Tools of Structured Analysis

Chapter 6

Structured Analysis

- It is a set of techniques and graphical tools that allow the analyst to develop a new kind of system that is understandable to the user

Why do we use these tools?

- Use graphics whenever possible to help communicate better with the user.

- Differentiate between logical and physical system

- Build a logical system model to familiarize the user with system characteristics and interrelationships before implementation

Data Flow Diagram

- It was first developed by Larry Constantine as a way of expressing system requirements in a graphical form.

- It is also known as Bubble Chart

DFD Symbols

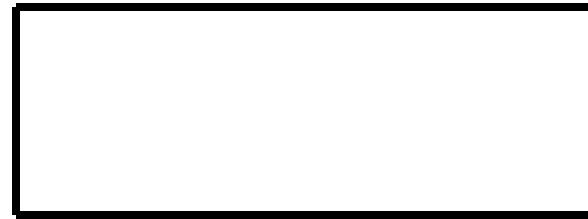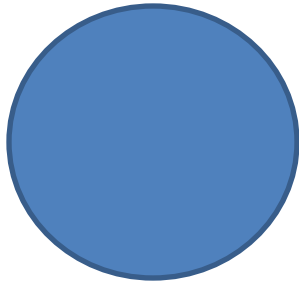- **Square** defines a source or destination of data.

- **Arrow** identifies data flow, means the data in motion. It is a pipeline through which information flows.

Continued…

- **Circle or a bubble** represents a process that transforms incoming data flow into outgoing data

- **Open rectangle** is a data store, or data at rest, or a temporary repository of data

Constructing a DFD

- Processes should be named and numbered for easy reference

- The direction of flow is from top to bottom and from left to right

- Data flow from the source to destination, although they may flow back to a source

- When a process is exploded into lower level details, they are numbered

- The names of data stores, sources, and destinations are written in capital letters. Process and data flow names have the first letter of each word capitalized

Data Dictionary

- A structured place to keep details of the contents of data flows, processes, and data store.

- It is a structured repository of data about data.

- It is a set of definitions of all DFD elements

Advantages of Data Dictionary

- Documentation- it is a valuable reference in any organization.

- It improves analyst/user communication by establishing consistent definitions of various elements, terms and procedures

- It is important step in building a database

Items to be defined in Data Dictionary

- Data Elements- smallest unit of data that provides for no further decomposition.
  For example: date consists of day, month and year

- Data Structure- a group of data elements handled as a unit.
  For example: phone is a data structure consisting of four data elements: area-code-exchange-number-extension.

- Data Flows and Data Stores- data flows are data structures in motion, whereas data stores are data structures at rest. A data store is a location where data structures are temporarily located.

