S1 Informatic Engineering

Advanced Software Engineering

Overview: Structured Analysis

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SYLLABUS

1. Introduction Advanced Software Engineering
2. Overview: Structured Analysis – DFD, ERD, STD
3. Overview: Structured Design – Architecture, Interface, Data
4. Introduction Web Application + Requirement Web. App
5. Web Engineering Basic Concepts
6. Introduction OOA (Object Oriented Analysis) – (Team and Topic)
7. Present Final Project Topic

Overview: Structured Analysis

- What is the purpose of the analysis?
- What are modeled in analysis?
- What is the relationship between the model of analysis?

Overview: Structured Analysis (2)

- What is the purpose of the analysis?

Model the problem to make it more easily understood and prepared in solution design

Overview: Structured Analysis (3)

- What are modeled in analysis?

- Functional Modeling: DFD (Data Flow Diagram)
- Data Modeling: ERD (Entity Relationship Diagram)
- Behavior Modeling: STD (State Transition Diagram)

Overview: Structured Analysis (3)

- What is the relationship between the model of analysis?

- Data store (DFD) vs. Entity/ Relationship (ERD)
- Process (DFD) vs. Action (STD)

→ should be ensured to be consistent

Overview: DFD (Data Flow Diagram)

- What are modeled on the DFD?

- Mention DFD elements!

Overview: DFD (2)

- What are modeled on the DFD?

- Process and data flow between processes
- Process at DFD level 1 relates to the needs of software functionality

Overview: DFD (3)

- Mention DFD elements!
  - External Entity
  - Process
  - Data flow
  - Data store

Overview: DFD Elements

1. External Entity

- The external entity represents a person or a part of an organization which sends or receives data from the system but considered to be outside the system boundary (scope of the project).
- Common errors related to external entity: Incomplete described

Overview: DFD Elements (2)

2. Process

- Processes are transformations, changing incoming data flows into outgoing data flows.

Overview: DFD Elements (2)

2. Process

- Common errors related to process:
  - → naming process
  - → Process that does not have a data input -> "magic"
  - → Process that does not have a data output -> "black hole"

Overview: DFD Elements (3)

3. Data Flow

- A data flow shows the flow of data from a source to a destination.
- The flow is shown as an arrowed line with the arrowhead showing the direction of flow. Each data flow should be uniquely identified by a meaningful descriptive name (caption).

Overview: DFD Elements (3)

3. Data Flow

- Common errors related to data flow:
  - Naming the data are too generic, ex: DATA, REPORTS
  - “Tramp data”; data out of the process but doesn’t change the name
  - Data flows directly from the external entity to a data store
  - The data flow from data store to data store
  - There is a flow of data from one external entity to another external entity

Overview: DFD Elements (4)

