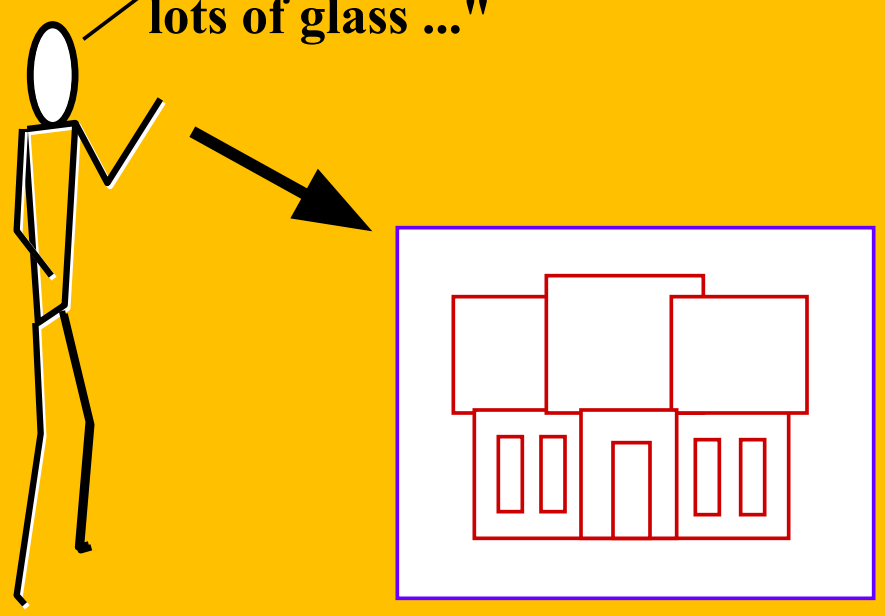
Mapping Requirements into a Software Architecture

An Architectural Design Method

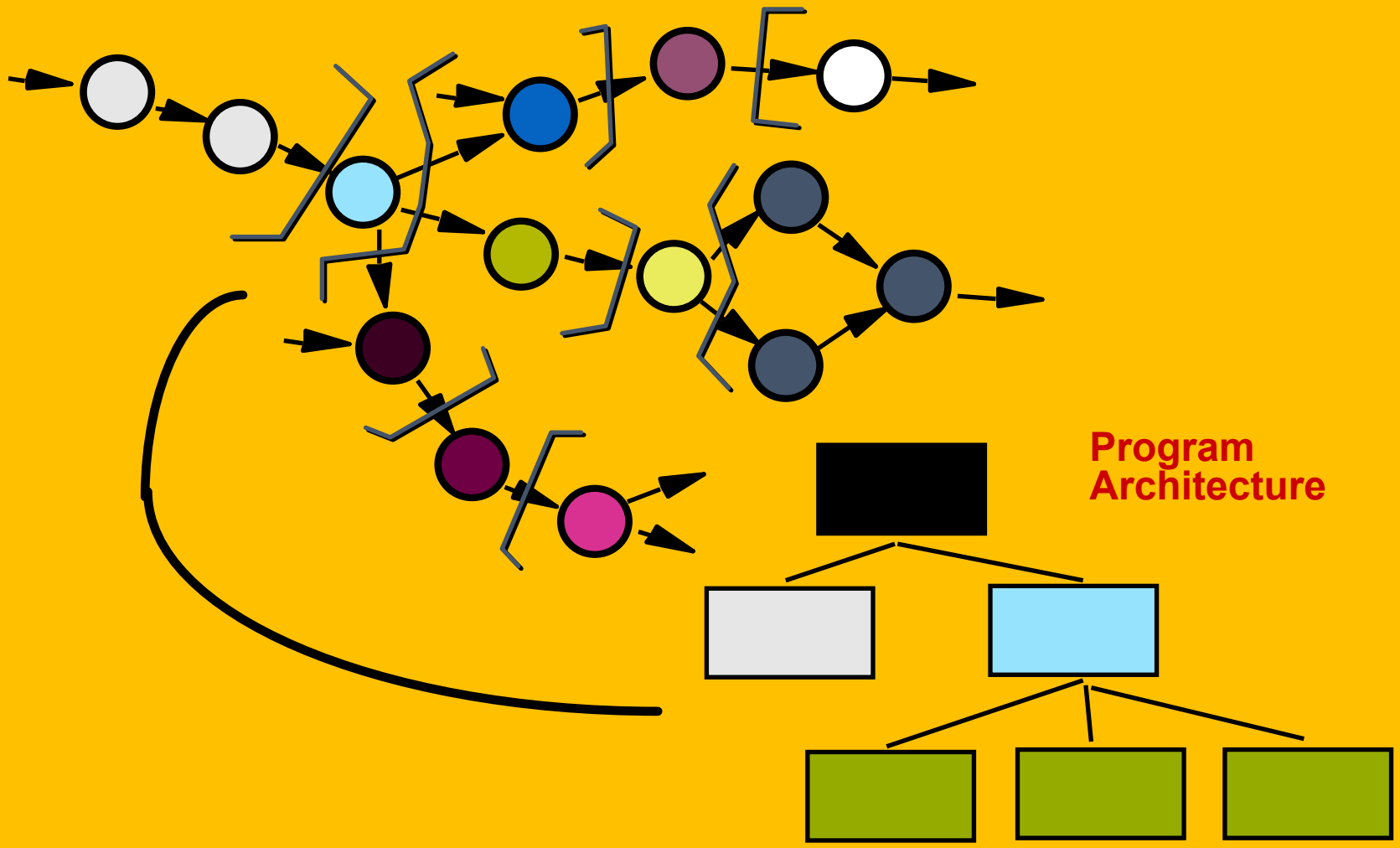
Customer Requirements

"four bedrooms, lounge, drawing & dinning,
lots of glass ..."



