SOFTWARE ENGINEERING PRACTICAL DOCUMENT

PRACTICAL NO: 9

AIM: Study and implementation of Data Flow Diagrams.

SOLUTION

What is Data Flow Diagram?

Data flow diagram (DFD) maps out the flow of information for any process or system**. It uses defined symbols like rectangles, circles and arrows, plus short text labels, to show data inputs, outputs, storage points and the routes between each destination.** They can be used to analyse an existing system or model a new one.

The objective of a DFD is to show the scope and boundaries of a system as a whole. It may be used as a communication tool between a system analyst and any person who plays a part in the order that acts as a starting point for redesigning a system. **The DFD is also called as a data flow graph or bubble chart.**

It shows how data enters and leaves the system, what changes the information, and where data is stored.

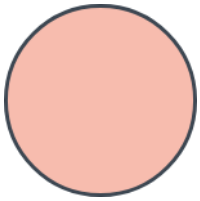
The following observations about DFDs are essential:

1. All names should be unique. This makes it easier to refer to elements in the DFD.
2. Remember that DFD is not a flow chart. **Arrows is a flow chart that represents the order of events**; **arrows in DFD represents flowing data.** A DFD does not involve any order of events.
3. Suppress logical decisions. If we ever have the urge to draw a diamond-shaped box in a DFD, suppress that urge! A diamond-shaped box is used in flow charts to represents decision points with multiple exists paths of which the only one is taken. This implies an ordering of events, which makes no sense in a DFD.
4. Do not become bogged down with details. Defer error conditions and error handling until the end of the analysis.

Symbols and Notations Used in DFDs

1. External entity: An outside system that sends or receives data, communicating with the system being diagrammed. They are the sources and destinations of information entering or leaving the system. They might be an outside organization or person, a computer system or a business system. They are also known as terminators, sources and sinks or actors. They are typically drawn on the edges of the diagram**.**


2. Process: Any process that changes the data, producing an output. It might perform computations, or sort data based on logic, or direct the data flow based on business rules. A short label is used to describe the process, such as “Submit payment.”



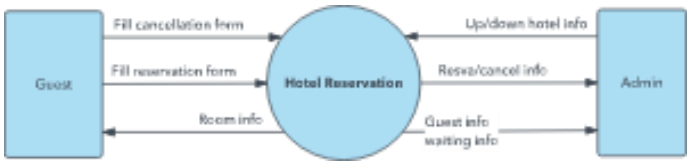

3. Data store: Files or repositories that hold information for later use, such as a database table or a membership form. Each data store receives a simple label, such as “Orders.”


4. Data flow: The route that data takes between the external entities, processes and data stores. It portrays the interface between the other components and is shown with arrows, typically labelled with a short data name, like “Billing details.”

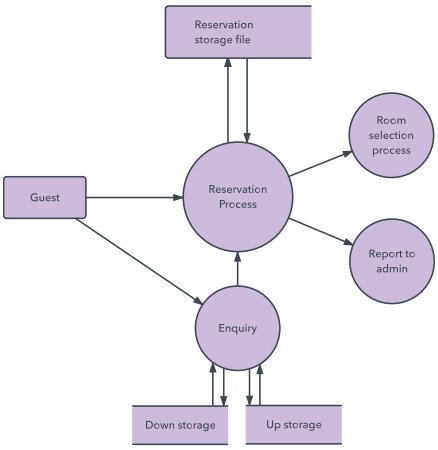

DFD levels and layers

A data flow diagram can dive into progressively more detail by using levels and layers, zeroing in on a particular piece. DFD levels are numbered 0, 1 or 2, and occasionally go to even Level 3 or beyond. The necessary level of detail depends on the scope of what you are trying to accomplish.

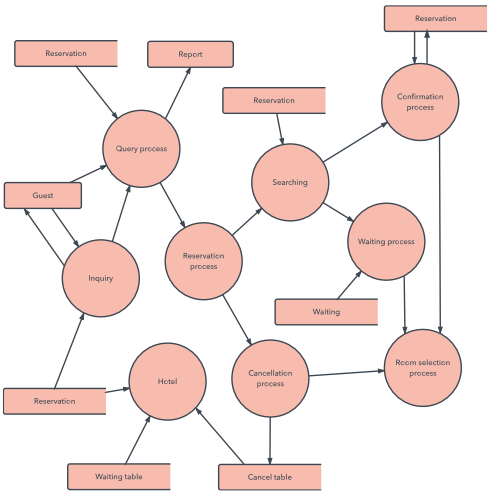
1. DFD Level 0 is also called a Context Diagram: It's a basic overview of the whole system or process being analysed or modelled. It's designed to be an at-a-glance view, showing the system as a single high-level process, with its relationship to external entities. It should be easily understood by a wide audience, including stakeholders, business analysts, data analysts and developers.



2. DFD Level 1: provides a more detailed breakout of pieces of the Context Level Diagram. You will highlight the main functions carried out by the system, as you break down the high-level process of the Context Diagram into its subprocesses.



3. **DFD Level 2**: then goes one step deeper into parts of Level 1. It may require more text to reach the necessary level of detail about the system's functioning.



Rule of Data Flow

One of the rules for developing DFD is that all flow must begin with and end at a processing step. This is quite logical, because data can't transform on its own with being process. By using the thumb rule, it is quite easily to identify the illegal data flows and correct them in a DFD.

1. An entity cannot provide data to another entity without some processing occurred.

2. Data cannot move directly from an entity to a data story without being processed.

3. Data cannot move directly from a data store without being processed.

4. Data cannot move directly from one data store to another without being processed.

Example of Data Flow Diagram

The importance of the data flow diagram (DFD) for an online shopping system is to show the developers the actual happenings in the system. This is done by visualizing the system's data management at various levels.

DFD Level 0 Online Shopping System

DFD Level 0 shows the entities that interact with a system and defines the border between the system and its environment. Users, the main process, and data flow make up its parts. The user feeds data into the system and then receives the output from it.

Level 1 DFD for Online Shopping System

Level 1 shows the broader details of Level 0. This is to clarify the paths (flow) of data and its transformation from input to output. The designed diagram portrays four different scenarios: managing purchasing information, product monitoring, tracing transaction, and managing payment and deliveries.