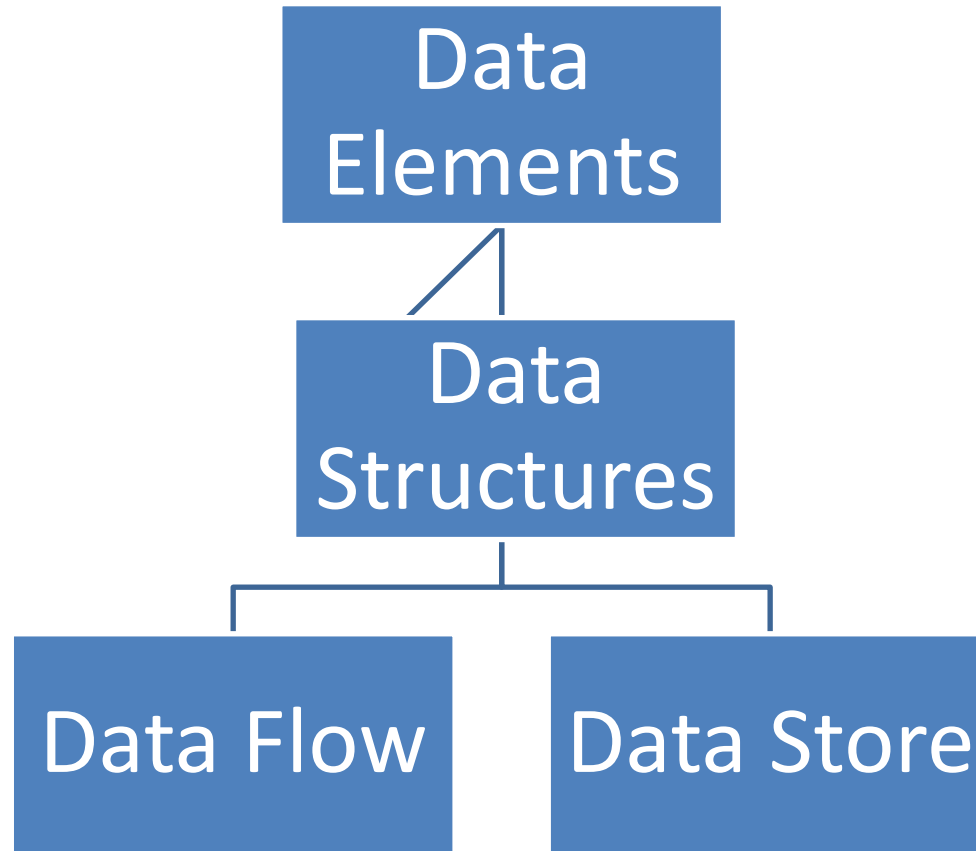# Data Dictionary

Smallest Unit of Data

Data Elements

Group of Data Elements

Data Structures

Groups of Data Structures

Data Flow

Data Store

Data Elements

- For e.g.

Author Name:

                         First

                         Middle

                         Last

                         Alias

The Description of Data Element should include:

1. Name
2. Description &
3. An Alias (Synonym)

Data Elements

- Whether or not Data Element has the following:
  - A Different Name:
    - For e.g. A Purchase Order may exist as Pur. Order, Purchase Ord., or P.O. We will record all these in Data Dictionary under Definition of Purchase Order.
  - Usage Characteristics
    - Range of Values or Frequency of use or both.
    - 2 types:
      - Value within Range: For e.g. Payroll between 1000 and 10000 = Continuous Value.
      - Specific Value: For e.g. Depts. In a Firm coded 100 (Accounting), 110 (HR), 111 (Operations) etc.

Data Elements

- Control Information
  - Such as Source, Date of Origin, Users, or Access Authorization.

    For e.g. Looking for Properties of Word Doc.

- Physical Location
  - In terms of Record of File or Database.

    For e.g. Where Storage is done C Drive, D Drive, CD ROM etc.

Data Structures

- It is the Group of Elements .

  For e.g.

  Data Structures: Book Details

  Data Elements: Author Name (M)

                          Title of the Book (M)

                          ISBN (Optional)

                          Publisher Name (M)

                          Quantity Ordered (M)

  Some Element are Mandatory whereas others are Optional

Data Flows and Data Stores

- Data Flows = Data Structures in Motion
- Data Stores = Data Structures at Rest

For e.g.

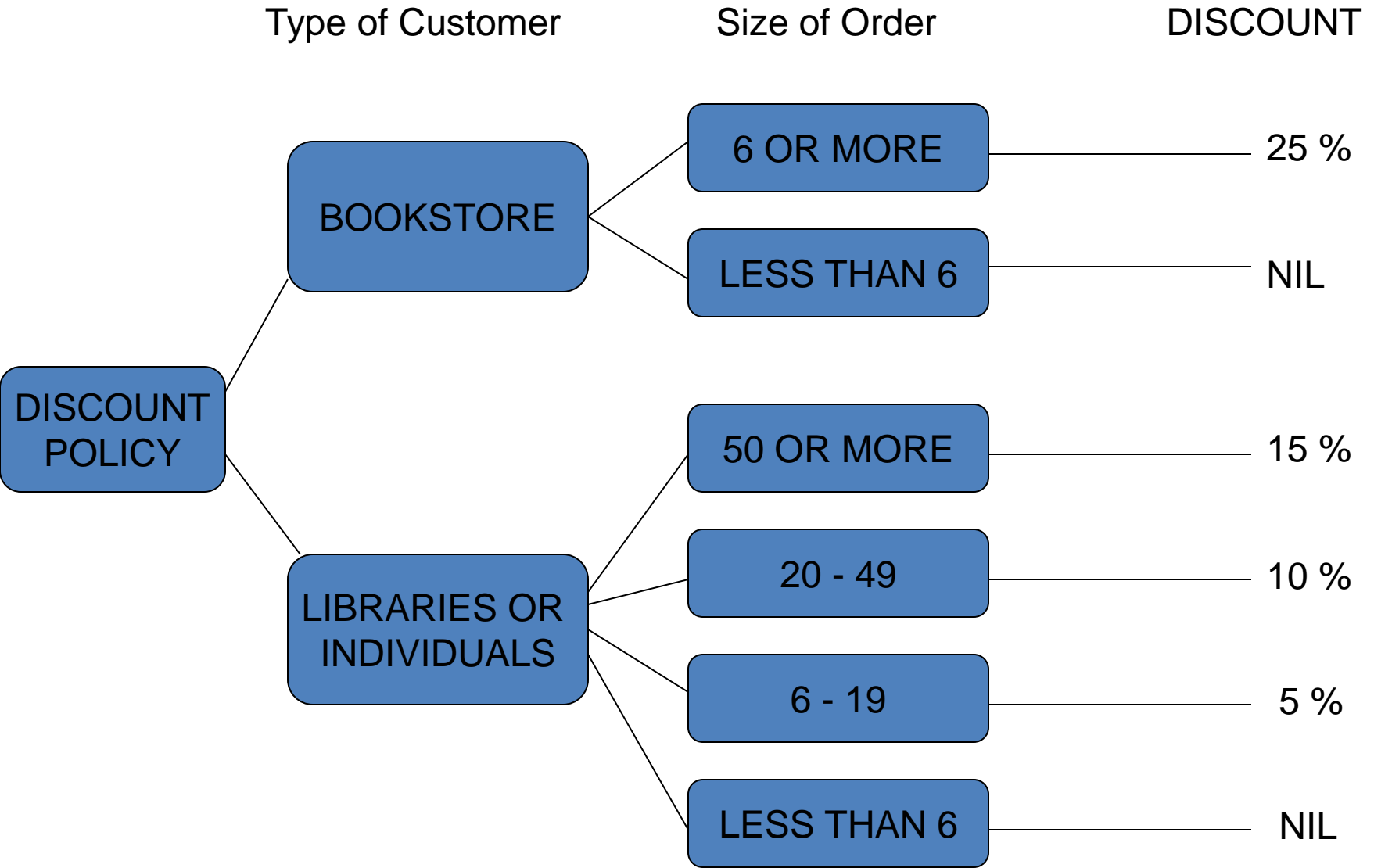| Data Flow/Store	Comments
Book Details	From ABC Book Store
Edition	4th
Quantity	10 Copies
Customer Details	

