SOFTWARE DESIGN & ANALYSIS (Week-3)

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CONTENTS OF WEEK # 3

- Requirement Engineering
  - Analysis Modeling

REQUIREMENT ENGINEERING

WHAT IS REQUIREMENT?

What is requirement?

- **The descriptions of what the system should do**
  - **services that it provides and the constraints**

TYPES OF REQUIREMENTS

- **Functional requirements:**
  - **statement of services**
  - **how system reacts to input**
  - **how system behaves in particular situation**
- **Non-functional requirements:**
  - **constraints on services (timing, quality, security etc.)**

- Domain requirements
- Inverse requirements
- Design and implementation constraints

Why Requirement Engineering:

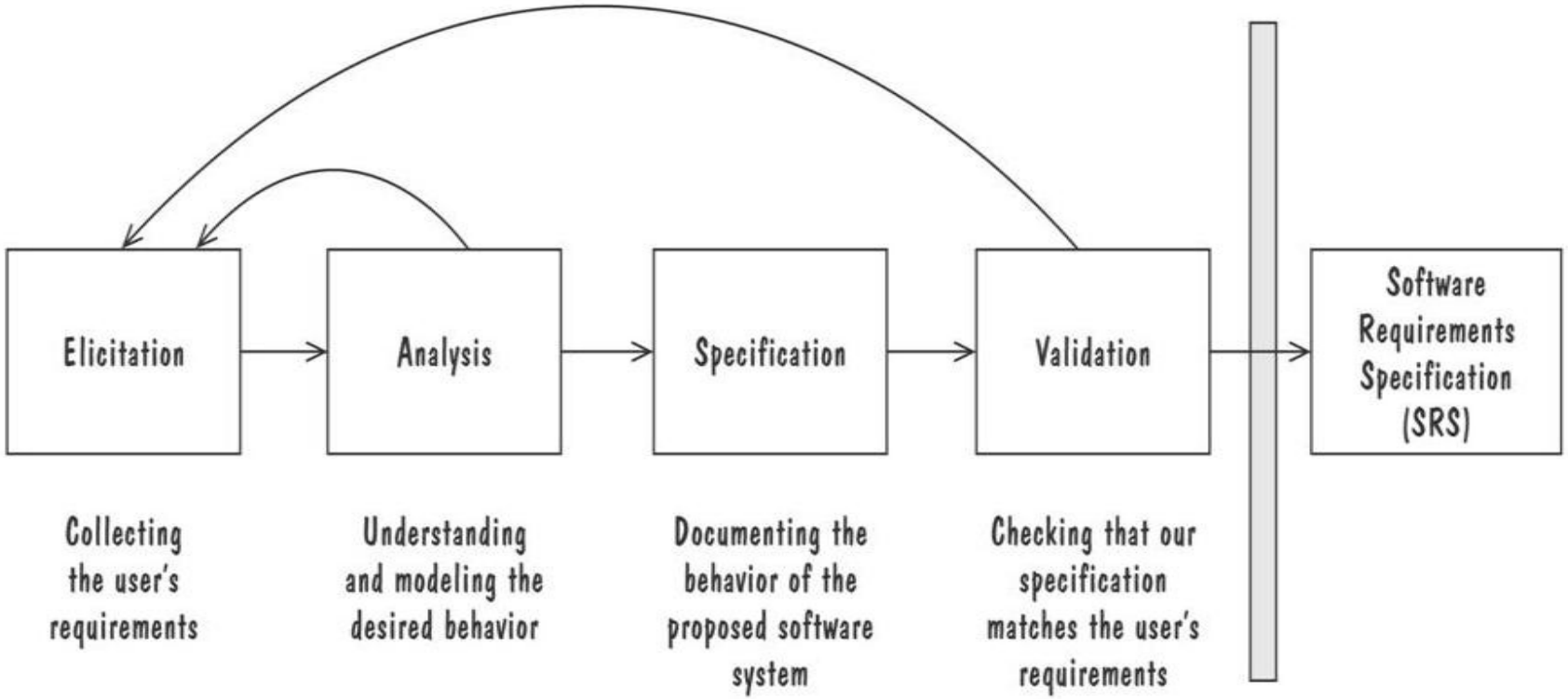
- **A study based on 340 companies in Austria, more than two thirds consider the SRS as the major problem in development process (1995)**
- **A study on Web applications, 16% systems fully meet their requirement while 53% deployed systems do not (Cutter Consortium, 2000)**

Why Requirement Engineering:

