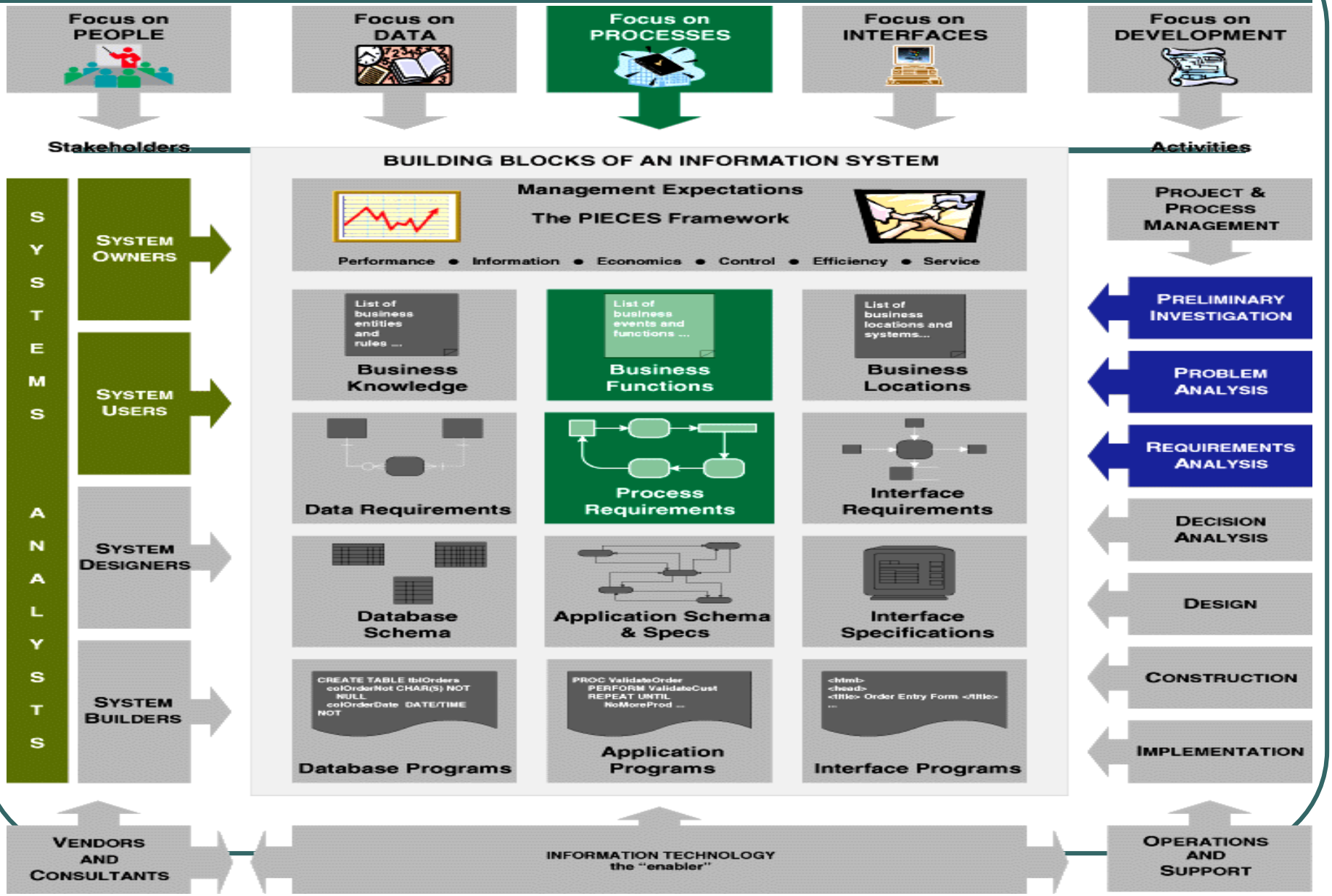
CHAPTER

8

PROCESS MODELING

Chapter Map



Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Models: Logical and Physical

A **model** is a representation of reality. Just as a picture is worth a thousand words, most models are pictorial representations of reality.

Logical models show *what* a system is or does. They are implementation *in*dependent; that is, they depict the system independent of any technical implementation.

Physical models show not only what a system is or does, but also *how* the system is (to be) physically and technically implemented. They are implementation *de*pendent because they reflect technology choices.

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Why Logical System Models

- Logical models remove biases that are the result of the way the system is currently implemented, or the way that any one person thinks the system might be implemented.
- Logical models reduce the risk of missing business requirements because we are too preoccupied with technical results.
- Logical models allow us to communicate with end-users in nontechnical or less technical languages.

