

CASE STUDY

Library System



Library System

Library supports

- Lending
- Cataloging
- Registration of Members and Books
- Reservation
- Inquiries
- Correspondence



All activities are done manually

Library System

To Analyze and Design a Library System

- What are the Documents in the system?



- Study the physical movements of documents



Library System

- Documents in the system
 - Application form
 - Student Id
 - Membership card
 - Reminders
 - Borrowing slips etc.
 - Reservation ready notice



Library System

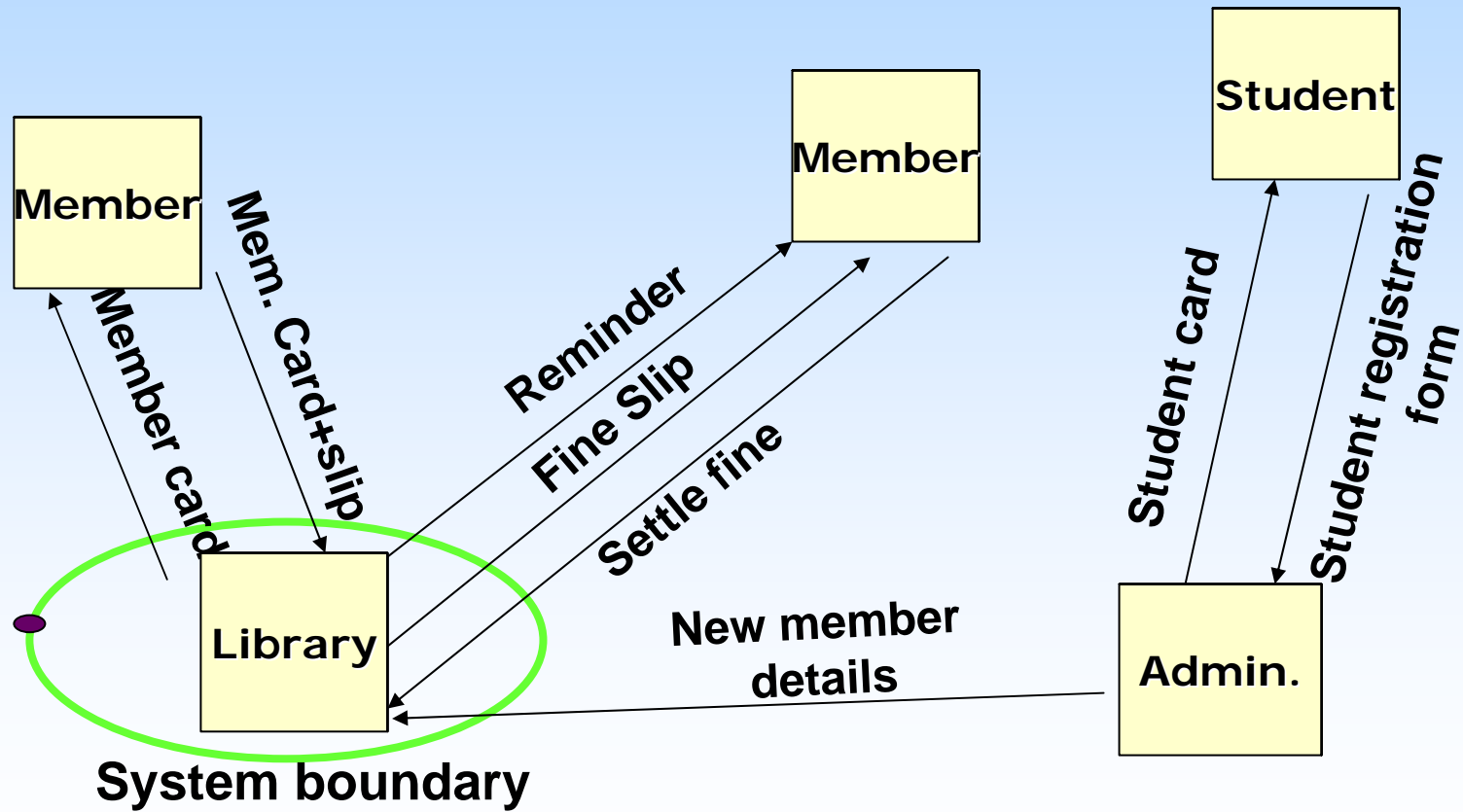
- Identify the physical movements of documents.
 - **Document Flow Diagram**
 - Modeling method or technique used to illustrate movements of documents.



Converting Document Flow Diagrams to DFDs

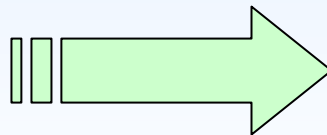
- What process generates this document flow?
- What process receives this document ?
- Is the document stored by a process?
- Where is the document stored?
- Is the document created from stored data?

