Chapter 2

Learning Objectives

- Understand that organizations and their members are systems and that analysts need to take a systems perspective.
- Depict systems graphically using context-level data flow diagrams, and entity-relationship models, use cases, and use case scenarios.
- Recognize that different levels of management require different systems.
- Comprehend that organizational culture impacts the design of information systems.

Three Main Forces Shaping Organizations

1. Levels of Management

Organizations consist of interconnected subsystems influenced by different levels of management. These levels include **operational Control**, **middle management / Managerial planning and Control**, and **strategic management**. e.g. executives --> project managers --> team leaders ---> individual contributors.

2. Design of Organizations

Interrelated subsystems, such as operations, middle management, and strategic management, are influenced by the design of organizations and decision-makers across the system e.g. A flat organizational structure or a matrix organizational Structure

3. Organizational Cultures

Organizations are shaped by cultures and subcultures, influencing their functioning and interactions. e.g. encouraging creativity and risk taking

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Organizations as Systems:

- Conceptualized as systems designed to achieve predetermined goals.
- Composed of smaller, specialized sub-systems reintegrated to form an effective organizational whole.

Interrelatedness and Independence of Systems:

- All systems and subsystems are interrelated and interdependent. They have boundaries separating them from their environments.
- Processing inputs from environments and utilizing feedback for planning and control.
- An ideal system self-corrects or self-regulates.

Organizational Environments:

- Influenced by factors like community(physical location, demographics), economy(market factors, competition), politics and legal considerations.

Openness and Closedness:

- Systems can be open that is facilitating free information flow or closed that is restricting access to information and are also limited by numerous rules.

Virtual Organizations and Teams:

- Virtual organizations have parts in different locations.
- Utilize technology for virtual teams, offering benefits like cost reduction, rapid response and enabling employees spend time with loved ones.

Taking a Systems Perspective

- Understanding businesses requires a systems perspective.
- Subsystems must realize their interrelatedness to avoid problems arising from a narrow departmental focus.
- **Example:** In a manufacturing company, production, supply chain, and sales are interrelated subsystems.

Enterprise Resource Planning (ERP)

- Describes an integrated organizational information system software, used by an organization to manage their day-to-day activities.
- Affects various aspects, including employee work design, job competency, and strategic positioning.

Issues to Overcome for ERP Success

- User acceptance, integration with legacy systems(Old existing systems), upgrading functionality of ERP modules, Reorganizing work life of users and decision makers and strategic repositioning must be addressed.

