

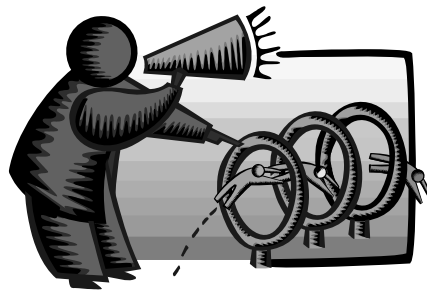
## What is Information System?

## In this lecture you will learn:

- How to define an Information System
- Some examples and types of Information System
- How to apply basic concepts of systems theory to Information System?
- How Information System are related to organizations?

## What is a System?

- How do we define a systems?
- What are the common characteristics of systems?

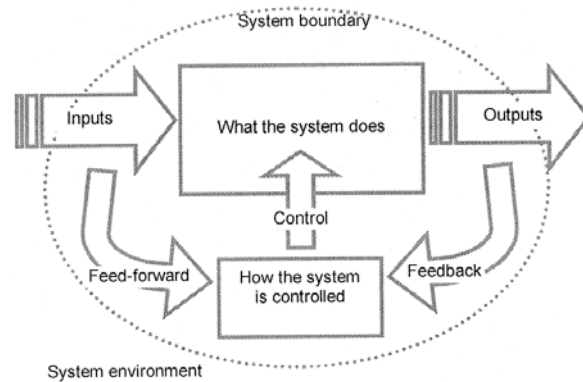


## A System is ...

- Exists in an Environment
- Has a Boundary
- Has Inputs and Outputs
- Has Interfaces
- May have Sub-system
- May have a Control Mechanism.
- May Rely on Feedback
- Has Emergent Properties

## Boundary and Environment

- A system is separated from its environment by some kind of boundary.

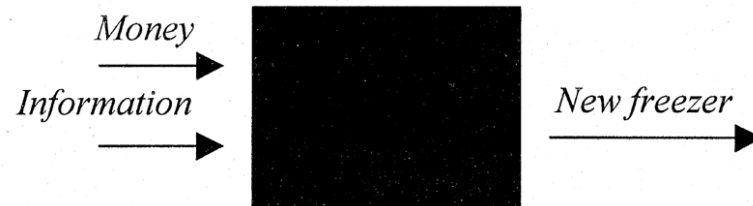


## Class Exercise

- Why are boundary and environment important for understanding a system?

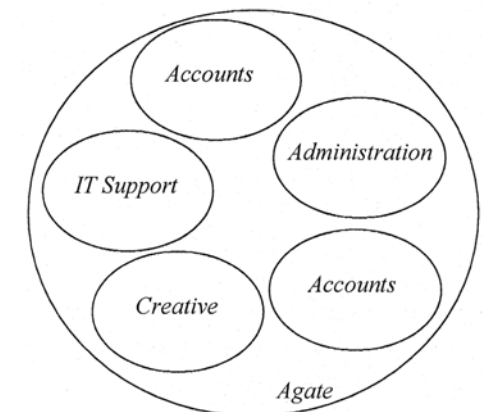
## Input, Output and Interface

- Systems have inputs and outputs. They receive inputs from their environment, and send outputs into their environment.
- Systems have interfaces which allows communication between two systems.



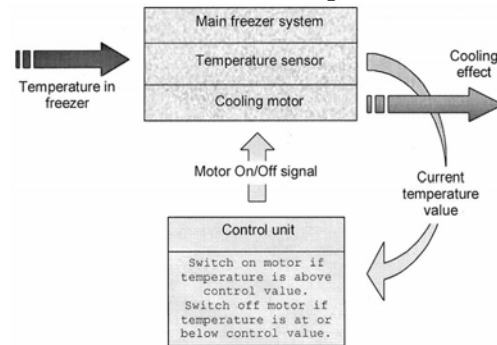
## Sub-system

- A system may have sub-systems.
- A sub-system is also a system, and may have sub-systems of its own.



## Control, Feedback & Feed-forward

- Systems that endure have a control mechanism.
- System control relies on feedback (and sometimes feed-forward). These comprise information about the system's operations or its environment, that is passed to the control mechanism.



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## Class Exercise

- What is the different between Feedback and Feed-forward?

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## Emergent Properties

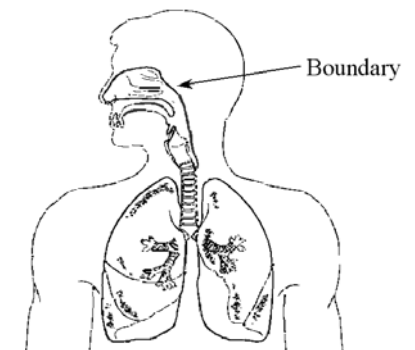
- A system has some properties that are not directly dependant on the properties of its parts.
- These are called emergent properties, as they only emerge at the level of the system as a whole.