Document Flow Diagrams for the Library System

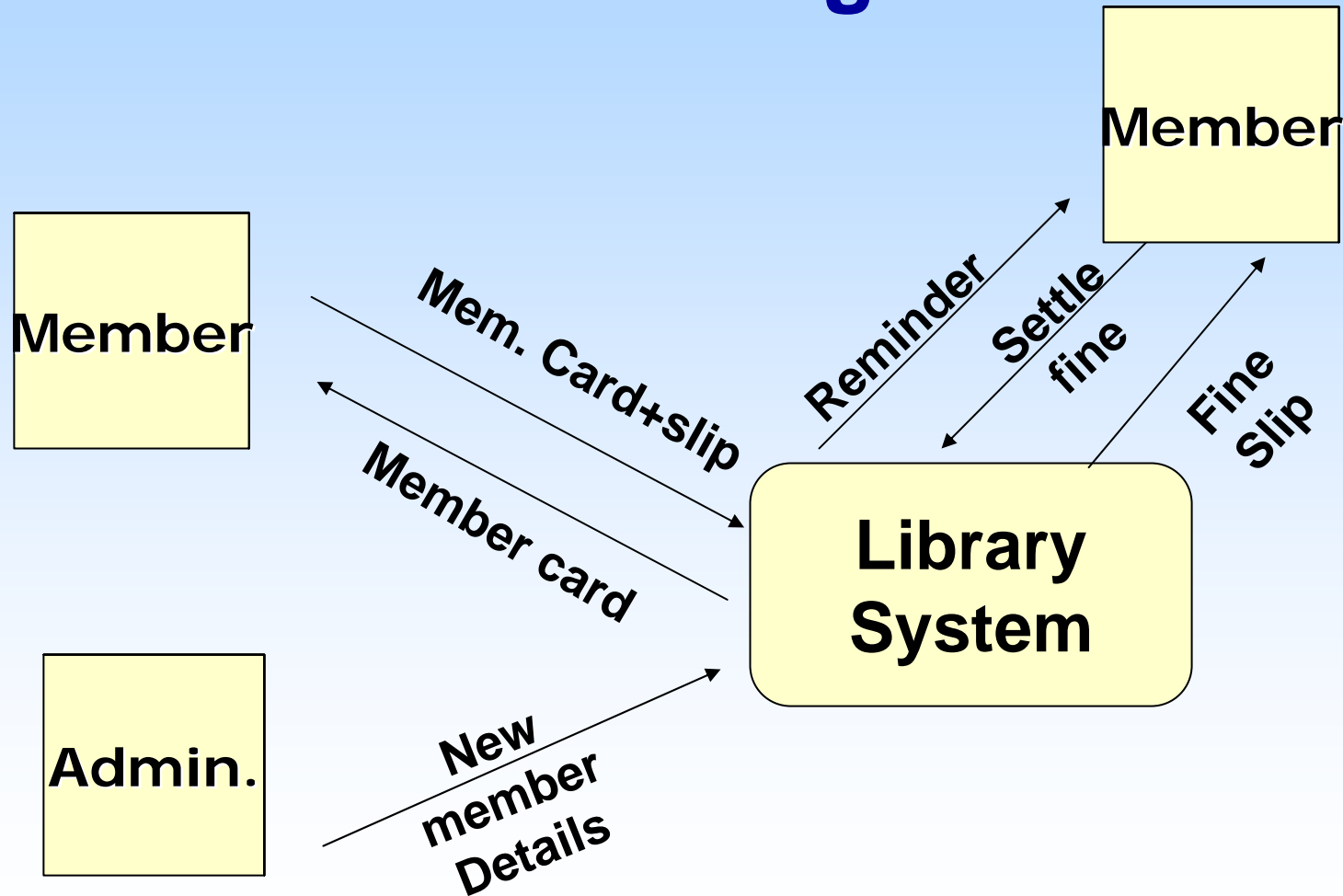


Data Flow Diagrams (DFDs)

