System Models

System Model

- System models provides the abstract description of the system whose requirements are being analysed.
- It is a tool for describing, visualizing, analysing and verifying the requirements before proceeding with design.
- To facilitate the common understanding standard graphical tools, techniques and models are used for describing the specifications.

System Model

Essential elements of system models are

a) **Environmental Model :** It defines the scope of the proposed system and its boundaries. It consist of statement of purpose, context diagram and events of the system.

b) **Behavioural Model :** It describes the functional requirements, internal behavioural and data entities of the system. It consists of ER diagram, DFD, State Transition diagram.

c) **Implementation Model :** It describes the design specification of the software and consist of software architecture, data design, interface design and component design.

d) **Structural Model :** It emphasise on modelling the structure of the data that is processed by the system.

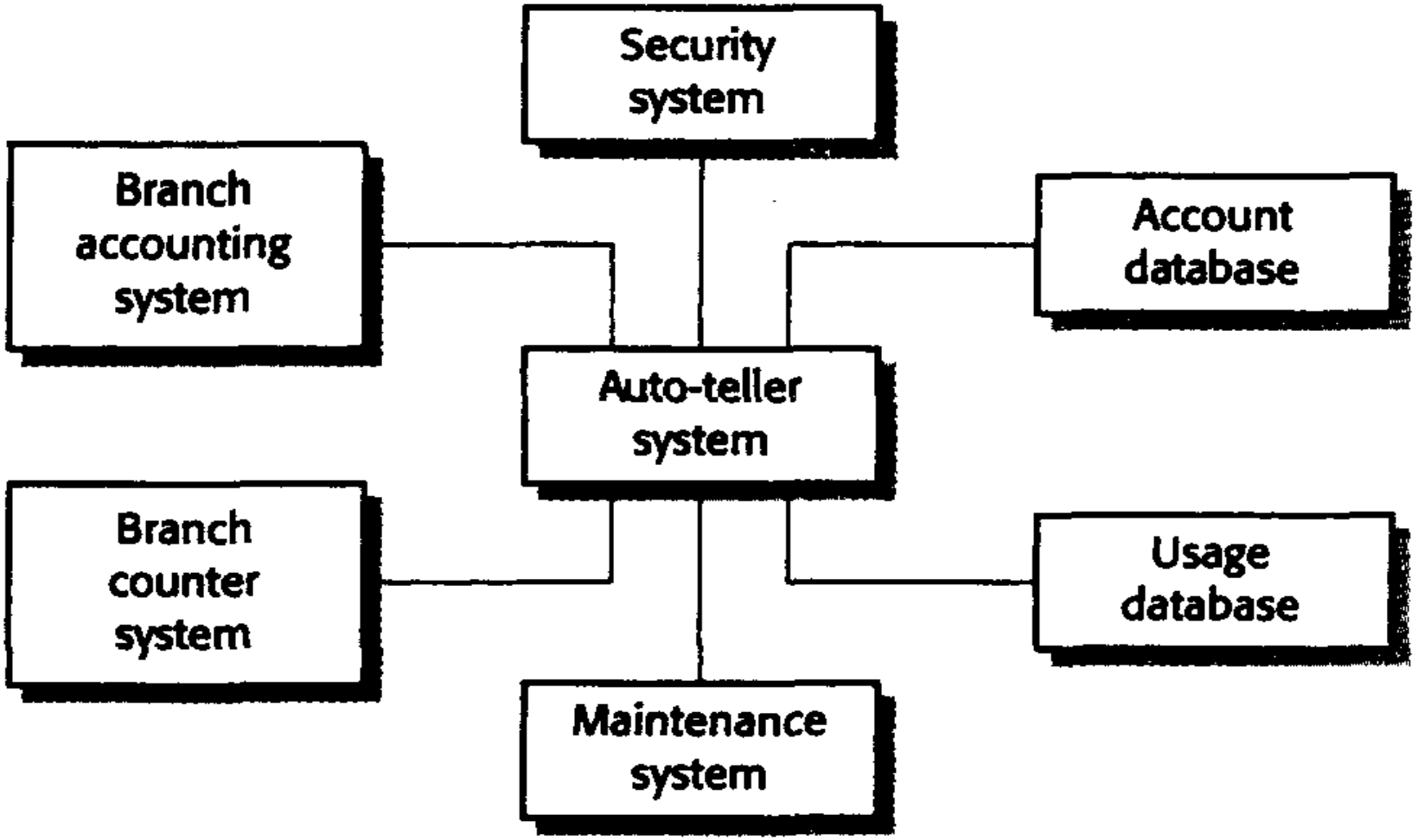
TYPES OF SYSTEM MODEL

- **Data processing Model :** Data processing model showing how the data is processed at different stages.
- **Composition Model :** Composition model showing how entities are composed of other entities.
- **Architectural Model :** Architectural model showing principal subsystems
- **Classification Model :** Classification model showing how entities have common characteristics.
- **Stimulus/response model :** Stimulus/response model showing the system’s reaction to events

Context Models

- Context models are used to illustrate the boundaries of a system
- Social and organisational concerns may affect the decision on where to position system boundaries
- Architectural models show the a system and its relationship with other systems

Context Of ATM System



Context Models

- In the above figure each ATM is connected to account database, local branch accounting system, a security system and a system to support machine maintenance.
- The system is also connected to usage database that monitors how the networks of ATM is used and to a local branch counter system.
- This counter system provides services such as backup and printing.
- These therefore need not be included in the ATM system itself
- Architectural models describes the environment of the system but do not show the relationships between the other systems in the environment and the system that is being specified
- Simple architecture models are supplemented by other models such as process models that show the process activities by the system

Behavioral Model

- Behavioral models are models of the dynamic behavior of a system as it is executing. They show what happens or what is supposed to happen when a system responds to a stimulus from its environment.