Architectural Design

Deriving Program Architecture



Structured Design

- **objective:** develop a modular program structure and represent control relationships between modules
- **approach:**
  - the DFD is mapped into a program architecture
  - the PSPEC and STD are used to indicate the content of each module
- **notation:** structure chart

Structured Design

It provides a convenient transition from a data flow diagram to software Architecture

1. **The type of information flow is established**
2. **Flow boundaries are indicated**
3. **The DFD is mapped into program structure**
4. **Control hierarchy is defined**
5. **Resultant structure is refined using design measures and heuristics**
6. **The architectural description is refined and elaborated**

Types of Information Flow

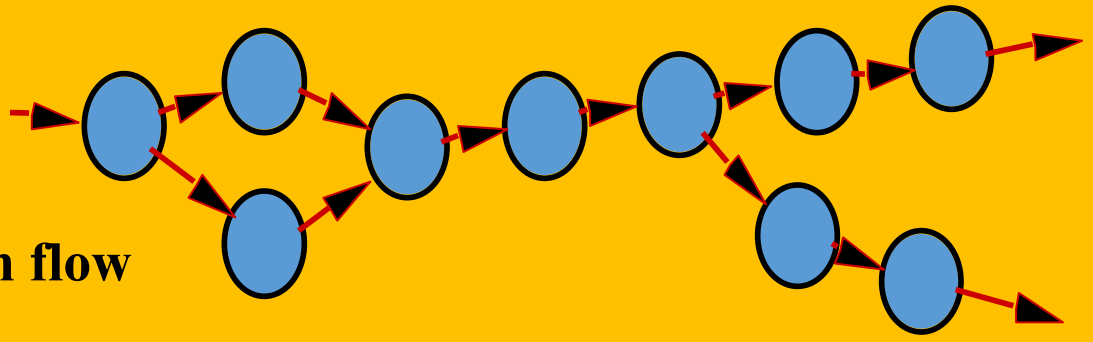
- **There are 2 different types of information flow that have different treatments**

  - ***Transform flow*** **- Overall DF in sequential manner and follows one, or only a few, "straight line" paths. (incoming, transform, output)**

  - ***Transaction Flow*** **- Info flow has a single transaction node that *triggers* other data flow**