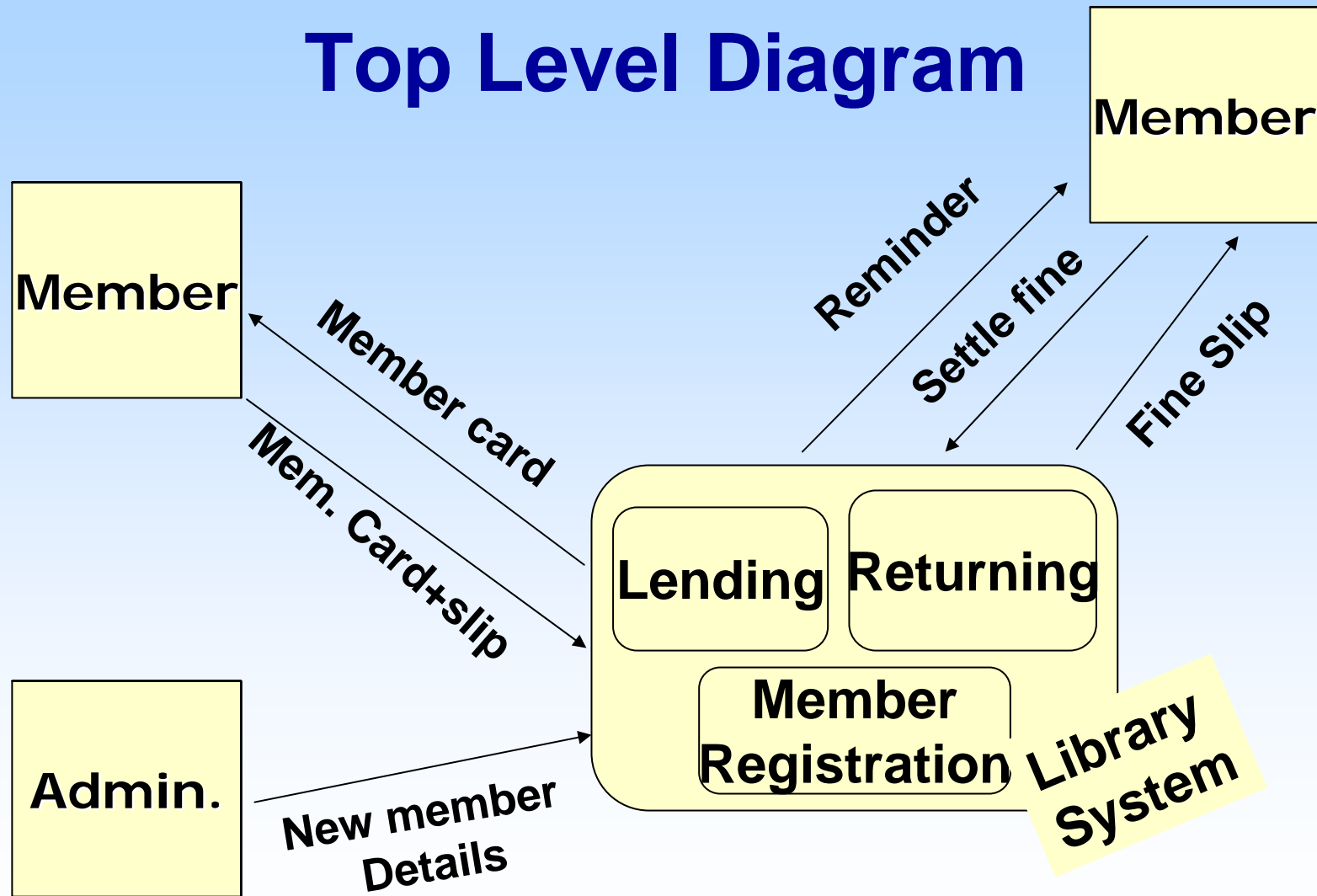
- DFDs handle transformation from physical document to logical data
- Advances in technology mean that electronic means are increasingly supplementing the paper based documents.



