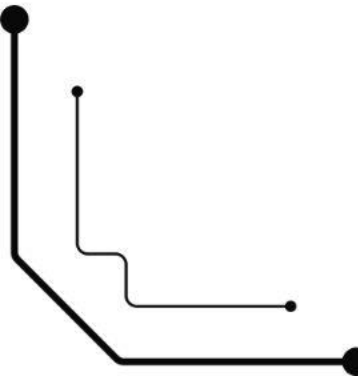**Atliq Hardware**

CONSUMER GOODS AD-HOC INSIGHTS
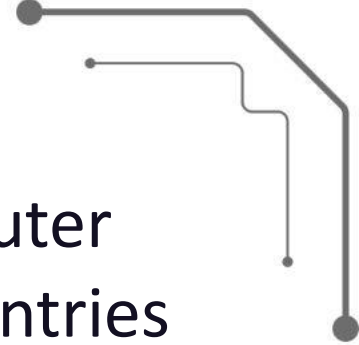
SQL PROJECT CHALLENGE

- BY SUNIDHI SHARMA

AGENDA

- About Company
- Problem Statement
- Data
- Ad-Hoc Requests
- Recommendations

ABOUT ATLIQ HARDWARE

Atliq Hardware (imaginary company) is one of the leading computer hardware producers in India and is well-established in other countries too.
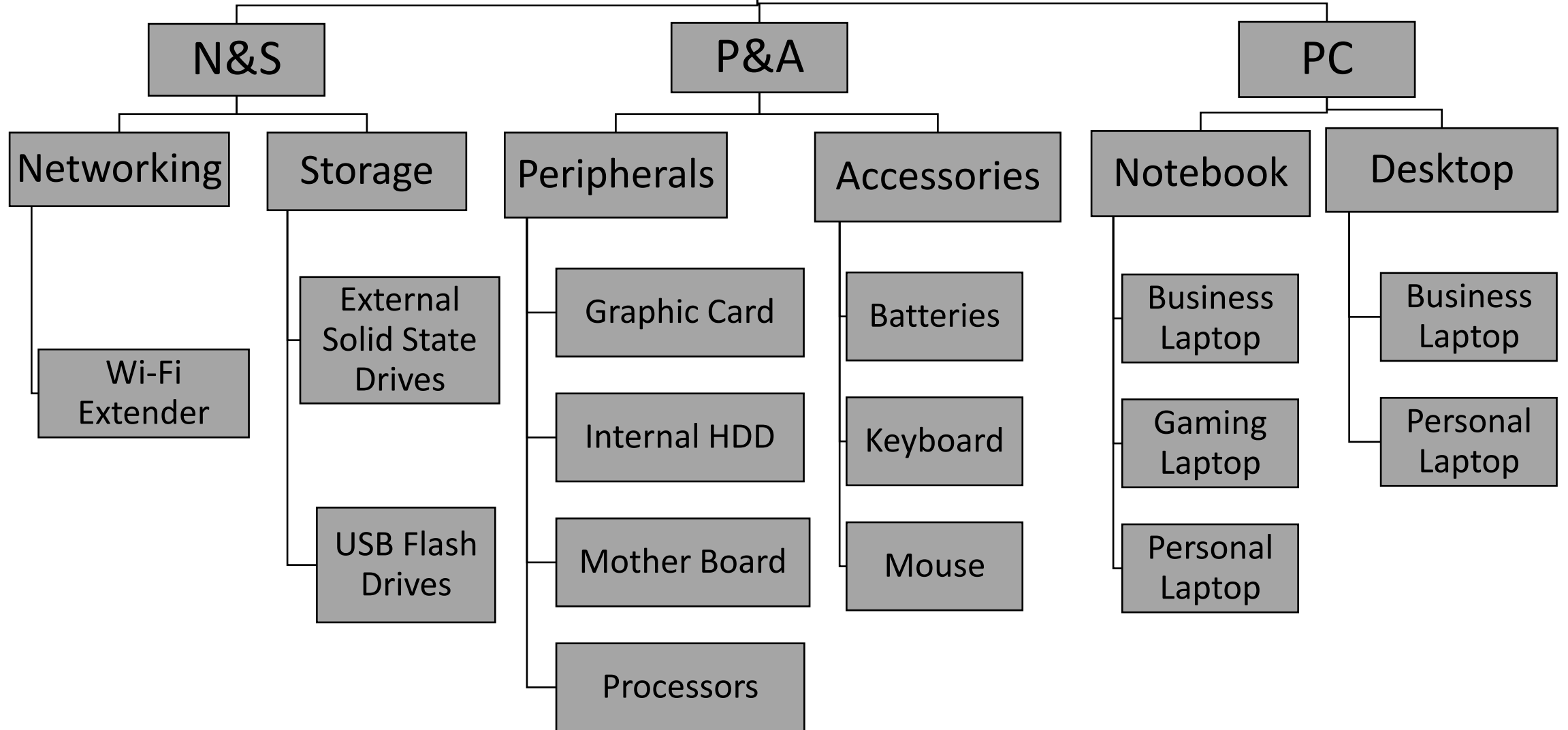
Sales Channels-
- Retailers
- Direct Sales
- Distributors

Platforms-
- Brick & Mortar
- E-commerce

Atliq's Product Line
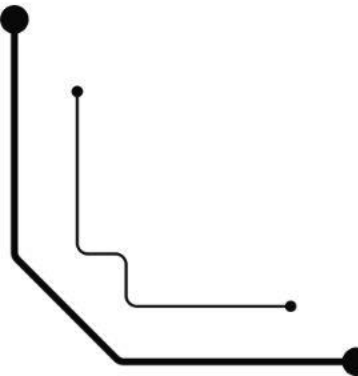
N&S

Networking
- Wi-Fi Extender

Storage
- External Solid State Drives
- USB Flash Drives

P&A

Peripherals
- Graphic Card
- Internal HDD
- Mother Board
- Processors

Accessories
- Batteries
- Keyboard
- Mouse

PC

Notebook
- Business Laptop
- Gaming Laptop
- Personal Laptop

Desktop
- Business Laptop
- Personal Laptop

PROBLEM STATEMENT

The management noticed that they do not get enough insights to make quick and smart data-informed decisions. They want to expand their data analytics team by adding several junior data analysts. Tony Sharma, their data analytics director, wanted to hire someone who is good at both tech and soft skills. Hence, he decided to conduct an SQL challenge that would help him understand both skills.

