

Unit 2 – Chapter 6

Tools for Requirements Gathering

In the previous sections, several methods that can be employed to get to know the user requirements have been discussed. In this section, three tools that are traditionally used to document the gathered information are discussed:

1. Decision Table
2. Decision Tree
3. Data Flow Diagrams
4. Data Dictionary

6.1 Decision Tables

While understanding the procedures followed in a system, we come across many situations where different actions are taken under different conditions. When such combinations are many, a compact way of documenting and presenting them is by using decision tables.

A decision table has a rectangular form divided into four compartments — Conditions, Condition Entries, Actions, and Action Entries (Fig. 6.1).

Conditions	Condition Entries
Actions	Action Entries

Fig. 6.1. Decision table



Conditions are usually defined in a manner such that they can be expressed in a binary manner -True or False, or Yes or No. Examples of conditions are:

- Is the price minimum among all quotations?
- Is age less than 40?

Condition entries in the above situations are always either Yes (Y) or No (N).

For a given set of conditions, one needs to know the *action* which is usually followed in the system under consideration.

Examples of actions are:

- Recruit the applicant.
- Admit the student.
- Place order.

Cross marks (X) are always used for *action entries*. They are placed one in each column.

A condition-action combination defines a *decision rule*. The columns spanning the decision entries and the action entries compartments are the various decision rules.

Fig 6.2 depicts the decision table for library acquisition. The Head of the Department (HOD) recommends books to be bought by the Library. If funds are available, then the books are bought. In case funds don't permit, a textbook is kept wait-listed for purchase on a priority basis during the next year, whereas the Library returns the requisitions for all other books to the Head of the Department.

Conditions	Decision rules			
	1	2	3	4
Textbook?	Y	Y	N	N
Funds Available?	Y	N	Y	N
Actions				
Buy	X		X	
Waitlist for Next Year.		X		
Return the Reco to the HOD.				X

Fig. 6.2. Decision table for library requisition



6.2 Decision Trees

Decision trees provide a very useful way of showing combinations of conditions and resulting action for each such combination. A decision tree starts from a root node, with branches showing conditions. Each node is a decision point and a choice has to be made at each node. Each branch has a corresponding value to the decision choice. Fig. 6.3 shows a decision tree for library requisition.

