Information Systems
ISM 3011

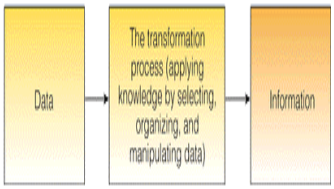
Fall 2003
Unit 1B

Information System

- A set of interrelated components that collect, manipulate, and disseminate data and information, and provide feedback to meet an objective
- Examples: ATMs, airline reservation systems, course reservation systems

Information System

FIGURE 1-2
The Process of Transforming Data into Information



IPO: Input – Processing - Output

Data vs. Information

- **Data:** raw facts
- **Information:** collection of facts organized in such a way that they have value beyond the facts themselves

Data vs. Information

Data

8-28-2003 Miller, John	37.40
8-28-2003 Smith, Bill	23.20
8-27-2003 Burger, Mary	11.11
8-26-2003 Miller, John	40.00

Information

Turnover 111.71

Total sales by customer:

Miller, John	77.40
Smith, Bill	23.20
Burger, Mary	11.11

Customers on August 28:
Miller, John
Smith, Bill

Types of Data

TABLE 1-1
Types of Data

Data	Represented By
Alphanumeric data	Numbers, letters, and other characters
Image data	Graphic images and pictures
Audio data	Sound, noise, or tones
Video data	Moving images or pictures

Machine-readable Content vs. Unstructured Data

ORDER
QTTY=3
ITEMNO=1234

Further Examples

Good	Bad
Structured text message	Fax Image
Vector drawing of a floor plan	Photo

The Characteristics of Valuable Information

TABLE 1-2
Characteristics of Valuable Data

Characteristics	Definitions
Accurate	Accurate information is error free. In some cases, inaccurate information is generated because inaccurate data is fed into the transformation process (this is commonly called garbage in, garbage out [GIGO]).
Complete	Complete information contains all the important facts. For example, an investment report that does not include all important costs is not complete.
Economical	Information should also be relatively economical to produce. Decision makers must always balance the value of information with the cost of producing it.
Flexible	Flexible information can be used for a variety of purposes. For example, information on how much inventory is on hand for a particular part can be used by a sales representative in closing a sale, by a production manager to determine whether more inventory is needed, and by a financial executive to determine the total value the company has invested in inventory.
Reliable	Reliable information can be depended on. In many cases, the reliability of the information depends on the reliability of the data collection method. In other instances, reliability depends on the source of the information. A rumor from an unknown source that oil prices might go up may not be reliable.

The Characteristics of Valuable Information

Relevant	Relevant information is important to the decision maker. Information that lumber prices might drop may not be relevant to a computer chip manufacturer.
Simple	Information should also be simple, not overly complex. Sophisticated and detailed information may not be needed. In fact, too much information can cause information overload, whereby a decision maker has too much information and is unable to determine what is really important.
Timely	Timely information is delivered when it is needed. Knowing last week's weather conditions will not help when trying to decide what coat to wear today.
Verifiable	Information should be verifiable. This means that you can check it to make sure it is correct, perhaps by checking many sources for the same information.
Accessible	Information should be easily accessible by authorized users to be obtained in the right format and at the right time to meet their needs.
Secure	Information should be secure from access by unauthorized users.

Timeliness

- How can barcodes on products help to improve the timeliness of inventory-related data in a company?

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Should data be "simple"? (p. 7)

- It should be well-structured and reduced to the relevant aspects.
- Defining the relevant data fields is a key task in IS design.

Relevance and Value of Information

- The text says that valuable data is "relevant" and that the value of information depends on the improved decisions they allow. Can we assess those two parameters in advance?

The relevance of data and the value of information are usually not known before you need or apply them.

Put In Nonsense, Get Out Chaos

- Accurate data is crucial.
- False or ambiguous data propagates and puts the integrity of the whole Information System at risk.
- This is an even bigger danger when multiple systems work together and exchange data.

System and Modeling Concepts

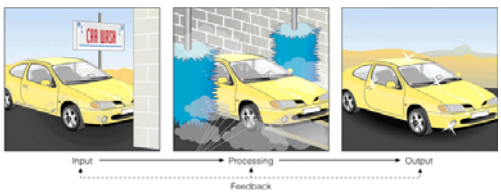
System

- A set of elements or components that interact to accomplish goals

- Input
- Processing mechanism
- Output
- Feedback
- System boundary

Components of a System

FIGURE 1.3
Components of a System
A system's four components consist of input, processing, output, and feedback.



