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Case Study on Sequence Diagram

What is a Sequence Diagram ?

Data Flow Diagram (DFD) is a graphical representation of data flow in any system. It is capable of illustrating incoming data flow, outgoing data flow and store data. The DFD depicts both incoming and outgoing data flows and provides a high-level overview of system functionality. It is a relatively simple technique to learn and use, making it accessible for both technical and non-technical stakeholders.

Data Flow Diagram can be represented in several ways. The Data Flow Diagram (DFD) belongs to structured-analysis 1 tools. Data Flow diagrams are very popular because they help us to visualize the major steps and data involved in **software-system processes**.
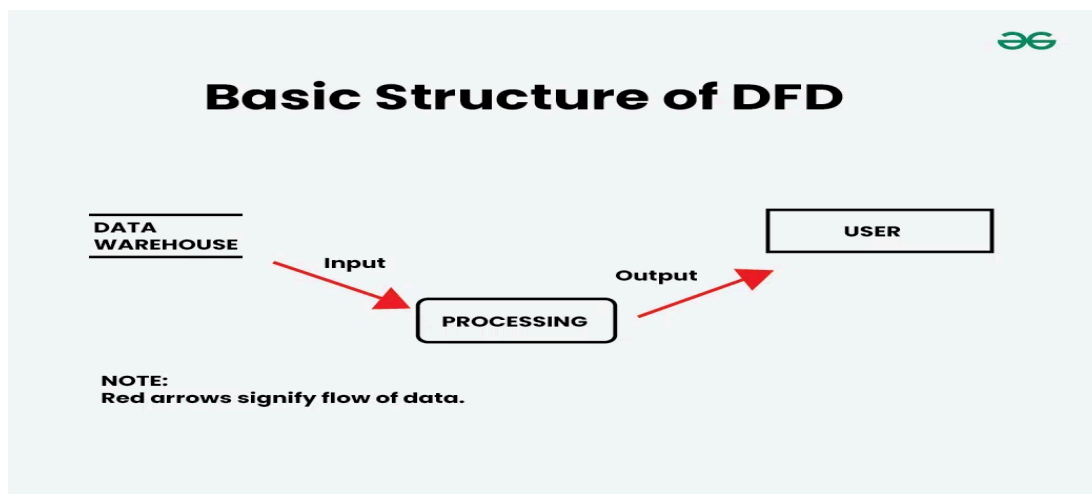
Characteristics of Data Flow Diagram (DFD):

1. **Graphical Representation** – DFDs use standard symbols and notations to represent data flow, simplifying complex systems into easy-to-understand visuals.

2. **Problem Analysis** – They are effective tools for analyzing systems, especially

during software requirement gathering and specification.

3. **Abstraction** – DFDs hide implementation details and focus only on data movement and processes, providing a high-level overview.

4. **Hierarchy** – They support hierarchical modeling: a Level-0 diagram gives a system overview, while Level-1 and further levels show detailed processes.

Levels in Data Flow Diagram (DFD):

1. **Level 0 (Context Diagram) :** Represents the entire system as a single process interacting with external entities. Provides an overview of inputs and outputs without internal details.

2. **Level 1 DFD :** Breaks the single process of Level 0 into major sub-processes. Shows main functions, related data flows, and data stores.

3. **Level 2 DFD :** Further decomposes Level 1 processes into more detailed sub-processes. Useful for analyzing specific requirements.

4. **Level 3 DFD :** The most detailed diagram, showing all processes, data flows, and data stores comprehensively. Used for complex systems requiring in-depth analysis.

Types of Data Flow Diagram (DFD) :-

DFDs can be classified into two main types, each focusing on a different perspective of system design:
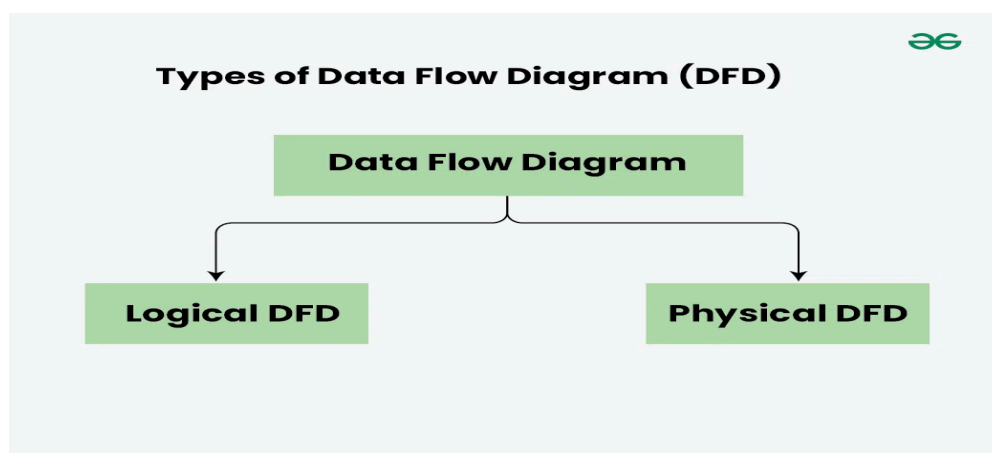
Types of Data Flow Diagram (DFD):