- You can think of these stimuli as being of two types:
  - Data Some data arrives that must be processed by the system.
  - Events Some event happens that triggers system processing. Events may have associated data, although this is not always the case.

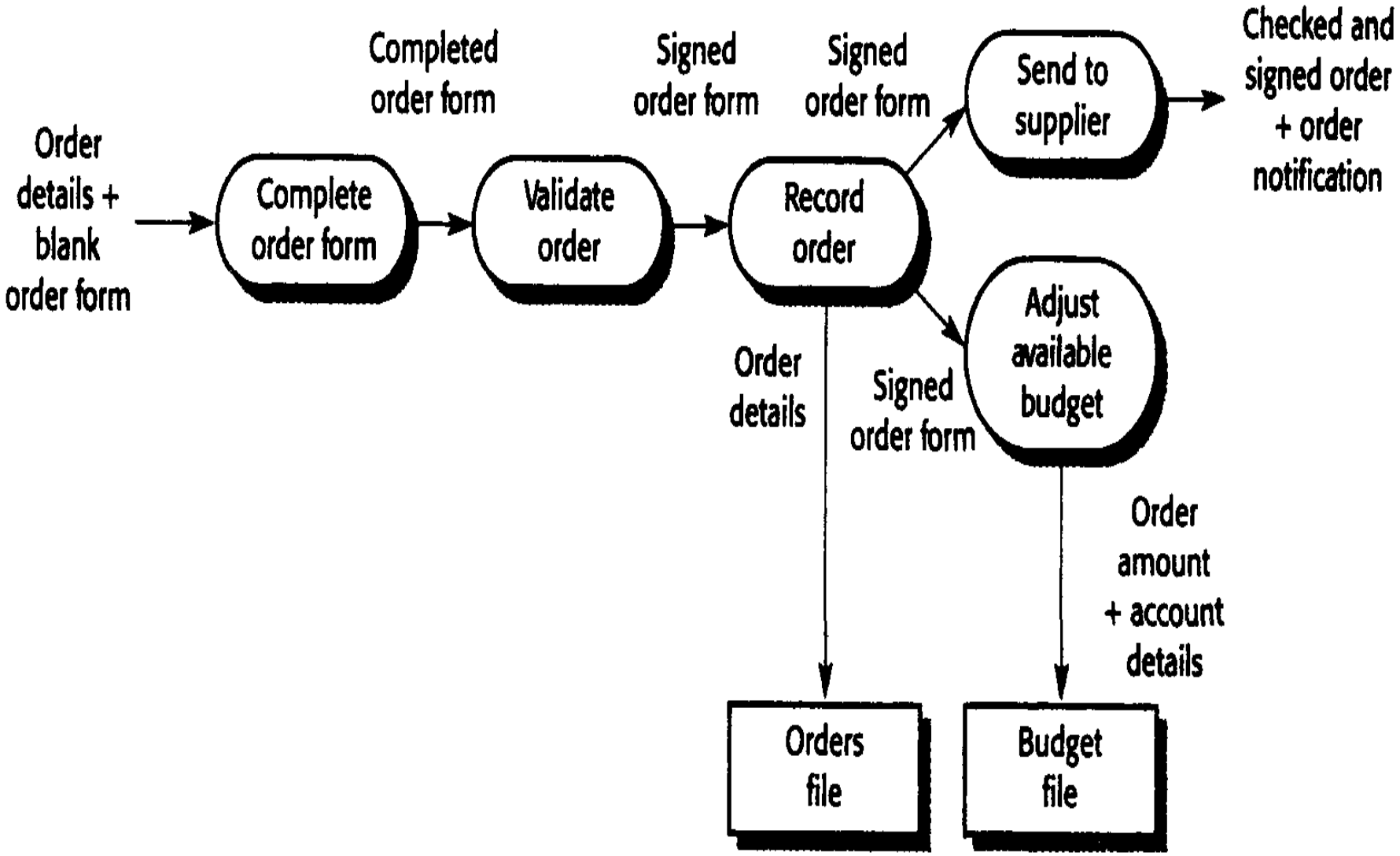
Data-processing models

- Data flow diagrams are used to model the system’s data processing
- These show the processing steps as data flows through a system
- Basic part of many analysis methods
- Simple and in-built notation that customers can understand
- Show end-to-end processing of data

Data Models

- An important part of system modeling is defining the logical form of data processed by the system. These are called as semantic data models.
- The most widely used data modeling technique is ERA (Entity-Relation-Attribute) modeling
- The relationship models devised from this system are in 3NF and hence they been widely used
- Data models lack detail and more descriptions of ERA must be maintained.
- Data dictionaries are used to develop system models
- It is simply an alphabetical list of names included in model
- The advantages of data dictionary are it checks for the uniqueness and warns against name duplications and it stores all data in a single place
- The following figure is an example of data model

Data Flow Model For Order Processing



Data Flow Model For Insulin Pump