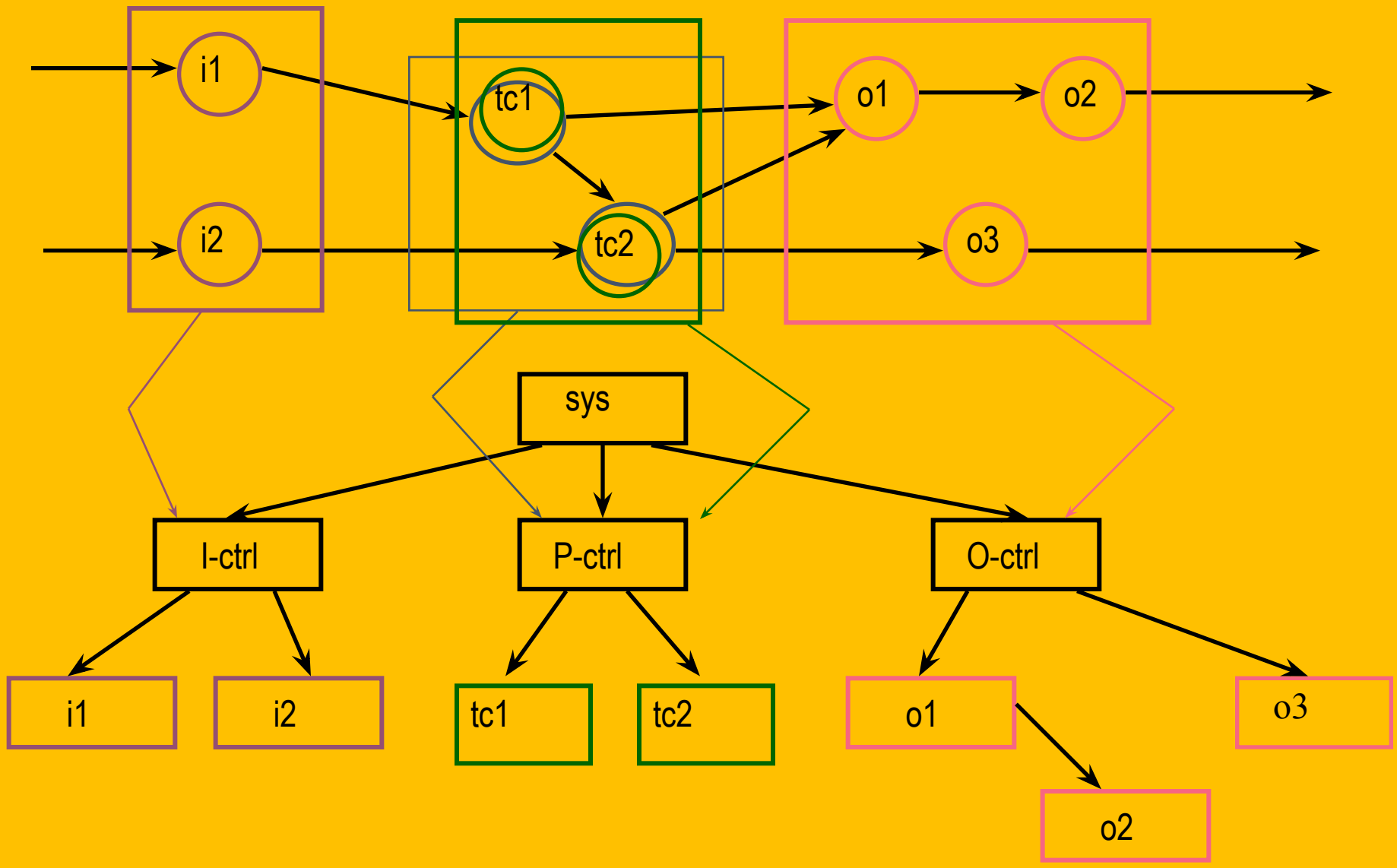
Transform Flow

- ***Incoming Flow:*** The paths that transform the external data into an internal form
- ***Transform Center:*** The incoming data are passed through a transform center and begin to move along paths that lead it out of the software
- ***Outgoing Flow:*** The paths that move the data out of the software