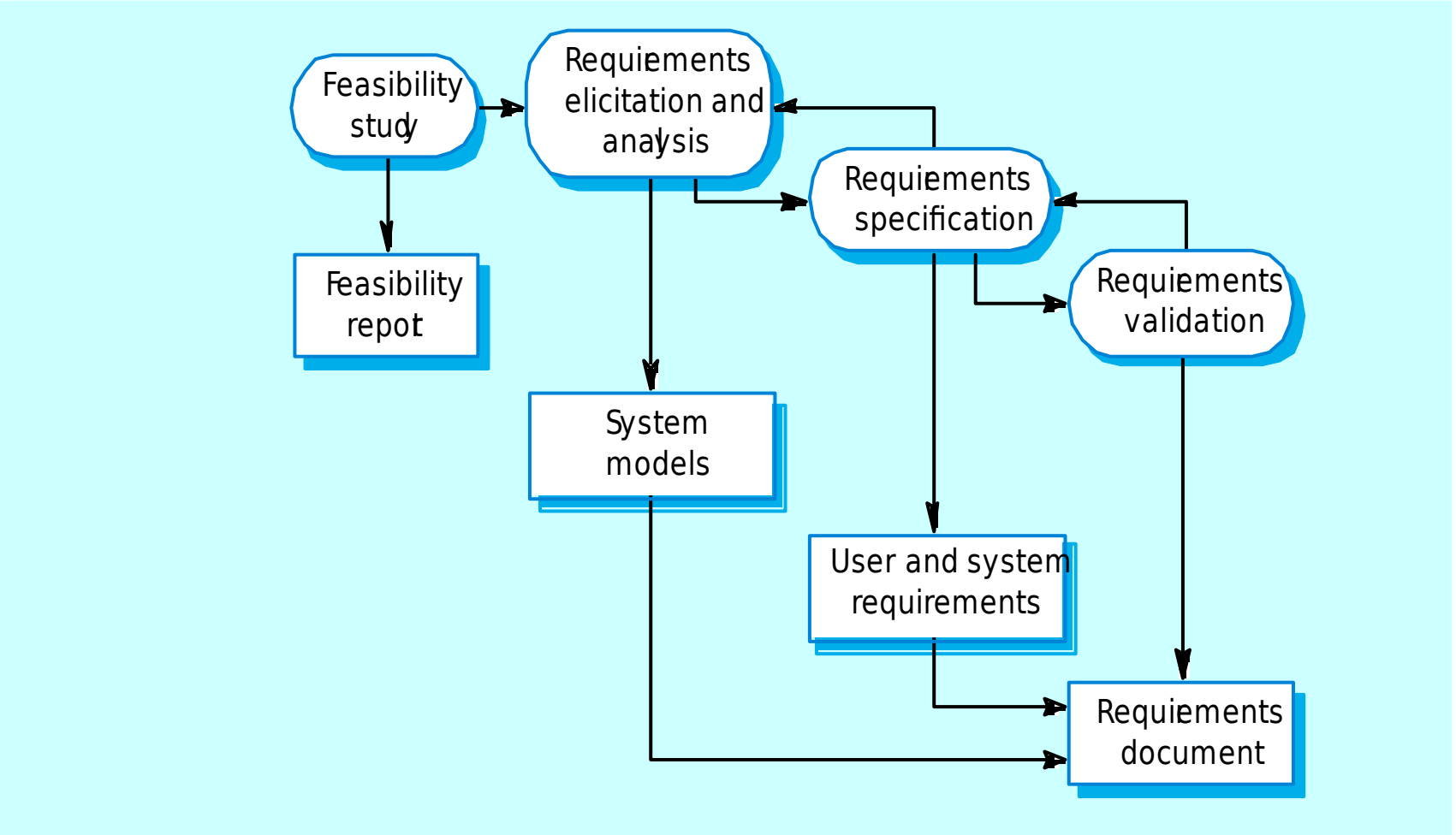
- **A study among 8000 projects, 30% of projects fail before completion & almost half do not meet customer requirements (Standish group, 1994)**
  - **Unclear objectives, unrealistic schedules & expectations, poor user participation**

THE REQUIREMENTS PROCESS
(PROCESS FOR CAPTURING REQUIREMENTS)

- Performed by the req. analyst or system analyst
- The final outcome is a Software Requirements Specification (SRS) document



REQUIREMENT ENGINEERING PROCESS



REQUIREMENTS ELICITATION
IDENTIFY SOURCES OF REQUIREMENTS

- Interviewing stakeholders
- Reviewing available documentations
- Observing the current system (if one exists)

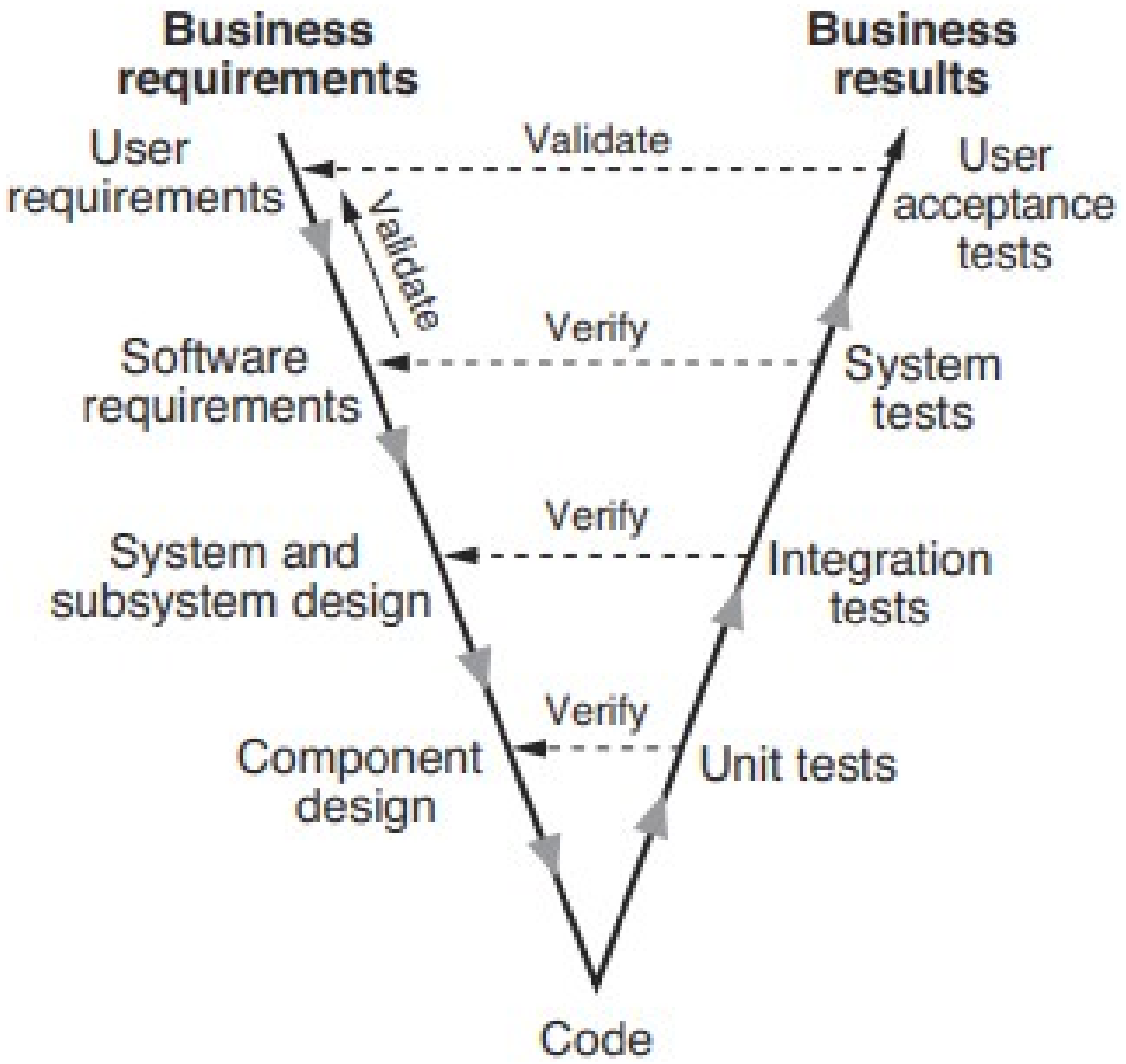
REQUIREMENTS ELICITATION
STAKEHOLDERS

- Clients: pay for the software to be developed
- Users: use the system
- Domain experts: familiar with the problem that the software must automate