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## Example: The Respiratory System

- Exists in an environment
- Has a boundary
- Has interfaces
- Has inputs and outputs
- May have
  - ◆ Sub-system
  - ◆ Control mechanism
  - ◆ Rely on feedback
  - ◆ Emergent properties



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## System Transformation

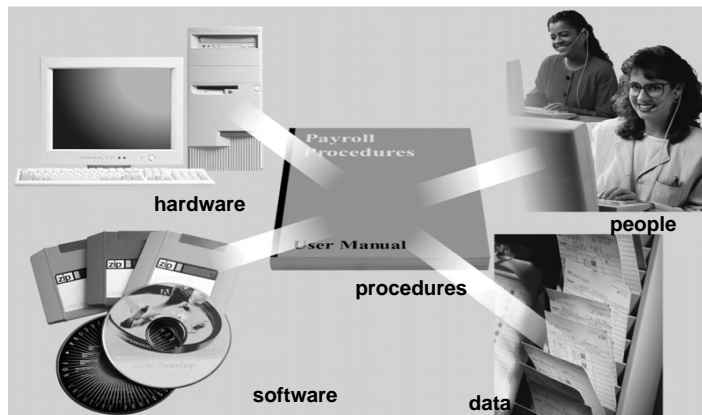
- All useful systems transform their inputs into useful outputs
- For Information System, both inputs and outputs are typically information
- This transformation is the whole reason for building and operating the system

## Information Technology (IT)

- A combination of
  - ◆ Hardware
  - ◆ Software
  - ◆ Telecommunications systems
- Support business operations
- Improve productivity
- Help managers make decisions.

## Information System (IS)

- Set of hardware, software, data, people, and procedures that work together to produce information



## Class Exercise

- What is the different between an Information System and Information Technology?

## Characteristics of Information System

- Information System like any other kind of system
- Every system has:
  - ◆ Inputs and outputs
  - ◆ A purpose (related to transformation)
  - ◆ A boundary and an environment
  - ◆ Sub-systems and interfaces
  - ◆ Control using feedback and feed-forward
  - ◆ Some emergent property

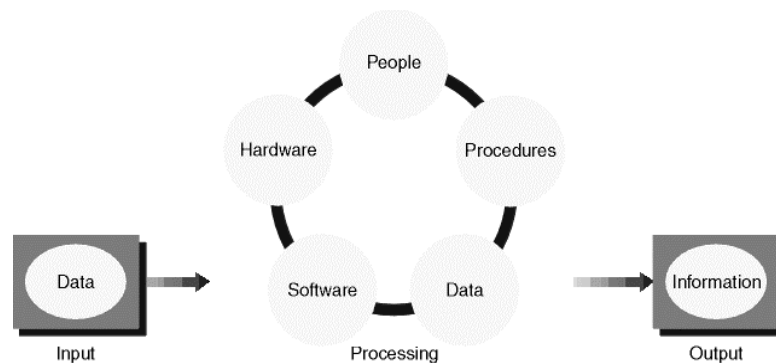


## Elements of an Information System

- Every Information System has:
  - ◆ A human activity that needs information
  - ◆ Some stored data
  - ◆ An input method for entering data
  - ◆ Some process that turns the data into information
  - ◆ An output method for representing information

## Information System Components

- An Information System has five key components: Hardware, Software, Data, Processes, and People.



## Information System Components

- Hardware
  - ◆ Hardware refers to the physical layer of the information system.
- Software
  - ◆ Software consists of system software and application software.
- Data
  - ◆ An information system transforms data into useful information.

## Information System Components

- Processes
  - ◆ Describe the tasks that users, managers, and IT staff members perform.
- People
  - ◆ Users, sometimes called end users, include employees, customers, vendors, and others who interact with an information system.

## Class Exercise

- Define information. How does it differ from data?

## Class Exercise

- Describe how knowledge differs from information.

## Functionality of Information System

- Information Systems are used to support people's activities
- Store and retrieve information
- Carry out calculations
- Aid communication
- Control and schedule work
- Provide other support?

## Functionality of Information System

- Operational Systems assist or control business operations
- An Accounting System replaces costly and error-prone human clerks
- Management Support Systems help managers to decide or to communicate
- A Market Intelligence System helps decide where to site a new retail store

## Functionality of Information System

- Real-time Control Systems typically operate physical equipment, often in safety-critical settings
- Some cars have an Engine Management System to control fuel supply and ignition

## Example of Information System

- Enterprise Computing Systems
  - ◆ Enterprise computing refers to information systems that support company wide data management requirements.
- Transaction Processing Systems
  - ◆ Transaction Processing (TP) systems and Online Transaction Processing (OLTP) systems are called operational systems because they process data generated by day-to-day business operations.
- Business Support Systems
  - ◆ Business Support Systems (BSS) provide job-related information support to users at all levels of a company.