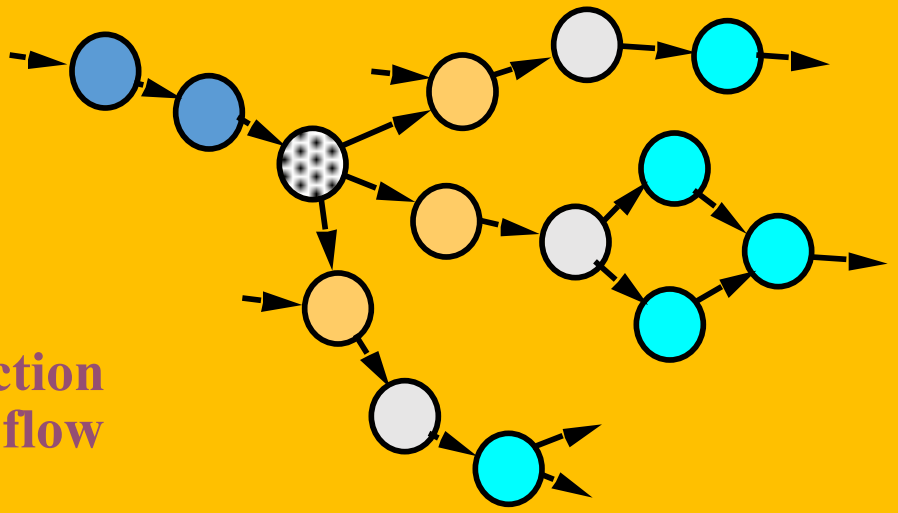
Transform flow

Transform Analysis: mapping heuristic



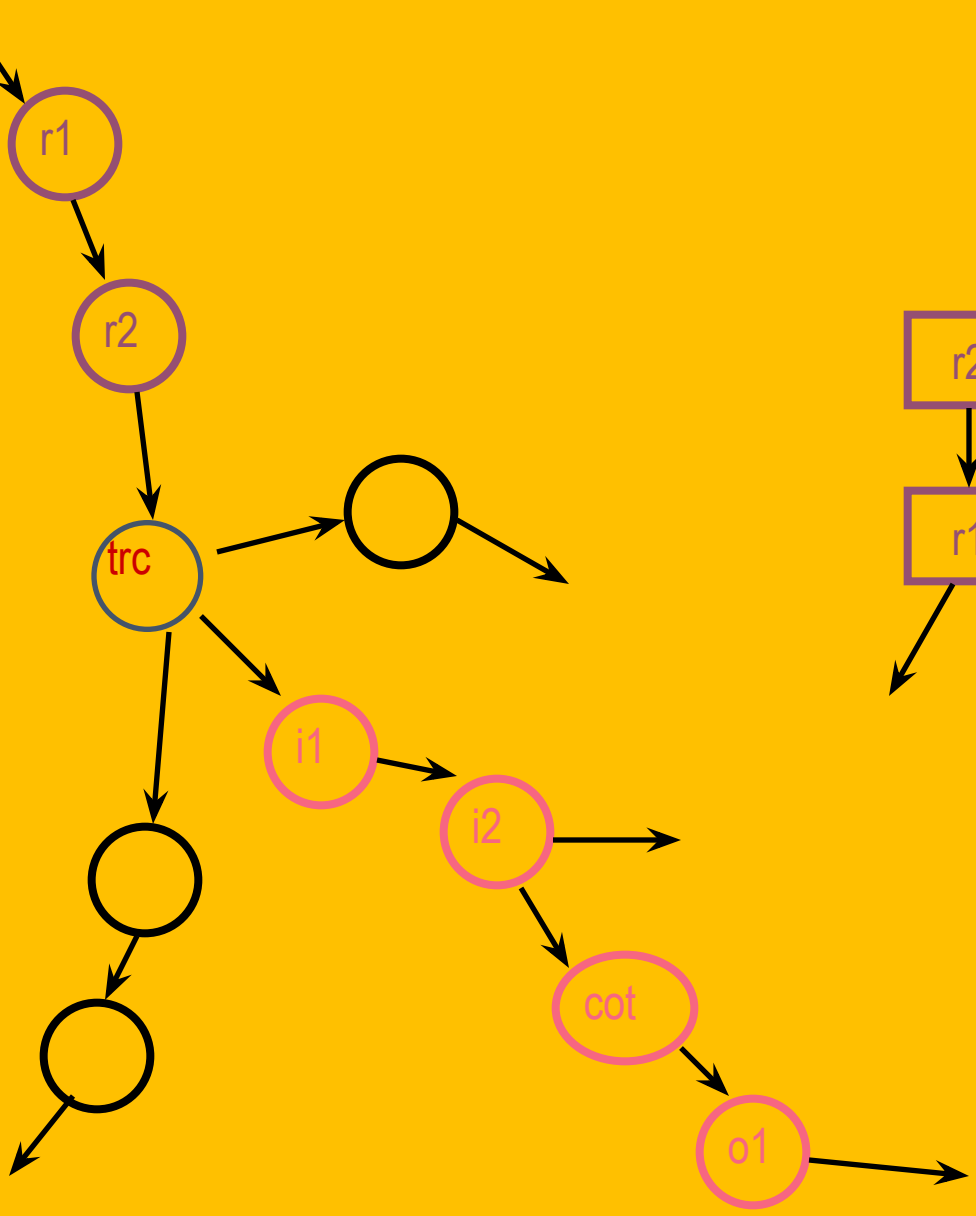
Transaction Flow

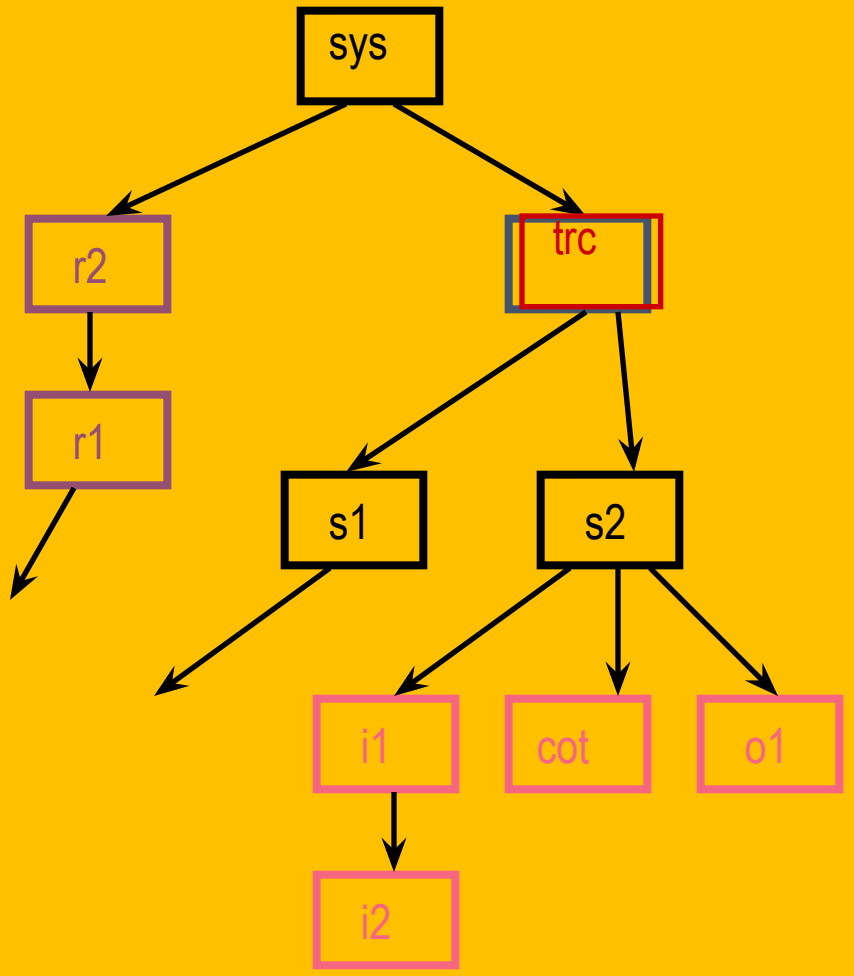
- Information flow is often characterized by a single data item, called a transaction that triggers other data flow along one of many paths
- *Action Paths :* The transaction is evaluated and based on its value flow along one of many action paths
- *Transaction center :* The hub of info flow from which many action paths originate