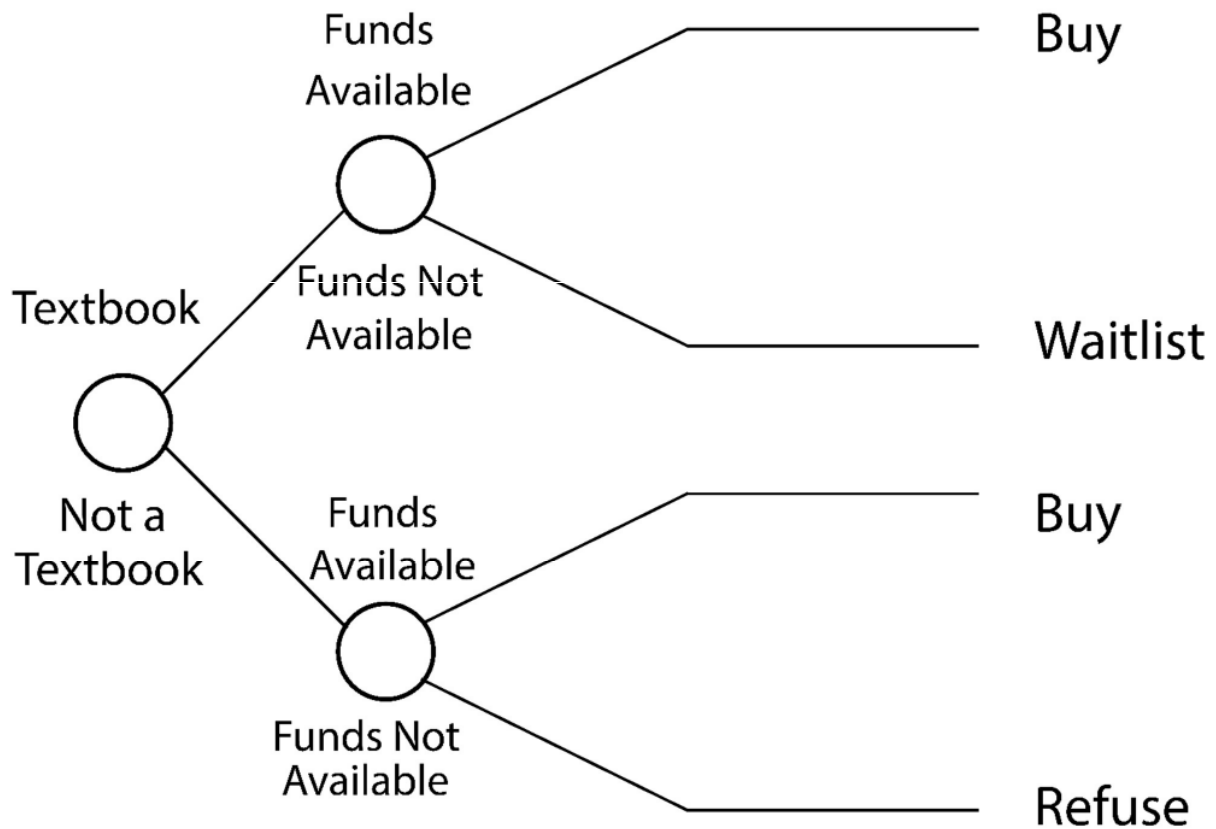


Fig. 6.3 Decision tree

- Decision Trees are best used for logic verification or moderately complex decisions which result in a small number of actions. They are especially also useful to represent the order of decision-making in the system.
- Decision Tables are best used for problems involving complex combinations. They can represent actions resulting from a large number of combinations of conditions.

6.3 Data Flow Diagrams (DFD)

A Data Flow Diagram (DFD) is a way to understand how data flows and gets transformed and stored in a system. A data flow diagram uses four symbols (Fig. 6.4), one each for data flow, process (or data transform), data store, and external entity (data originator or data receiver).

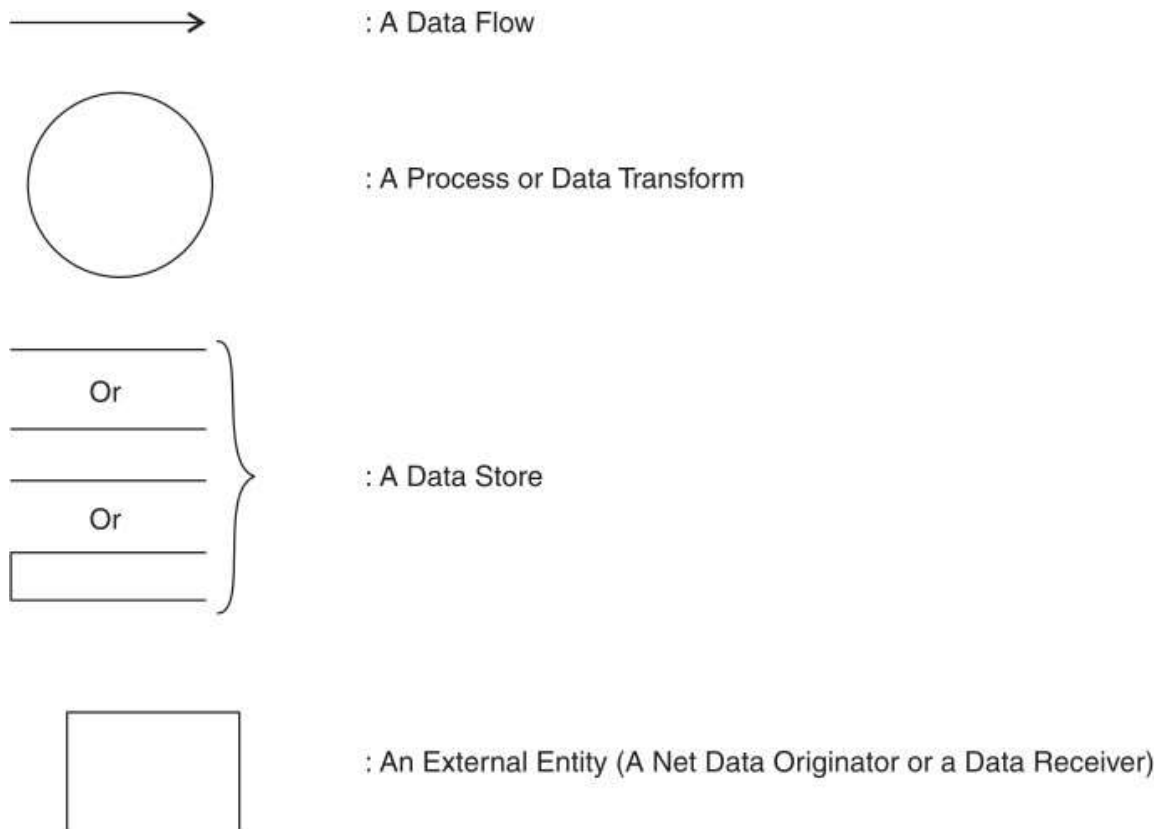


Fig. 6.4. The symbols used in data flow diagrams

- A *data flow* is either an input to or an output of a process. The data may be in the form of a document, a record, or even a series of numbers keyed by a human operator. The arrowhead of the symbol indicates the direction of the flow of the data.
- A *data transform* (or a *process*) receives data as input and transforms it to produce output data. It may involve filtration or distribution of data. Foreexample, the Head of a Department sends the list of students to his office for

storing it in a file. The operations in a process can be carried out with the help of hardware, software, or even by human elements.

