What is Information System?

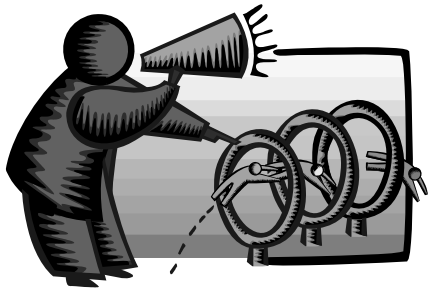
Chapter 1

Learning Outcomes

- 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?

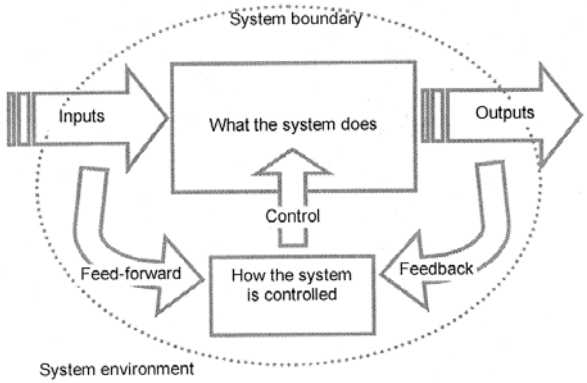


A System is …

- 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

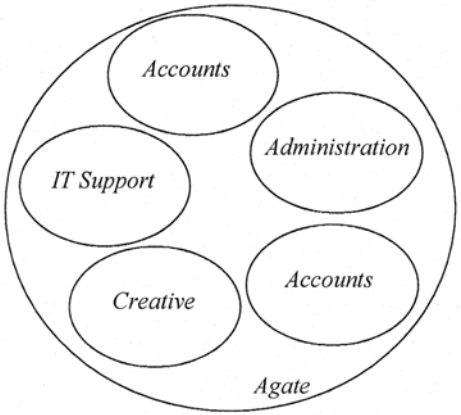
- Why are boundary and environment important for understanding a system?

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.

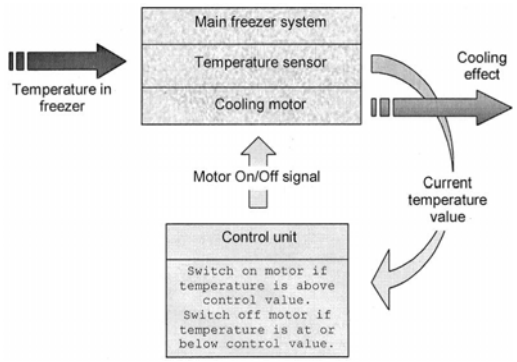
Sub-system

- 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.



Class Exercise

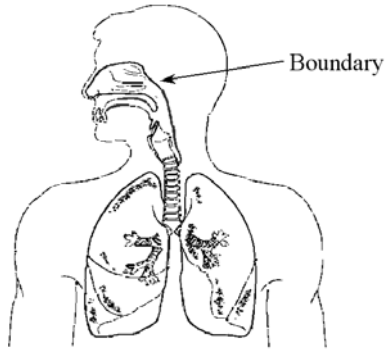
- What is the different between Feedback and Feed-forward?

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.

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



System Transformation

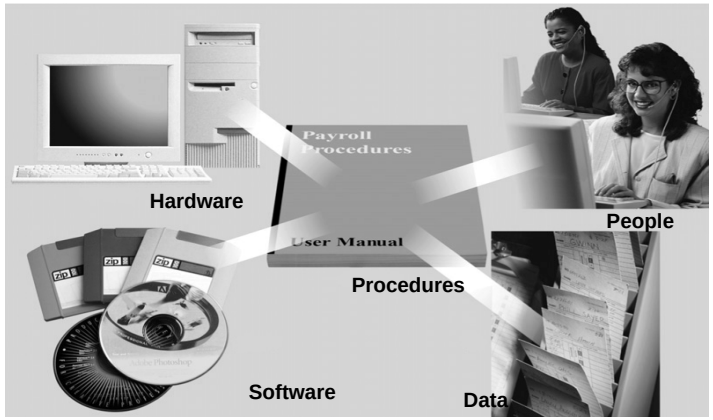
- All useful systems transform their inputs into useful outputs
- For Information System, both inputs and outputs are typically information
- This transformation is the whole reason for building and operating the system

