Lecture
Structured Analysis and Data Dictionary

Structured analysis is a development method that allows the analyst to understand the system and its activities in a logical way.

"System analysts transform user requests or requirements into technical design specifications and act as a liaison between clients/IT professionals and technology vendors."

Structured analysis is a systematic approach, which use graphical tools that analyze and refine the objectives of an existing system and develop a new system specification which can be easily understandable by the user.
It has following attributes:

- It is logical rather than physical i.e. the elements of system do not depend on vendor or hardware.
- It divides the processes so that it gives a clear picture of system flow.
- It is an approach that works form high level overviews to lower-level details.

During structured analysis, various tools and techniques are used for system development. They are:

- Data Flow Diagrams
- Data Dictionary
- Decision Trees
- Decision Tables

Data Flow Diagrams (DFD) or Bubble Chart:
A DFD is a graphical tool that describes the flow of data through a system and the functions performed by the system.
This technique was developed by Larry Constantine to express the requirements of system in a graphical form.
DFD is also called a bubble chart or process model or information flow model.
It shows the processes that receive input, perform a series of transformations and produce the desired outcomes.
A DFD has four different symbols:

- **Process:** A process is represented by a circle and it denotes transformations of the input data to produce the output data.
- **Data Flow:** represent the movement of data i.e. leaving one process and entering into another process. Data flows are represented by arrows, connecting one data transformation to another.

- **Data Store:** Data store is the data at rest. It is represented by parallel lines.
- **Actor:** It is the external entity that represents the source or sink (destination of data). It is represented by rectangle.

Fig: **DFD for ATM Withdrawal**
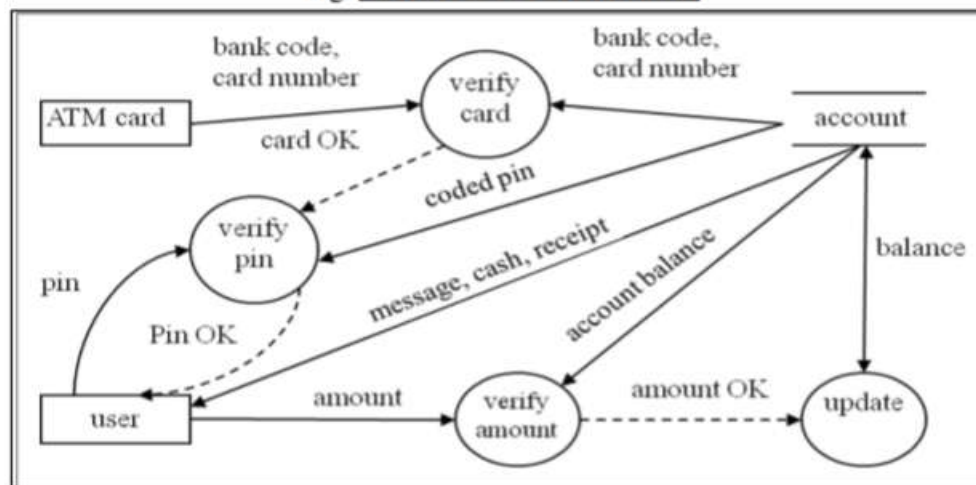
The construction of the DFD starts with the high-level functionality of the system, which incorporates external inputs and outputs. This abstract DFD is further decomposed into smaller functions with the same input and outputs. The decomposed DFD is the elaborated and nested DFD with more concrete functionalities.

Decomposition of DFD at various levels to design a nested DFD is called leveling of DFD. Data Flow Diagrams at each level are numbered for reference purposes like level 0, level 1, etc.

Data Dictionary:

A data dictionary is a structured repository of data elements in the system. It stores the descriptions of all DFD data elements i.e. details and definitions of data flows, data stores, data stored in data stores and the processes.

A data dictionary improves the communication between the analyst and the user. It plays an important role in building a database.

Data dictionary is the major component in the structured analysis model of the system. It is file or a set of files that includes a database's metadata (i.e. hold records about other objects in the database), like data ownership, relationships of the data to another object and some other data.

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.

The data dictionary contains the following information as follows:
- Name of the item:
- Aliases: it represents another name.
- Description: description of what actual text is about.
- Related data items: relationship with other data items.
- Range of values: represent all possible answers.

e.g. consider a data element "Purchase Order": for this in data dictionary we will record in data dictionary like a purchase order may exist as Pur. Order, Purchase Ord. or P.O.