Data Tables provided & Relationship between tables

fact_manufacturing_cost ···
product_code
Expand ∨

fact_sales_monthly ···
customer_code
date
product_code
Expand ∨

dim_customer ···
customer_code
Expand ∨

dim_product ···
product_code
Expand ∨

fact_pre_invoice_deduct... ···
customer_code
Expand ∨

fact_gross_price ···
product_code
Expand ∨
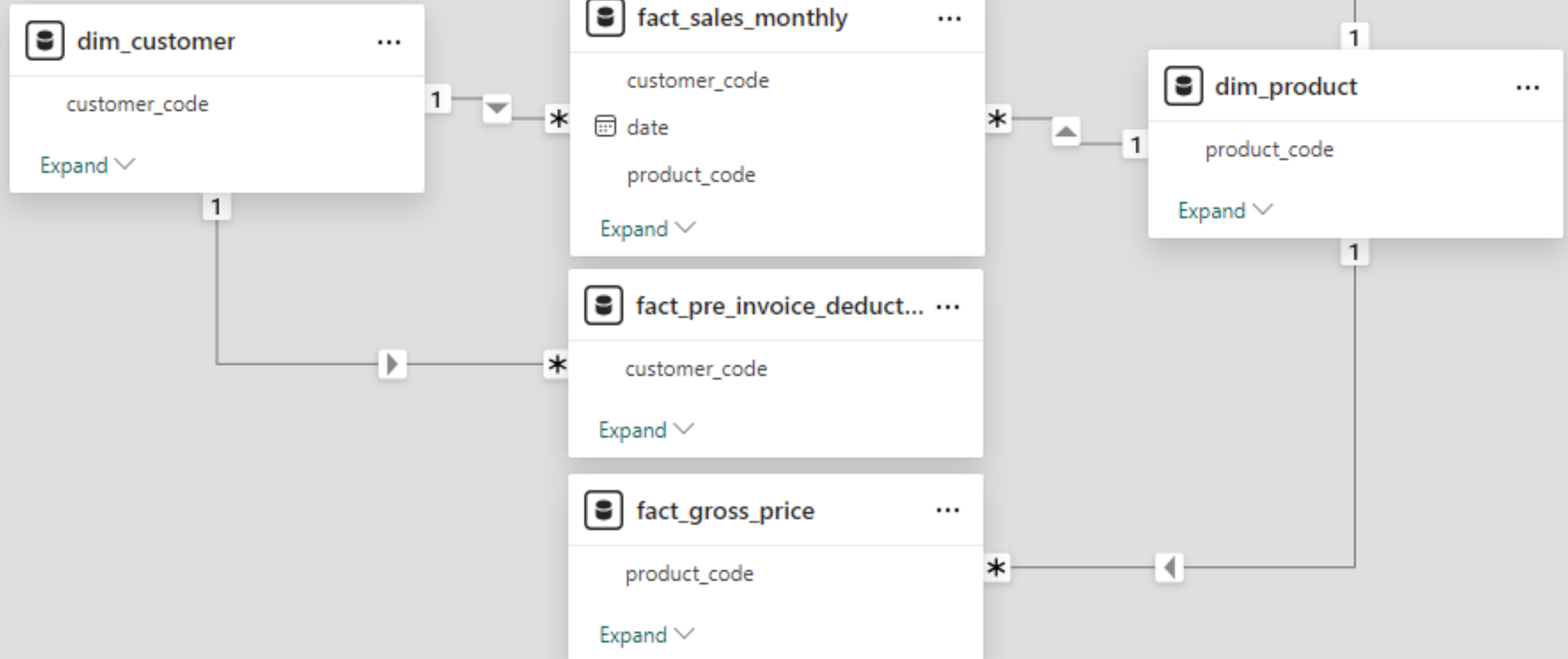
AD-HOC REQUESTS

1. Provide the list of markets in which customer "Atliq Exclusive" operates its business in the APAC region.

```sql
SELECT DISTINCT(Market)
FROM dim_customer
WHERE customer = 'Atliq Exclusive' AND region = 'APAC';
```

- Atliq Exclusive operates in 8 markets in the APAC region.

	Market
1	Australia
2	Bangladesh
3	India
4	Indonesia
5	Japan
6	Newzealand
7	Philiphines
8	South Korea

Market of Atliq Exclusive in APAC Region

- APAC is the largest market for Atliq Hardware, in which India is the largest, followed by South Korea then the Philippines in this region.

Region	Gross Sales ▼
APAC	4,658.14bn
EU	1,941.24bn
NA	1,819.18bn
LATAM	44.63bn

Top 5 markets

Region	Market	Gross Sales ▼
APAC	India	2,282.71bn
NA	USA	1,363.01bn
APAC	South Korea	706.12bn
NA	Canada	456.17bn
APAC	Philiphines	427.49bn

2. What is the percentage of unique product increase in 2021 vs. 2020?
The final output contains these fields -
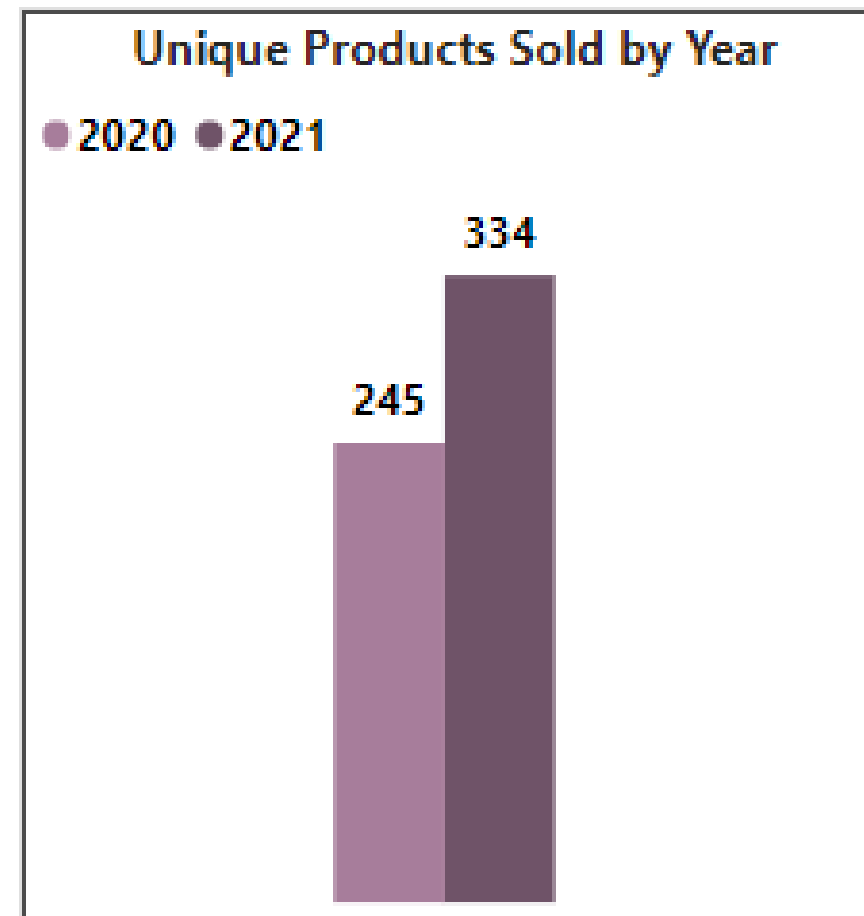unique_products_2020
unique_products_2021
percentage_chg

```sql
WITH unique_products_count AS (
    SELECT COUNT(DISTINCT(product_code)) AS unique_products_2020,
            (SELECT COUNT(DISTINCT(product_code)) FROM fact_sales_monthly WHERE fiscal_year=2021) AS unique_products_2021
    FROM fact_sales_monthly
    WHERE fiscal_year=2020
    )
SELECT unique_products_2020,unique_products_2021,CAST(((unique_products_2021-unique_products_2020)*100/unique_products_2020)
        AS DECIMAL(10,2)) AS percentage_chg
FROM unique_products_count;
```

	unique_products_2020	unique_products_2021	percentage_chg
1	245	334	36.00

- **36% increase** in unique product sales from 2020 to 2021 indicating increased demand due to increase in remote work & education; content creation and gaming.

