available stock.

Recommendation: Adjust inventory planning so highdemand items are stocked up before sales periods to avoid stockouts.

3. Weather and Sales

Sales are slightly higher during sunny days, but overall stable across all weather types.

Recommendation: Run special offers on rainy and snowy days to push sales during slower weather periods.

4. Regional Sales Comparison

East is slightly ahead in total units sold, with West lagging behind others.

Recommendation: Maintain supply strength in East and launch customer engagement or loyalty programs in West to boost sales.

5. Holiday Promotions

Sales during promotions are nearly the same as nonpromotional periods, meaning limited effectiveness.

Recommendation: Make holiday offers more attractive by adding discounts, bundles, or exclusive items.

6. Seasonal Sales Trends

Sales are steady throughout the year, with small peaks in Winter and Autumn.

Recommendation: Use targeted seasonal campaigns, such as festive themes or seasonal discounts, to take advantage of these peaks.

7. Inventory and Forecast by Region

All regions have more inventory than forecasted demand, increasing the risk of overstock.

Recommendation: Move excess stock to regions with higher sales or run clearance offers to free up space and reduce holding costs.

END