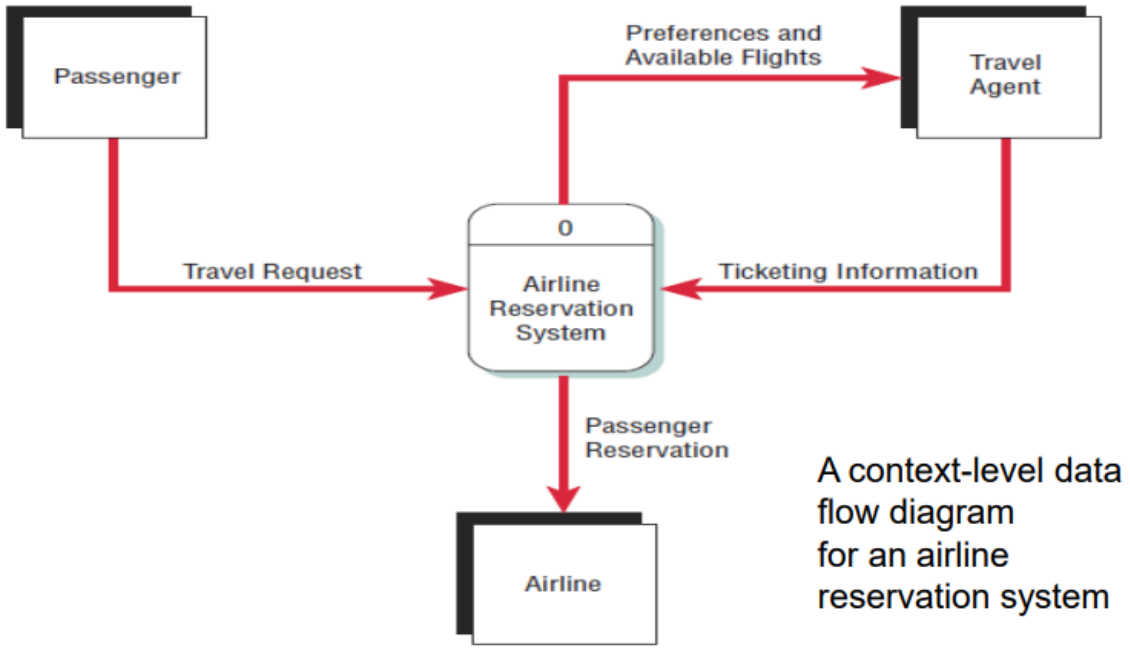
Depicting Systems Graphically

These methods enable us to show the scope of a system

1. **Context-level Data Flow Diagrams (DFD):**
    - **Description:** Context-level DFD is a visual representation of a system that shows how entities interact with it or simply the scope of a system. It also shows the how data flows into/out of the

system.

- **Example:**
  Consider an Airline reservation system. In a context-level DFD, you might have:
  - External Entities: Passenger, Airline, Travel Agent
  - Processes: Airline Reservation System
  - Data Flows: =Travel Request, Preferences and Available Flights, Ticketing Information, Passenger Reservation.



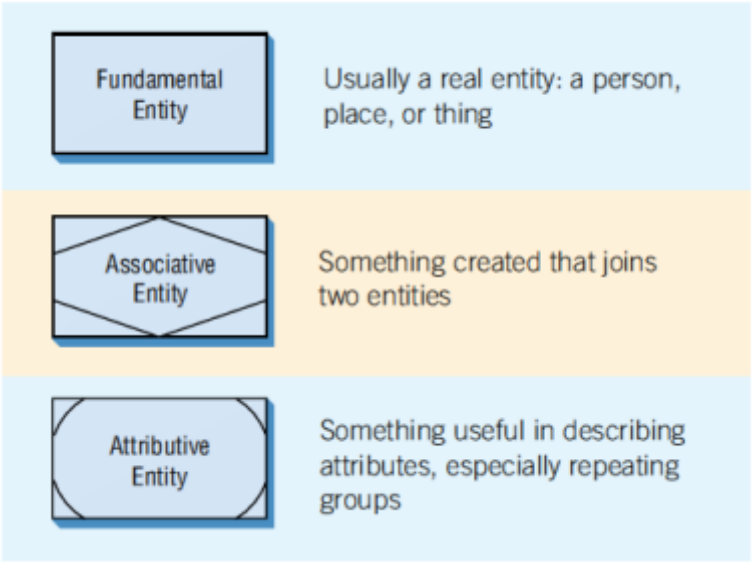
A context-level data flow diagram for an airline reservation system

2. **Entity-Relationship Model (ER Model):**
   - **Description:** An Entity-Relationship model is a graphical representation of the entities and the relationships between them within the organizational system. It
   - **Example:**
     In the context of a university database:
     - Entities: Student, Course, Professor
     - Relationships: Enrolls In (connecting Student and Course), Teaches (connecting Professor and Course)
     - Attributes: StudentID, CourseCode, ProfessorName

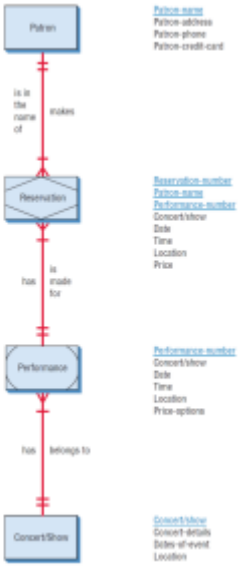
- Relationships: These show how entities of the ER model are connected. The relationship could be One-to-one, One-to-many, Many-to-many and Many-to-one.
- Entities: This is a thing / object in the real world. An entity contains attributes which define the entity. Types of entities used in E-R Diagrams:

  - ****Fundamental Entity**** Usually a person, place or thing.
  - ****Associative Entity:**** Something created that joins 2 entities.

- ****Attributive Entity:**** Something useful in describing attributes, especially repeating groups.



note: Data attributes may be added to the diagram



3. **Use Case Modeling:**

- **Description:** This is a technique used to capture and describe the interactions between a system and its external entities (actors). It Describes what a system does without describing how the system does it.