Unique Products Sold by Year

● 2020 ● 2021

334

245

3. Provide a report with all the unique product counts for each segment and sort them in descending order of product counts.
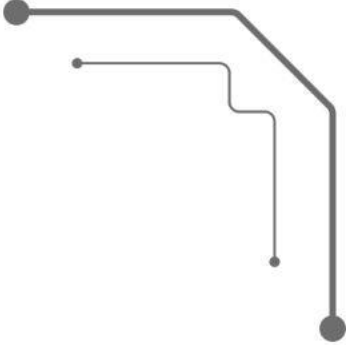The final output contains 2 fields –
segment
product_count
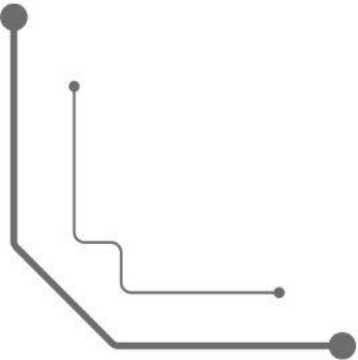
```sql
SELECT Segment, COUNT(DISTINCT(product_code)) AS product_count
FROM dim_product
GROUP BY segment
ORDER BY product_count DESC;
```

	Segment	product_count
1	Notebook	129
2	Accessories	116
3	Peripherals	84
4	Desktop	32
5	Storage	27
6	Networking	9

Product Count by Segment

Segment	Count
Notebook	129
Accessories	116
Peripherals	84
Desktop	32
Storage	27
Networking	9
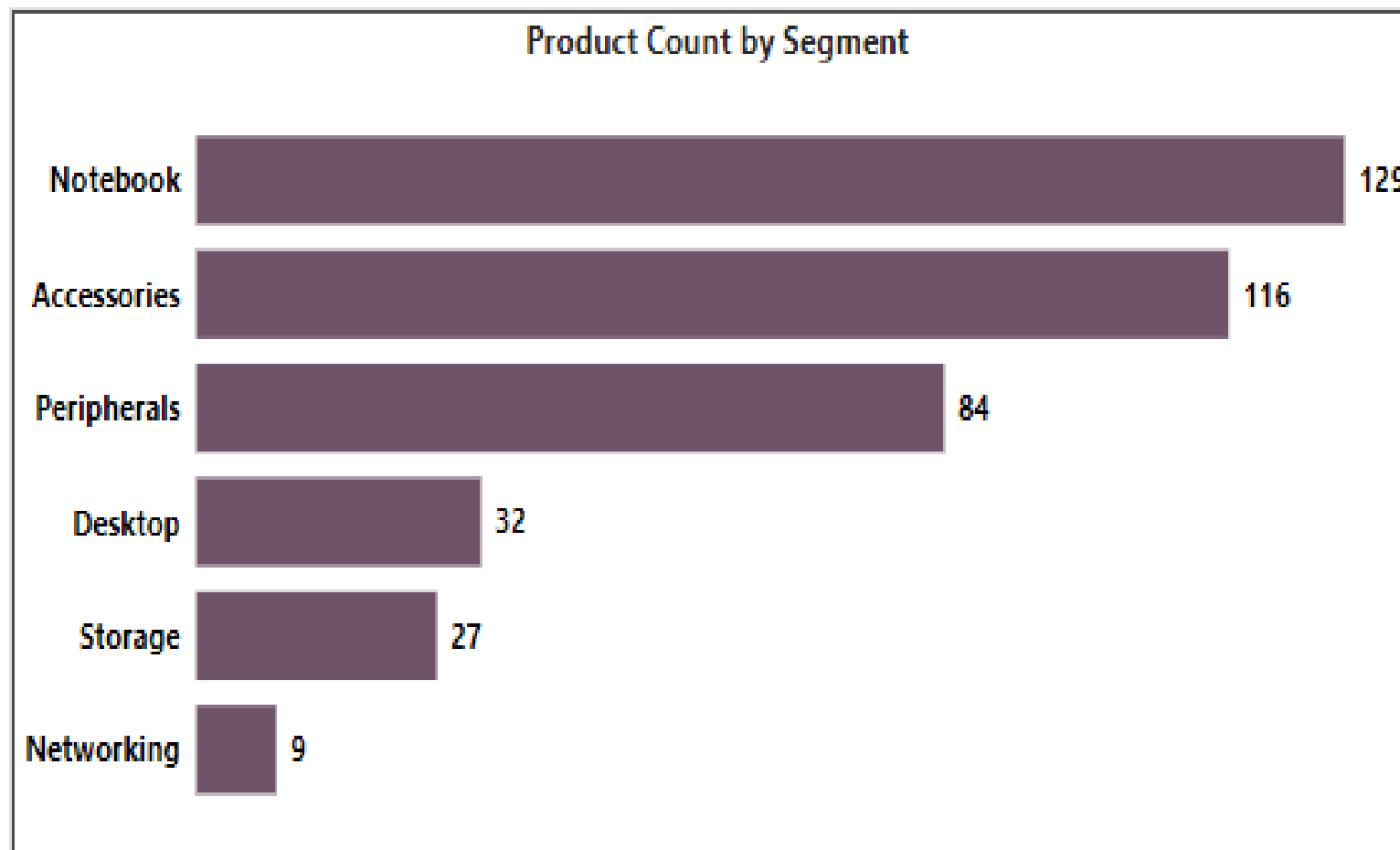
- **The notebook segment (129)** has the largest offerings share, indicating a strong focus on portable computing devices.
- **The accessories segment (116)**, is the second-largest, suggesting an emphasis on supporting and enhancing the core product range.
- **The desktop segment(32)** has a much smaller presence, reflecting a lower focus on traditional, stationary computing solutions.
- **Storage (27 products)** and **Networking (9 products)** are the smallest segments, suggesting these are niche or less prioritized areas
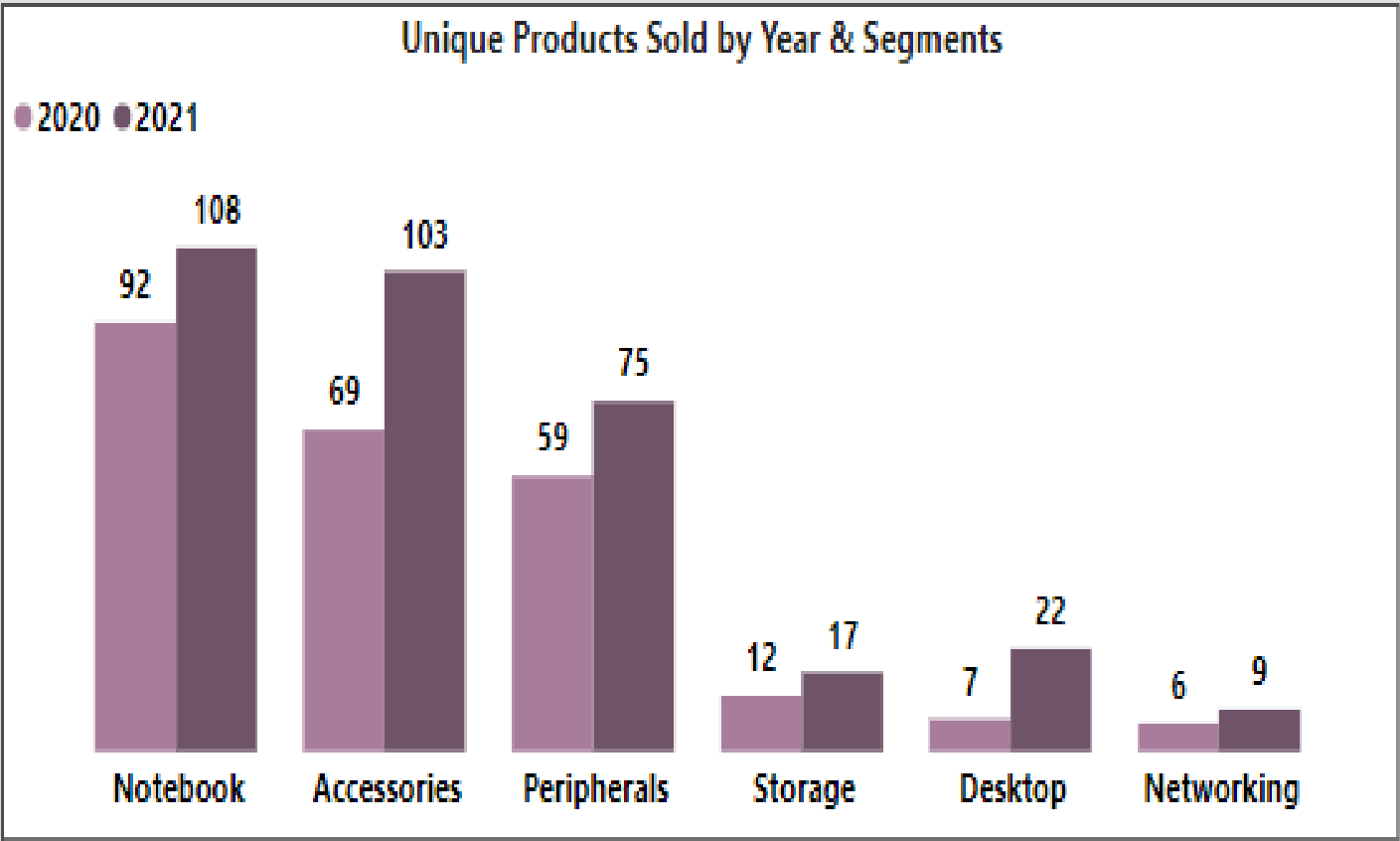
4. Which segment had the most increase in unique products in 2021 vs 2020?
The final output contains these fields -
Segment; product_count_2020; product_count_2021; difference

```sql
WITH up20 AS ( SELECT Segment, COUNT(DISTINCT(p.product_code)) AS product_count_2020
     FROM fact_sales_monthly AS ms
     JOIN dim_product AS p
     ON p.product_code = ms.product_code
     WHERE fiscal_year=2020
     GROUP BY Segment
     ),
up21 AS ( SELECT Segment, COUNT(DISTINCT(p.product_code)) AS product_count_2021
     FROM fact_sales_monthly AS ms
     JOIN dim_product AS p
     ON p.product_code = ms.product_code
     WHERE fiscal_year=2021
     GROUP BY Segment
     )
SELECT u1.Segment, product_count_2020,product_count_2021,(product_count_2021-product_count_2020) AS difference
FROM up20 AS u1
JOIN up21 AS u2
ON u1.Segment = u2.Segment
ORDER BY difference DESC;
```