REQUIREMENTS ELICITATION
STAKEHOLDER LIST

- Auditor
- Buyer
- Clerical user
- Customer service analyst
- Database administrator
- Financial expert
- Sales specialist
- Software Architect
- Network Administrator
- Usability specialist
- Security Specialist

How Requirements are Verified and Validated



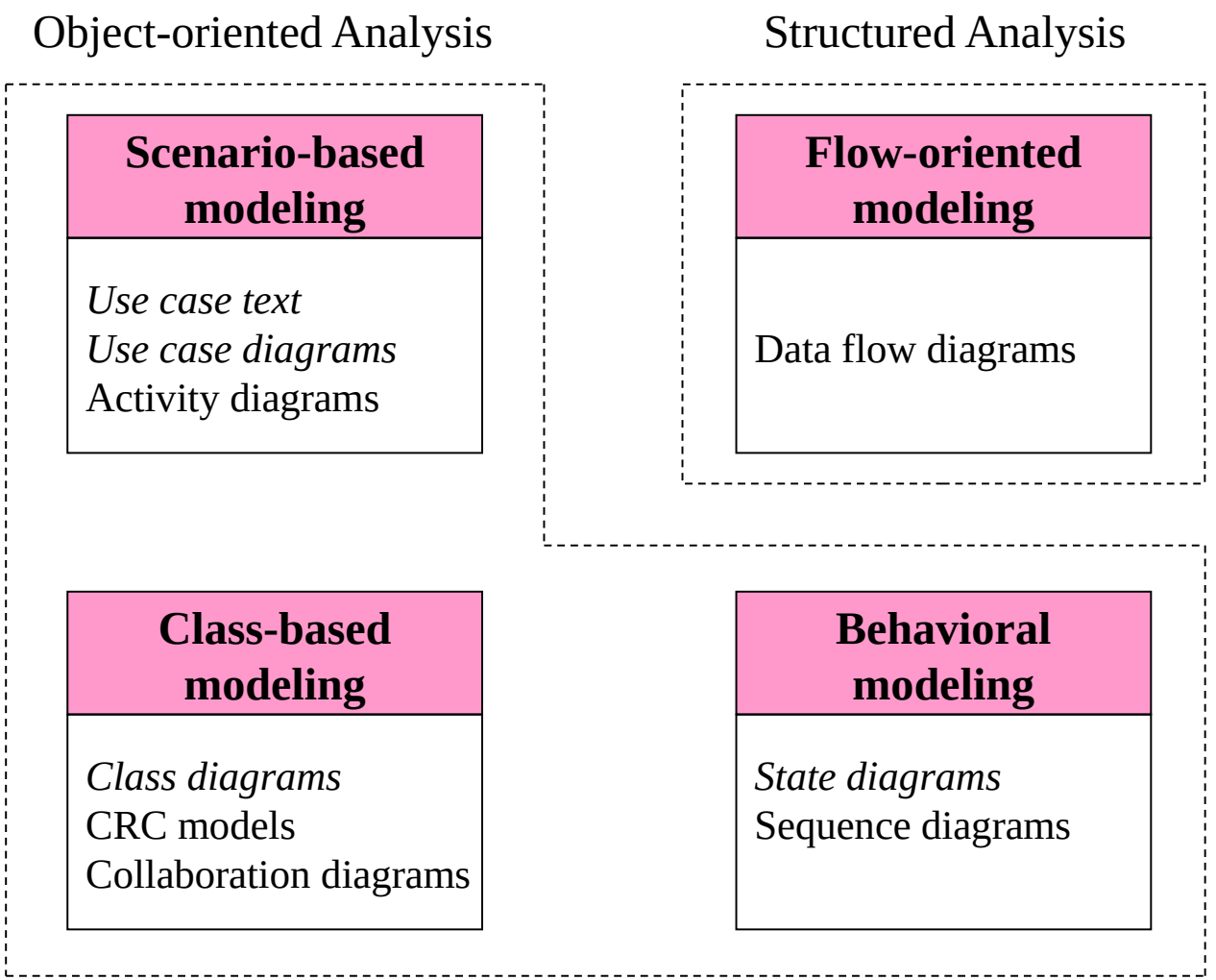
REQUIREMENT ANALYSIS

ANALYSIS MODELING

ANALYSIS MODEL

- Analysis results in requirements models.
- Requirements models (also referred to as analysis models) are user requirements represented by diagrams.

ELEMENTS OF THE ANALYSIS MODEL



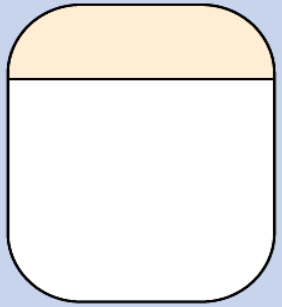
FLOW-ORIENTED MODELING

WHAT IS A DATA FLOW DIAGRAM?

- A data flow diagram (DFD) is a graphical tool that allows system analysts (and system users) to depict the flow of data in an information system.

