

Data-flow diagram

Theory

A data-flow diagram (DFD) is a way of representing a flow of data through a process or an information system. The DFD also provides information about the outputs and inputs of each entity and the process itself. A data-flow diagram has no control flow — there are no decision rules and no loops. Specific operations based on the data can be represented by a flowchart.

A DFD can represent the context of the IS. Then, the refined representation of a process can be done in another data-flow diagram, which subdivides this process into sub-processes.

DFD consists of processes, flows, warehouses/datastores, and terminators/external entities. There are several ways to view these DFD components:

- **Process**

The process (function, transformation) is part of a system that transforms inputs to outputs. The symbol of a process is a circle, an oval, a rectangle or a rectangle with rounded corners (according to the type of notation). The process is named in one word, a short sentence, or a phrase that is clearly to express its essence.

- **Data flow**

Data flow (flow, dataflow) shows the transfer of information (sometimes also material) from one part of the system to another. The symbol of the flow is the arrow. The flow should have a name that determines what information (or what material) is being moved. Exceptions are flows where it is clear what information is transferred through the entities that are linked to these flows. Material shifts are modeled in systems that are not merely informative. Flow should only transmit one type of information (material). The arrow shows the flow direction (it can also be bi-directional if the information to/from the entity is logically dependent - e.g. question and answer). Flows link processes, warehouses and terminators.

- **Warehouse**

The warehouse (datastore, data store, file, database) is used to store data for later use. The symbol of the store is two horizontal lines, the other way of view is shown in the DFD Notation. The name of the warehouse is a plural noun (e.g. orders) - it derives from the input and output streams of the warehouse. The warehouse does not have to be just a data file, for example, a folder with documents, a filing cabinet, and optical discs. Therefore, viewing the warehouse in DFD is independent of implementation. The flow from the warehouse usually represents the reading of the data stored in the warehouse, and the flow to the warehouse usually expresses data entry or updating (sometimes also deleting data). Warehouse is represented by two parallel lines between which the memory name is located (it can be modeled as a UML buffer node).

- **Terminator**

The Terminator is an external entity that communicates with the system and stands outside of the system. It can be, for example, various organizations (eg a bank), groups of people (e.g. customers), authorities (e.g. a tax office) or a department (e.g. a human-resources department) of the same organization, which does not belong to the model system. The terminator may be another system with which the modeled system communicates.

Cases

Case 1

The purpose of the green access real estate system is to assist agents as they sell houses. Sellers contact the agency, and an agent is assigned to help the seller complete a listing request. Information about the house and lot taken from that request is stored in a file. Personal information about the sellers is copied by the agent into a sellers file.

When a buyer contacts the agency, he or she fills out a buyer request. Every two weeks, the agency sends prospective buyers area real estate listings and an address cross reference listing containing actual street addresses. Periodically, the agent will find a particular house that satisfies most or all of a specific buyer's requirements, as indicated in the buyer's requirements statement distributed weekly to all agents. The agent will occasionally photocopy a picture of the house along with vital data and send the multiple listing statement (mls) to the potential buyer.

When the buyer selects a house, he or she fills out an offer that is forwarded through the real estate agency to the seller, who responds with either an offer acceptance or a counteroffer. After an offer is accepted, a purchase agreement is signed by all parties. After a purchase agreement is notarized, the agency sends an appraisal request to an appraiser, who appraises the value of the house and lot. The agency also notifies its finance company with a financing application.

Case 2

Lincoln Pizza is a small restaurant on Lincoln Ave. Most of its customers are EIU students. In the current manual ordering system, the restaurant employees have to go through three different activities in order to process a pizza order.

The first activity, called receiving the order, consists in getting customers information (such as name, phone number, and address), and getting orders information (such as the pizza size, the type of crust, and the ingredients needed to make the pizza). The same process also checks the availability of the ingredients needed before setting the status of the pizza order as "valid".

When a pizza order is valid, the employee in charge of receiving the order provides the valid order information to the cooks who make the pizza.

The second activity, making the pizza, consists in getting the ingredients needed (from containers in the kitchen) and actually cooking the pizza. At the end of that process, the cooks have to update the manual file that keeps track of the ingredients.

They, then, provide the drivers in charge of delivering the pizza with the (completed) status of the order. The final activity, delivering the pizza, done by the drivers consists in getting address and payment information from the employee in charge of Receiving the order, and actually delivering the pizza. The drivers provide the customers with a receipt and get the payment.

- Name all the processes to be found in the Data Flow Diagram of the system.
- Name all the external entities to be found in the Data Flow Diagram of the system.
- Name all the data stores to be found in the Data Flow Diagram of the system.
- Draw the Data Flow Diagram for the new Lincoln Pizza's ordering system.

Case 3

Choose one process of your case, and draw a DFD

Sources:

- https://en.wikipedia.org/wiki/Data-flow_diagram
- <https://www.youtube.com/watch?v=KA4rRnihLII>