4. Data Store

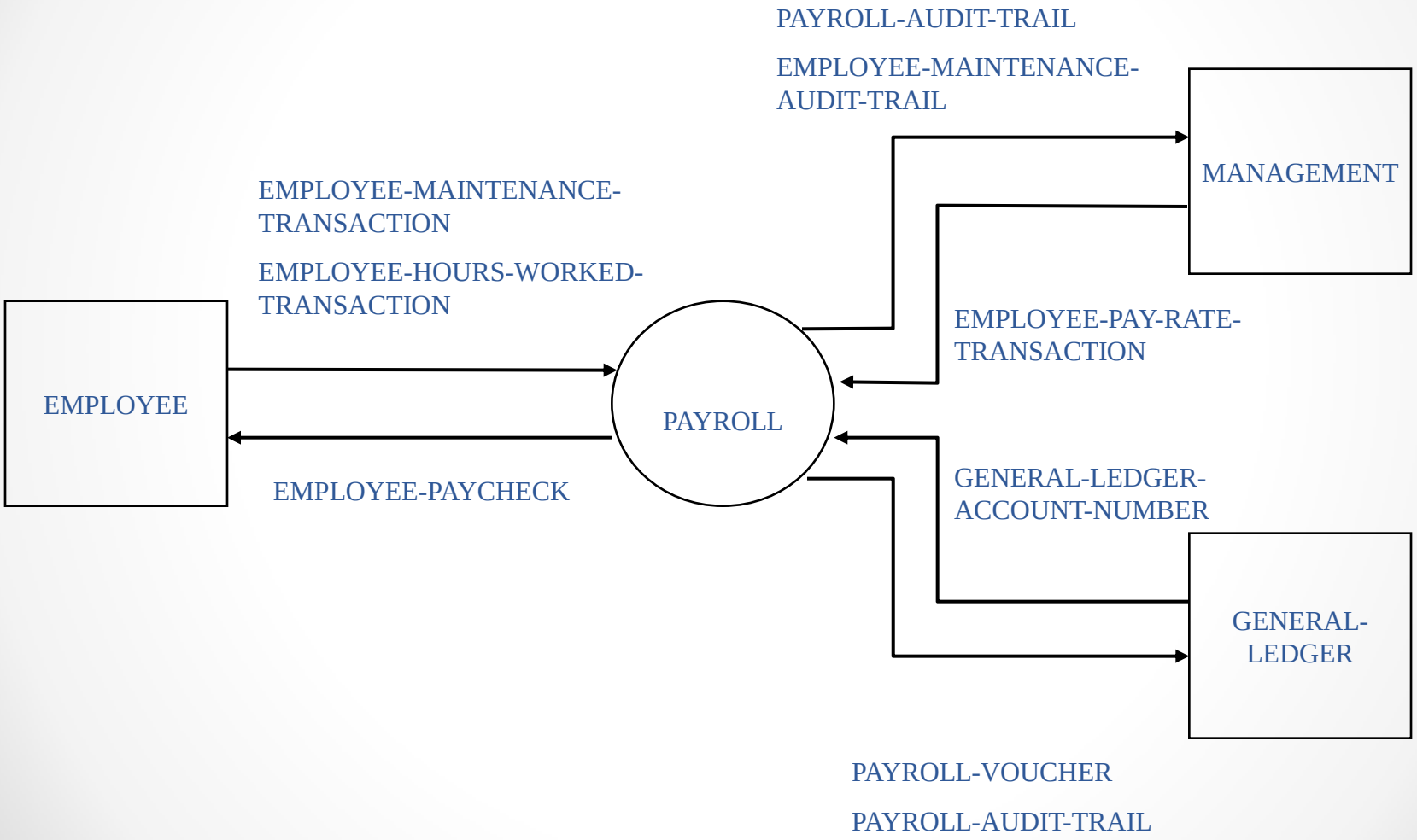
- A store is a repository of data; it may be a card index, a database file, a temporary pile of sales orders awaiting processing, or a folder in a filing cabinet.
- The store may contain permanent data or temporary accumulations (pending documents, daily movements).

Overview: DFD Elements (4)