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Process Modeling and DFDs

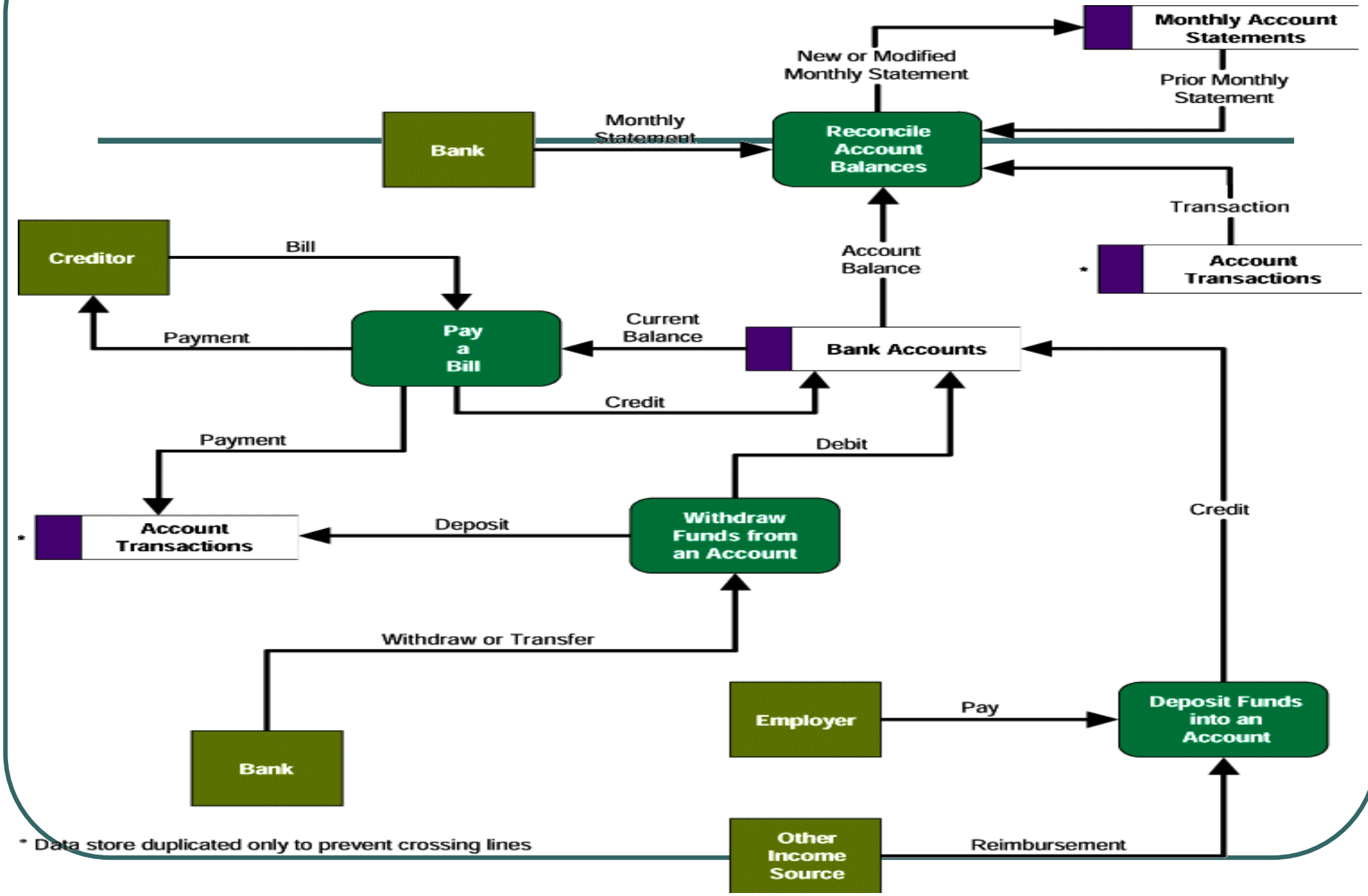
Process modeling is a technique for organizing and documenting the structure and flow of data through a system's processes, and/or the logic, policies, and procedures to be implemented by a system's processes.

A data flow diagram (DFD) is a tool (and type of process model) that depicts the flow of data through a system and the work or processing performed by that system.

DFDs have become a popular tool for business process redesign.

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Simple Data Flow Diagram



Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Differences Between DFDs and Flowcharts

- Processes on DFDs can operate in parallel (at-the-same-time)
  - Processes on flowcharts execute one at a time
- DFDs show the flow of data through a system
  - Flowcharts show the flow of control (sequence and transfer of control)
- Processes on one DFD can have dramatically different timing
  - Processes on flowcharts are part of a single program with consistent timing

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Systems Thinking

Systems thinking is the application of formal systems theory and concepts to systems problem solving.

DFDs are a tool that supports systems thinking.

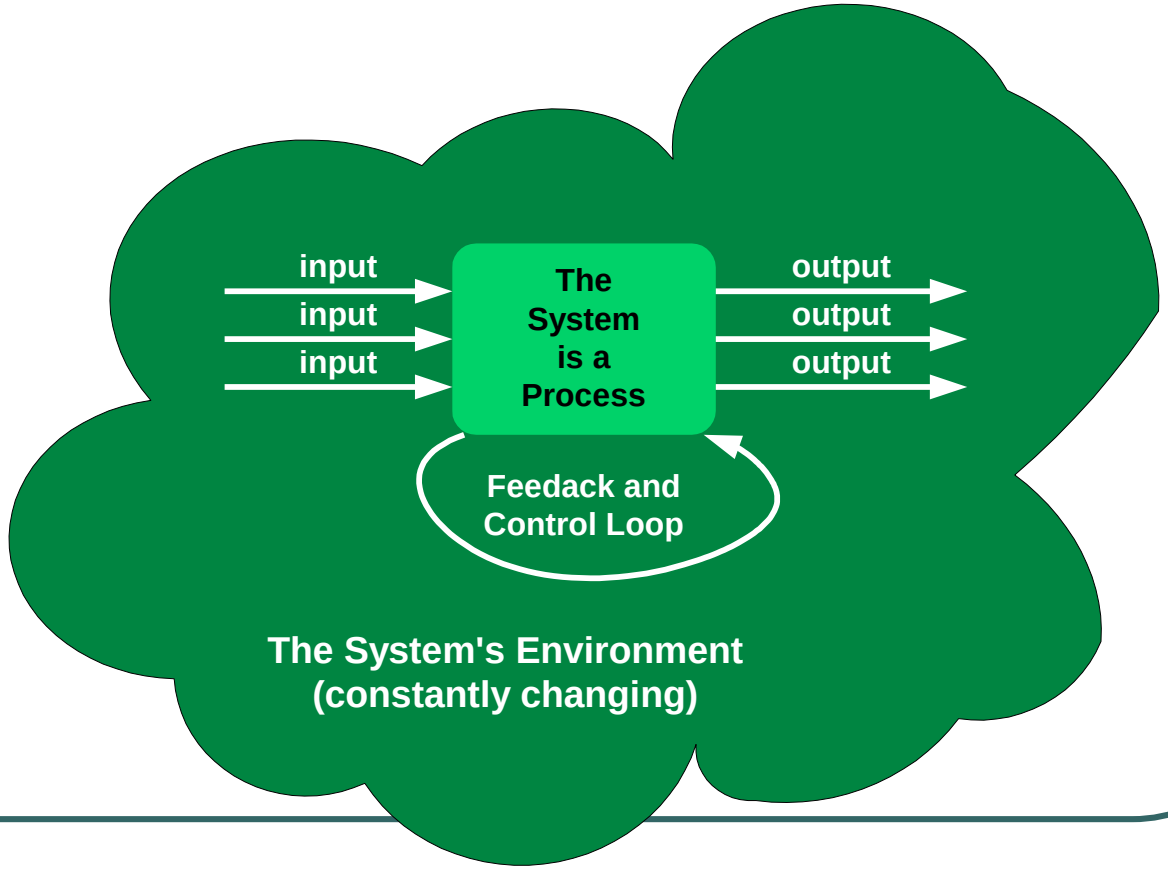
Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Process Concepts

A **process** is work performed on, or in response to, incoming data flows or conditions.

