**DATA FLOW DIAGRAMS**

It is the primary graphical tool in the analysis phase of the SDLC.

They show the flow of data from external entities into the system, show how data moves from one process to another as well as its logical storage.

(Analysis uses DFDs to show what happens to data items as they flow through a system).

The model uses four basic symbols which include:

1. ***Process***

* They show what the system do i.e. any activity that alters data in any way.
* Each process has one or more data inputs and produces one or more data output and number which appear inside the symbol that represent the process in a DFD.
* Process names should be unambiguous and convey meaning if possible without being too long.

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Sales department

Compute sales

SSADM

demaccro

1. ***Data Store***

* It’s a repository of data and contains data that is retained in the system.
* Processes can enter data into a data store or retrieve data from the data store.
* Each data store has a unique name.

Demacro SSADM

Price file

Price file

M1

M1

Price file

D1

D1

1. ***External Entity***

* They represent the sources of data that enter the system or the recipients of data that leaves the system.
* As entities are not part of the system with which the DFD is about, we are not concerned with the internal workings of an entity only the data it supplies or receives
* External entities that supply data are ***sources*** and those that use the system data are ***sinks.***

1. ***Data Flows***

* They model the passage of data into the system and are represented by lines joining system components.
* The direction of the flow is indicated by an arrow and the line is labelled by the name of the data flow.
* Flows of data in the system can take place:
* Between two processes
* From a data store to a process and vice versa
* From a source to a process
* From a process to a sink.

**NB:** A boundary is sometimes drawn around a DFD to show the units of the system which is being charted.

**DFD Levels**

They include:

1. ***Context Diagram/level O DFD***

It models the whole system by one process i.e shows the inputs and outputs of a system.

It does not explain the system in detail.

For more detail it is necessary to identify the major system processes and draw a DFD made up of these processes and the data flows between them.

Process of breaking down a higher level DFD to its constituent lower level DFD is known as **levelling.**

1. ***Lower Level DFDs***

* Level 1 DFD shows the major system processes.
* Each process has a unique name and number.
* Level 2 DFD shows the sub levels of each of the processes.

**NB:** The process can be expanded by even more detailed DFD. However this expansion must eventually stop instead process description and detailed data definition are used.

**Conservation of Data**

It applies to processes and data stores.

For data stores, conservation of data means that what comes out of the data store must first go in. It is not possible for the data store to create new data elements.

A process cannot create new data. It can only take its input data and either output it again or transform it into a new form of data.

**Naming**

Specific names should be used at all parts of the DFD. The choice of these names depends on the type of component named.

A process name should be one single phrase and it should be possible to describe a process in one sentence while naming data stores use specific names not general names.

**Levelling DFDs**

Levelling allows an analyst to start with a top level function and to elaborate it interms of its more detailed components. These detailed components are modelled as lower level DFDs.

Levelling also improves the readability of the DFD. One should be able to understand what the system is doing just by looking at a DFD.

***Examples***

1. A small company makes and sells machine tools. The production and accounting system have been computerised for sometime and a system analyst is putting together a proposal to computerise the firms order entry system. The system has been described in narative form as follows.

The order entry process currently begins when the sales department passes an enquiry from a customer to the order department which prepares a quotation using the price file and returns the quotation to the sales department. A record of the quoted price is held in the quotation file (The quotation is sent to the customer). A successful quotation result in the customer sending an order to the order department where the order is matched with the quotation.

The order is then given a number and entered onto the order file. The order department uses the details in the order file to create an acknowledgement which is sent to the customer and to compile a works order which is sent to the production department, Produce a context diagram and level 1 DFD for the current order entry system.

1. A purchasing deparment receives a purchase requisition from the stores. The requisition is checked and an invalid requisition is returned to the stores for corrections. An order is made out using a file of approved suppliers and sent to the appropriate supplier .

A copy order is filed. The requisition is also filed.when the goods are received,the invoice is compared with the filed order copy and an invalid invoice is returned to the supplier.

Valid invoices are passed to the accounts department for payment and fulfilled orders are filed . Draw a DFD.

1. When an invoice is received from a supplier it’s checked against a file of authorised puechases. If the invoice does not match an authorised purchase then a querrying letter is prepared and returned back with the invoice to the supplier. If the invoice matches an authorised purchase but it’s for an incorrect amount, then a standard form is completed and returned together with reconciles, a payment authorization is made out. A cheque is prepared and sent to the supplier and the authorisation filed. Draw a DFD
2. The following narative describes employees recruitment policy in a large establishment for an advertised vacancy.

* Applicants are expected to send letters seeking employment to personnel manager at the headquarters. The manager then sorts out the letters based on predetermined qualifications. Rejection letters are sent back to unqualified appilcants. The application letters from qualified applicants are then sent to the recruitment committee for interview.
* Applicants who fail the interview are sent letters to that effect. For successful applicants, their document details are sent to the general manager for formalization. The manager sends formal letters of employment offers to the applicants. Letters of acceptance by applicants are received by the general manager’s office. Applicants rejecting employment offers are however required to submit letters to the personnel manager.Draw a DFD for the above policy.

**Advantags of DFDs**

1. DFDs are used to specify the functions of a system. They show in detail how the system works from overview to mynute detail using the levelling technique.
2. They give an overview of the system as a guide to later fact finding.
3. Are easy to learn.
4. Are simple to draw since they use only a set of four standard symbols.
5. They help substantiate the logic underlying the data flow of the organisation i.e. highlighting data flows into through a system.
6. The nouns and verbs of the system description translate directly into the diagram.

**Disadvantages of DFDs**

1. DFD soon become clutterd with too much detail.
2. They can be difficult to read if not clearly set out.
3. They can be difficult to correct or maintain without redrawing the whole diagram.
4. There are no control elements in the diagrams such as ‘does a process use all inputs’.