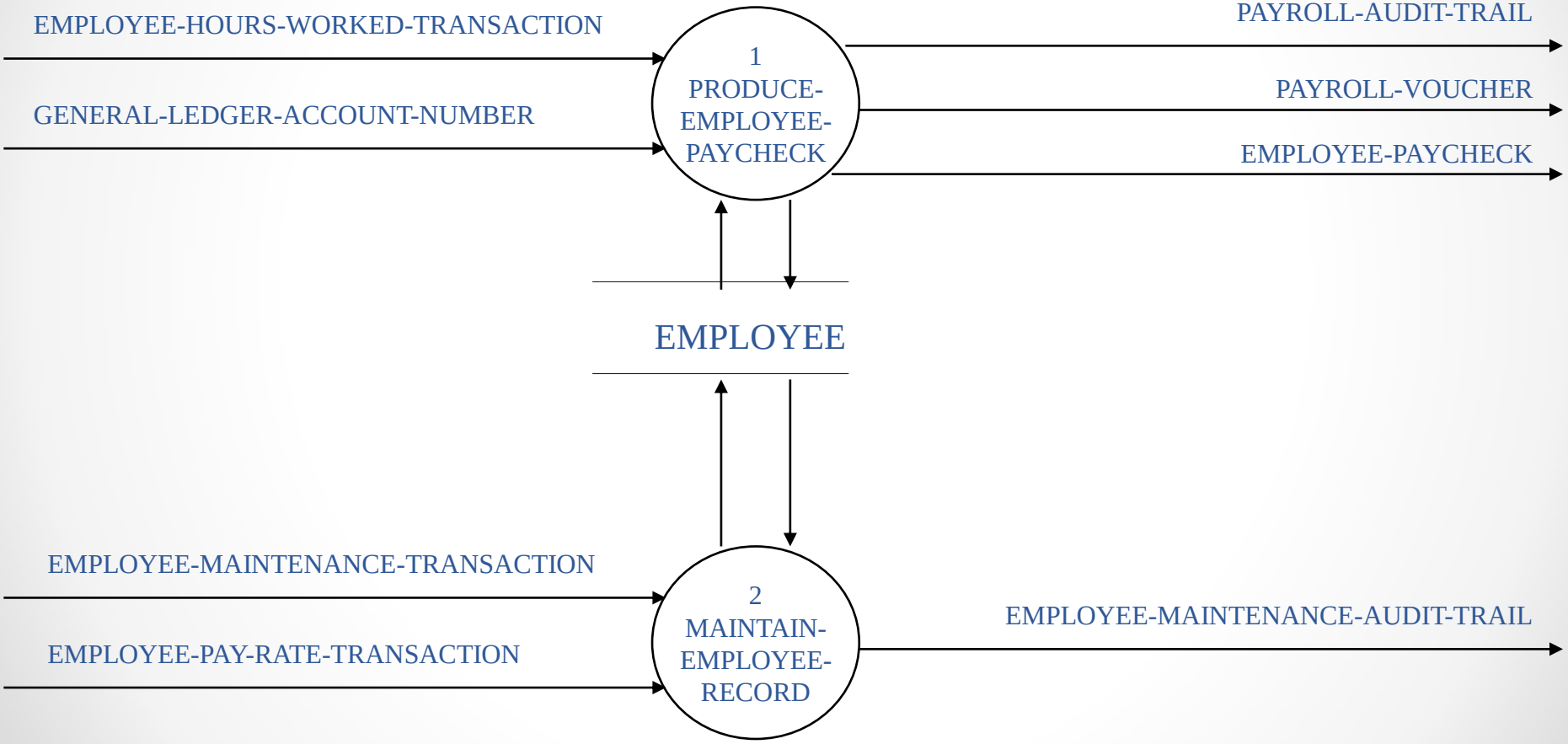
4. Data Store

- Common errors related to the data store:
  - Data stores are too generic, eg .: DATA, REPORTS, DATABASE
  - The data store is too detailed, eg .: AGE, ADDRESS
  - The data store is never filled, only read only
  - The data store is never read, only filled only

Example: Context Diagram



Example: DFD Level 1



Overview: ERD

- What are modeled in the ERD?
- What element ERD?

Overview: ERD (2)

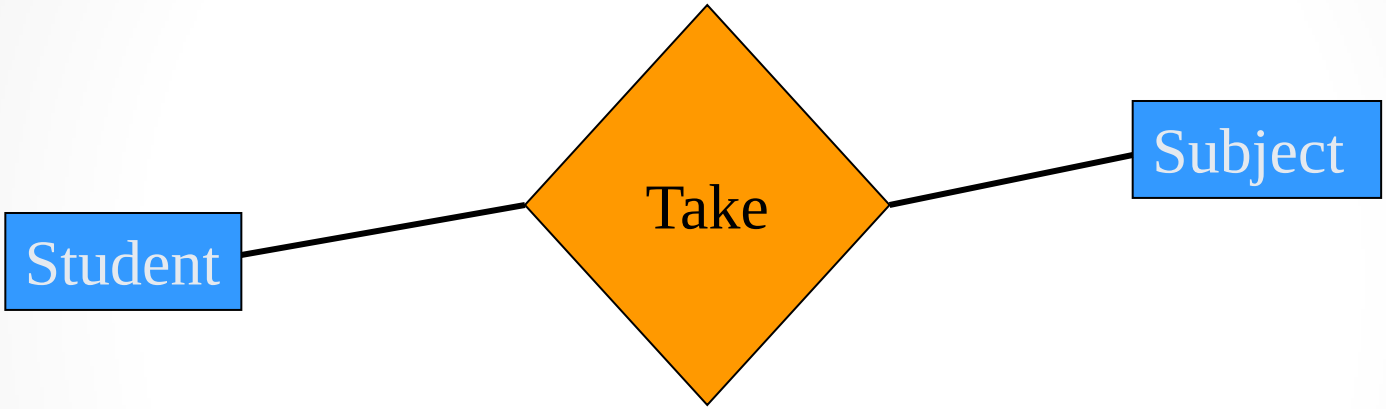
- What are modeled in the ERD?

The data that must be managed software and their relationships

Overview: ERD (2)

- What element ERD?
  - ✓ Entity / Entities
  - ✓ Relationship
  - ✓ Attributes
  - ✓ Cardinality
  - ✓ Modality

ERD Example



Overview: ERD Elements

- **Entity**

An item or object which can be distinguished from other objects

Example:

- Individuals: employees, customers, students, distributors.
- Place: building, office, campus.
- Object: books, motorcycles, package software, products
- Events: registration, ordering, billing
- Concept: account, qualifications.