DATA FLOW DIAGRAM SYMBOLS

process



data store

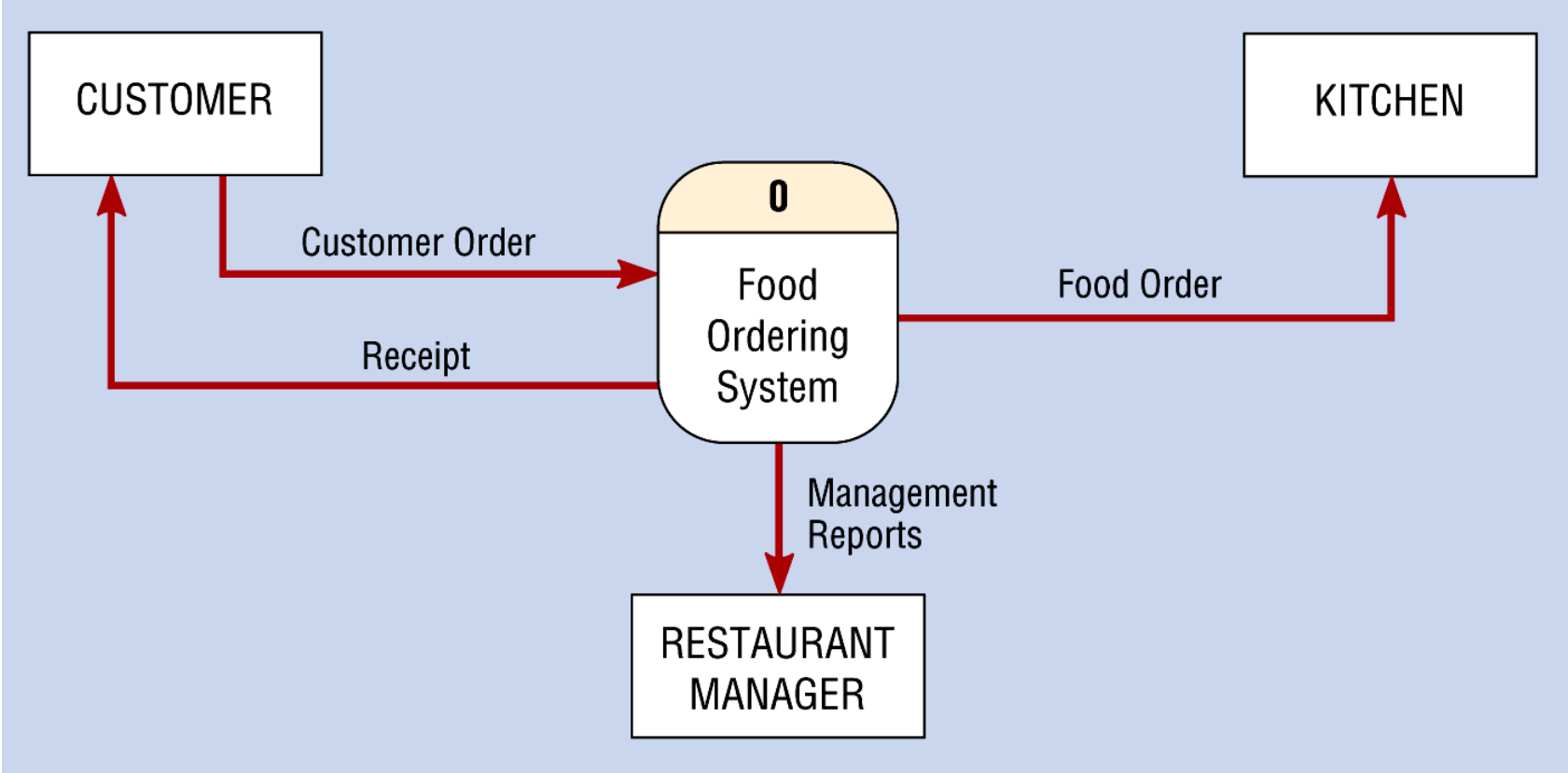
Source

data flow

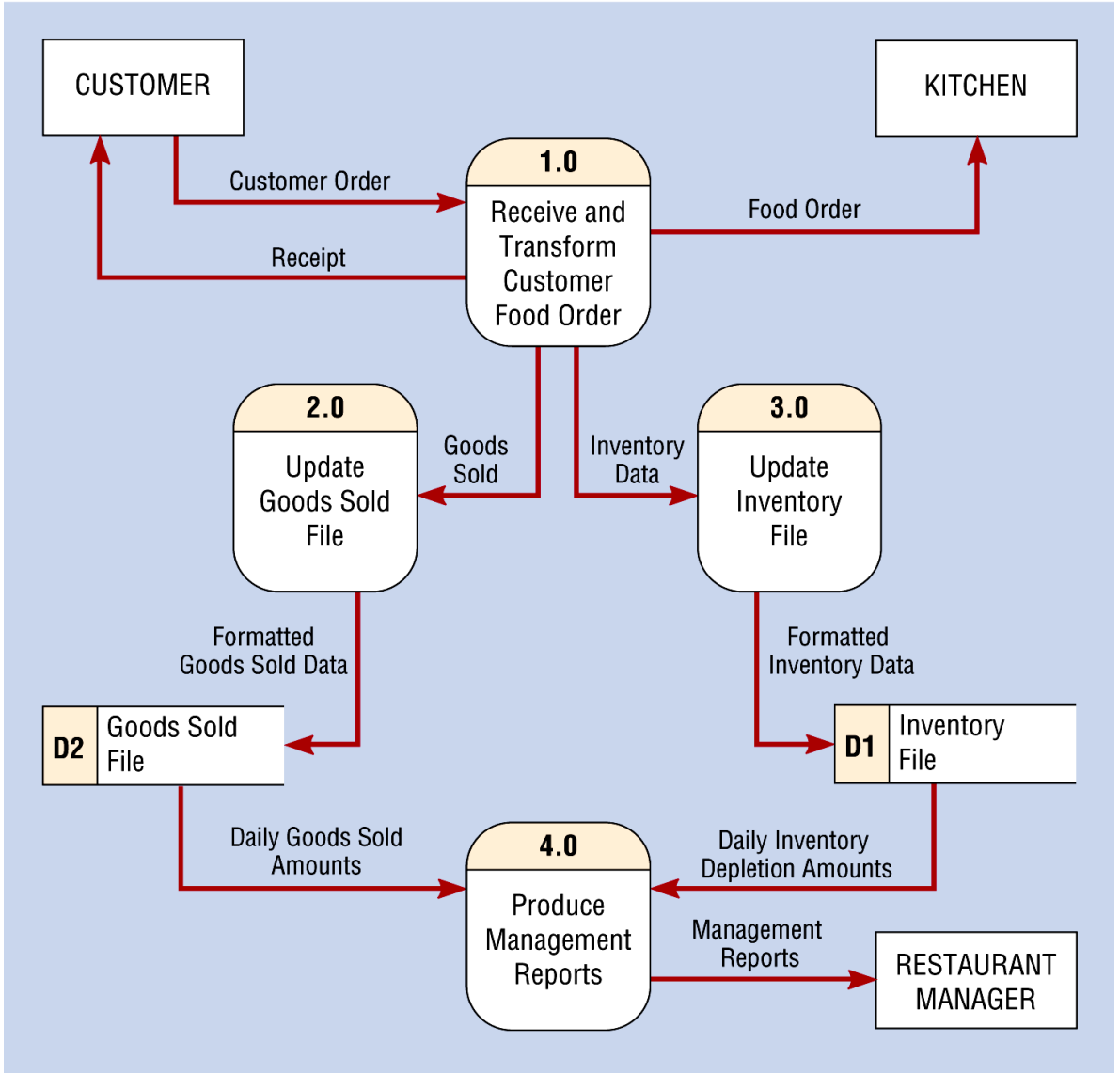
STEPS IN BUILDING DFDS

- Build the context diagram
- Create DFD fragments
- Organize DFD fragments into level 0
- Decompose level 0 DFDs as