Transaction flow

Transaction Analysis: mapping heuristic





Transaction Mapping

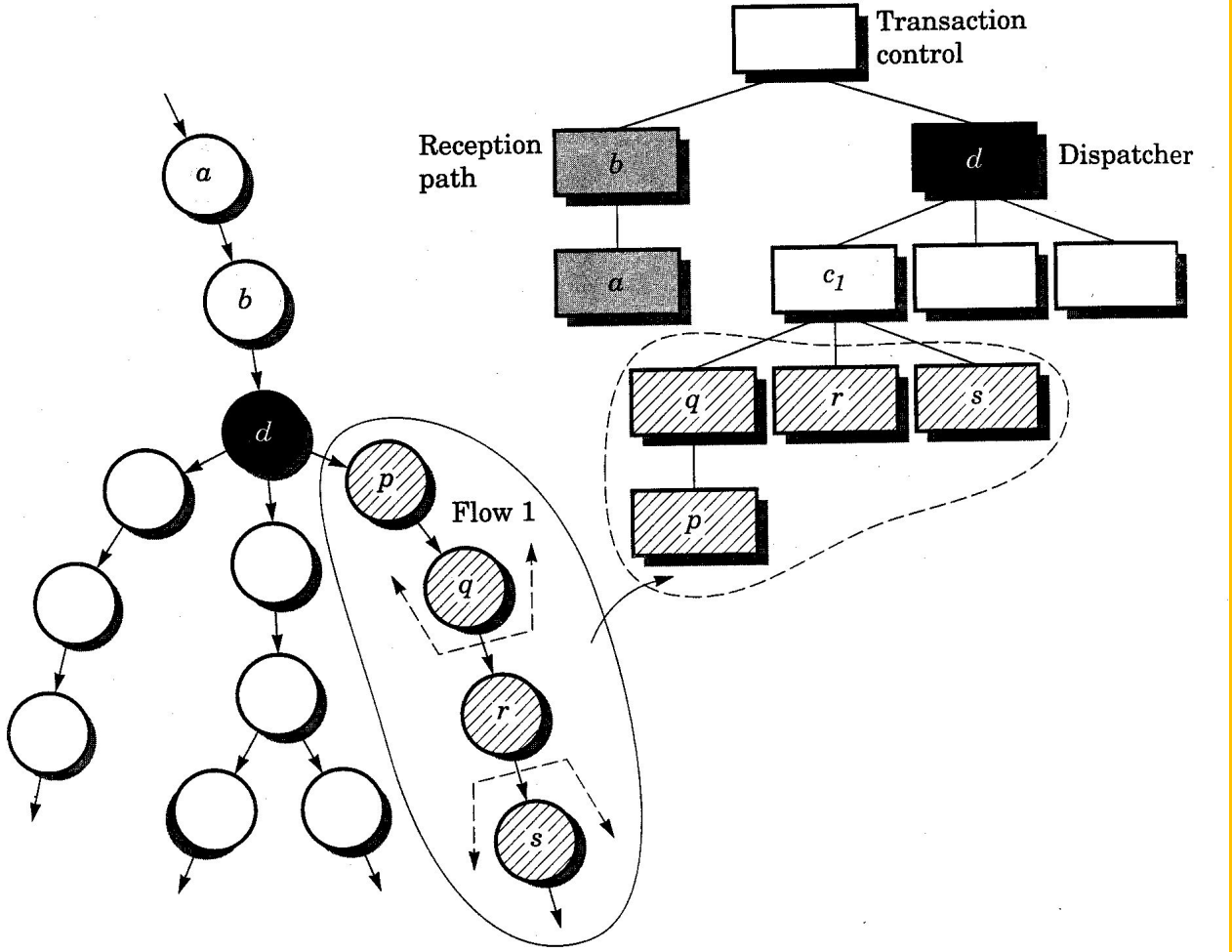
