Sample Sales Data

Order ID	Product	Category	Sales ($)	Quantity	Discount (%)
101	Laptop	Electronics	1200	2	10
102	Mouse	Electronics	25	5	5
103	Shoes	Fashion	80	1	20
104	Mobile	Electronics	800	1	15
105	Shirt	Fashion	40	3	5

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1. Logical Functions

These functions help in decision-making based on conditions.

- **Check if Sales is greater than $500**
- **Check if Category is "Electronics"**
- **Check if Discount is more than 10% and Sales above $500**

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2. Conditional Functions

These functions return values based on conditions.

- **Total Sales for Electronics**
- **Total Quantity Sold for Fashion Category**
- **Average Discount for Electronics**

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3. Statistical Functions

These functions analyze the dataset.

- **Total Sales**
- **Average Sales**
- **Maximum Sale Amount**

Minimum Sale Amount

- **Count of Orders**
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4. Using google sheet perform Descriptive, correlation,frequency distribution for above data

5. Load above data in to python data frames , and perform following operations

5.1 Create New columns region, subcategory, segment
5.2 region wise sales group by and column chart
5.3 Segment wise sub cat total sales chart
5.4 Display data region is south and sub category is furniture
5.5 Display data segment is consumer and sales > 5000
5.6 Display name of the product highest sales value
5.7 Compute net sales and display product wise total net sales in column chart

5 Create sample dash board for choosing any problem statement by collecting data from Kaggle and any open source.

1. Retail Store Performance Dashboard

Problem Statement: Background: A chain of retail stores aims to optimize its in-store sales and inventory management. They want to understand the sales trends and customer behavior across multiple locations to make better inventory decisions and improve customer satisfaction. The company is implementing a Power BI dashboard that aggregates data from POS systems, inventory logs, and customer feedback.

Objective: The goal is to create a dashboard that provides detailed insights into store performance, including sales trends, customer satisfaction, and inventory status. The dashboard should help store managers track sales efficiency, identify top-selling products, and assess customer satisfaction.

Dashboard Features:

- **Sales by Region:** Show sales performance by region to identify areas of high and low sales.
- **Top 5 Products Sold:** Visualize the top-selling products in each store to ensure that stock is optimized.
- **Customer Satisfaction:** Track customer satisfaction scores through surveys and feedback forms.
- **Inventory Levels:** Monitor inventory levels for top-selling products to avoid stockouts and overstocking.

Challenges:

- Integrating data from multiple locations and systems.

- Ensuring real-time data updates to prevent discrepancies.
- Balancing detailed analysis with easy-to-understand visuals for store managers.

2. Employee Performance and Productivity Dashboard

Problem Statement: Background: A global consulting firm wants to track employee productivity, project progress, and performance metrics across different departments. They are using Power BI to create a performance dashboard that allows managers to make informed decisions about resource allocation and team performance.

Objective: The dashboard should help HR and department heads to monitor employee performance metrics, track project progress, and assess the overall productivity of teams. This includes visualizing the impact of various factors, such as time spent on projects, KPIs, and employee engagement.

Dashboard Features:

- **Employee KPIs:** Track key metrics like hours worked, tasks completed, and client satisfaction.
- **Project Timeline:** Show a timeline for each department's ongoing projects with milestones and deadlines.
- **Team Performance:** Visualize productivity trends across teams to identify high and low performers.
- **Employee Engagement Scores:** Track engagement survey results to monitor employee morale.

Challenges:

- Ensuring data privacy and confidentiality for employee performance data.
- Handling large datasets from various departments and systems.
- Visualizing complex data without overwhelming managers.

3. Customer Churn Prediction Dashboard

Problem Statement: Background: A subscription-based online service (e.g., a SaaS company) wants to predict and reduce customer churn. They need to analyze historical customer behavior data to identify patterns and trends that indicate when customers are likely to cancel their subscriptions. The company is implementing a Power BI dashboard to visualize these insights.

Objective: The goal is to create a dashboard that helps the company predict customer churn based on historical behavior, subscription data, and customer interactions. The dashboard will help the marketing and customer service teams take proactive actions to retain at-risk customers.