A Process

A System is a Process



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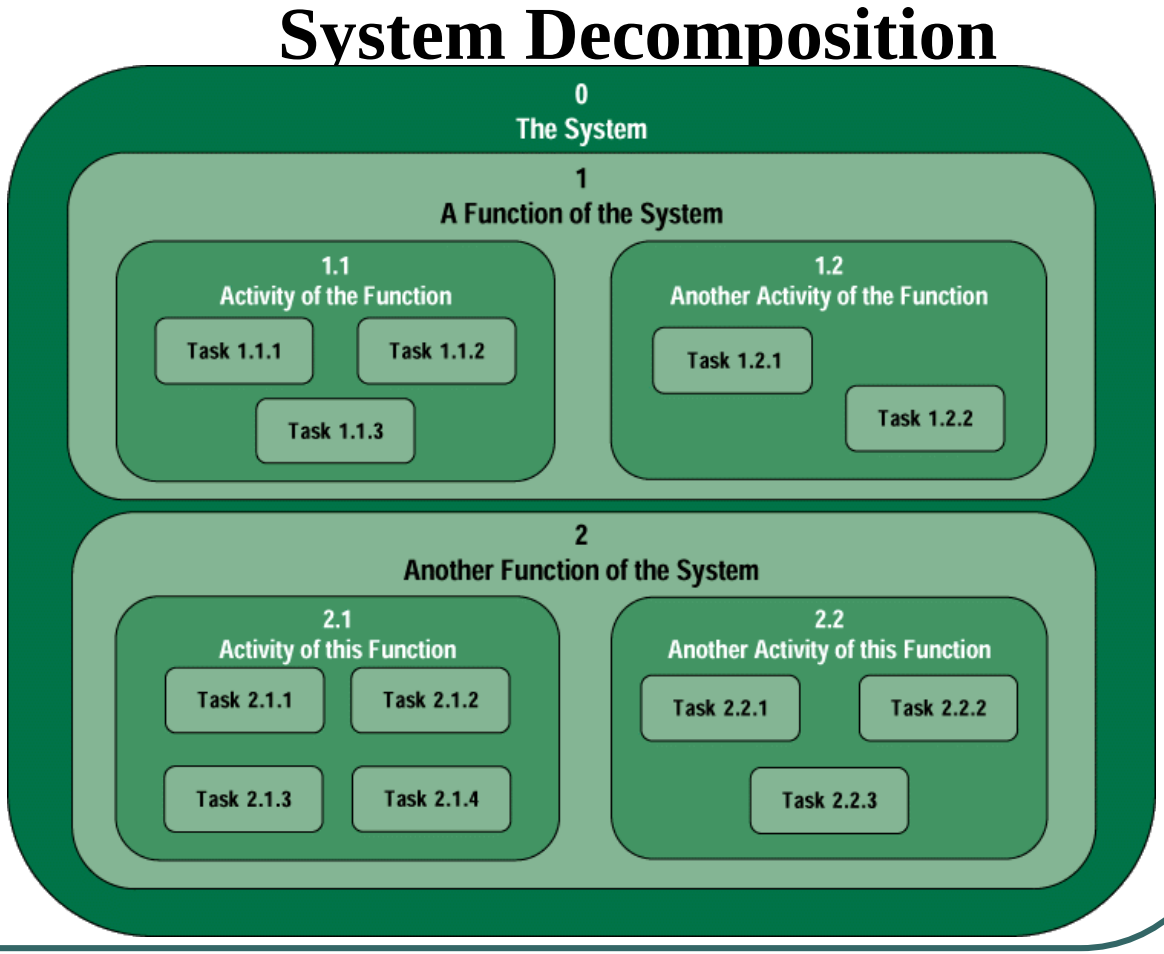
Decomposition

Decomposition is the act of breaking a system into its component subsystems, processes, and subprocesses. Each level of abstraction reveals more or less detail.



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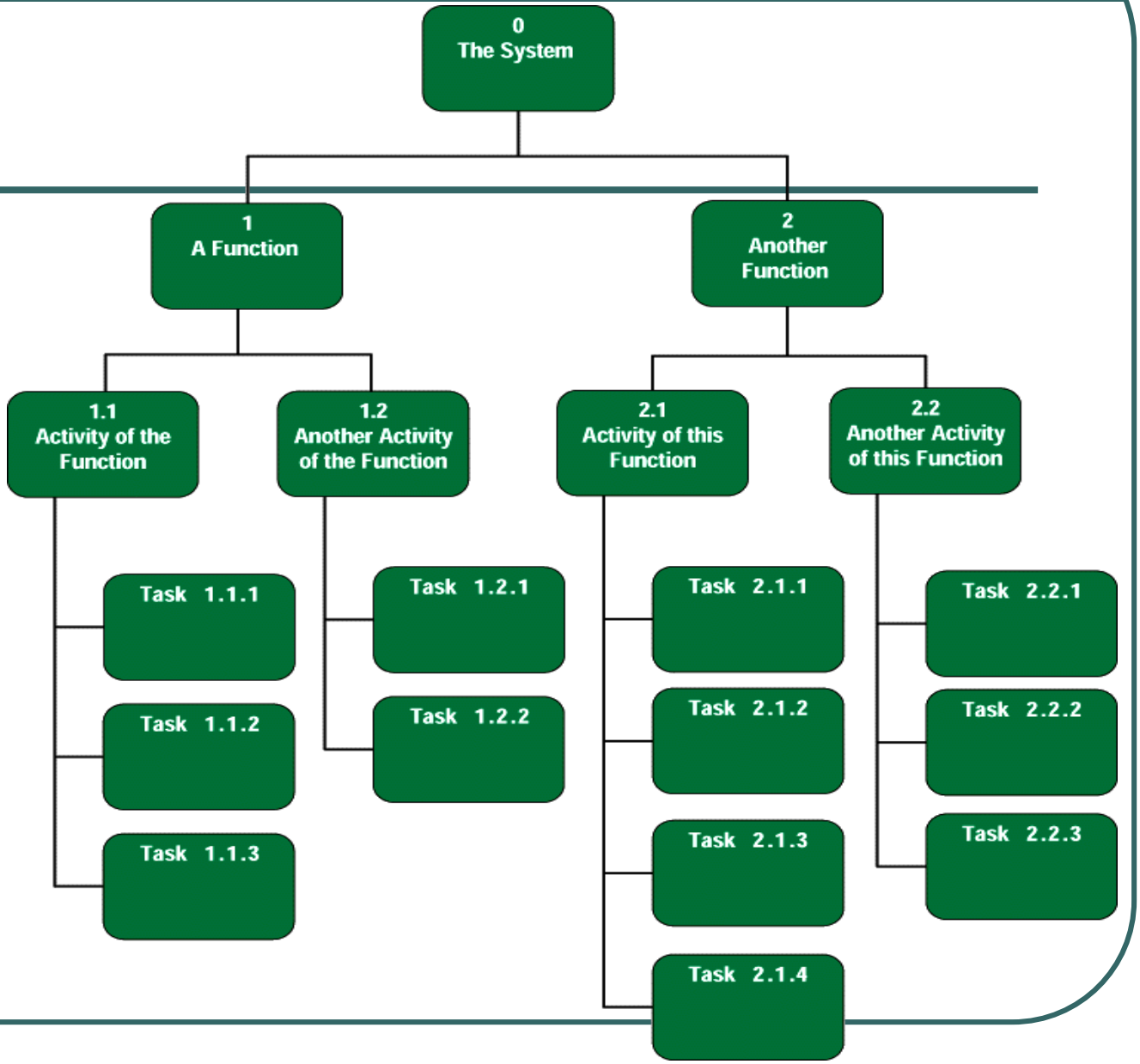
Decomposition Diagrams