1. **Logical DFD:**
   - Focuses on **what the system does**.
   - Shows the flow of information, processes, and data stores without considering physical implementation.
   - Useful in requirement analysis to understand business operations.
   - *Example:* Shows how customer order data is processed, validated, and stored, without specifying databases or devices.

2. **Physical DFD:**
   - Focuses on **how the system is implemented**.
   - Describes actual hardware, software, files, databases, and people involved in the system.
   - Useful in system design and implementation stages.
   - *Example:* Shows how order data flows through servers, specific databases, and user interfaces.

Components of Data Flow Diagrams (DFD) :-

A **DFD** consists of **four main components** that work together to represent the flow of data within the system:
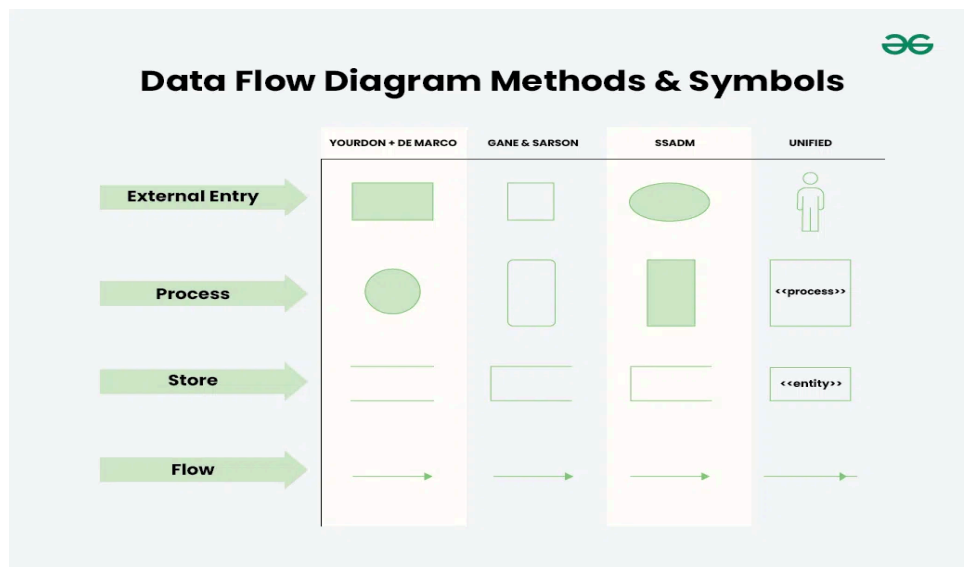
1. **Process** – Transforms inputs into outputs; shown with a circle or rounded rectangle; named with a short phrase.
2. **Data Flow** – Represents movement of information/material using arrows; should carry only one type of data.

3. **Data Store (Warehouse)** – Stores data for later use; shown with two parallel lines; supports reading and updating.
4. **External Entity (Terminator)** – Outside system element (e.g., customer, bank) that sends or receives data.

Rules for Data Flow Diagram (DFD) :-

Following are the rules of DFD:

1. Data can flow from

- Terminator or External Entity → Process

- Process → Terminator or External Entity

- Process → Data Store

- Data Store → Process

- Process → Process

2. Data Cannot Flow From

- Terminator or External Entity → Terminator or External Entity

- Terminator or External Entity → Data Store

- Data Store → Terminator or External Entity

- Data Store → Data Store

Advantages of Data Flow Diagram (DFD):