Dashboard Features:

- **Churn Rate:** Track the monthly or quarterly churn rate to monitor the overall health of the business.
- **Churn Prediction by Segment:** Identify which customer segments are at highest risk of churn using predictive analytics.
- **Customer Lifetime Value (CLV):** Visualize the CLV of different customer segments to prioritize retention efforts.
- **Engagement Metrics:** Show metrics like login frequency, usage patterns, and customer support tickets to identify signs of disengagement.

Challenges:

- Integrating data from multiple touchpoints (e.g., web app, customer support, payment systems).
- Building an accurate predictive model with historical data.
- Balancing prediction accuracy with the interpretability of results.

4. Healthcare Patient Management Dashboard

Problem Statement: Background: A hospital is looking to improve patient care through better tracking of patient outcomes, treatment plans, and appointment scheduling. The hospital has a large dataset of patient records, treatments, and feedback that needs to be visualized for effective decision-making.

Objective: The goal is to develop a Power BI dashboard that tracks patient demographics, treatments, recovery progress, and hospital operations. This dashboard will be used by doctors, nurses, and hospital administrators to monitor patient care and ensure efficient use of resources.

Dashboard Features:

- **Patient Demographics:** Visualize the distribution of patients by age, gender, and diagnosis to identify trends in health needs.
- **Treatment Efficacy:** Track patient recovery rates and the success of various treatments.
- **Appointment Management:** Monitor appointment schedules and track patient no-shows or cancellations.
- **Patient Satisfaction:** Aggregate and analyze patient feedback to improve hospital services.

Challenges:

- Ensuring HIPAA compliance and data privacy for patient information.
- Integrating data from disparate hospital systems (e.g., EHR, patient feedback tools, appointment scheduling software).
- Visualizing complex healthcare data in an accessible format for diverse hospital staff.

5. Financial Performance Dashboard for a Non-Profit Organization

Problem Statement: Background: A non-profit organization needs to track its financial performance, fundraising efforts, and program expenditures to ensure transparency and accountability. They are using Power BI to create a financial dashboard for stakeholders and board members to make informed decisions about budgeting and resource allocation.

Objective: The goal is to build a Power BI dashboard that provides an overview of revenue, expenses, donations, and program spending. The dashboard should enable the organization to monitor financial health, track donations, and report on program performance in a way that aligns with their mission.

Dashboard Features:

- **Revenue and Expenses:** Visualize monthly and annual revenue and expenses to track overall financial health.
- **Donor Contributions:** Track total donations and the number of donors over time to measure fundraising success.
- **Program Spending:** Show how much is spent on each program and compare it to budgeted amounts.
- **Fundraising Progress:** Display the status of fundraising campaigns and the percentage of the goal achieved.

Challenges:

- Ensuring accurate and up-to-date financial data from various sources (e.g., donations, grant funding, expenditures).
- Balancing transparency with data sensitivity, especially regarding donor information.
- Creating visualizations that cater to both financial experts and non-financial stakeholders.

These problem statements outline the objectives, features, and challenges of different types of dashboards across various industries. Each problem emphasizes the need for effective data visualization to drive business decisions, and provides a foundation for defining specific KPIs, metrics, and challenges.

6. E-Commerce Website Traffic and Conversion Dashboard

Problem Statement: Background: An e-commerce company needs to understand user behavior on their website, including traffic patterns, conversion rates, and product engagement. They are building a Power BI dashboard to help the marketing and product teams improve website traffic and optimize the user experience.

Objective: To create a dashboard that visualizes traffic sources, conversion rates, product page performance, and customer demographics. This will help optimize digital marketing campaigns and identify opportunities for improving the customer journey.

Dashboard Features:

- **Website Traffic by Source:** Track how users are arriving at the website (organic search, paid ads, direct traffic, etc.).
- **Conversion Rate Analysis:** Show the percentage of visitors who complete a purchase or sign up, broken down by traffic source.
- **Top Performing Products:** Identify the products with the most views, clicks, and sales.
- **Customer Demographics:** Visualize customer age, location, and interests to tailor marketing strategies.

Challenges:

- Integrating data from multiple sources (Google Analytics, CRM, e-commerce platform).
- Ensuring data consistency across platforms.
- Handling high volumes of web traffic data without performance issues.