A decomposition diagram or hierarchy chart shows the top-down, functional decomposition of a system.



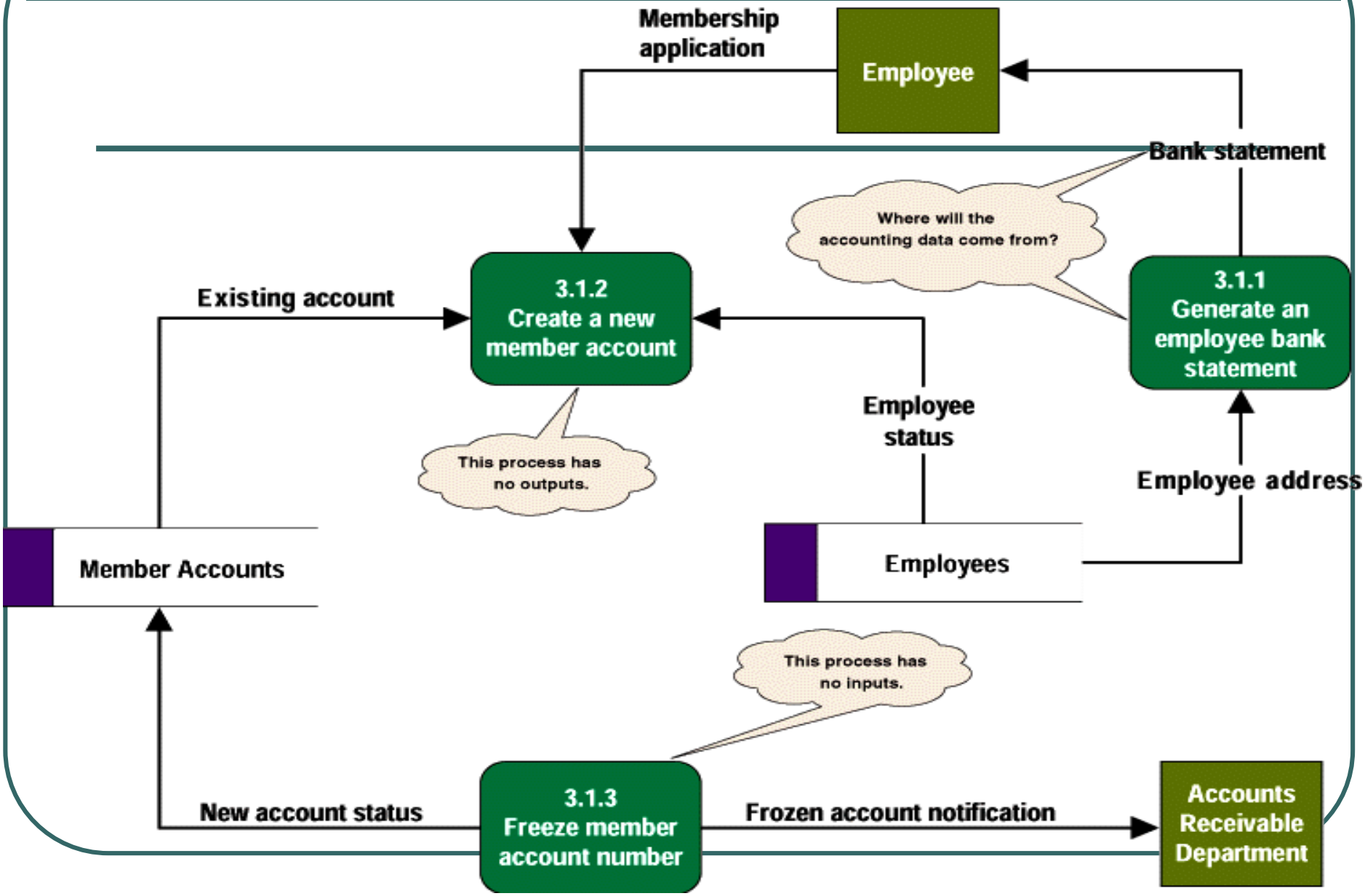
Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Types of Logical Processes

- A function is set of related and ongoing activities of a business.
- An event (or transaction) is a logical unit of work that must be completed as a whole (as part of a function).
- An elementary process (or primitive process) is a discrete, detailed activity or task required to respond to an event. Usually, several such tasks must be completed to respond to an event.

