Data Flow Diagram and its Importance

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Process modeling involves graphically representing the processes or actions, that capture, manipulate, store and distribute data between a system and its environment and among component within the system. A common form of a process model is a data-flow diagram (DFD).

A process model is a formal way of representing how a business system operates. Through structural analysis technique called data flow diagram, the system analyst can put together a graphical representation of data processes throughout the organization.

The purpose of data flow diagram is to show the "flow" and transformation of data through the system. These diagrams are used as visualization tool to help the audience get a better idea of what exactly is going on in the system.

The DFDs are use to :

(i)   discuss with the user a diagrammatic interpretation of the process in the system and clarify what is currently being performed.

(ii)   determine what the new system should be able to do and what information is required for each different process the should be carried out.

(iii)   Check that the completed system conforms to its intended design.

(iv)   provides easy presentation and communication between technical and non technical staff.

Components of Data Flow Diagram

The components of Data Flow Diagram are always the same but there are different diagrammatic notations used. The notation used here is one adopted by a methodology known as structured systems analysis and design methods there are four different symbols that are normally used on a DFD. The elements represented are :

- External entities
- Processes
- Data stores
- Data Flows

External entities are those things that are identified as needing to interact with the system under consideration. The external entities either input information to the system, output information from the system or both. Typically, they may represent job tilled or other systems that interact with the system to be built. Some examples are shown as:
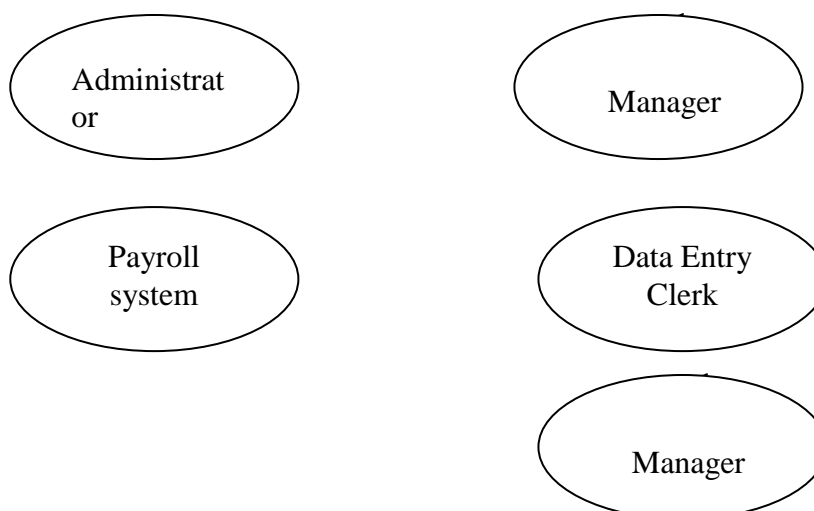
A process is an activity or a function that is performed for some specific business reason. Processes are actions that are carried out with the data that flows around the system.

The process symbol has three parts as shown in figure

Process identifier ⇨ ⇦ Where / who

⇦ Process name
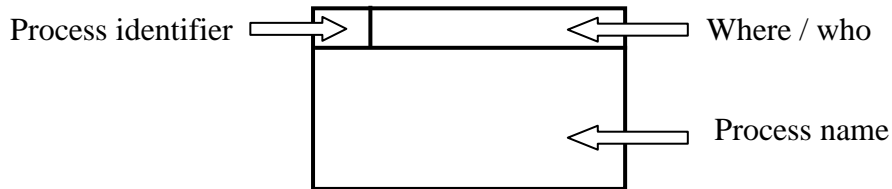
Data stores are places where data may be stored. This information may be stored. This information may be stored either temporarily or permanently by the user. In any system you will probably need to make some assumptions about which relevant data stores to include. How many data stores you place on a DFD some what depends on the case study and how for you go in being specific about the information stored in them. It is important to remember that unless we store information coming our system it will be lost.

⇧ ⇧

Data Store   Data store description

Identifier
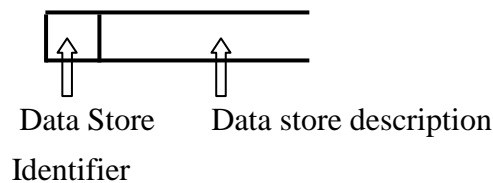
Symbol for data store

| D1 | Students |
| D2 | Customers |
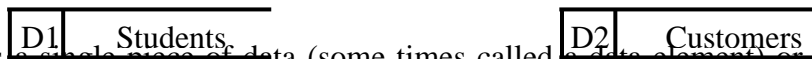
A data flow is a single piece of data (some times called a data element) or a logical collection of several pieces of information (e.g. purchase receipt). Every data flow should be named with noun. The description of a data flow lists exactly what data elements the flow certain. For example, the payment details data flow can list the payment type, payment amount, and account number as its data elements.

some examples of data flows.

Customer's details
———————————→

Applicant's name
———————————→

Payment
———————————→
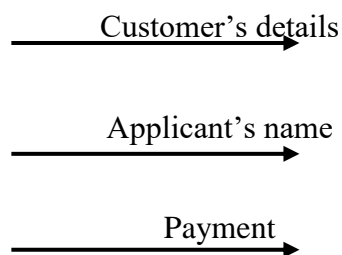
We must follow a **set of rules when drawing data flow diagrams.** DFD rules are :

(i)   Each process must have a minimum of one data flow going into it and one data flow leaving it.

(ii)   Each data store must have at least one data flow going into it and one data flow leaving it.

(iii)   A data flow out of the process should have some relevance to one or more of the data flows into a process.

(iv)   Data stored in a system must go through a process.

(v)   Filing systems within an organization cannot logically communicate with one another unless there is a process involved.

(vi)   All processes in DFA must be linked to either another process or a data store

DFD Characteristics are :

(i)   DFD can be used to model physical logical, current or new systems.

(ii)   DFD does not represent procedural or time-related processes.

(iii)   Revisions of the same DFD are done to improve model based on understanding.

(iv)   Decision to stop iterative decomposition may be difficult.

References:

- Roger S. Pressman, "Software Engineering" McGraw Hill Education (India) Private Limited, 2019.
- Brijendra Singh "Systems Analysis and Design" New Age International Publication 2016.