Overview: ERD Elements

- **Entity**
  - Common errors related entities:
    - Entity will only have 1 of data, eg: COMPANY, whereas there is only 1 company data
    - Entities are too detailed, eg: AGE, ADDRESS
    - Naming the entity is not clear, eg: DATABASE

Overview: ERD Elements (2)

- **Relationship**
  - Association of two or more entities
  - A verb

Overview: ERD Elements (2)

- **Relationship**
  - Common errors related relationships:
    - Naming less fit
    - Not illustrated with full

Overview: ERD Elements (3)

- **Attributes**

  Property owned by each entity that will be stored data.

  Example:

  Customer attributes

  - ID
  - Name
  - Address

Overview: ERD Elements (3)

- **Attributes**
  - Common errors related attributes:
    * Naming less fit
    * Attribute property not describe entities or relationships
    * Not identified with complete

Overview: ERD Elements (4)

- Cardinality
  - The figures indicate the number of occurrences of an object associated with the appearance of objects in a relation
  - Possible combinations: (1:1, 1:N, M:N)

Overview: ERD Elements (4)

- Modality

Participation of an entity in a relationship

- 0 if participation is "optional" / partial
- 1 if participation is "mandatory" / total

Example:

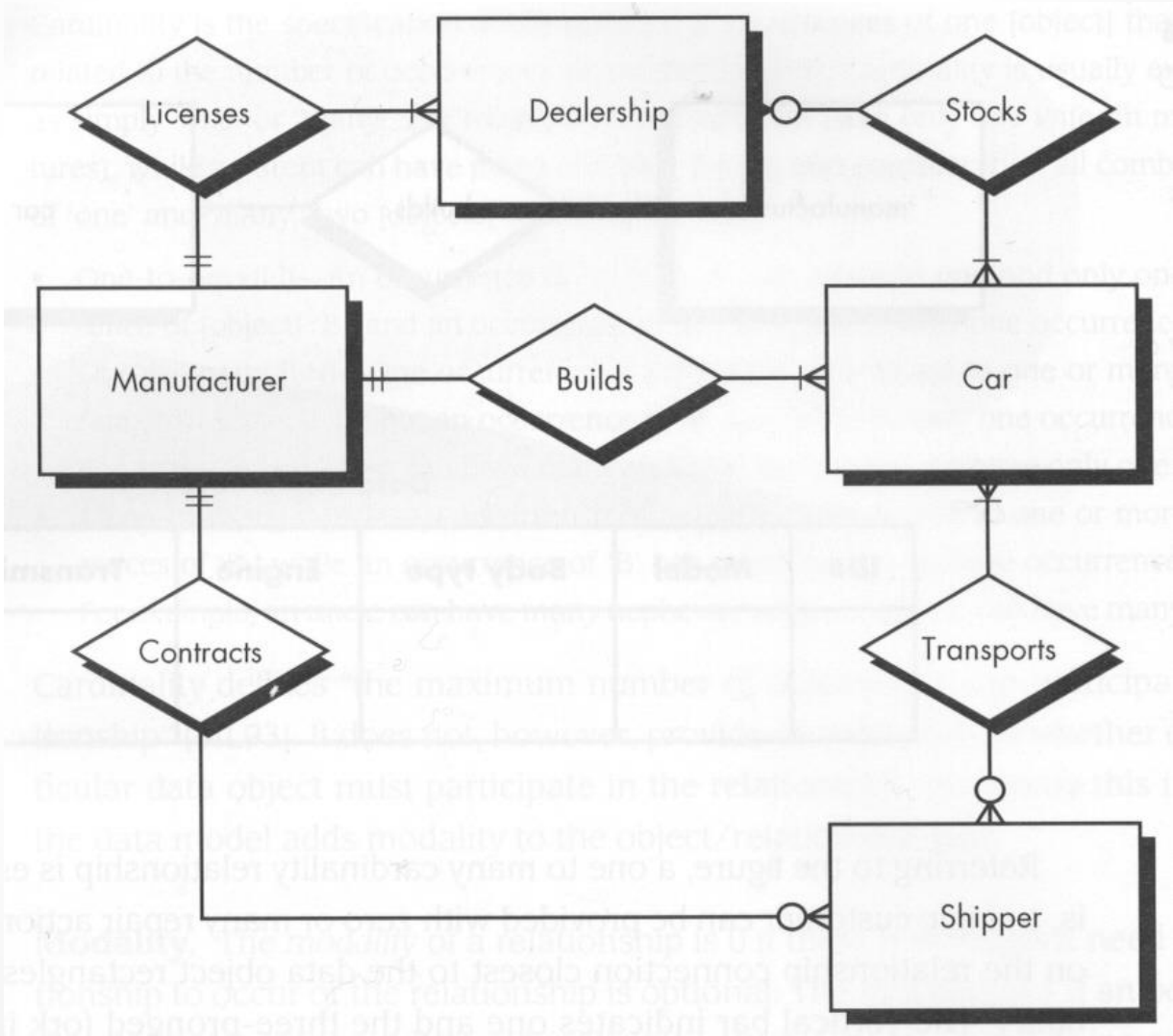
Total participation

- Each child has a mother

Partial participation

- Not every woman has a child

ERD Example (2)



Overview: State Transition Diagram

- What are modeled on STD?
- What elements of STD?