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Common Process Errors on DFDs



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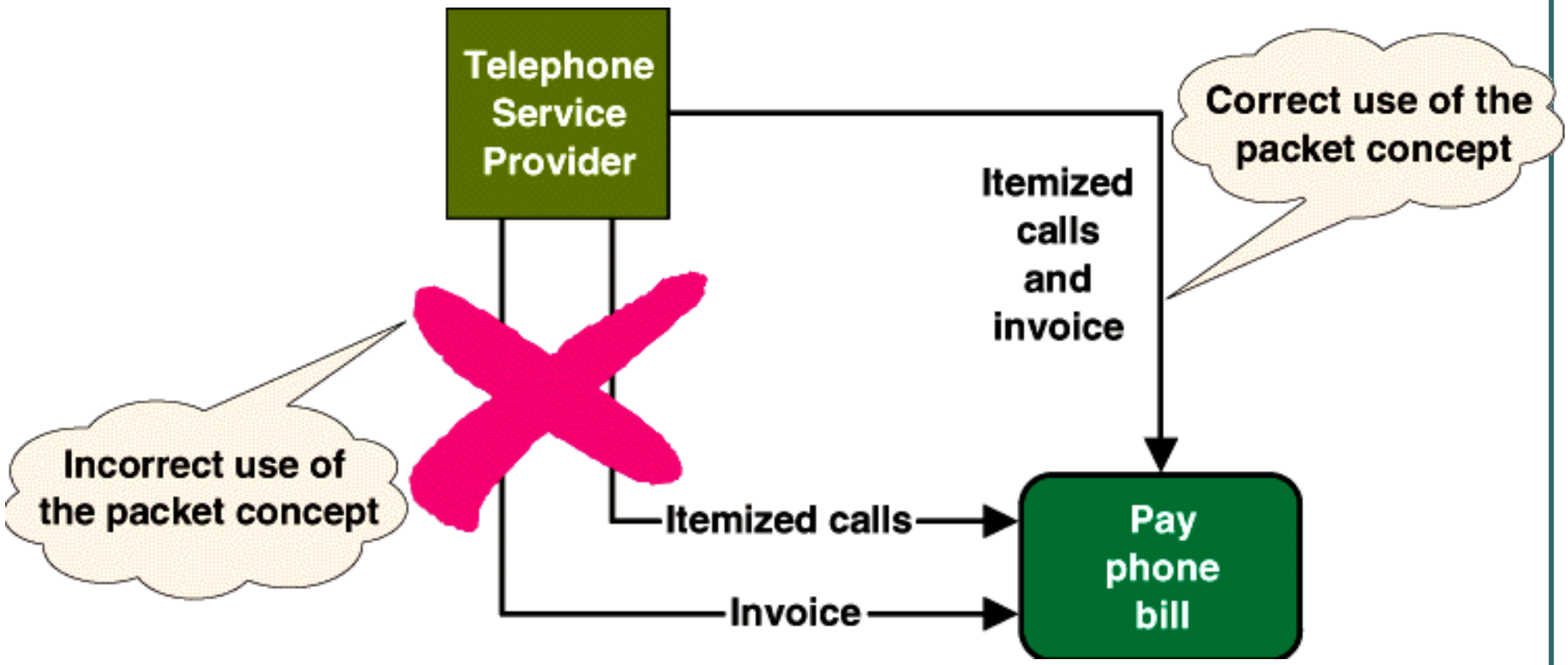
Data Flows & Control Flows

- A data flow represents an input of data to a process, or the output of data from a process.
  - A data flow may also be used to represent the creation, reading, deletion, or updating of data in a file or database (called a data store).

  - A composite data flow is a data flow that consists of other data flows.
- A control flow represents a condition or nondata event that triggers a process.
  - Used sparingly on DFDs.

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Data Flow Packet Concept



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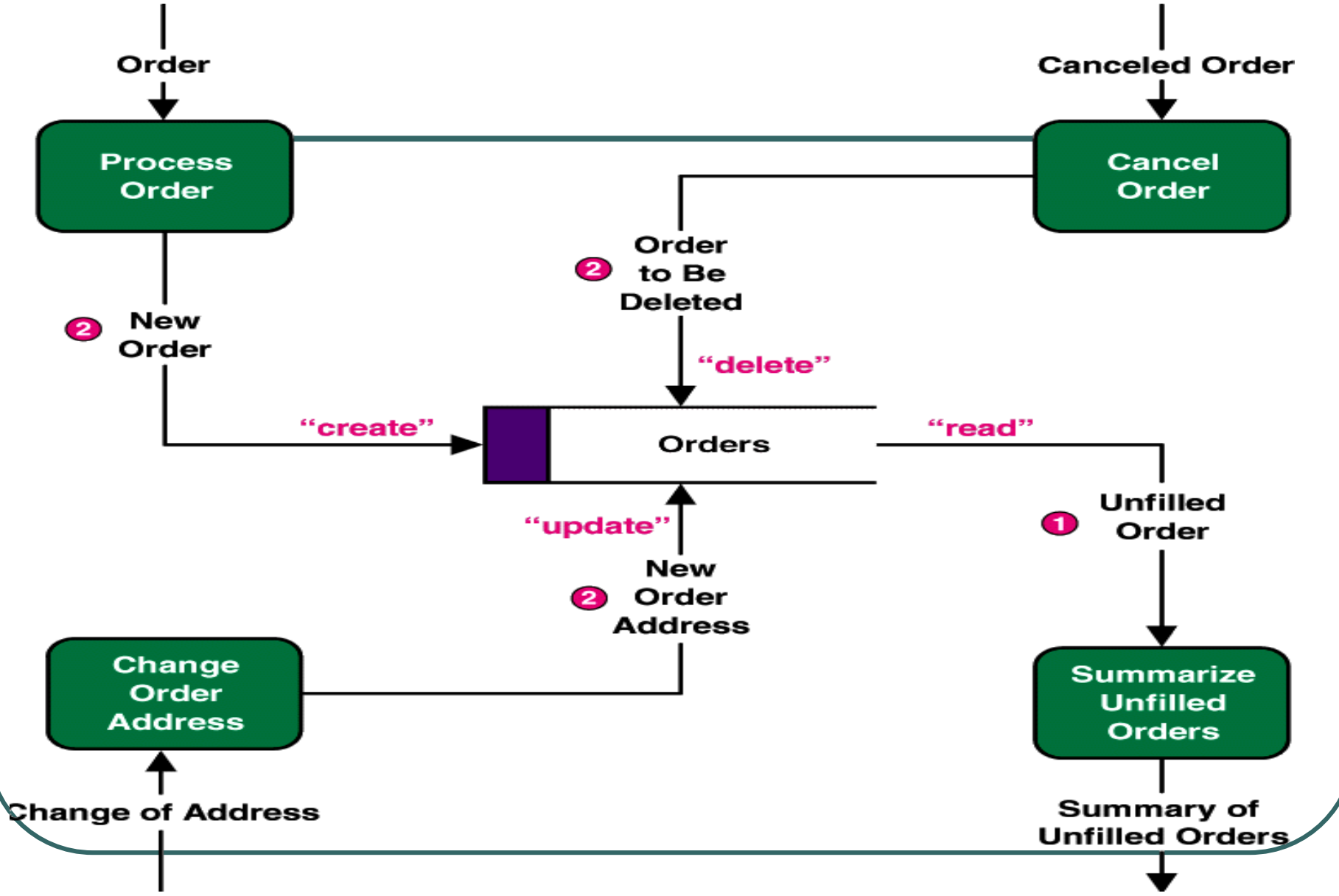
Data Flows to and from Data Stores