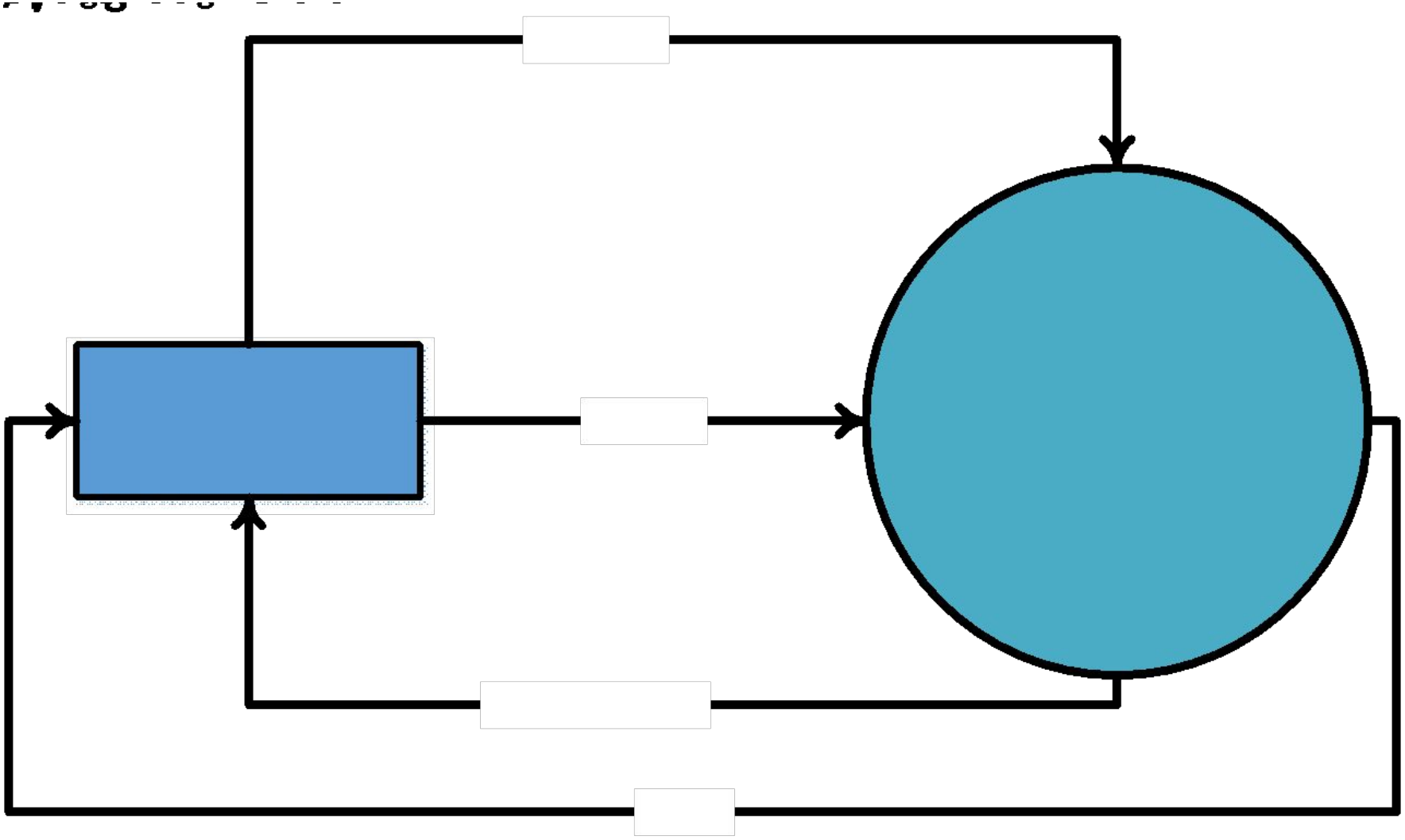
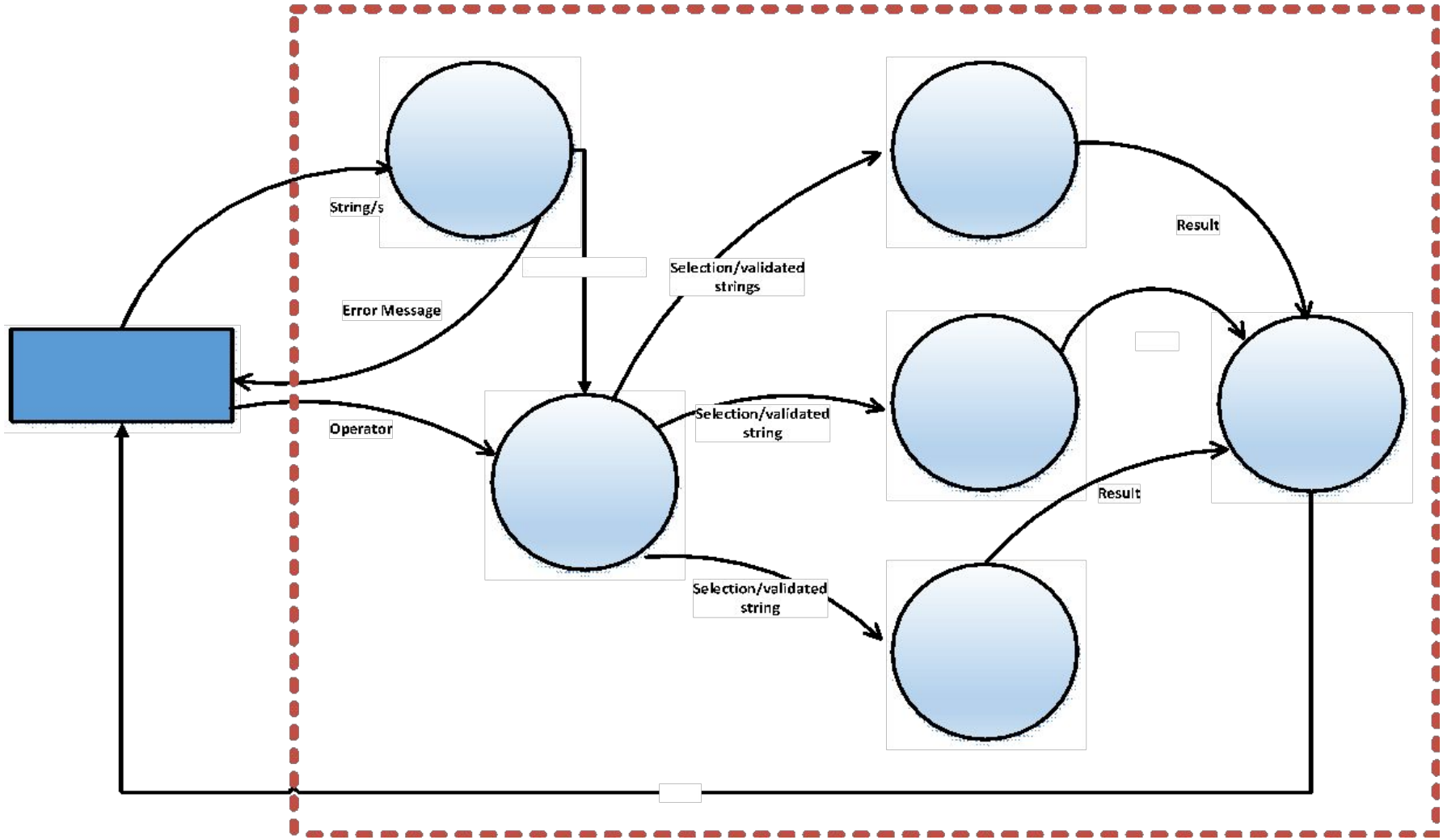