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

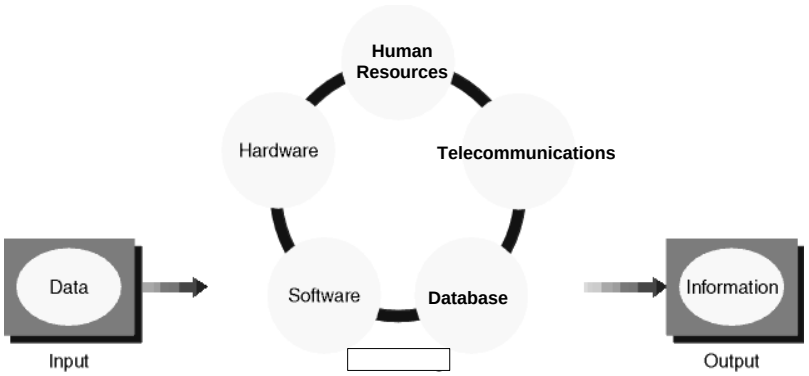
- Information System like any other kind of system
- Every system has:
  - Inputs and outputs
  - A purpose (related to transformation)
  - A boundary and an environment
  - Sub-systems and interfaces
  - Control using feedback and feed-forward
  - Some emergent property

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

Components of Information System

- An Information System has five key components: Hardware, Software, Database, Telecommunications, and Human Resources



Components of Information System – Human Recourses

- Human Resources include the users of an information system and those who develop, maintain and operate the system.
  - Examples: operators, users, management.

Components of Information System – Hardware

- Hardware refers to all types of machines, not just computer hardware
- It also covers any media use by these machines, such as magnetic disks or paper.
  - Example: processors, disk, I/O devices.

Components of Information System – Software

- Software Resources not only refer to computer programs and the media on which they are stored.
- It can also be used to describe the procedures used by people.
  - Example: code, documentation

Components of Information System – Database

- Database can be defined as a collection of related information.
- The information held in the database is stored in an organized way so that specific items can be selected and retrieved quickly
  - Example: file, tables, fields of data

Components of Information System – Telecommunications

- Telecommunications is the method by which data and information are transmitted between different locations.
  - Example: LAN, WAN, Internet, Web

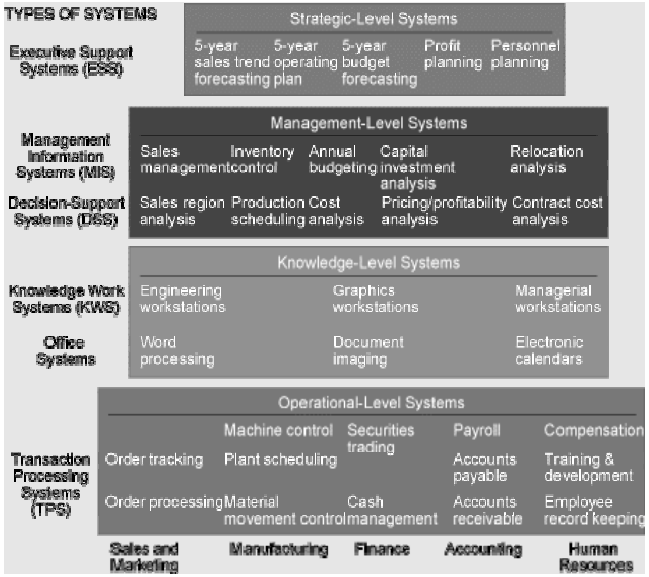
Class Exercise

- Define information. How does it differ from data?

Class Exercise

- Describe how knowledge differs from information.

Types of Information Systems



Types of Information Systems

- 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?

Types of Information Systems: Operational Systems

- Operational Systems assist or control business operations
  - An Accounting System replaces costly and error-prone human clerks

Types of Information Systems: Management Support Systems

- Management Support Systems help managers to decide or to communicate
  - A Market Intelligence System helps decide where to site a new retail store

Types of Information Systems: Real-time Control Systems

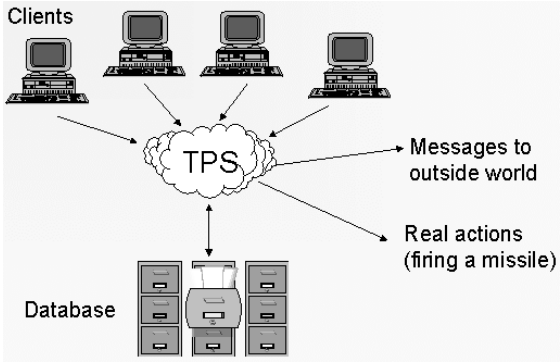
- Real-time Control Systems typically operate physical equipment, often in safety-critical settings
  - Some cars have an Engine Management System to control fuel supply and ignition

Classification of Information Systems

- There are various ways of classifying information systems.
- One common approach is to classify according to its main functions.
  - Transaction Processing Systems (TPS)
  - Information Reporting Systems (IRS)
  - Decision Support Systems (DSS)
  - Expert Systems (ES)
  - Executive Information Systems (EIS)
  - Office Automation (OA)

Transaction Processing Systems (TPS)

- Automated clerical and operational functions
- Track data at the most elementary level



Information Reporting System (IRS)

- Provide routine summary and exception reports, often drawing on transaction level data.