## Example of Information System

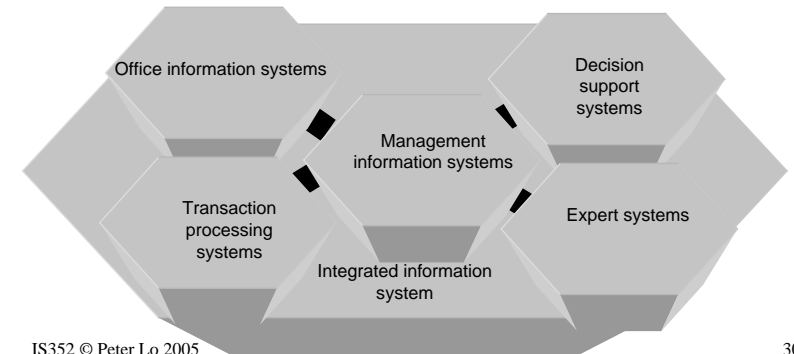
- Knowledge Management Systems
  - ◆ Knowledge management systems are sometimes called expert systems because they simulate human reasoning by combining a knowledge base and inference rules that determine how the knowledge is applied.
- User Productivity Systems
  - ◆ User productivity systems provide employees at all organizational levels with a wide array of tools that can improve quality and job performance.

## Example of Information System

- Management Information Systems (MIS)
  - ◆ Converts raw data from transaction processing system into meaningful form
- Decision Support Systems (DSS)
  - ◆ Designed to help decision makers
  - ◆ Provides interactive environment for decision making
- Expert Systems (ES)
  - ◆ Replicates decision making process
  - ◆ Knowledge representation describes the way an expert would approach the problem

## Information Systems Integration

- Systems that combine enterprise computing, transaction processing, business support, knowledge management, and user productivity features.



## Class Exercise

- What is the purpose of a management support system?

## Class Exercise

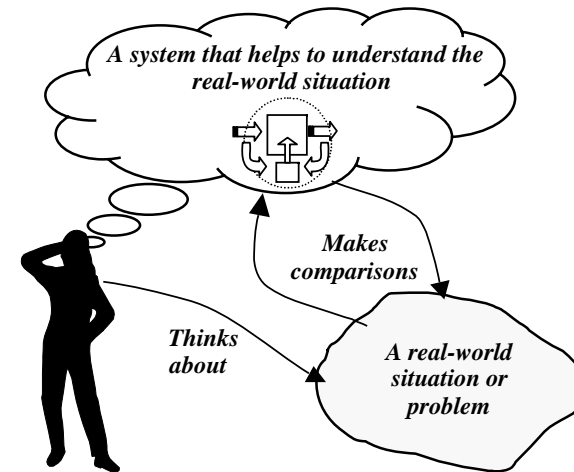
- Identify some things that a computerized information system can do, which are difficult or impossible for a non-computerized equivalent.



## Are Systems Real?

- Maybe, maybe not!
- Systems thinking is useful because it helps to analyze and understand problems
- What matters is the understanding you achieve
- You can choose to see anything as a system, whether or not it really is one

## Systems and the Real World



## Class Exercise

- Why does it not matter whether a system is real, or exists only in someone's mind?

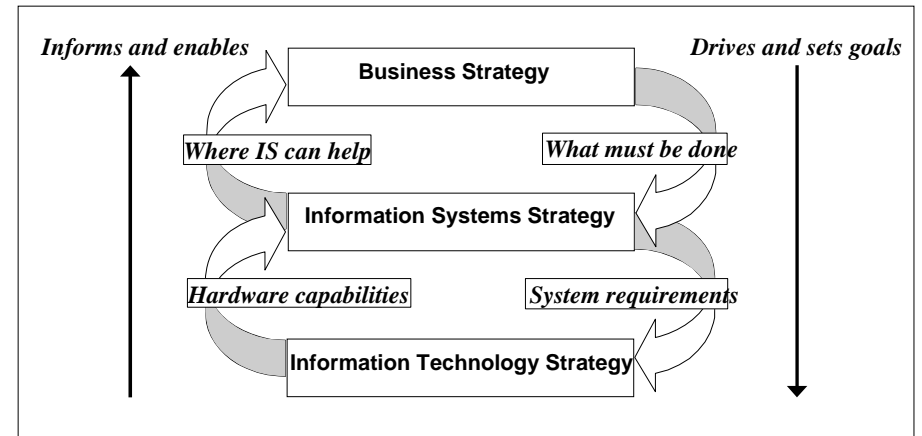
## How do Information System relate to the Human Activity System?

- We can view an organization as a system, perhaps with many sub-systems
- Ideally, each sub-system helps the overall system fulfill its purpose
- Information System are also sub-systems and should help to meet goals of people in the organization

## Class Exercise

- Why has a human activity system more than one purpose?

## Strategy and Planning for Information System



## Class Exercise

- What is meant by disaster between business goals, information system strategy and information technology strategy?

## Class Exercise

- What are the relationships between business goals, information systems strategy and information technology strategy?