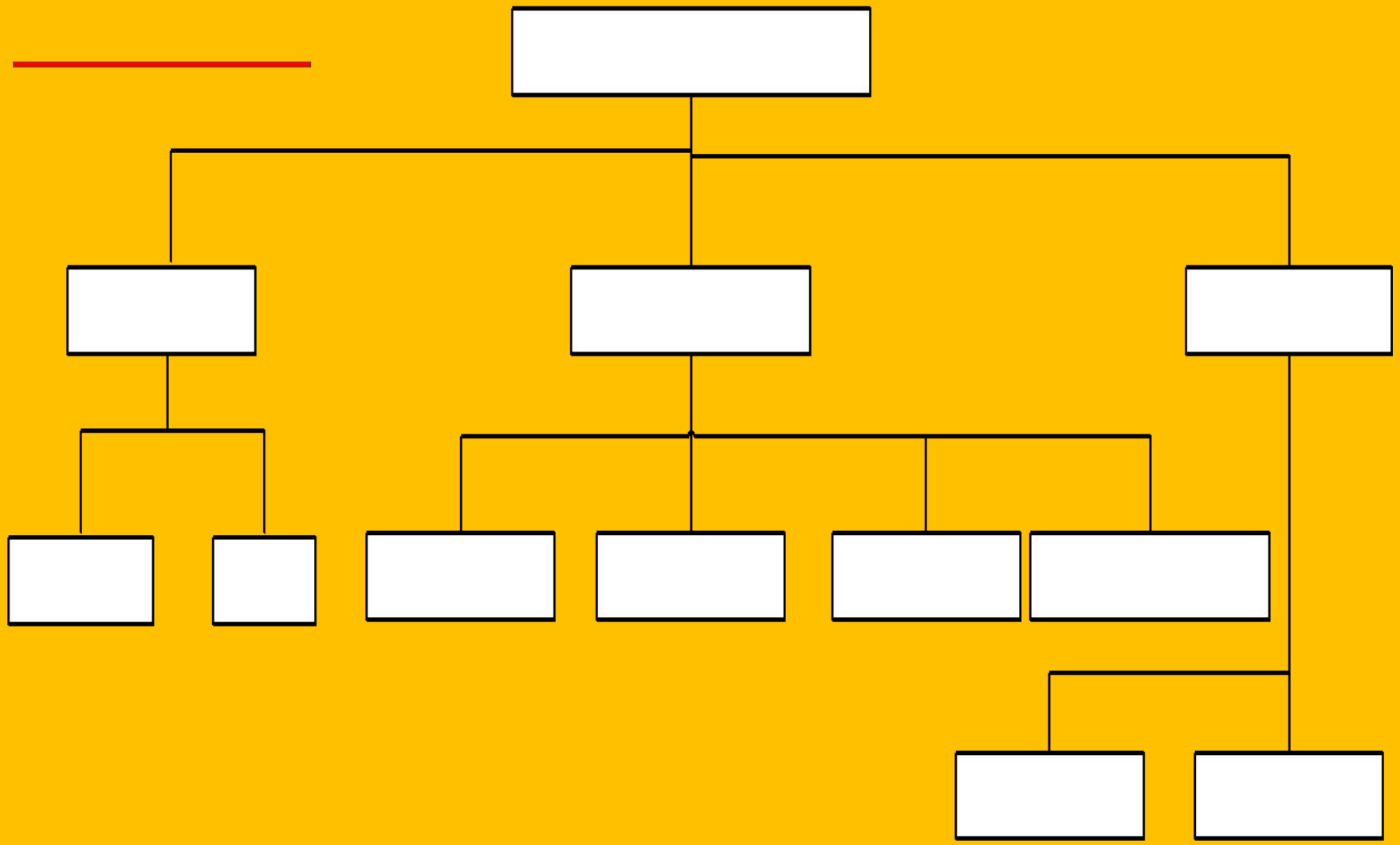
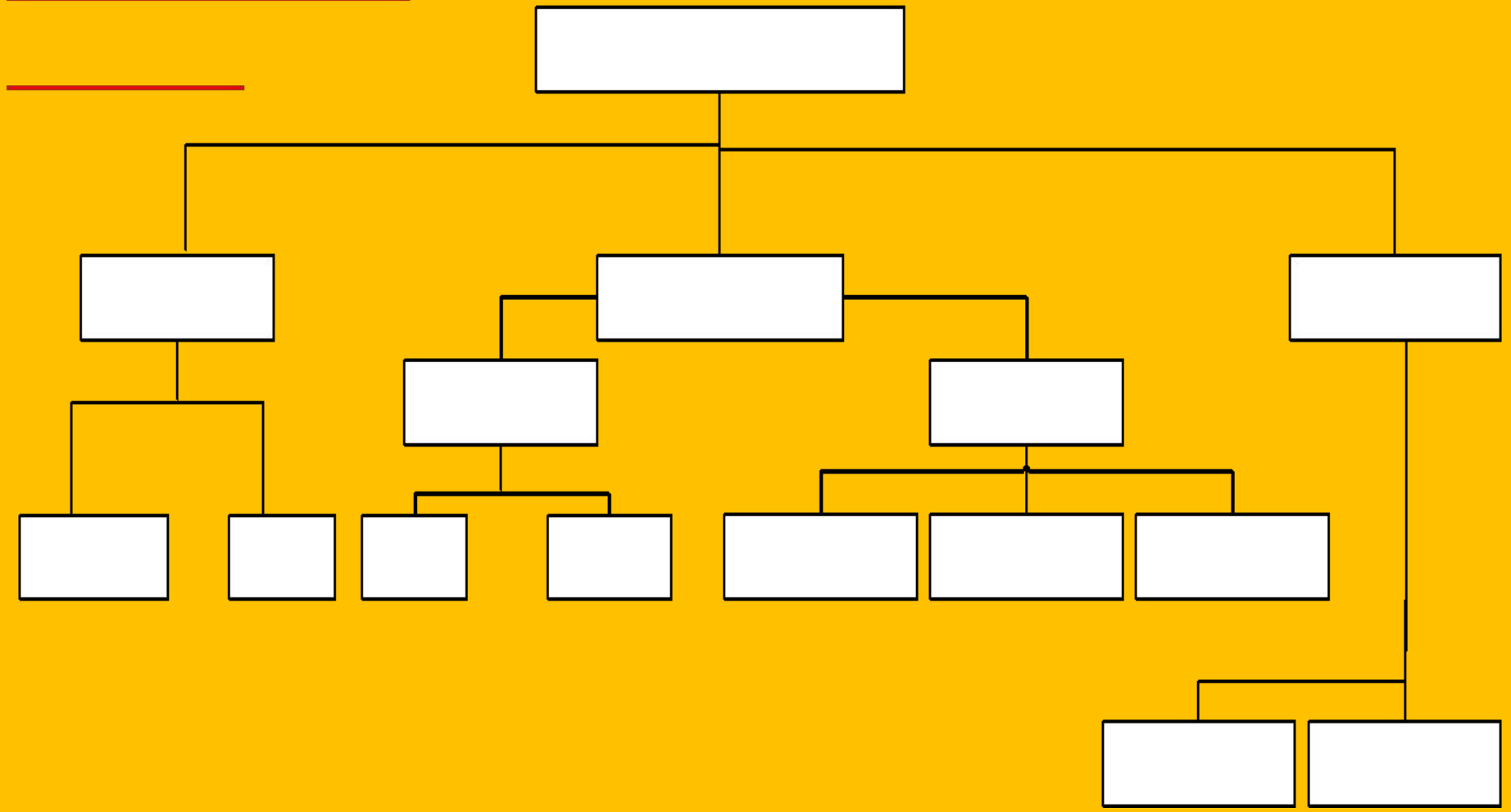
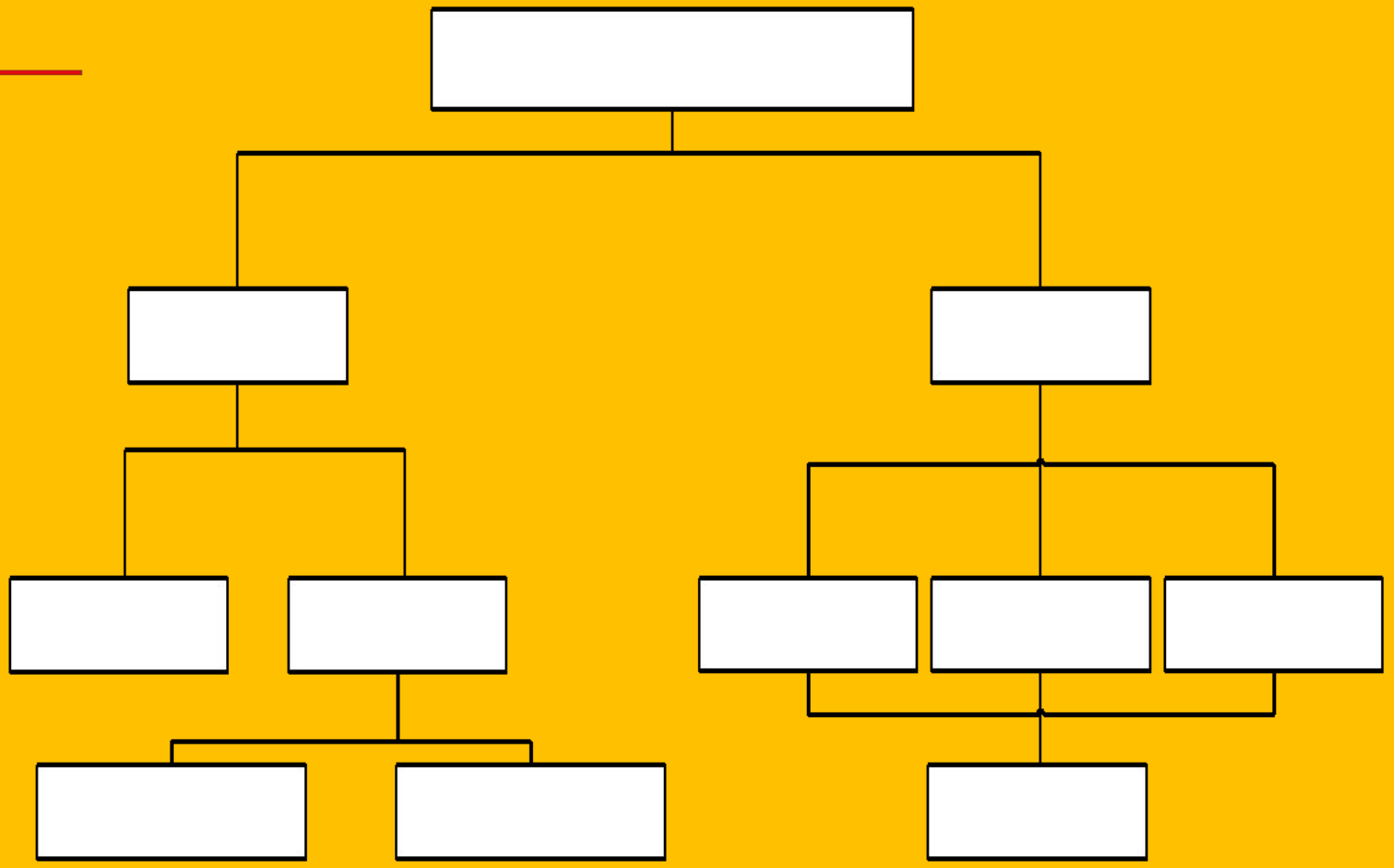


FIGURE 14.12. Transaction mapping

String Conversion System: Context Level DFD



String Conversion System