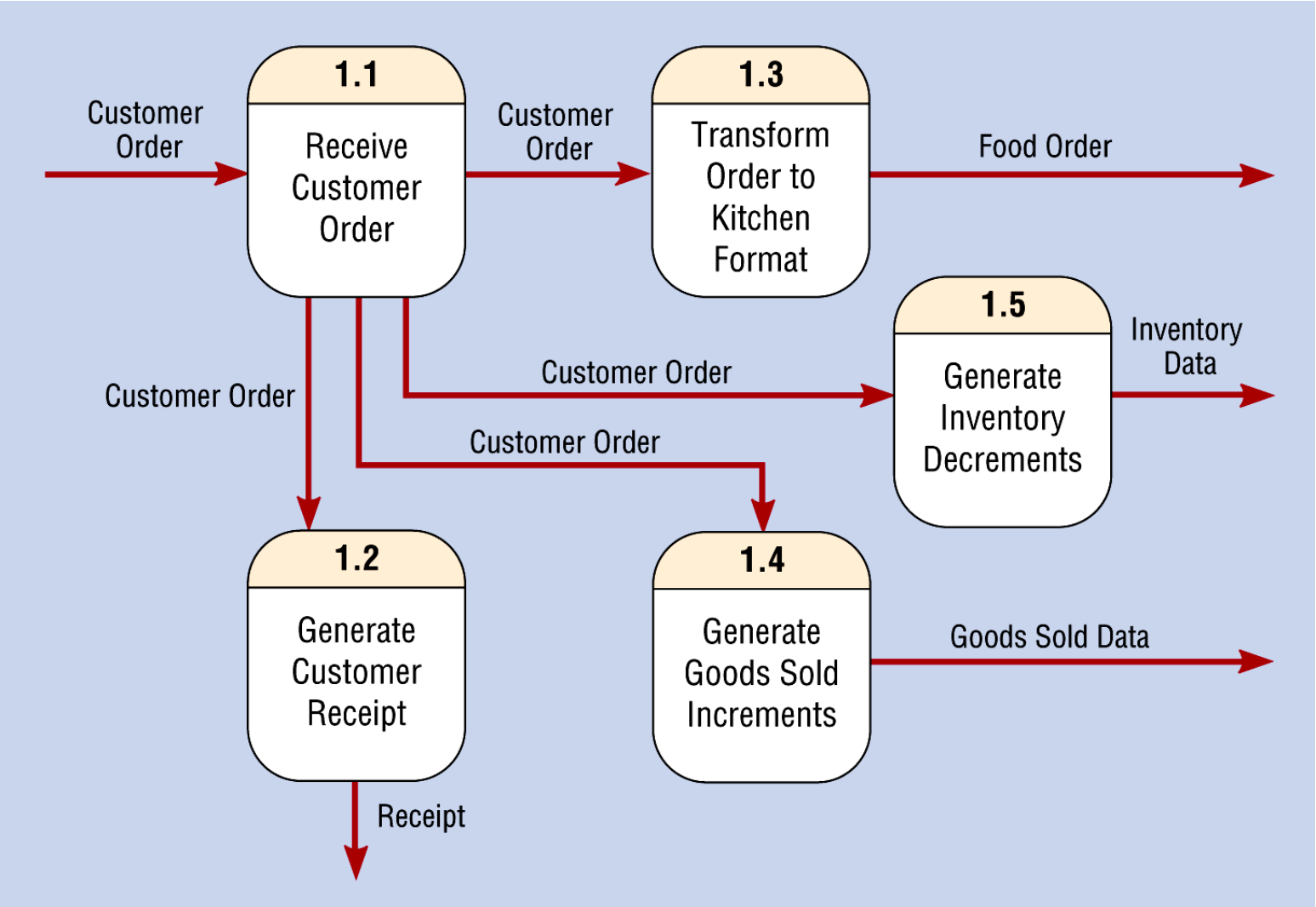
CONTEXT DIAGRAM OF FOOD ORDERING SYSTEM



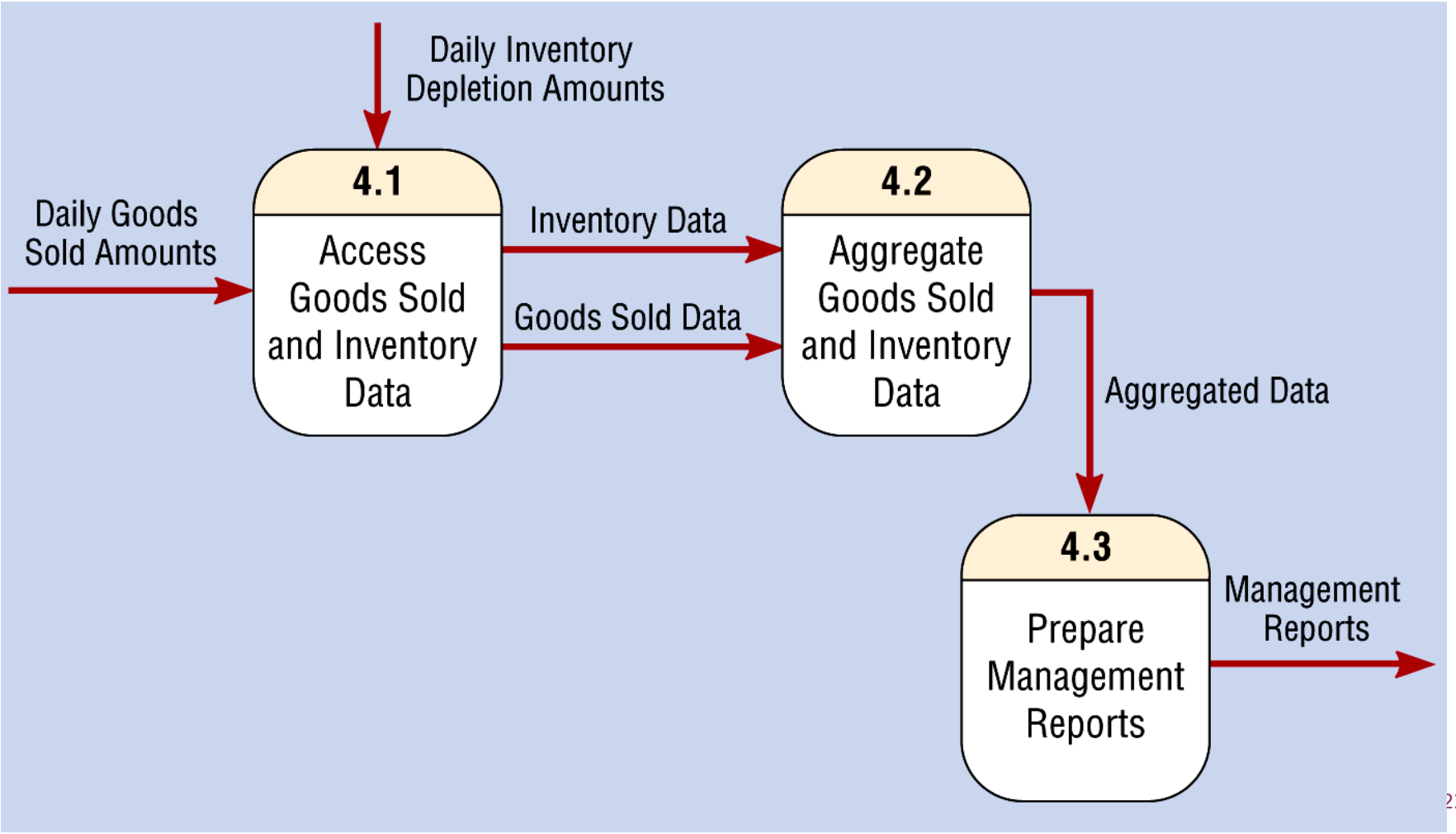
LEVEL-0 DFD OF FOOD ORDERING SYSTEM



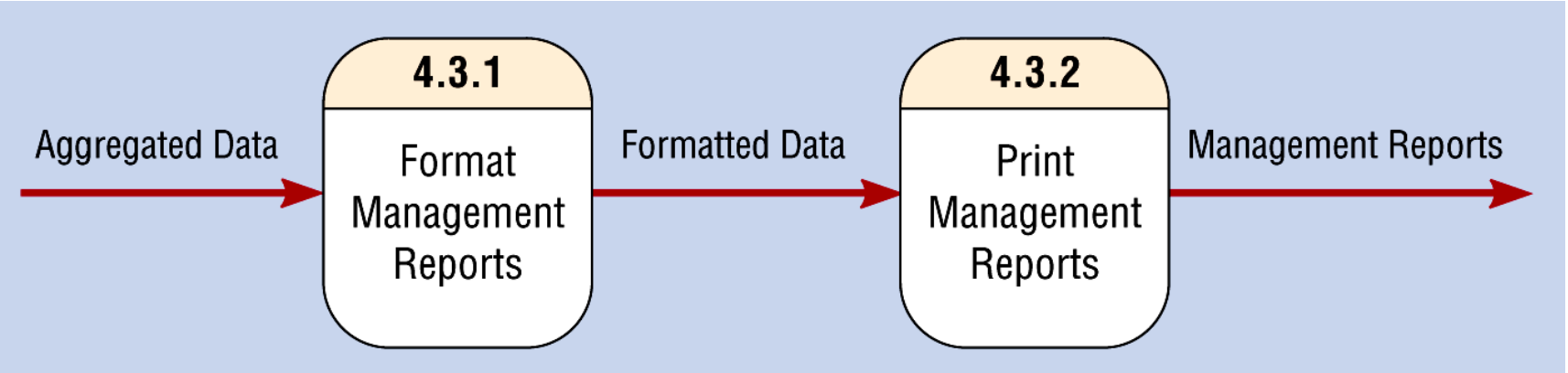
LEVEL-1 DIAGRAM SHOWING DECOMPOSITION OF PROCESS 1.0 FROM THE LEVEL-0 DIAGRAM