	Segment	product_count_2020	product_count_2021	difference
1	Accessories	69	103	34
2	Notebook	92	108	16
3	Peripherals	59	75	16
4	Desktop	7	22	15
5	Storage	12	17	5
6	Networking	6	9	3

Unique Products Sold by Year & Segments

● 2020 ● 2021

Notebook 92 108 · Accessories 69 103 · Peripherals 59 75 · Storage 12 17 · Desktop 7 22 · Networking 6 9

•**Accessories and Notebooks** are the biggest sales drivers, with Accessories leading in growth contribution.

•**Desktops and Peripherals** show strong growth potential, reflecting an opportunity to cater to specific markets.

•**Storage and Networking** demonstrate steady but limited growth, requiring a focus on high-demand products.

•**Sales Margin is highest in Notebooks, followed by Desktop**, Peripherals, Accessories, Networking & Storage.

Segment	Manufacturing Cost	Gross Price	Margins
Accessories	0.79K	2.65K	1.86K
Desktop	6.52K	21.82K	15.30K
Networking	0.15K	0.51K	0.36K
Notebook	25.91K	86.72K	60.81K
Peripherals	2.14K	7.17K	5.03K
Storage	0.13K	0.43K	0.30K

5. Get the products that have the highest and lowest manufacturing costs.
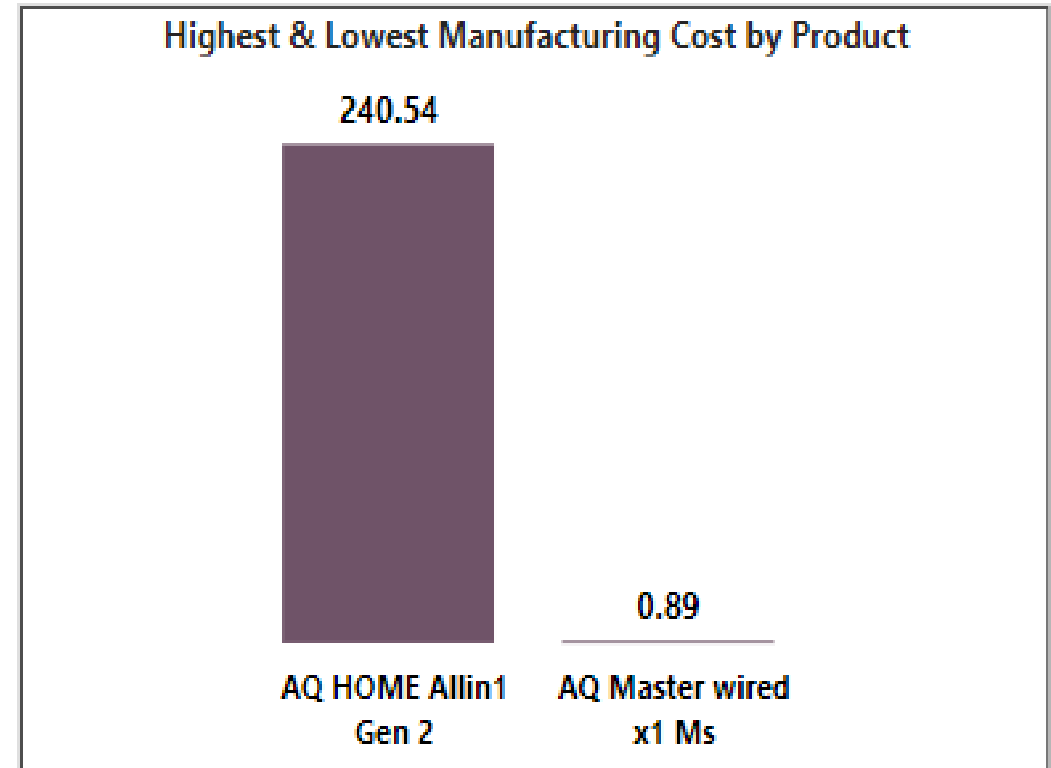The final output should contain these fields -
product_code
product
manufacturing_cost

```sql
SELECT m.product_code, product, manufacturing_cost
FROM fact_manufacturing_cost AS m
JOIN dim_product AS p
ON m.product_code=p.product_code
WHERE manufacturing_cost=(SELECT MAX(manufacturing_cost) FROM fact_manufacturing_cost) OR
      manufacturing_cost=(SELECT MIN(manufacturing_cost) FROM fact_manufacturing_cost)
ORDER BY manufacturing_cost DESC;
```

|	product_code	product	manufacturing_cost
1	A6120110206	AQ HOME Allin1 Gen 2	240.5364
2	A2118150101	AQ Master wired x1 Ms	0.8920

- AQ HOME Allin1 Gen 2 (Personal Desktop) has the **highest manufacturing cost**.
- AQ Master wired x1 Ms (Mouse) has the **lowest manufacturing cost**.