Decision Support System (DSS)

- Supports management decisions that are semi-structured or cannot be specified in advance
- Interactive and user-friendly

Expert System (ES)

- Captures human expert knowledge to solve problems
- Gives the computer the ability to make suggestions and act like an expert
- Captures the use of the wisdom of experts and specialists
- Years of experience and specific skills are not completely lost when a human expert dies, retires or leaves the company
- To solve complex problems and support difficult decisions

Executive Information System (EIS)

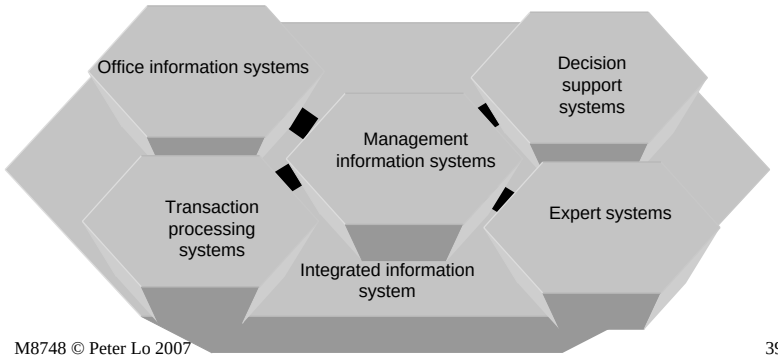
- Utilizes heavy graphics displays, draws together data from numerous internal and external sources
- Determine how certain data was produced
- For senior managers
- Drill down capabilities

Office Automation (OA)

- Office Automation (OA) refers to a wide variety of computer-based technologies that make office workers more productive at their jobs.
- This improvement in productivity can be achieved through increases in effectiveness or efficiency.

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?

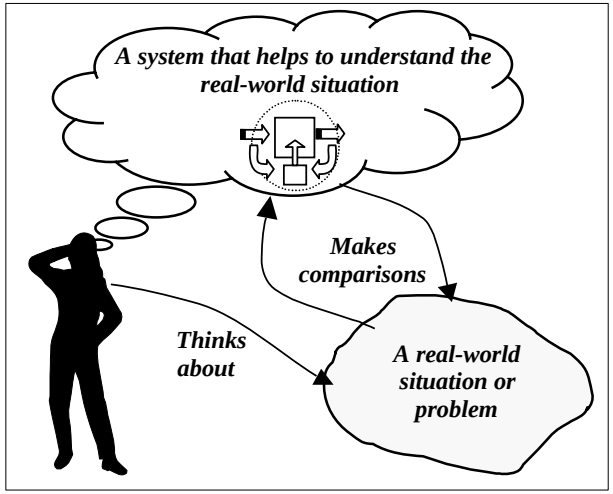
Class Exercise

- 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?

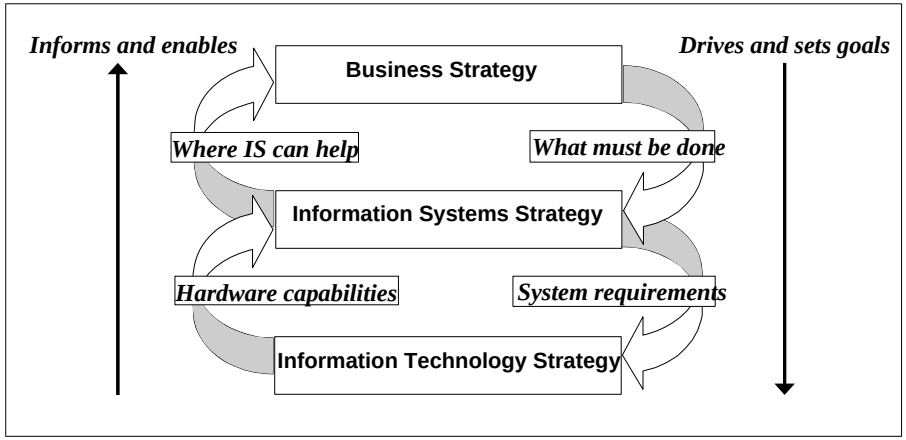
How do Information System relate to the Human Activity System?

- 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?