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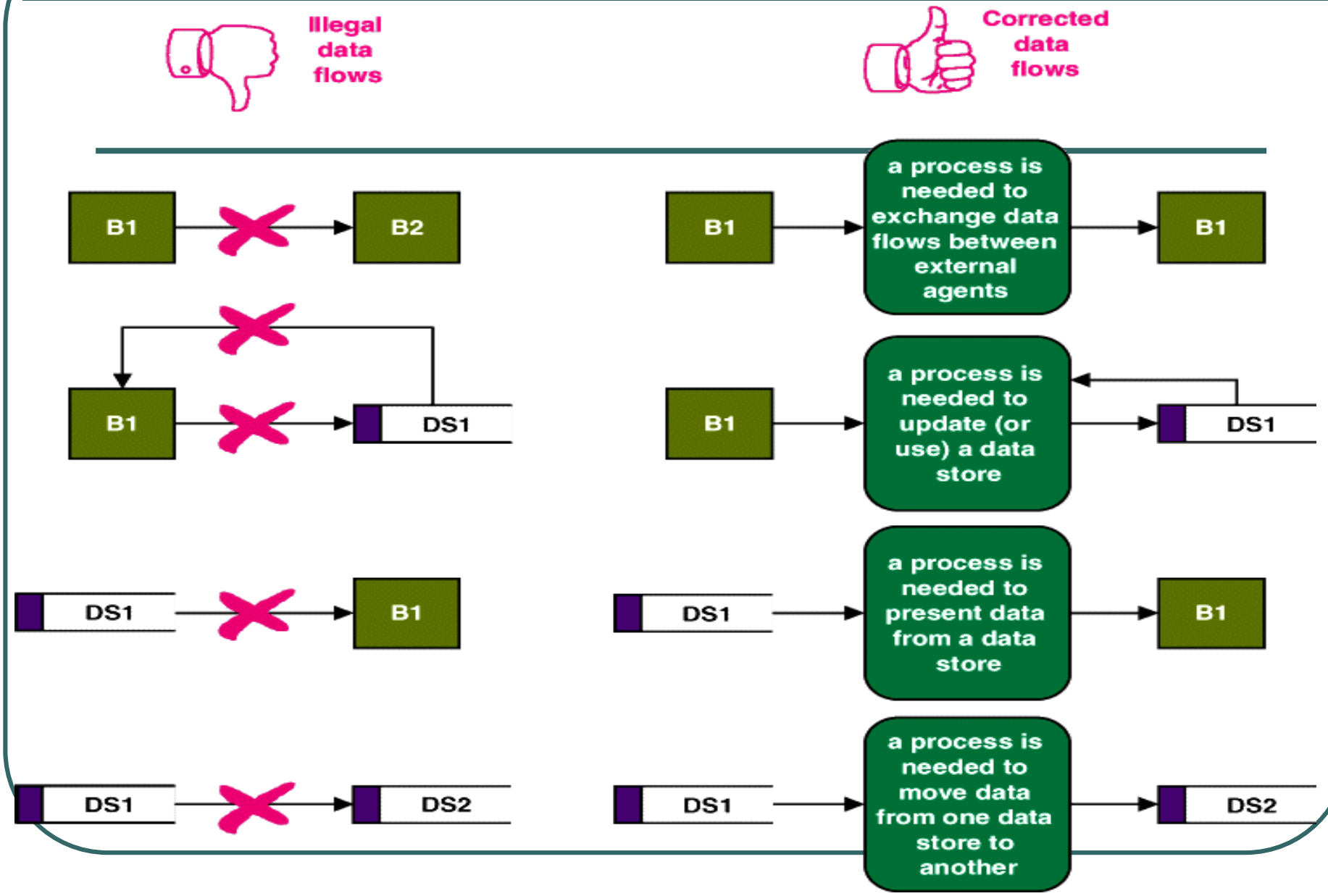
Illegal Data Flows