Highest & Lowest Manufacturing Cost by Product

240.54

0.89

AQ HOME Allin1 Gen 2   AQ Master wired x1 Ms

6. Generate a report which contains the top 5 customers who received an average high pre_invoice_discount_pct for the fiscal year 2021 and in the Indian market. The final output contains these fields -
customer_code; customer; average_discount_percentage

```sql
SELECT TOP 5 c.customer_code, customer, CAST((AVG(pre_invoice_discount_pct)*100) AS DECIMAL(10,2)) AS average_discount_percentage
FROM dim_customer AS c
JOIN fact_pre_invoice_deductions AS d
ON c.customer_code = d.customer_code
WHERE market = 'India' AND fiscal_year = 2021
GROUP BY c.customer_code, customer
ORDER BY average_discount_percentage DESC;
```

	customer_code	customer	average_discount_percentage
1	90002009	Flipkart	30.83
2	90002006	Viveks	30.38
3	90002003	Ezone	30.28
4	90002002	Croma	30.25
5	90002016	Amazon	29.33

Top 5 Customers by Average Discount Percentage in Indian Market in 2021
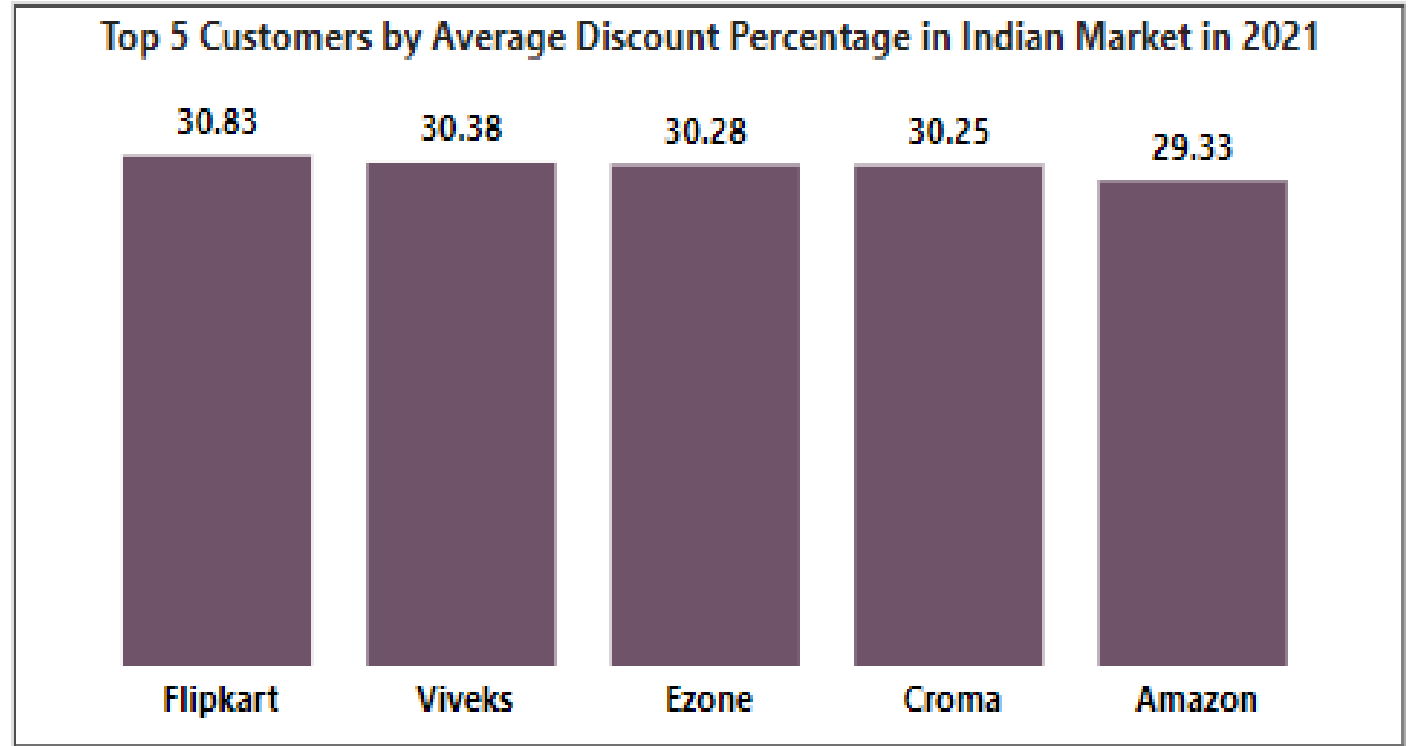
- The average discounts for all top 5 are very similar, indicating these customers are in a competitive tier in terms of their contribution and relationship with Atliq Hardware. With **Flipkart(30.83)** receiving the highest discounts and **Amazon (29.33%)** the least.

7. Get the complete report of the Gross sales amount for the customer "Atliq Exclusive" for each month. The final report contains these columns -
Month; Year; Gross sales Amount

```sql
SELECT CASE WHEN RIGHT(ms.date,2)=01 THEN 'January'
            WHEN RIGHT(ms.date,2)=02 THEN 'February'
            WHEN RIGHT(ms.date,2)=03 THEN 'March'
            WHEN RIGHT(ms.date,2)=04 THEN 'April'
            WHEN RIGHT(ms.date,2)=05 THEN 'May'
            WHEN RIGHT(ms.date,2)=06 THEN 'June'
            WHEN RIGHT(ms.date,2)=07 THEN 'July'
            WHEN RIGHT(ms.date,2)=08 THEN 'August'
            WHEN RIGHT(ms.date,2)=09 THEN 'September'
            WHEN RIGHT(ms.date,2)=10 THEN 'October'
            WHEN RIGHT(ms.date,2)=11 THEN 'November'
            WHEN RIGHT(ms.date,2)=12 THEN 'December'
            END AS Month,
            ms.fiscal_year AS Year ,CAST(SUM(ms.sold_quantity * g.gross_price)/1000000 AS DECIMAL(10,2)) AS 'Gross Sales Amount (mn)'
FROM dim_customer AS c
JOIN fact_sales_monthly AS ms ON c.customer_code=ms.customer_code
JOIN fact_gross_price AS g ON g.product_code=ms.product_code
WHERE customer='Atliq Exclusive'
GROUP BY RIGHT(ms.date,2), ms.fiscal_year
ORDER BY ms.fiscal_year DESC, RIGHT(ms.date,2) ASC;
```

	Month	Year	Gross Sales Amount (mn)
1	January	2021	19.57
2	February	2021	15.99
3	March	2021	19.15
4	April	2021	11.48
5	May	2021	19.20
6	June	2021	15.46
7	July	2021	19.04
8	August	2021	11.32
9	September	2021	19.53
10	October	2021	21.02
11	November	2021	32.25
12	December	2021	20.41
13	January	2020	9.58
14	February	2020	8.08
15	March	2020	0.77
16	April	2020	0.80
17	May	2020	1.59
18	June	2020	3.43
19	July	2020	5.15
20	August	2020	5.64
21	September	2020	9.09
22	October	2020	10.38
23	November	2020	15.23
24	December	2020	9.76