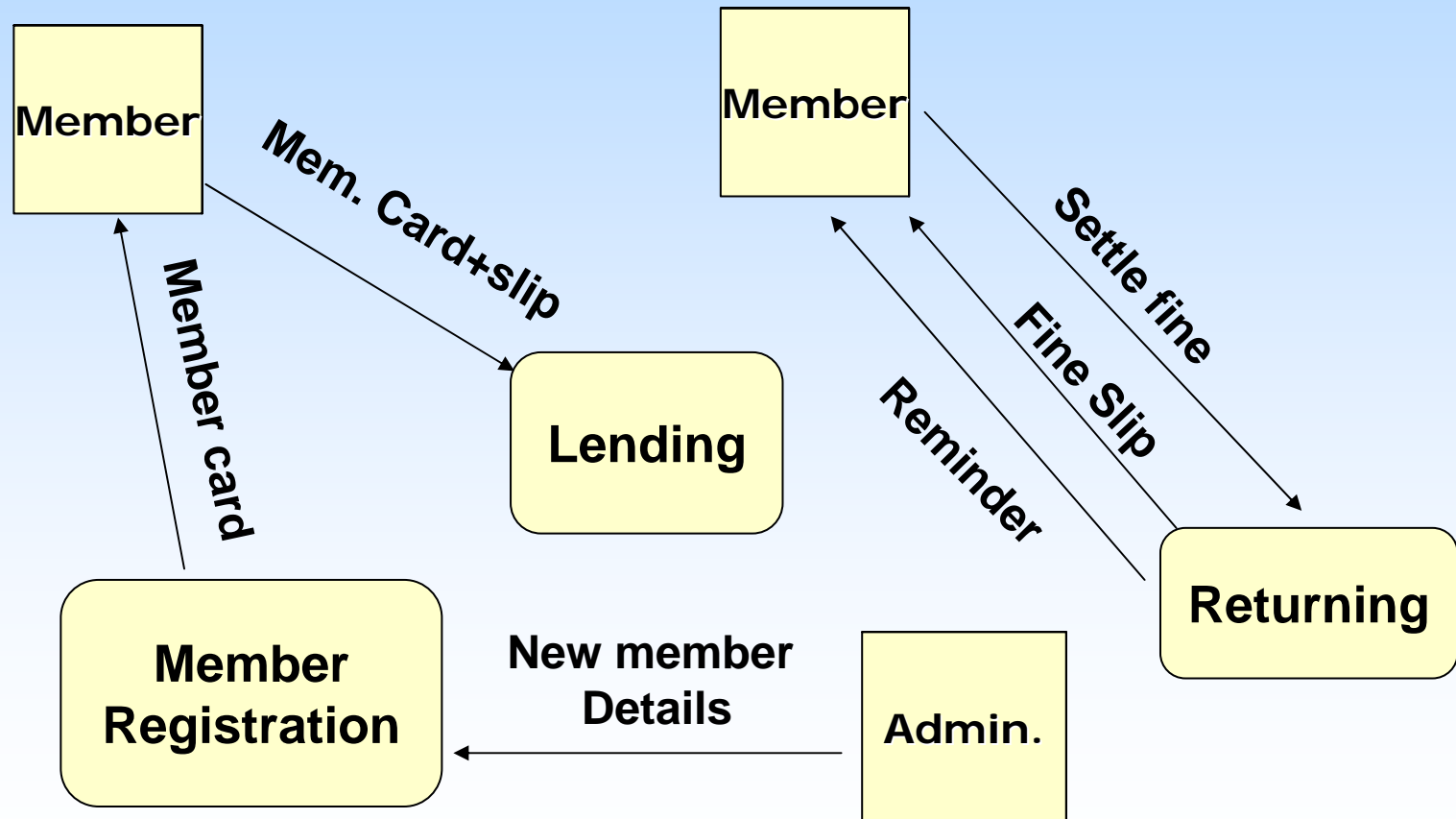
Context Diagram



Top Level Diagram



Top Level Diagram



Data Stores



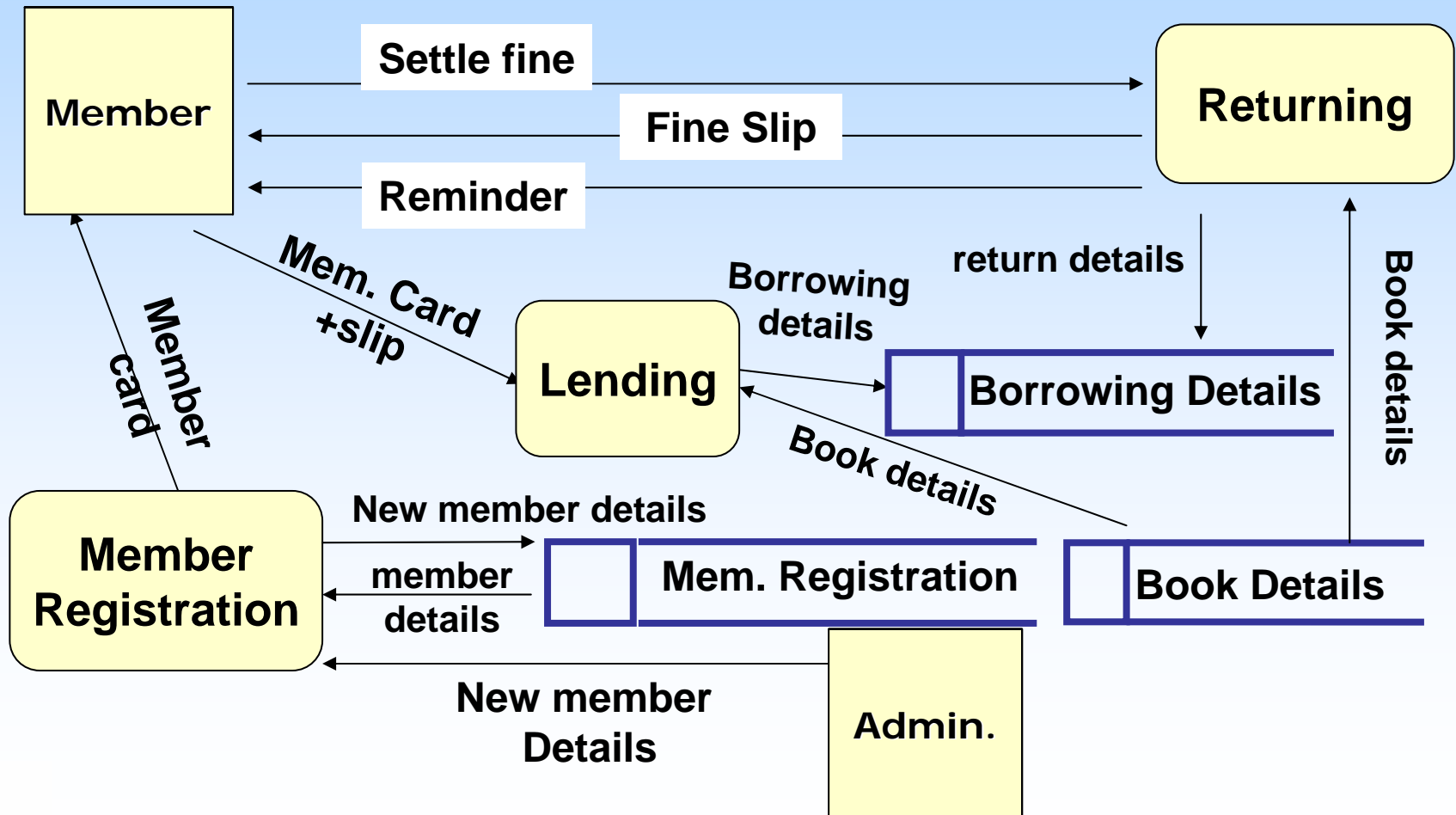
☐ **Mem. Registration**

☐ **Borrowing Details**

☐ **Book Details**

