**Data Warehousing for Customer Order Processing System**

**Report**

**1. Introduction**

**Objective and Scope**  
The project aims to design and implement a data warehouse for business intelligence to support decision-making by consolidating data from multiple sources. The scope includes:

* + Designing a star schema for data organization.
  + Implementing OLAP operations for advanced analysis.
  + Automating data loading into the warehouse.

**2. Business Requirement**

**Application Specification**  
The warehouse supports users like managers and analysts by providing:

* Sales and inventory tracking across stores.
* Customer purchasing behavior analysis.
* Performance monitoring and trend analysis.
* Data-driven decision-making with historical data insights.

**3. Functional Specification**

* **Input Specifications**  
  Data sources include:
* Customer info (ID, name, purchase history).
* Product and inventory data (ID, description, stock).
* Sales/order info (order ID, date, items).
* Store details (ID, location, contact).

**Output Specifications**  
Outputs include:

* Sales, inventory, and customer reports.
* OLAP-based multidimensional analysis.

**4. Data Warehousing Design**

**Star Schema Design**

* **Central Table: Orders** (Order ID, Customer ID, Store ID, Item ID, Quantity, Ordered Price, Order Date)
* **Related Tables:**
  + Customers (Customer ID, Name, City, First Order Date)
  + Stores (Store ID, City ID, Phone)
  + Items (Item ID, Description, Size, Weight, Unit Price)
  + Cities (City ID, City Name, State, Headquarter Address)

**5. Data Cube Implementation**

**Implementation Steps**

1. **Data Extraction:** Fetch data from operational databases.
2. **Data Transformation:** Normalize, clean, and aggregate data.
3. **Data Loading:** Load data into the data warehouse.
4. **Data Cube Creation:** Generate multi-dimensional cubes for OLAP analysis.
5. **OLAP Queries Execution:** Implement roll-up, drill-down, slice, and dice operations.

**6. Observations**

**a. Online Analytical Processing Reports**

Reports generated using OLAP queries include:

* **Stock Report:** Stores holding a specific item with details like city, state, and unit price.
* **Order Fulfilment Report:** Orders that can be fulfilled by a given store.
* **Customer Analysis:** Customers ordering from specific stores.
* **Stock Availability:** Headquarters managing stores with high stock levels.
* **Detailed Order Report:** Breakdown of customer orders by item, store, and city.

**b. Data Verification**

* Cross-verification of OLAP reports with relational database tables.
* Validation of data integrity and accuracy after transformation.
* Ensuring consistency between warehouse data and source data.

**7. Conclusion**

The data warehouse successfully integrates data from multiple sources to support customer order processing and inventory management. The implementation of OLAP enables efficient reporting and analysis, enhancing decision-making for the company. Future improvements could include predictive analytics and real-time data processing for enhanced business intelligence.