Decision Tree

- Once the data elements are defined in the data dictionary, we begin to focus on the processes.

- **For example:**

  Bookstores get a trade discount of 25%; for orders from libraries and individuals, 5% allowed on orders of 6-19 copies per book title; 10% on orders for 20-49 copies per book title; 15% on orders for 50 copies or more per book title

Type of Customer   Size of Order   DISCOUNT

DISCOUNT POLICY

BOOKSTORE
- 6 OR MORE — 25 %
- LESS THAN 6 — NIL

LIBRARIES OR INDIVIDUALS
- 50 OR MORE — 15 %
- 20 - 49 — 10 %
- 6 - 19 — 5 %
- LESS THAN 6 — NIL

Structured English

- Structures English is like structured programming, it uses logical construction and sentences designed to carry out instructions

- Designs are made through IF, THEN, ELSE, and SO statements

An Example

IF order is from Bookstore

    and-IF order is for 6 copies or more per book title

        THEN: Discount is 25%

ELSE (order is for fewer than 6 copies per book title)

    SO: no discount is allowed

ELSE (order is from libraries or individuals)

Continued…

ELSE (order is from libraries or individuals)

   SO-IF order is for 50 copies or more per book title

      Discount is 15%

ELSE IF order is for 20 to 49 copies per book title

       Discount is 10%

ELSE IF order is for 6 to 19 copies per book title

       Discount is 5%

ELSE (order is for less than 6 copies per book order)

SO: no discount is allowed

Decision Tables

- It is a table of possibilities foe defining a problem and the actions to be taken

- It is a single representation of the relationships between conditions and actions

- It consists of two parts: stub and entry

- The stub part is divided into an upper quadrant called the condition stub and a lower quadrant called the action stub

- The entry part is also divided into an upper quadrant, called the condition entry and a lower quadrant called the action entry

Condition Stub		Condition Entry					
		1	**2**	**3**	**4**	**5**	**6**
	Customer is Bookstore	Y	Y	N	N	N	N
IF	Order size 6 copies or more ?	Y	N	N	N	N	N
(Condition)	Customer Librarian or Individual			Y	Y	Y	Y
	Order-size 50 copies or more ?			Y	N	N	N
	Order-size 20-49 copies ?				Y	N	N
	Order-size 6-19 copies ?					Y	N
Then	Allow 25% Discount	X					
(action)	Allow 15% Discount			X			
	Allow 10% Discount				X		
	Allow 5% Discount					X	
	No Discount allowed		X				X
Action Stub		**Action Entry**					