7. Supply Chain Performance Dashboard

Problem Statement: Background: A manufacturing company wants to improve its supply chain efficiency by analyzing key metrics such as lead times, order fulfillment rates, and supplier performance. The company is using Power BI to create a dashboard to help procurement and logistics teams monitor and optimize their supply chain.

Objective: Build a Power BI dashboard that provides real-time insights into supplier performance, order statuses, inventory levels, and shipment delays.

Dashboard Features:

- **Supplier Performance:** Monitor metrics like on-time delivery, defect rates, and order accuracy for each supplier.
- **Inventory Levels:** Visualize current stock levels and reorder points to prevent stockouts.
- **Order Fulfillment Time:** Track the time taken from order placement to delivery to assess the efficiency of the supply chain.
- **Shipment Delays:** Identify patterns in shipment delays to work with logistics partners for improvement.

Challenges:

- Integrating data from disparate systems (ERP, supplier systems, shipping carriers).
- Maintaining real-time data accuracy.
- Visualizing complex supply chain data in an easy-to-understand way.

8. Hotel Booking and Occupancy Dashboard

Problem Statement: Background: A hotel chain wants to monitor booking trends, occupancy rates, and revenue generation to optimize pricing strategies and marketing campaigns. The company is building a Power BI dashboard to gain insights into performance across different locations.

Objective: To create a dashboard that tracks bookings, occupancy rates, revenue per available room (RevPAR), and customer satisfaction scores across multiple hotels.

Dashboard Features:

- **Booking Trends:** Display monthly and weekly booking trends, including the average length of stay.
- **Occupancy Rate:** Show the percentage of rooms occupied across locations and time periods.
- **Revenue Per Available Room (RevPAR):** Track the profitability of each hotel location.
- **Customer Satisfaction:** Visualize guest feedback and ratings to monitor service quality.

Challenges:

- Aggregating data from multiple property management systems (PMS) and booking platforms.
- Ensuring data accuracy, especially when dealing with seasonal variations in bookings.
- Real-time data visualization to optimize daily operations.

9. Retail Inventory Management Dashboard

Problem Statement: Background: A retail chain with multiple stores needs to track inventory levels across locations to ensure that products are stocked efficiently and reduce instances of overstocking or stockouts. The company is implementing a Power BI dashboard for better inventory management.

Objective: The goal is to build a dashboard that provides a comprehensive view of current inventory levels, stock turnover, and sales trends to optimize inventory and reduce waste.

Dashboard Features:

- **Stock Levels by Store:** Display real-time stock levels for each store and compare them against predefined thresholds.
- **Sales by Product Category:** Show sales trends across different product categories to determine demand for each product.
- **Stock Turnover:** Visualize how quickly stock is being sold and replenished.
- **Reorder Alerts:** Generate alerts when products fall below reorder points.

Challenges:

- Integrating inventory data from various store locations and warehouses.
- Synchronizing data across sales systems and inventory management tools.
- Maintaining accurate, real-time inventory information.

10. Social Media Analytics Dashboard

Problem Statement: Background: A brand wants to monitor the performance of its social media campaigns across platforms like Facebook, Instagram, Twitter, and LinkedIn. The marketing team uses Power BI to aggregate data and measure engagement and ROI from social media efforts.

Objective: The dashboard should aggregate data from various social media platforms to evaluate campaign performance, audience engagement, and the effectiveness of paid advertising.

Dashboard Features:

- **Social Media Engagement:** Track likes, shares, comments, and overall engagement on each platform.
- **Campaign Performance:** Visualize the ROI of paid social media campaigns and compare them across platforms.
- **Audience Demographics:** Break down social media audience by age, location, and interests to refine targeting strategies.
- **Top Performing Posts:** Highlight the posts with the most engagement, clicks, and conversions.

Challenges:

- Integrating data from multiple social media platforms.
- Handling large volumes of data from user interactions.
- Ensuring that the dashboard is user-friendly for marketing teams without technical expertise.