  Key Elements:
- **Actor:** Represents a user role or external entity.
  - Primary: Supply or receive data from the system and Define use case functionality.
    - Supporting: Maintain system operation or offer assistance e.g. Help desk personnel, analysts, programmers
- **Use Case Symbol:** Oval indicating a task.
- **Connecting Lines:** Arrows for behavioral relationships.

- Actors: particular role of a user in the system and are external entities existing outside the system.

Use Case Always Provides Three Things:

1. An actor that initiates an event
2. The event that triggers a use case
3. The use case that performs the actions triggered by the event

Use Case Behavioral Relationships:

- **Communicates:** Used to Connect an actor to a use case.
- **Includes:** Describes shared behavior among multiple use cases.
- **Extends:** Describes a use case handling variations or exceptions.
- **Generalizes:** Implies one thing is more typical than another.

Developing Use Case Diagrams:

1. **Review Business Specifications:**
   - Identify involved actors.
   - Utilize agile stories if applicable.
2. **Identify High-Level Events:**
   - Define primary use cases describing events.
   - Illustrate how actors initiate these events.
3. **Variations in Flow:**
   - Examine each primary use case for flow variations.
   - Consider possible deviations through the use case.
4. **Utilize Context-Level Data Flow Diagram:**
   - Use it as a starting point for creating use cases.

Developing Use Case Scenarios:

1. **Use Case Description:**
   - Comprises identifiers, initiators, and steps.
   - Three key areas: use case identifiers, steps performed, conditions.
2. **Use Case Header Area:**
   - Name, unique ID, application area.
   - Lists actors, stakeholders, and level.
   - Brief description of the use case.
3. **Use Case Levels:**
   - Describe the level of detail.
   - White (clouds): enterprise level.
   - Kite: business unit or department level.
   - Blue (sea level): user goals.
   - Indigo (fish): functional or subfunctional.
   - Black (clam): most detailed.

4. **Alternative Scenarios:**
    - Extensions or exceptions to the main use case.
    - Numbered with an integer, decimal point, integer.
    - Steps that may or may not always be used.
5. **Use Case Footer Area:**
    - Preconditions, postconditions, assumptions.
    - Minimal and success guarantees.
    - Outstanding issues, optional priority, and risk.

Steps to Create Use Cases:

- Utilize agile stories, problem definition objectives, user requirements, or a features list.
- Identify necessary tasks.
- Determine any iterative or looping actions.
- The use case concludes when the customer goal is achieved.

Why Use Case Diagrams Are Helpful:

- Identify all actors.
- Clearly show actions needed.
- Provide a worthwhile use case scenario.
- Emphasize simplicity and lack of technical detail.

note: The Main Reasons for Writing Use Cases Are Their Effectiveness in Communicating with Users and Their Capturing of User Stories

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Management in Organizations: Three Horizontal Levels

1. Operational Control:

- **Decision-Making:** Based on predetermined rules with predictable outcomes.
- **Responsibility:** Oversee operating details of the organization.
- **Nature:** Tactical and focused on routine operations.

2. Managerial Planning and Control:

- **Decision-Making:** Short-term planning and control decisions for resources and objectives.
- **Nature:** Decisions may be partly operational and partly strategic.
- **Timeframe:** Focus on immediate to short-term goals.

3. Strategic Management:

- **Decision-Making:** Looks outward to guide middle and operations managers, focusing on the future.
- **Environment:** Works in a highly uncertain decision-making environment.

- **Scope:** Defines the organization as a whole.

Managerial Levels:

- **Factors Affecting:** Different organization structure, leadership style, technological considerations, organizational culture, and human interaction.
- **Implications:** Carry implications for the analysis and design of information systems.

Organizational Culture:

- **Nature:** Organizations have cultures and subcultures.
- **Learning Mechanism:** Learn from verbal and nonverbal symbolism.

Verbal Symbolism:

- **Elements:** Myths, metaphors, visions, and humor.
- **Role:** Shapes the shared beliefs and values within the organization.

Nonverbal Symbolism:

- **Elements:** Shared artifacts, trophies, rites, rituals, promotions, birthdays, clothing, office placement, and decorations.
- **Role:** Reinforces cultural aspects through tangible expressions.