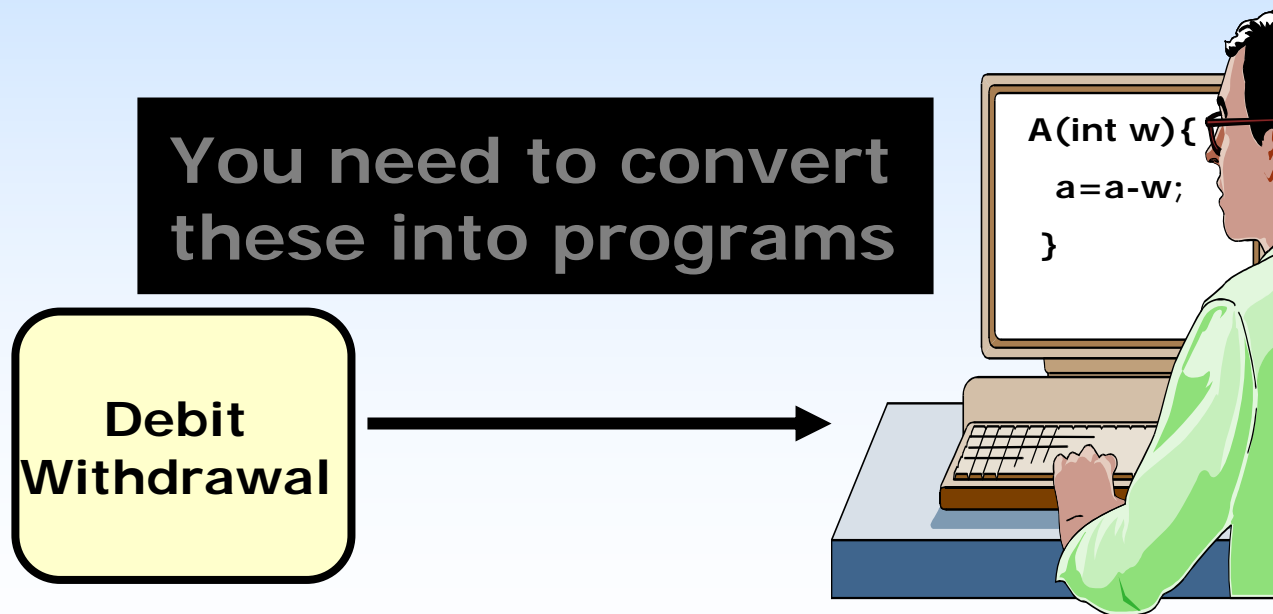


Top Level Diagram



Documenting Elements in DFD

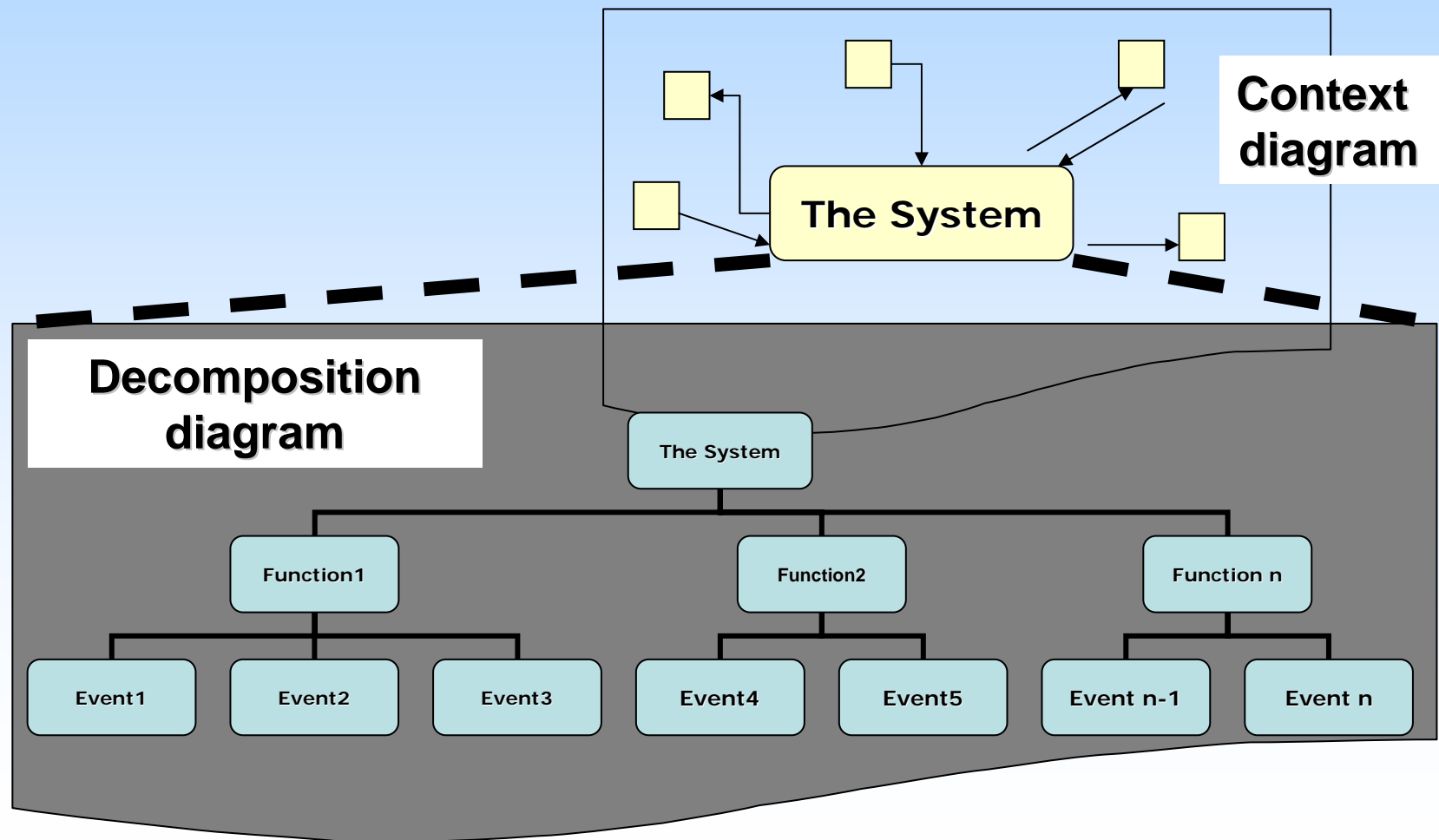
- Element name is not enough.
- More important for processes



The Functional Decomposition Diagram

- Shows the top-down functional decomposition / the structure of the system
- Break the system into its component subsystems , processes and sub processes
- Top level function is then decomposed to its component functions
- Provides an outline for drawing the data flow diagrams

