**Assignment – 7**

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### **Introduction**

* **Objective:** Build a data warehouse for X-Mart to improve decision-making.
* **Scope:** Store sales, customer purchases, product demand, and time-based analysis.

### **Business Requirements**

* **Profit Tracking:** Daily, weekly, monthly, and yearly profit for each store.
* **Sales Trends:** Analyze product demand by location and time.
* **Comparisons:** Weekly, monthly, and yearly sales comparisons.

### **Functional Specifications**

* **Input:** Sales transactions from multiple X-Mart stores.
* **Output:** OLAP reports for sales trends, store performance, and customer insights.

**Data Warehouse Design (Star Schema)**

Fact Table: sales\_fact

Dimension Tables: product, customer, store, date\_dimension, time\_dimension, sales\_person

## **2. Requirements Analysis**

Key business questions that need to be addressed by the data warehouse:

* **Sales Analysis:** Daily, weekly, monthly, quarterly profit of each store.
* **Comparison:** Sales and profit trends across different time periods.
* **Time-based Analysis:** Sales trends in different time bands of the day.
* **Product Demand:** Identifying high-demand products in various locations.
* **Sales Trends:** Understanding sales trends over different time periods (week, month, year).
* **Peak Sales Days:** Identifying the day with the highest sales.
* **Weekend vs Weekday Sales:** Analyzing sales and profits specifically on Sundays and other weekdays.
* **Growth and KPI Tracking:** Comparing sales data over weeks, months, and years to measure business performance.

## **3. Dimensional Model Design**

To meet the business requirements, the following **dimensional model** has been designed using a **star schema** approach.

### **3.1 Dimensions and Fact Table**

#### **Dimension Tables:**

1. **Product Dimension**: Stores product details (product\_id, name, category, brand).
2. **Customer Dimension**: Contains customer details (customer\_id, name, address, contact info).
3. **Store Dimension**: Holds store-related information (store\_id, store\_name, location, manager).
4. **Date Dimension**: Stores time-based attributes (date\_id, sales\_date, day\_of\_week, month, quarter, year, public\_holidays).
5. **Time Dimension**: Represents time-specific attributes (time\_id, hour, minute, time\_band).
6. **Sales Person Dimension**: Captures sales personnel details (sales\_person\_id, name, department).

#### **Fact Table:**

**Sales Fact Table** contains sales transactions and metrics such as:

* Foreign Keys: sales\_date\_key, sales\_time\_key, invoice\_number, sales\_person\_id, store\_id, customer\_id, product\_id.
* Measures: actual\_cost, total\_sales, quantity\_sold, fact\_record\_count.

