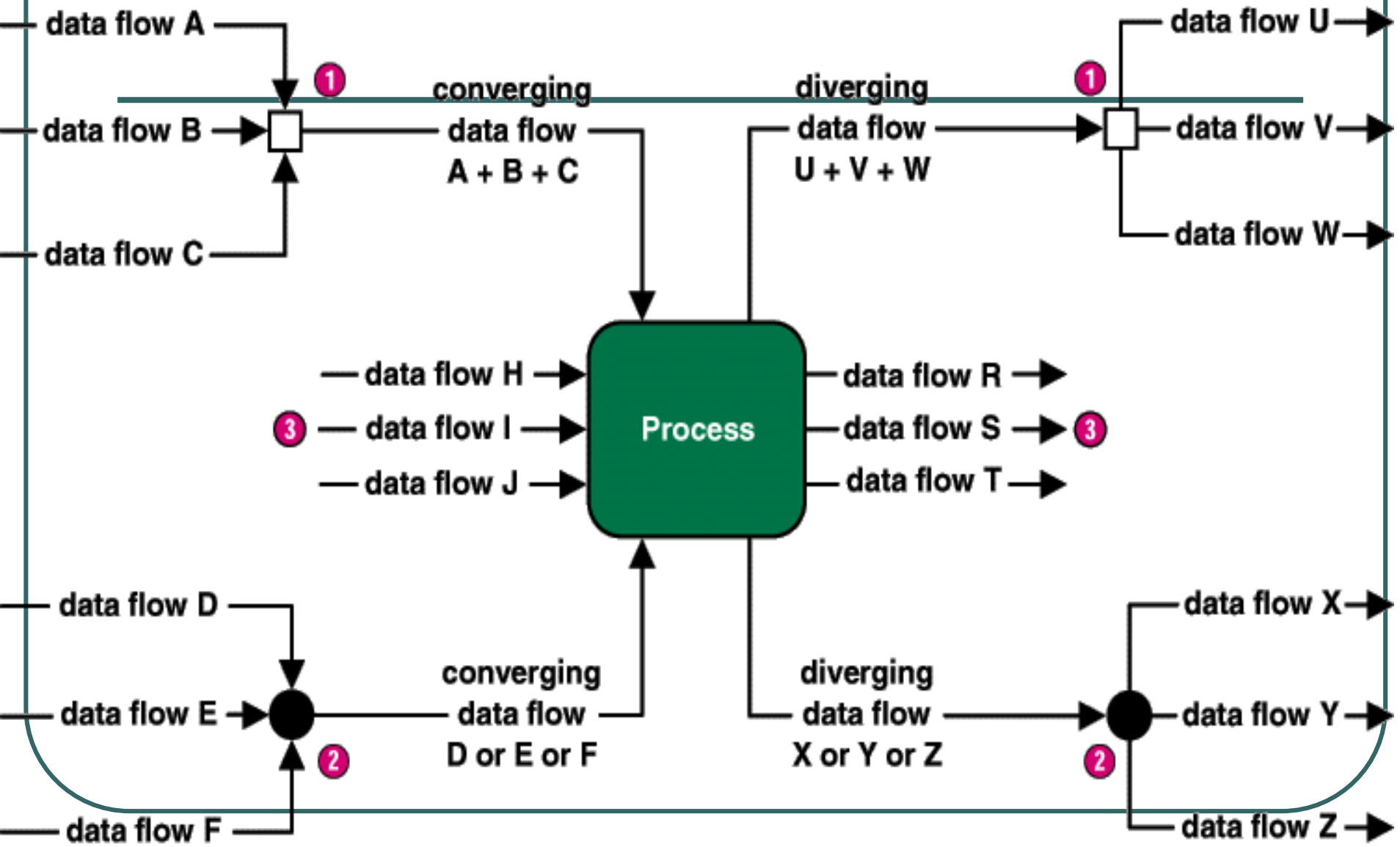
Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Diverging and Converging Data Flows

- A diverging data flow is one that splits into multiple data flows.
  - Useful for illustrating data that starts out naturally as one flow, but needs to be routed to parallel processes.
  - Also useful for illustrating multiple copies of the same output going to different destinations.
- A converging data flow is the merger of multiple data flows into a single packet.
  - Useful for illustrating data from multiple sources that must come back together for some subsequent processing

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Diverging and Converging Data Flows



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External Agents

- An external agent defines a person, organization unit, or other organization that lies outside of the scope of the project but that interacts with the system being studied.
  - External agents define the "boundary" or scope of a system being modeled.
  - As scope changes, external agents can become processes, and vice versa.
  - Almost always one of the following:
    - Office, department, division inside the business but outside the system scope.
    - An external organization or agency.
    - Another business or another information system.
    - One of your system's end-users or managers

External Agent

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Data Stores

- A data store is an inventory of data.
  - Frequently implemented as a file or database.
  - A data store is "data at rest" compared to a data flow that is "data in motion."
  - Almost always one of the following:
    - Persons
      (or groups of persons)
    - Places
    - Objects
    - Events
      (about which data is captured)
    - Concepts
      (about which data is important)
  - Data stores depicted on a DFD store all instances of data entities (depicted on an ERD)

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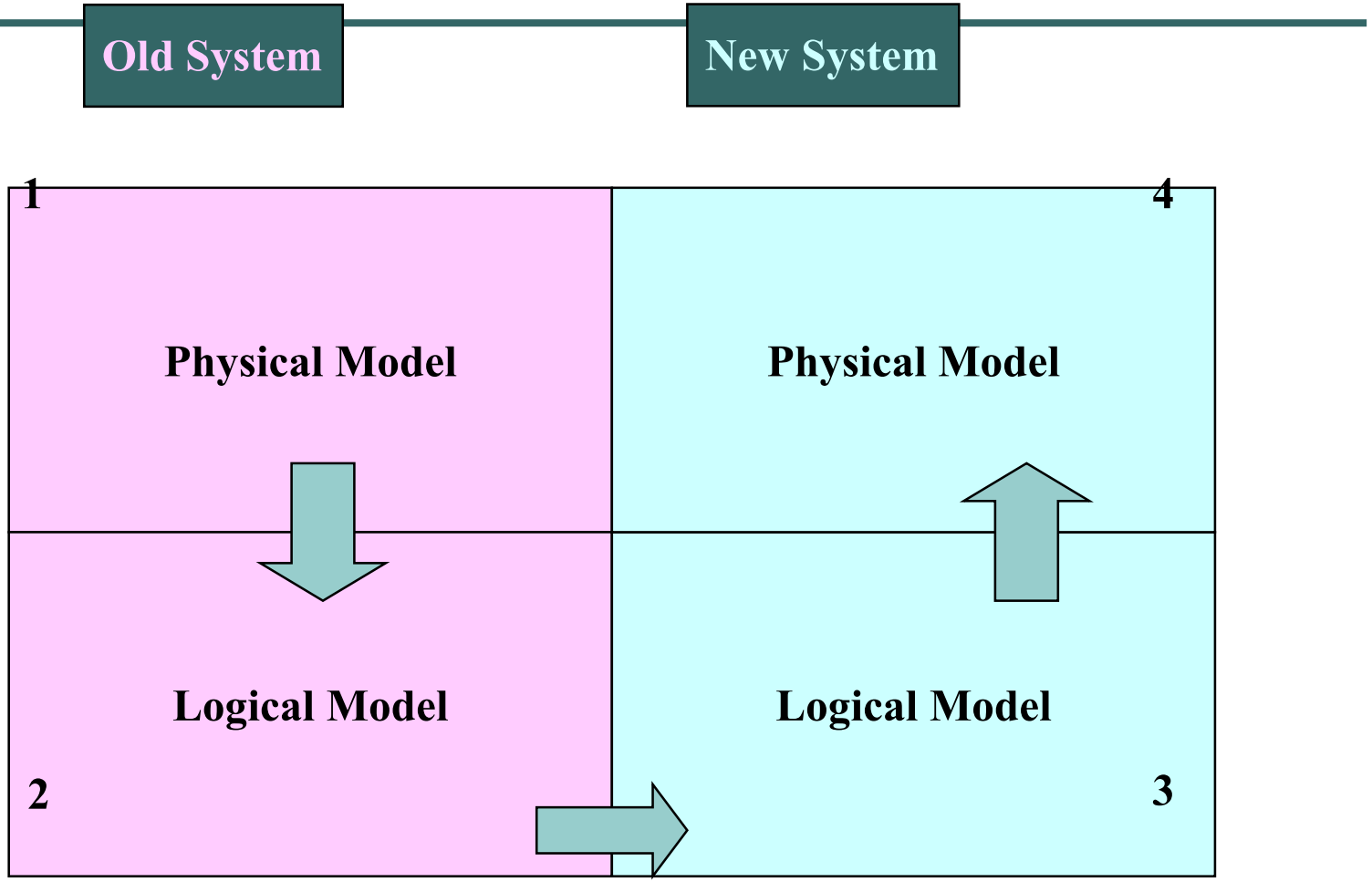
System Analysis