The Functional Decomposition Diagram

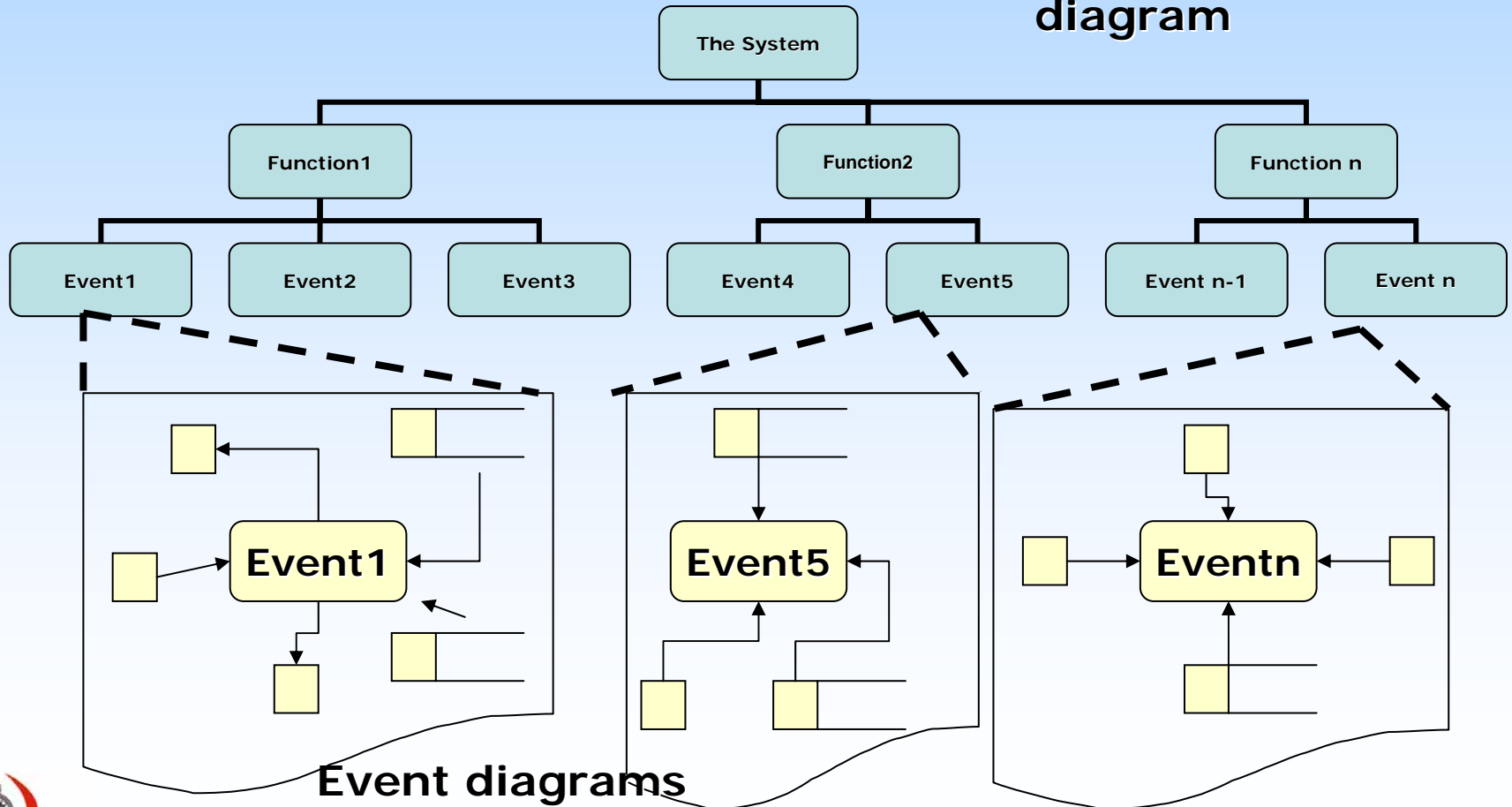


Event Diagram

- A data flow diagram that depicts the context for a single event
- Shows the inputs, outputs, and data store interactions for the event.
- Users are not overwhelmed by the overall size of the system
- A powerful communication tool between users and technical professionals

Event Diagram

Decomposition diagram



Event Diagram

- For each event, illustrate the following
 - **The inputs and their sources**
 - Sources are shown as external agents
 - The data structure for each input should be recorded in the repository
 - **The outputs and their destination**
 - Destinations are depicted as external agents
 - The data structure for each output should be recorded in the repository
 - **Any data stores from which records must be read**
 - **Any data stores from which records must be created, deleted, or updated**

Process Descriptions

- **Structured English**
- **Decision Table**
- **Decision Tree**



Eg. A Process that has to determine whether a customer is to be given credit

Structured English

- A language and syntax, based on the relative strengths of structured programming and natural English, for specifying the underlying logic of elementary processes on process models.