- A *data store* represents a repository of data that is stored for use as input to one or more processes. It can be a computer database or a manually operated file.
- An *external entity* lies outside the boundary of the system under consideration. It may be the origin of certain data that flows into the system boundary thus providing an input to the system, or it may be the destination of data that originates within the system boundary. Frequently, an external entity may be both an originator and a receiver of data.

Figure 6.5 is the data flow diagram (DFD) of the customer order receipt situation. This example has only one external entity (Customer), one process (Clerk Verifies Order), one data store (Customer Order File), and three data flows (Customer Order, Acknowledgment, and Verified Order). Note that Customer Order is the input data flow into the process and Acknowledgment and Verified Order are the data flows out of the process. A Verified Order is stored in the data store Customer Order File.

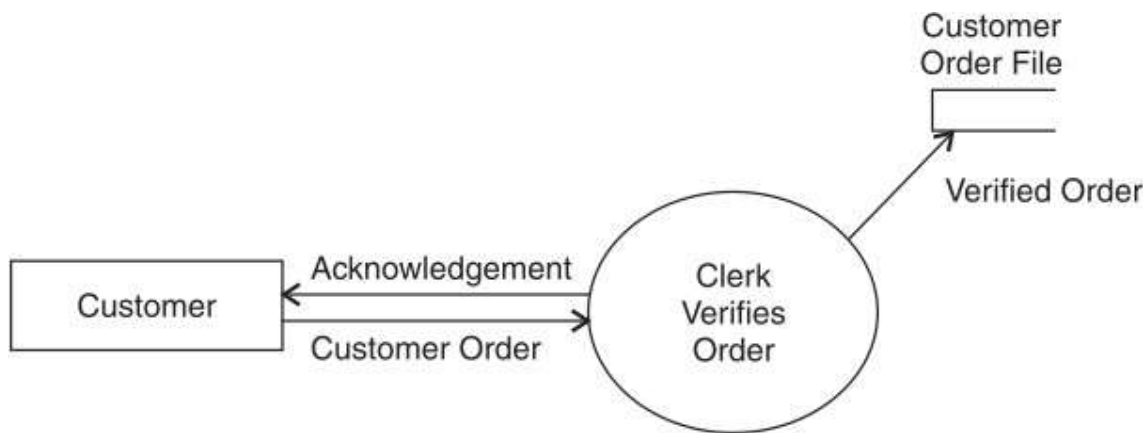


Fig. 6.5. DFD for customer order receipt

DFDs are useful tools for database designers, system programmers and analysts, end-users, and other members of the team. DFDs are easier to understand than text. The DFDs express different levels of abstraction in a system. DFDs are divided into three levels: Level-0, Level-1, and Level-2. These level diagrams present information depending on the scope. That is Level-0 DFDs cover the overview of the entire project, Level-1 DFDs describe some of the sub-systems or sub-processes and the



data flow. The Level-2 DFDs go deeper and break the subsystems in a more detailed manner.

6.4 Multiple Choice Questions (MCQ)

1. A decision table is a:
 - a) a truth tables
 - b) a table which facilitates taking decisions
 - c) a table listing conditions and actions to be taken based on the testing of conditions
 - d) a table in a Decision Support System
2. A decision table is preferable when the number of
 - a) conditions to be checked in a procedure is small
 - b) conditions to be checked in a procedure is large
 - c) actions to be carried out are large
 - d) actions to be carried out are small
3. Decision table description of data processing is
 - a) non-procedural specification
 - b) procedural specification
 - c) purely descriptive specification
 - d) very imprecise specification
4. Decision Trees are preferred when
 - a) Too many conditions need to be tested
 - b) Sequencing of testing conditions is important
 - c) When there are many loops to be performed
 - d) When too many actions are to be taken
5. In a DFD external entities are represented by a
 - a) rectangle



- b) ellipse
- c) diamond-shaped box
- d) circle

6. A data flow can

- a) only emanate from an external entity
- b) only terminate in an external entity
- c) may emanate and terminate in an external entity
- d) may either emanate or terminate in an external entity but not both

7. A data store in a DFD represents

- a) a sequential file
- b) a disk store
- c) a repository of data
- d) a random access memory

8. Data flow in a DFD must have

- a) an arrow showing the direction of flow of data
- b) a meaningful name
- c) a label such as XYZ
- d) no arrows as they are confusing

9. A context diagram

- a) describes the context of a system
- b) is a DFD that gives an overview of the system
- c) is a detailed description of a system
- d) is not used in drawing a detailed DFD

10. A context diagram is used

- a) as the first step in developing a detailed DFD of a system
- b) in systems analysis of very complex systems



- c) as an aid to system design
- d) as an aid to programmers

6.5 Review Questions

1. Differentiate between Decision Tree and Decision Table.
2. What is DFD? Design various levels of DFD for Admission System in GEU.

6.6 MCQ solution keys

1.c	2.b	3.a	4.b	5.a	6.c	7.c	8.a	9.b	10.z
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