Atliq Exclusive Gross Sales(mn) by month and year
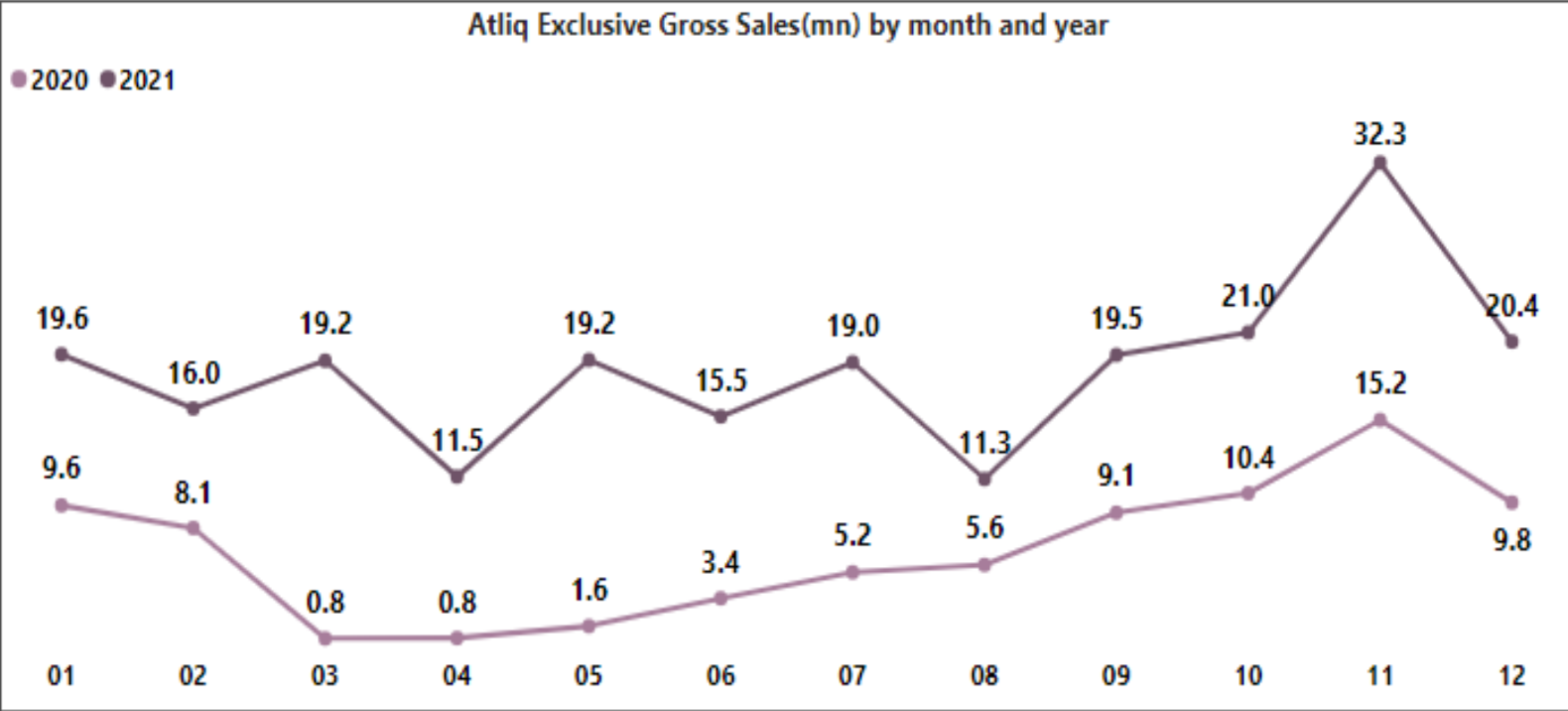
- Increasing sales since March 2020 could be due to COVID-19 leading to remote work & education.
- Fluctuations in 2021 could be due to supply chain disruptions and insufficient raw material availability like silicon chips.
- Overall, total revenue generated is Rs. 8463.19bn, of which over 50% was generated in 2021(Rs. 5079.83bn), 3383.36bn in 2020.

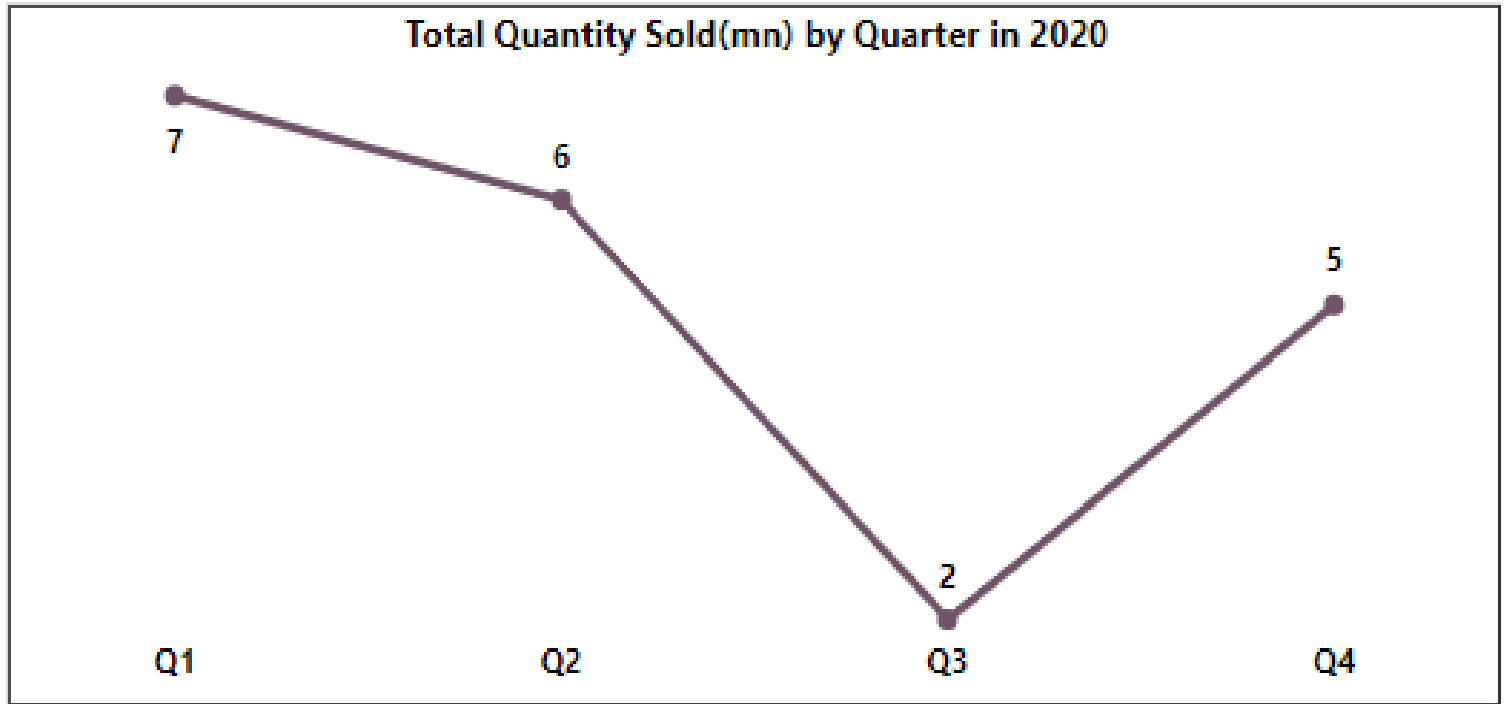8. In which quarter of 2020, got the maximum total_sold_quantity?
The final output contains these fields sorted by the total_sold_quantity -
Quarter
total_sold_quantity

```sql
WITH Qtr AS (
    SELECT  CASE
            WHEN RIGHT(date, 2) IN (09, 10, 11) THEN 'Q1'
            WHEN RIGHT(date, 2) IN (12, 01, 02) THEN 'Q2'
            WHEN RIGHT(date, 2) IN (03, 04, 05) THEN 'Q3'
            WHEN RIGHT(date, 2) IN (06, 07, 08) THEN 'Q4'
            END AS Quarter,
            sold_quantity
    FROM fact_sales_monthly
    WHERE fiscal_year = 2020
)
SELECT Quarter, CAST(SUM(sold_quantity)/1000000 AS DECIMAL(10,2)) AS total_sold_quantity_mn
FROM Qtr
GROUP BY Quarter
ORDER BY total_sold_quantity_mn DESC;
```

	Quarter	total_sold_quantity_mn
1	Q1	7.00
2	Q2	6.00
3	Q4	5.00
4	Q3	2.00

Total Quantity Sold(mn) by Quarter in 2020

- **Quarter 1** of 2020 got the maximum total sold quantity of **7mn**.
- **Quarter 3** of 2020 got the minimum total sold quantity of **2mn**.