11. Financial Portfolio Management Dashboard

Problem Statement: Background: A wealth management firm wants to track the performance of client portfolios, monitor risk exposure, and assess investment

strategies. They are using Power BI to create a comprehensive portfolio management dashboard.

Objective: The goal is to provide financial advisors with a real-time view of portfolio performance, asset allocation, risk metrics, and return on investment (ROI).

Dashboard Features:

- **Portfolio Performance:** Track the overall performance of client portfolios against market indices.
- **Risk Exposure:** Visualize exposure to different asset classes, sectors, and geographical regions.
- **Investment Return:** Show historical and projected returns on investment (ROI).
- **Asset Allocation:** Breakdown of asset allocation by type (stocks, bonds, commodities, etc.).

Challenges:

- Integrating data from multiple financial systems.
- Handling market volatility and real-time data changes.
- Providing actionable insights in a simplified, non-technical format for clients.

12. Human Resources Recruitment Dashboard

Problem Statement: Background: An HR department needs to streamline recruitment processes and improve the efficiency of hiring decisions. They want to use Power BI to analyze key hiring metrics and identify bottlenecks in the recruitment pipeline.

Objective: Build a dashboard to monitor the efficiency of the recruitment process, track the status of candidates, and identify areas for improvement.

Dashboard Features:

- **Time to Hire:** Track the average time it takes to fill a vacancy.
- **Candidate Pipeline:** Show the number of candidates in each stage of the hiring process.
- **Recruitment Funnel:** Visualize how many candidates drop off at each stage (screening, interviews, etc.).
- **Hiring Source Effectiveness:** Track the effectiveness of different hiring channels (job boards, referrals, LinkedIn, etc.).

Challenges:

- Integrating data from multiple recruitment platforms (LinkedIn, job boards, applicant tracking systems).
- Ensuring data privacy for candidate information.

- Visualizing complex recruitment metrics in an actionable format for HR managers.

13. Customer Service Support Dashboard

Problem Statement: Background: A customer support team needs to monitor service metrics like response time, resolution time, and customer satisfaction. The company is implementing a Power BI dashboard to track service performance and improve customer experience.

Objective: To create a dashboard that tracks customer service metrics and provides insights into areas where service can be improved.

Dashboard Features:

- **Average Response Time:** Visualize the average time taken to respond to customer queries.
- **Issue Resolution Time:** Track how long it takes to resolve customer issues.
- **Customer Satisfaction (CSAT):** Show CSAT scores from customer surveys to measure satisfaction.
- **Support Tickets by Issue Type:** Categorize and visualize the types of issues customers are reporting.

Challenges:

- Integrating data from different customer service tools (Zendesk, Freshdesk, etc.).
- Analyzing service performance across multiple teams and regions.
- Maintaining real-time insights for better decision-making.

14. Sales and Marketing Campaign Effectiveness Dashboard

Problem Statement: Background: A company running multiple marketing campaigns wants to evaluate the effectiveness of its advertising spend across different channels. They are using Power BI to track performance and optimize their marketing strategies.

Objective: The dashboard should provide insights into the ROI of marketing campaigns, conversion rates, and channel performance to optimize future campaigns.

Dashboard Features:

- **Campaign ROI:** Track the revenue generated from each campaign versus the costs.
- **Channel Performance:** Compare the effectiveness of different marketing channels (social media, email, search engine marketing, etc.).

- **Lead Generation:** Visualize the number of leads generated by each campaign and their conversion rate.
- **Customer Segments:** Breakdown of which customer segments are responding best to campaigns.

Challenges:

- Integrating data from multiple marketing tools and platforms.
- Ensuring accurate attribution of sales to the correct campaigns and channels.
- Handling campaign data over multiple time periods for meaningful analysis.

16. Product Return Analysis Dashboard

Problem Statement: Background: An online retailer needs to better understand product returns in order to optimize product quality and customer satisfaction. They are building a Power BI dashboard to analyze returns, identify patterns, and improve the return process.

Objective: The goal is to develop a dashboard that tracks return rates by product, reasons for returns, and customer satisfaction with the return process. This will allow the retailer to reduce returns and enhance customer retention.