LEVEL-1 DIAGRAM SHOWING THE DECOMPOSITION OF PROCESS 4.0 FROM THE LEVEL-0 DIAGRAM

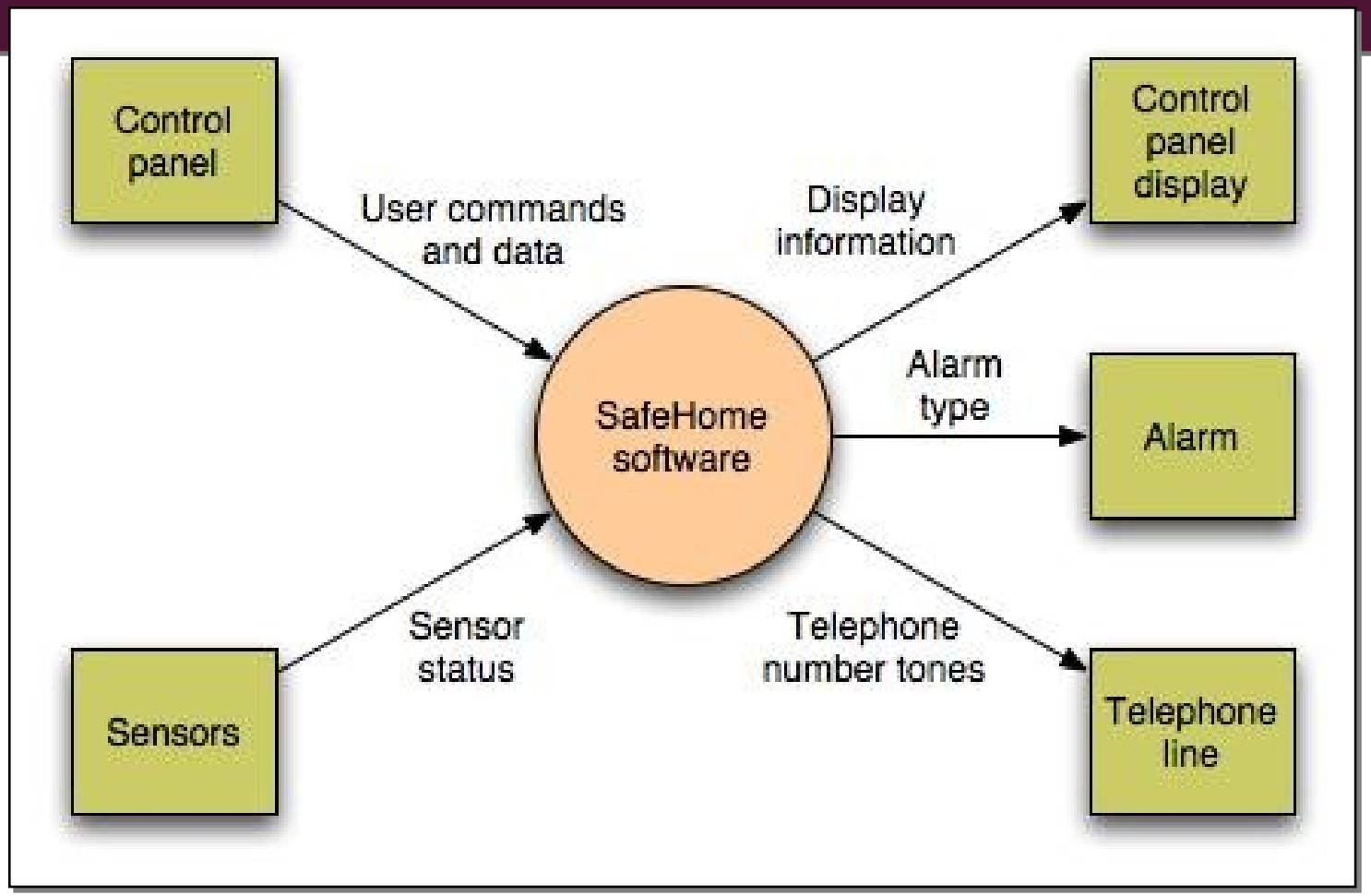


LEVEL-2 DIAGRAM SHOWING THE DECOMPOSITION OF PROCESS 4.3 FROM THE LEVEL-1 DIAGRAM FOR PROCESS 4.0

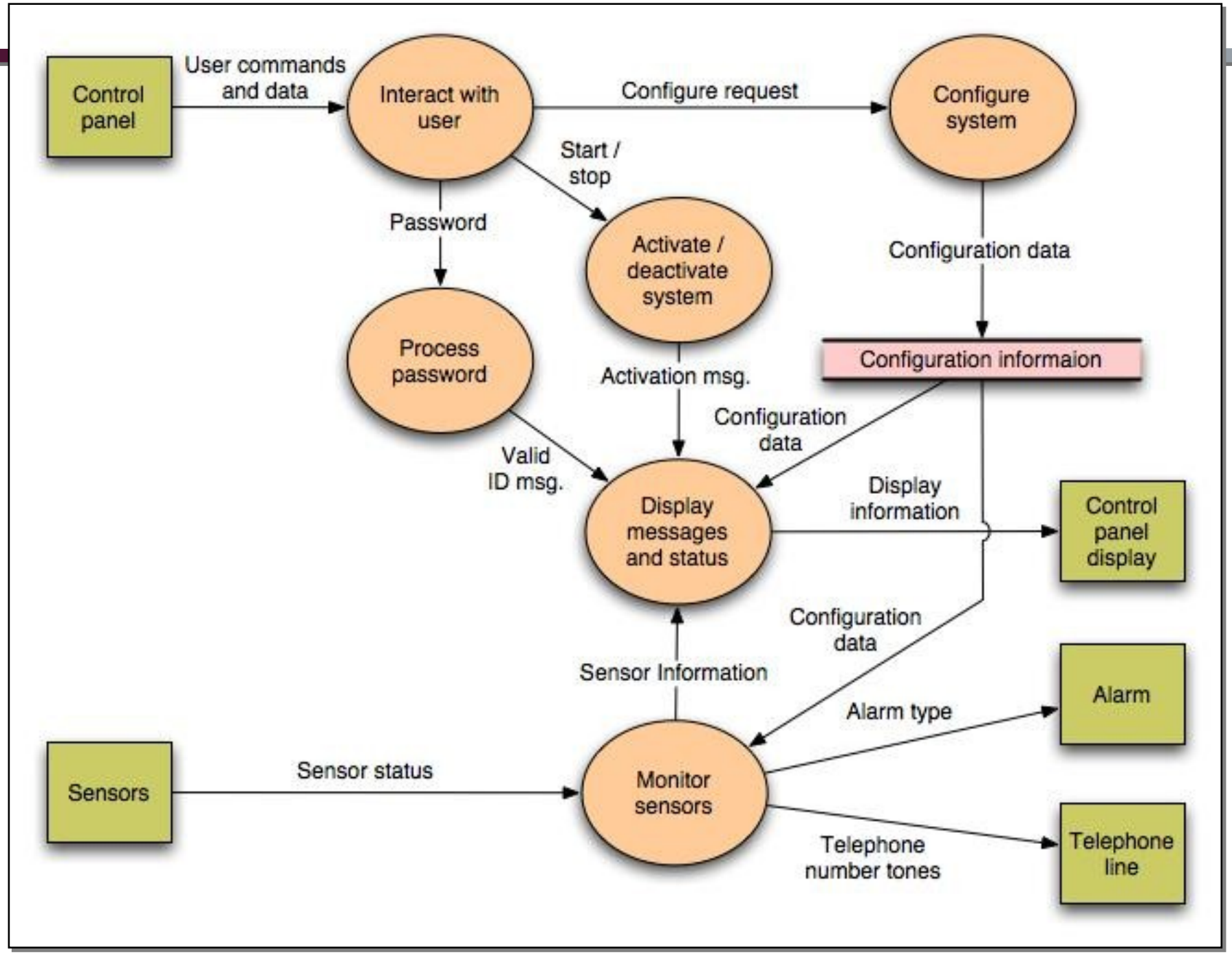


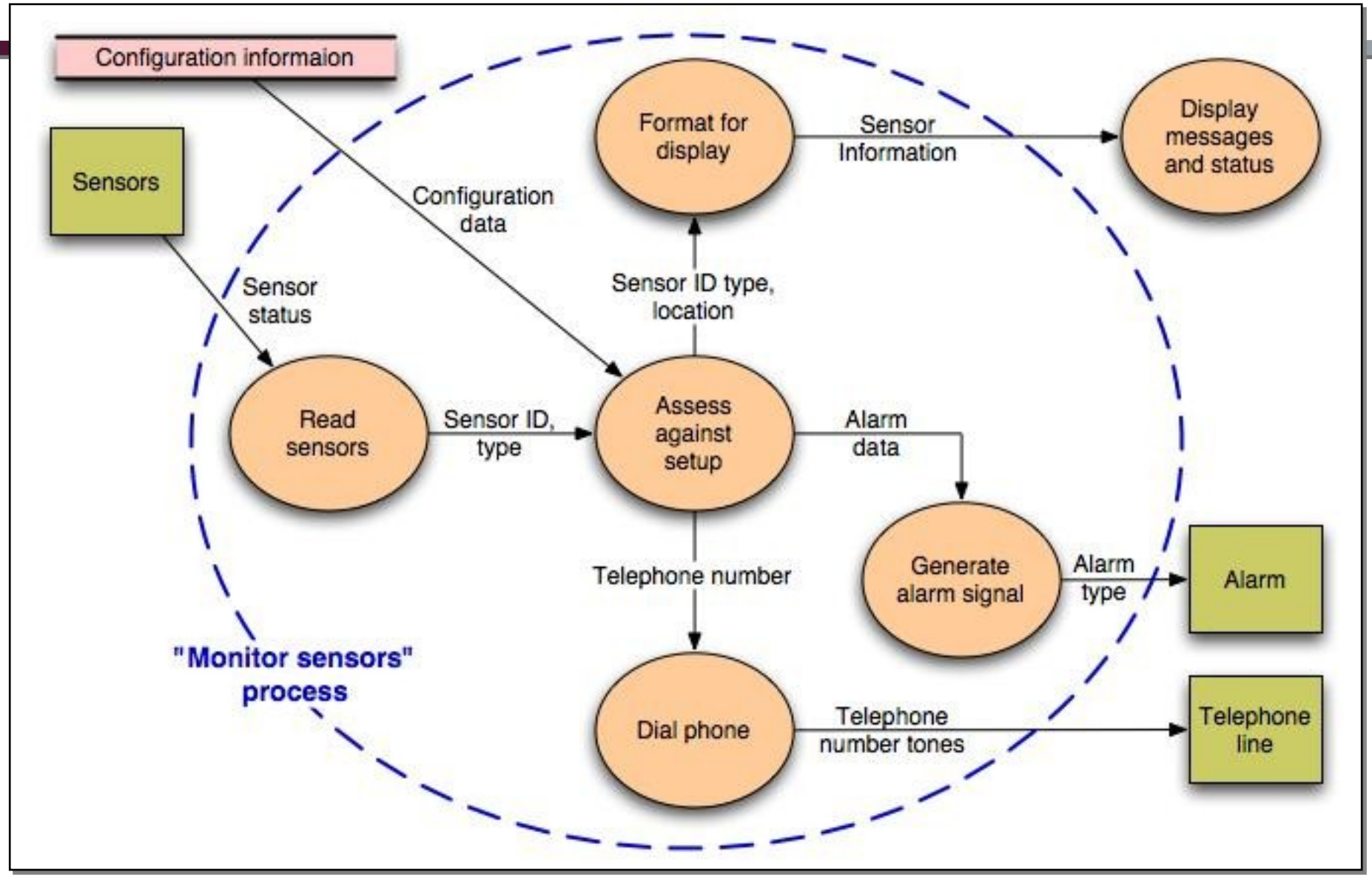
DATA FLOW DIAGRAM OF SAFE HOME SYSTEM

DATA FLOW DIAGRAM



Context-level DFD for *SafeHome* security function


Control panel
User commands and data
Interact with user
Configure request
Configure system
Start / stop
Password
Activate / deactivate system
Configuration data
Process password
Configuration informaion
Activation msg.
Configuration data
Valid ID msg.
Display messages and status
Display information
Control panel display
Configuration data
Sensor Information
Alarm type
Alarm
Sensors
Sensor status
Monitor sensors
Telephone number tones
Telephone line



Level 2 DFD that refines the monitor sensors process

HAVE A GOOD DAY!