9. Which channel helped to bring more gross sales in the fiscal year 2021 and the percentage of contribution? The final output contains these fields-
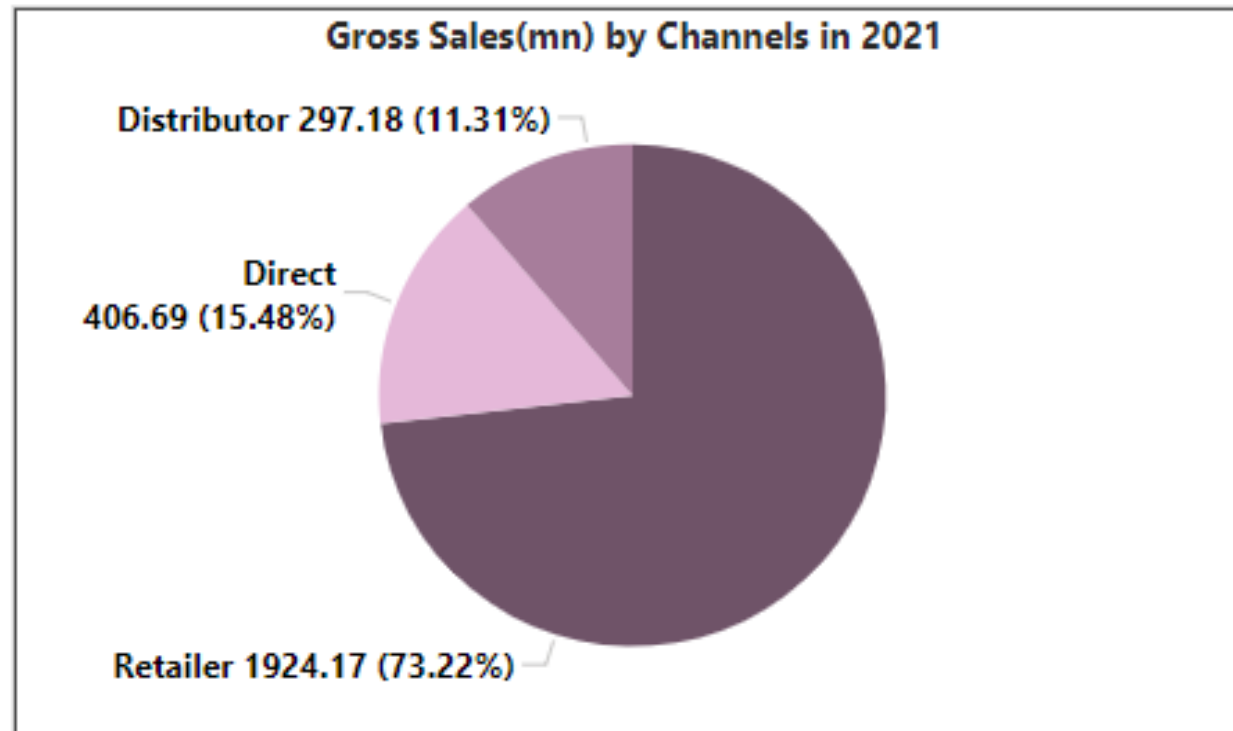channel
gross_sales_mln
percentage

```sql
SELECT Channel, CAST(SUM(gp.gross_price*ms.sold_quantity)/1000000 AS DECIMAL(10,2)) AS gross_sales_mln,
        CAST((SUM(gp.gross_price*ms.sold_quantity)*100/(SELECT SUM(gp.gross_price*ms.sold_quantity) FROM fact_sales_monthly AS ms
                                        JOIN fact_gross_price AS gp ON gp.product_code=ms.product_code WHERE ms.fiscal_year=2021))
                                        AS DECIMAL(10,2) )AS percentage

FROM dim_customer AS c
JOIN fact_sales_monthly AS ms ON ms.customer_code=c.customer_code
JOIN fact_gross_price AS gp ON gp.product_code=ms.product_code
WHERE ms.fiscal_year=2021
GROUP BY Channel;
```
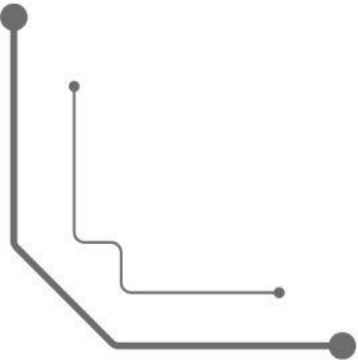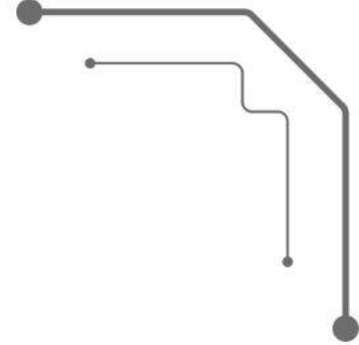
	Channel	gross_sales_mln	percentage
1	Retailer	1924.17	73.22
2	Direct	406.69	15.47
3	Distributor	297.18	11.31

Gross Sales(mn) by Channels in 2021

Distributor 297.18 (11.31%)

Direct
406.69 (15.48%)

Retailer 1924.17 (73.22%)

- The **Retailer channel contributes 73.22%** of the total gross sales, indicating it is the most significant channel driving revenue.
- **Direct channel contributes 15.47%**, which is considerably lower than Retailers. Increasing focus on direct sales could enhance profit margins, as direct channels typically bypass intermediaries.

10. Get the Top 3 products in each division that have a high total_sold_quantity in the fiscal_year 2021? The final output contains these fields - Division; product_code; product; total_sold_quantity; rank_order
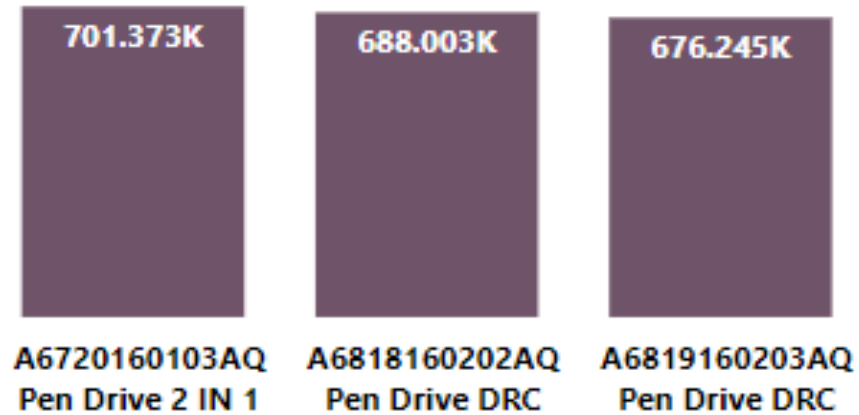
```sql
]WITH qty_sold AS(
    SELECT division, p.product_code, product, SUM(sold_quantity) AS total_sold_quantity
    FROM dim_product AS p
    JOIN fact_sales_monthly AS ms
    ON ms.product_code=p.product_code
    WHERE ms.fiscal_year=2021
    GROUP BY division,p.product_code, product
),
rnk AS(
    SELECT *,
        DENSE_RANK() OVER(PARTITION BY division ORDER BY total_sold_quantity DESC) AS rank_order
    FROM qty_sold
)
SELECT * FROM rnk WHERE rank_order<4
ORDER BY division ASC;
```