Dashboard Features:

- **Return Rate by Product:** Visualize the percentage of returns for each product.
- **Reasons for Return:** Display a breakdown of the most common reasons customers return items (e.g., damaged, incorrect size, dissatisfaction).
- **Return Rate by Region:** Show return rates by geographic location to identify regional trends.
- **Customer Satisfaction Post-Return:** Track satisfaction scores or feedback from customers who made returns.

Challenges:

- Integrating data from multiple returns processing systems and customer feedback surveys.
- Analyzing trends from returns data without overcomplicating the dashboard for non-technical users.
- Providing actionable insights that can lead to product improvements.

17. Real-Time Manufacturing Production Dashboard

Problem Statement: Background: A manufacturing company needs to track real-time production metrics to improve operational efficiency, minimize downtime, and

ensure timely deliveries. They are using Power BI to create a dashboard for monitoring production status.

Objective: To develop a Power BI dashboard that tracks key production metrics such as output, downtime, and machine efficiency, and provides alerts for underperforming machines or production delays.

Dashboard Features:

- **Real-Time Output:** Display the number of units produced per hour/day.
- **Machine Efficiency:** Track the efficiency of individual machines with visual alerts when performance drops below thresholds.
- **Downtime Analysis:** Visualize unplanned downtime by machine and department.
- **Production vs. Target:** Compare actual output against production targets to highlight deviations.

Challenges:

- Integrating real-time data from manufacturing equipment and sensors.
- Ensuring dashboard performance with high-frequency updates.
- Maintaining data accuracy when machines may experience temporary issues.

18. Customer Journey Mapping Dashboard

Problem Statement: Background: A company wants to better understand the customer journey from initial contact to post-purchase behavior. They are building a Power BI dashboard to track customer interactions across multiple touchpoints (website, mobile app, call center, etc.).

Objective: To create a dashboard that visualizes key customer journey stages, from awareness to purchase and post-purchase engagement, to improve marketing and customer service efforts.

Dashboard Features:

- **Customer Touchpoints:** Visualize how customers move through different touchpoints (website visits, app usage, customer service interactions).
- **Conversion Funnel:** Track the conversion rates at each stage of the customer journey (e.g., visitor to lead, lead to sale).
- **Purchase Behavior:** Analyze purchase patterns, such as frequency, value, and time between purchases.
- **Post-Purchase Engagement:** Show metrics like customer feedback, returns, and repeat purchases.

Challenges:

- Integrating data from various touchpoint systems (CRM, web analytics, call centers).
- Handling the complexity of cross-channel customer behavior.
- Maintaining clear visualizations of a complex, multi-step customer journey.

19. Fleet Management Dashboard

Problem Statement: Background: A logistics company needs to track its fleet of delivery vehicles in real time to optimize routing, monitor fuel efficiency, and ensure timely deliveries. They are building a Power BI dashboard to aggregate GPS and fleet data.

Objective: To develop a dashboard that provides real-time tracking of fleet vehicles, monitors fuel consumption, and analyzes delivery times to improve operational efficiency and reduce costs.

Dashboard Features:

- **Fleet Location:** Display real-time locations of all vehicles on a map.
- **Fuel Efficiency:** Track fuel usage per vehicle and identify areas for improvement.
- **Delivery Times:** Monitor delivery times to ensure vehicles are meeting deadlines.
- **Maintenance Status:** Display the maintenance status of each vehicle and alert when scheduled maintenance is due.

Challenges:

- Integrating data from GPS tracking systems and fleet management tools.
- Ensuring real-time data updates without lag.
- Visualizing location data clearly without overwhelming the user with too many vehicles on the map.

20. Retail Customer Segmentation Dashboard

Problem Statement: Background: A retail company wants to better understand customer segments in order to target them with personalized marketing campaigns. They are implementing a Power BI dashboard to segment customers based on purchasing behavior and demographics.

Objective: The dashboard should allow marketing teams to visualize customer segments, analyze behavior patterns, and optimize marketing campaigns to drive sales.

Dashboard Features:

- **Customer Segments by Purchase Behavior:** Display customer segments based on frequency of purchases, average order value, and product categories purchased.
- **Demographic Breakdown:** Visualize customer segments by demographics (age, gender, location).
- **Customer Lifetime Value (CLV):** Show CLV for each segment to identify high-value customers.
- **Segment Performance:** Track sales and engagement metrics for each customer segment over time.