1. **Understanding the System** – Shows how data flows and highlights key functions.
2. **Graphical Representation** – Simple visuals, easy for both technical and non-technical users.
3. **Detailed Breakdown** – Decomposes systems into smaller processes for clarity.
4. **System Documentation** – Provides well-defined records for current and future development.
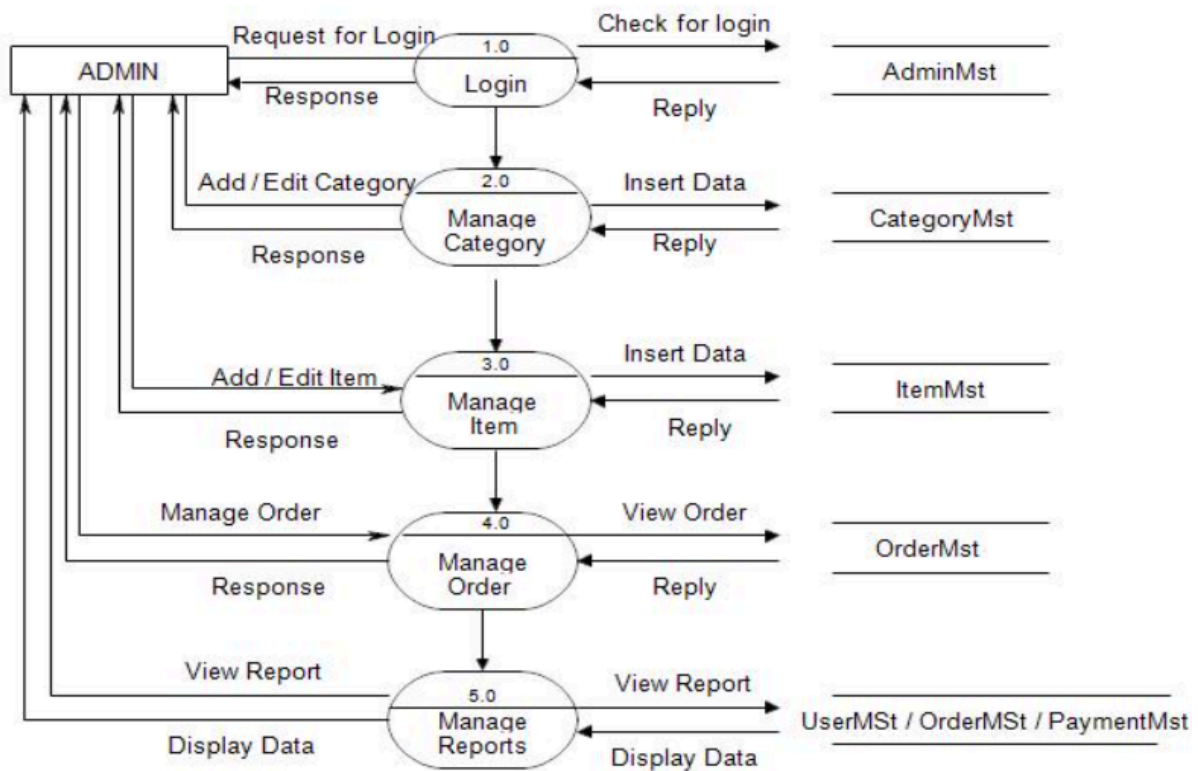
Disadvantages of Data Flow Diagram (DFD):

1. Time-consuming to create, especially for large systems.

2. Focuses only on data flow, not on security, control, or performance.

3. Can become outdated if the system changes frequently.

4. Difficult to maintain for complex or evolving systems.

5. Oversimplifies processes, leading to missing details.

6. Requires skilled analysts to create accurate diagrams.

7. Large diagrams may become confusing and hard to follow.

0-level DFD Diagram For Ecommerce Website :-
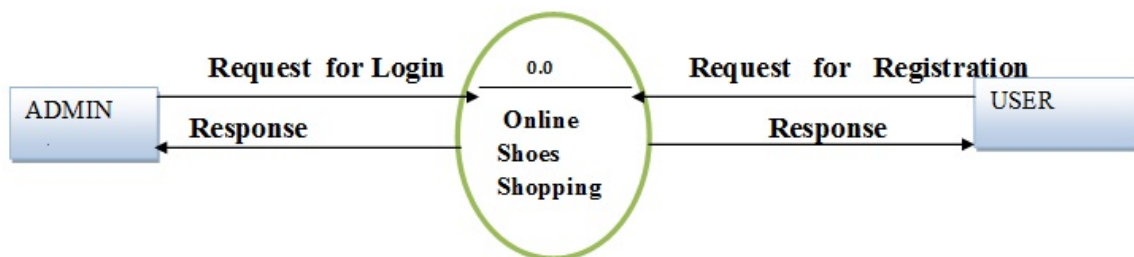
1-level DFD Diagram For Ecommerce Website :-

2-level DFD Diagram For Ecommerce Website :-