Structured English

IF credit limit exceeded

THEN

IF Customer has bad payment history

THEN refuse credit

ELSE

IF purchase above Rs.10000/=

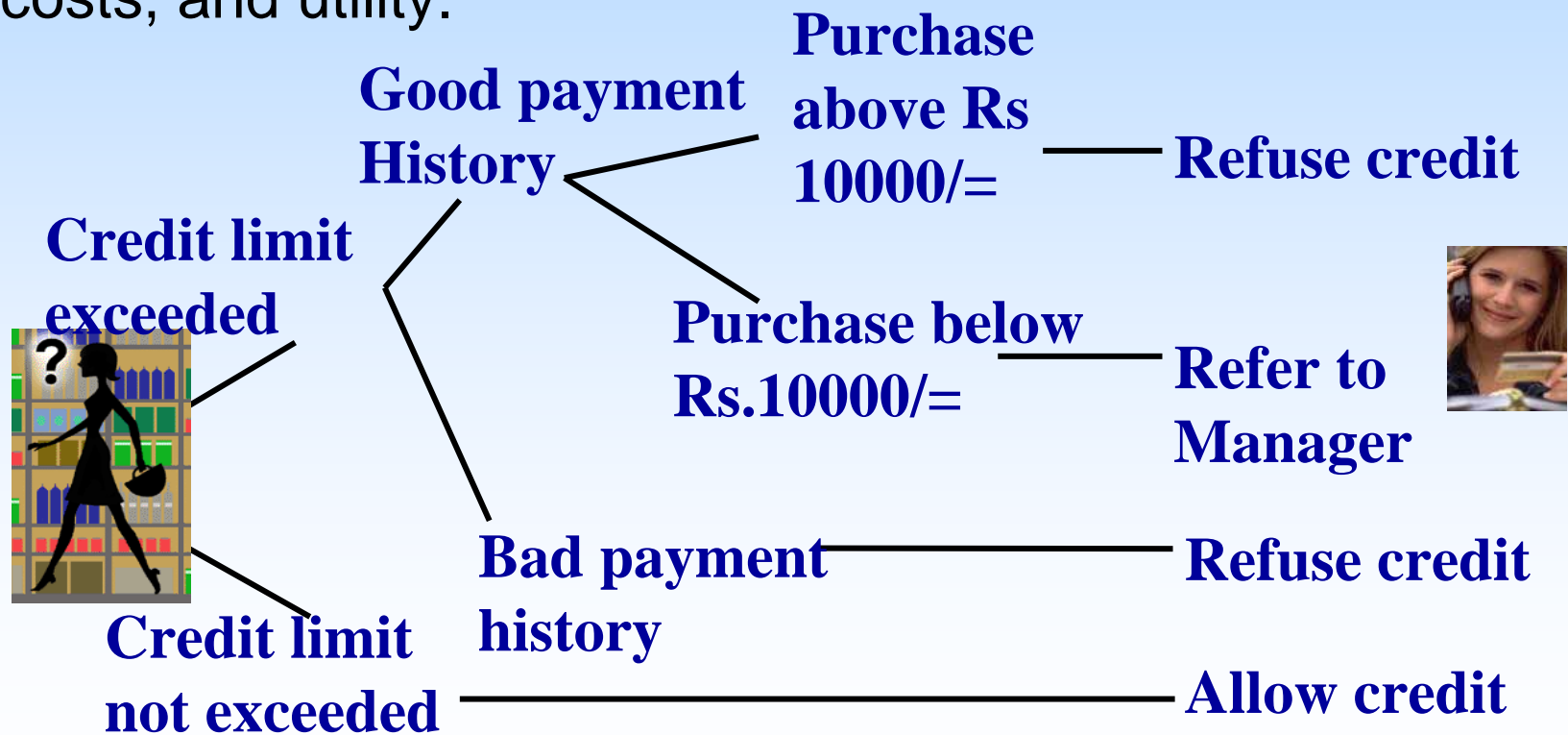
THEN refuse credit

ELSE refer to manager

ELSE allow credit

Decision Tree

A graph or model of decisions and their possible consequences, including chance event outcomes, resource costs, and utility.



Decision Table

- A tabular form of representation that specifies a set of conditions and their corresponding actions
- Very useful for specifying complex policies and decision making rules

Decision Table

Y-TRUE
N-NOT TRUE
X-TAKE ACTION

Condition	Credit limit exceeded	Y	Y	Y	Y	N	N	N	N
	Good payment history	Y	Y	N	N	Y	Y	N	N
	Purchase above Rs.10000/=	Y	N	Y	N	Y	N	Y	N
Action	Allow Credit					X	X	X	X
	Refuse	X		X	X				
	Refer Manager		X						