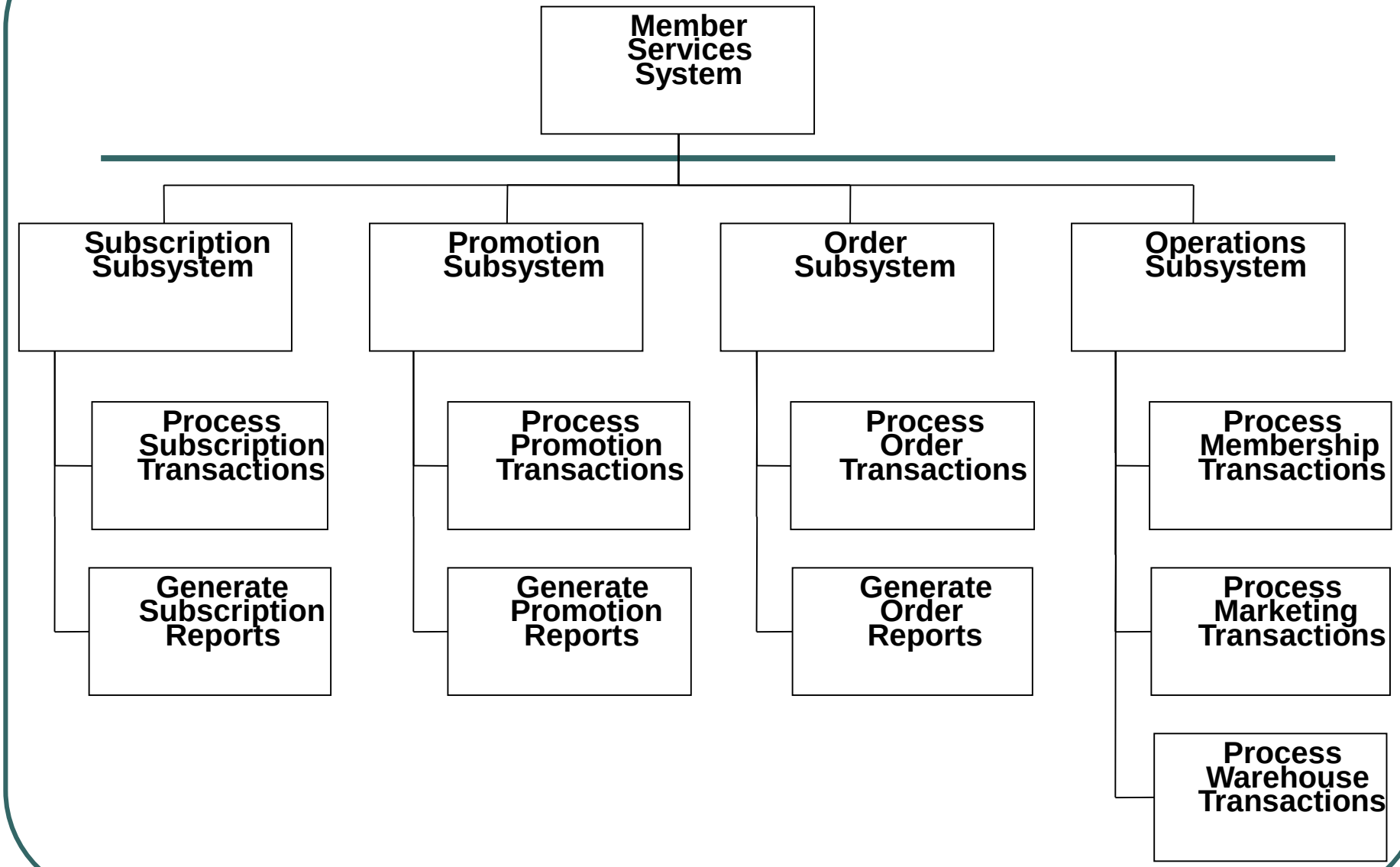
Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Context Diagram (L-0 Data Flow Diagram)

- The system is shown as a single process.
  - No data store
- A context diagram documents the system's boundaries by highlight its sources and destinations.
  - A source or destination is outside the system's boundaries and thus not subject to the system's control.
  - No data store

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

SoundStage Functional Decomposition Diagram



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Group of processes

No	Trigger Event	Processes	Name
1	Customer buy goods	1.1 xxx 1.2 yyy yyy1 yyy2 1.3 zzz	Buy Goods (Verb + Noun)
2			

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Data Flow Diagram

- Shows the system's primary processes, data stores, sources, and destinations linked by data flows.
- Every data element comes from somewhere (there are no miracles), and every data element that enters the system must be used (there are no black holes).

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Process Description

- Find out the event that triggers the process.
- How often the process is performed?
- How quickly the process must be completed?
- Find out the process volume.
- Consider the distinguish between normal rates and peak rates.

Source: System Analysis and Design Methods, 5th Edition, McGraw Hill.

Summary

- Systems modeling and logical &physical system models.
- Process modeling and its benefits.
- Basic concepts and constructs of a process model.
- Context Diagram & Data flow diagram.
- Use cases, external and temporal business events for a system.
- Document the distribution of processes to locations.
- Synchronize data and process models using a CRUD matrix.