Challenges:

- Ensuring customer data privacy and complying with data protection laws.
- Segmenting customers in a way that provides actionable insights.
- Balancing complexity with usability for non-technical marketing teams.

21. IT System Downtime and Incident Management Dashboard

Problem Statement: Background: An IT department needs to track system downtime and incidents across critical business applications. They want to use Power BI to visualize system health and monitor incident resolution.

Objective: To create a Power BI dashboard that tracks system uptime, incident types, resolution times, and root causes, helping IT teams proactively address issues.

Dashboard Features:

- **System Uptime:** Visualize uptime percentages for key systems and applications.
- **Incident Type Breakdown:** Display the frequency of different types of incidents (e.g., hardware failures, software bugs).
- **Mean Time to Resolve (MTTR):** Track the average time it takes to resolve incidents.
- **Root Cause Analysis:** Analyze incidents by root cause (e.g., network issues, human error).

Challenges:

- Integrating data from incident tracking systems (e.g., ServiceNow, Jira).
- Maintaining data accuracy and timeliness for incident tracking.
- Ensuring that the dashboard doesn't overwhelm IT teams with excessive detail.

22. Healthcare Patient Appointment Scheduling Dashboard

Problem Statement: Background: A healthcare provider wants to optimize patient appointment scheduling and reduce appointment no-shows. They are using Power BI to create a dashboard that helps clinic managers monitor appointment trends.

Objective: The dashboard should allow clinic managers to track appointment availability, patient no-show rates, and the impact of scheduling on clinic operations.

Dashboard Features:

- **Appointment Availability:** Visualize available time slots versus booked appointments.
- **No-Show Rate:** Track the no-show rate by doctor, department, and time of day.
- **Patient Wait Time:** Display the average wait time for patients from arrival to consultation.
- **Appointment Trends:** Monitor booking trends and identify peak hours/days.

Challenges:

- Integrating data from scheduling systems and patient records.
- Ensuring privacy and confidentiality of patient data.
- Making the dashboard easy for clinic managers to interpret and act upon.

23. Retail Sales Promotions and Discount Effectiveness Dashboard

Problem Statement: Background: A retail company wants to assess the effectiveness of its sales promotions and discount campaigns. They plan to use Power BI to measure the impact of discounts on overall sales and customer behavior.

Objective: To build a dashboard that tracks the performance of different sales promotions, comparing sales during promotional periods with regular periods.

Dashboard Features:

- **Sales Before vs. After Promotion:** Compare sales before, during, and after promotions to measure their impact.
- **Discount Type Effectiveness:** Analyze the effectiveness of various discount types (e.g., percentage off, buy-one-get-one).
- **Promotion Redemption Rates:** Track how many customers redeem promotional offers.
- **Customer Segmentation:** Visualize how different customer segments respond to discounts.

Challenges:

- Tracking and correlating sales data with specific promotions and discount codes.

- Analyzing the long-term impact of promotions on customer loyalty and repeat business.
- Ensuring that promotions are correctly tagged in the data for accurate analysis.

24. Product Quality Assurance Dashboard

Problem Statement: Background: A manufacturing company wants to monitor the quality of products produced on its production lines, track defects, and identify areas for quality improvement. They are using Power BI to analyze defect rates and improve production quality.

Objective: To develop a Power BI dashboard that tracks product defect rates, identifies the root causes of quality issues, and monitors corrective actions taken.

Dashboard Features:

- **Defect Rates by Product Line:** Track defect rates for different product lines and production shifts.
- **Root Cause Breakdown:** Display a breakdown of defect causes (e.g., machine malfunction, human error, material defects).
- **Quality Trends:** Monitor defect trends over time to spot patterns and identify areas for improvement.
- **Corrective Actions:** Visualize the status of corrective actions taken to address quality issues.

Challenges:

- Integrating data from quality control systems and production logs.
- Ensuring timely updates to the dashboard as new defects are reported.
- Presenting the data in a way that is actionable for production managers.

25. Employee Training and Development Dashboard