	division	product_code	product	total_sold_quantity	rank_order
1	N & S	A6720160103	AQ Pen Drive 2 IN 1	701373	1
2	N & S	A6818160202	AQ Pen Drive DRC	688003	2
3	N & S	A6819160203	AQ Pen Drive DRC	676245	3
4	P & A	A2319150302	AQ Gamers Ms	428498	1
5	P & A	A2520150501	AQ Maxima Ms	419865	2
6	P & A	A2520150504	AQ Maxima Ms	419471	3
7	PC	A4218110202	AQ Digit	17434	1
8	PC	A4319110306	AQ Velocity	17280	2
9	PC	A4218110208	AQ Digit	17275	3

Top 3 Products/Product Code by Divisions

Division ● N & S

701.373K	688.003K	676.245K
A6720160103AQ Pen Drive 2 IN 1	A6818160202AQ Pen Drive DRC	A6819160203AQ Pen Drive DRC

→ USB Flash Drives Category with variants.

Top 3 Products/Product Code by Divisions

Division ● P & A

428.498K	419.865K	419.471K
A2319150302AQ Gamers Ms	A2520150501AQ Maxima Ms	A2520150504AQ Maxima Ms
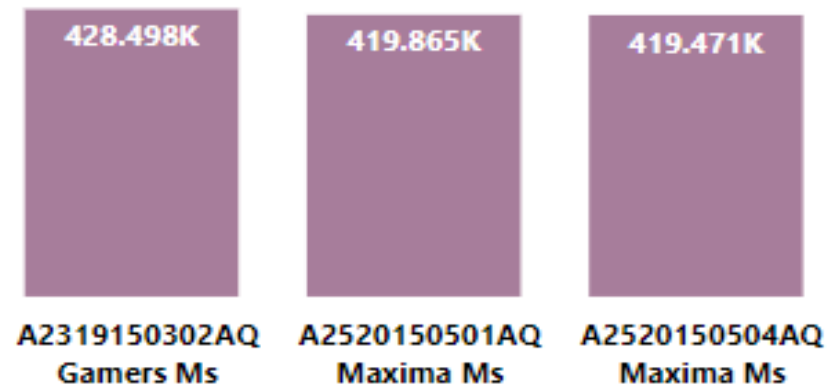
→ Mouse Category with variants.

Top 3 Products/Product Code by Divisions

Division ● PC

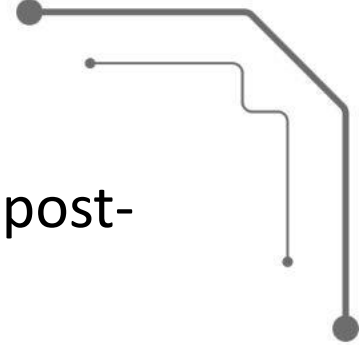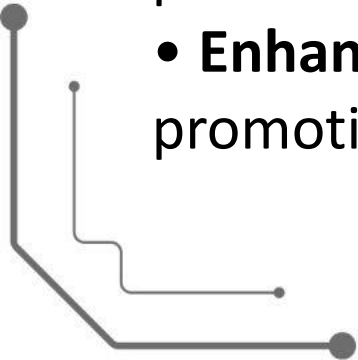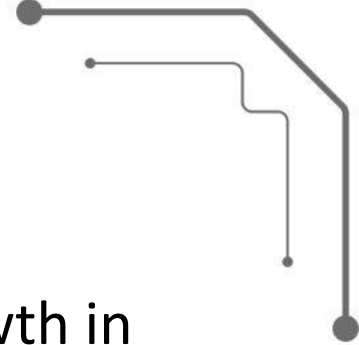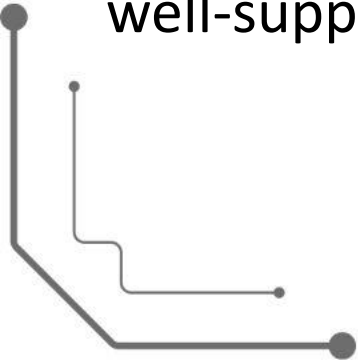|		
17.434K	17.280K	17.275K
A4218110202AQ Digit	A4319110306AQ Velocity	A4218110208AQ Digit
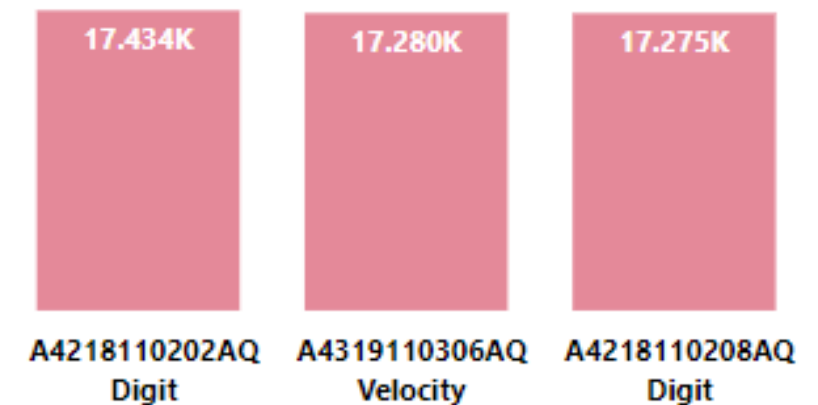
Personal Laptops Category with variants. ←

RECOMMENDATIONS

- **Enhance Customer Engagement:** Build customer loyalty programs or provide post-purchase support to retain customers.
- **Monitor Market Trends:** Stay alert to shifts in market demand (e.g., AI, cloud computing, or IoT hardware).
- **Expand Accessories Portfolio:** Focus on high-demand products like chargers, docking stations, and protective cases.
- **Leverage Notebook Sales:** Continue to innovate with diverse models targeting different consumer segments.
- **Promote Peripherals:** Bundle peripherals with notebooks and desktops to boost average transaction value.
- **Grow Desktop Offerings:** Market desktops to niche audiences, emphasizing performance and reliability.
- **Enhance Marketing:** Highlight the growth of Accessories and Peripherals in promotional campaigns to attract cross-buying customers.

- **Revenue Optimization:** Retailers may already be saturated, so focusing on growth in Direct and Distributor channels could yield incremental revenue.
- **Diversification Strategy:** Develop a strategy to reduce over-dependency on Retailers over time by scaling the other channels.
- **Focus on Direct Sales:** Build digital channels like e-commerce websites. Run targeted campaigns to attract end customers directly. Direct sales could enhance profit margins, as direct channels typically bypass intermediaries
- **Enhance Distributor Efficiency:** Analyze distributor performance and identify bottlenecks. Provide training or incentives to distributors.
- **Strengthen Retailer Relationships:** Since Retailers are the backbone, ensure they are well-supported through promotions, inventory management tools, or loyalty programs.

THANK YOU!