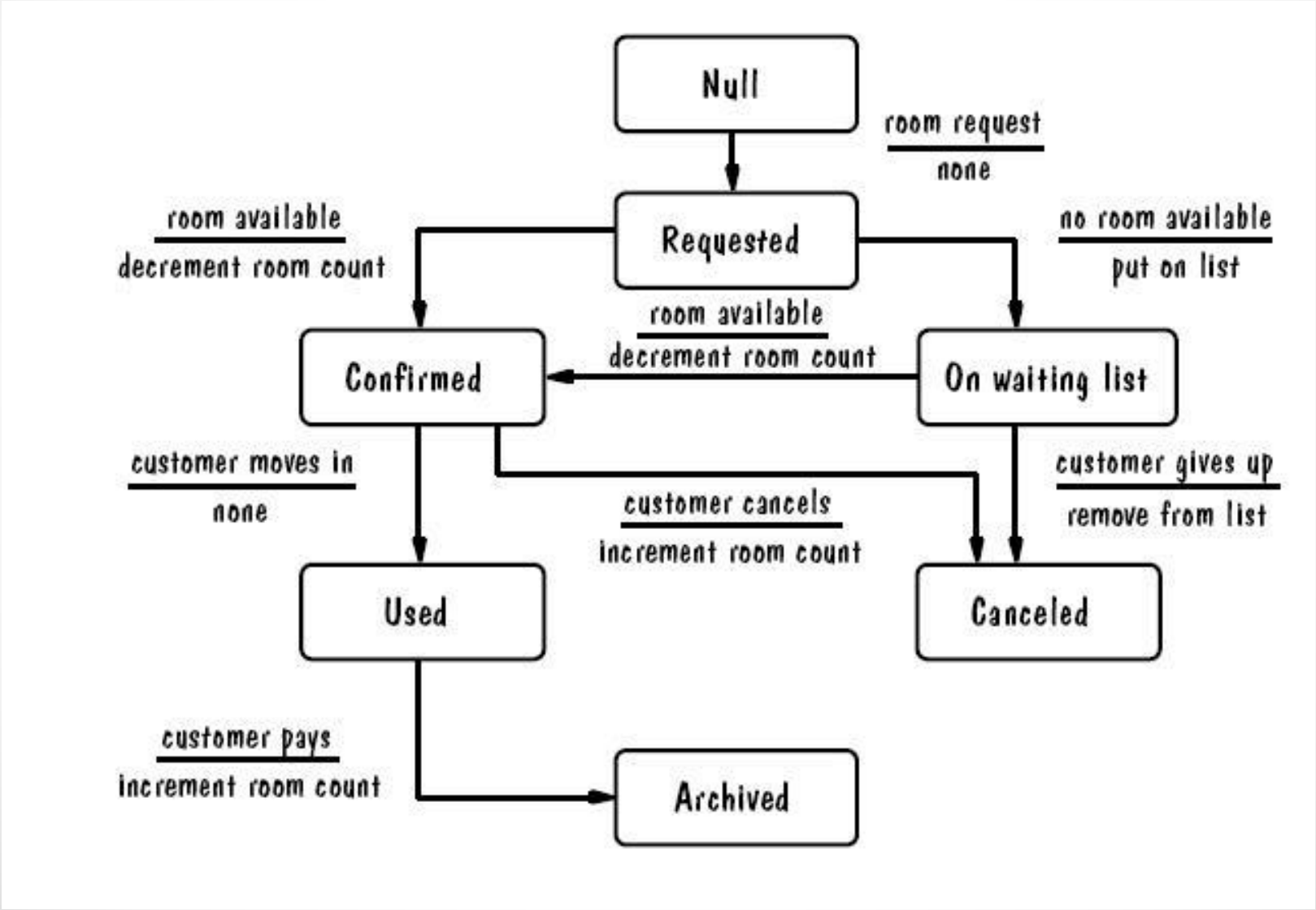
Overview: State Transition Diagram (2)

- What are modeled on STD?
  - Dynamic aspects of software

Overview: State Transition Diagram (2)

- What elements of STD?
  - State
  - Event
  - Action

Example: State Transition Diagram



THANK YOU