System	Elements			
	Inputs	Processing mechanisms	Outputs	Goal
Coffee Shop	Coffee beans, tea bags, water, sugar, cream, spices, pastries, other ingredients, labor, management	Brewing equipment	Coffee, tea, pastries, other beverages and food items	Quickly prepared delicious coffees, teas, and various food items
College	Students, professors, administrators, textbooks, equipment	Teaching, research, service	Educated students; meaningful research; service to community, state, and nation	Acquisition of knowledge

FIGURE 1.4
Examples of Systems and Their Goals and Elements

System Performance and Standards

- Efficiency: output/input
- Effectiveness: extent to which system attains its goals
- Performance standard: specific objective of a system

System Variables and System Parameters

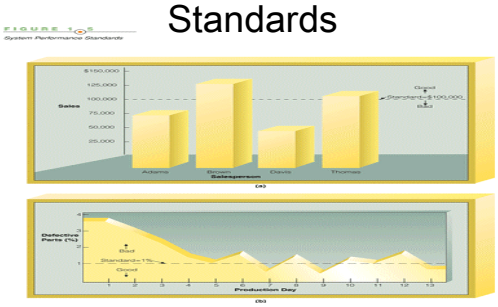
- System variable - item controlled by decision-maker
- System parameter - value that cannot be controlled

Systems Classification

TABLE 1-3
Systems Classifications and Their Primary Characteristics

Simple	**Complex**
Has few components, and the relationship or interaction between elements is uncomplicated and straightforward	Has many elements that are highly related and interconnected
Open	**Closed**
Interacts with its environment	Has no interaction with the environment
Stable	**Dynamic**
Undergoes very little change over time	Undergoes rapid and constant change over time
Adaptive	**Nonadaptive**
Is able to change in response to changes in the environment	Is not able to change in response to changes in the environment
Permanent	**Temporary**
Exists for a relatively long period of time	Exists for only a relatively short period of time

System Performance and Standards



Modeling a System

- A model is an abstraction that is used to represent reality
  - 4 major types of models
    - A narrative model is based on words
      - Logical, not physical
    - A physical model is tangible
    - A schematic model is a graphic representation
      - Graphs and charts
    - A mathematical model is an arithmetic representation

Why does it make sense to use models instead of reality?

- Reality is complex. It is easier to understand the functionality of a system once it has been reduced to its essential structure.
- Automation implies that we treat a set of individuals or items equally. That means, we must find a form of representation which is suited for each.

Modeling a System

Models should be validated!

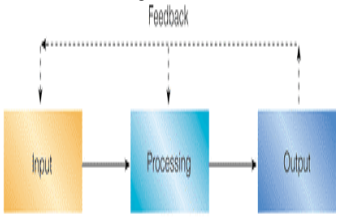
What Is An Information System?

Components of an Information System

FIGURE 1.7

The Components of an Information System

Feedback is critical to the successful operation of a system.

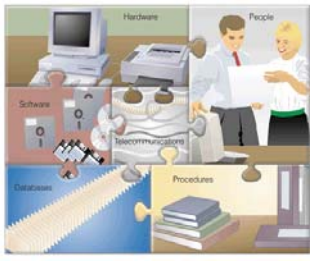


Computer-Based Information Systems (CBIS)

Components of a CBIS

FIGURE 1.8

The Components of a Computer-Based Information System

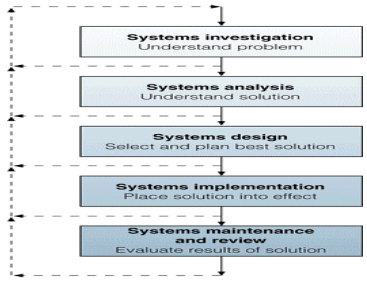


"…changing the way organizations conduct business."

What do you think is the better approach:

a) Write an individual program that exactly represents a company's current processes?
b) Change the company's processes to those already available in standard software?
c) First reengineer all processes and then write respective software.

Systems Development



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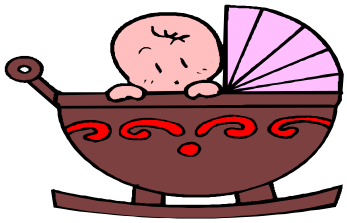
The Cradle Building Problem



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Summary

- Data - raw facts
- Information - data transformed into a meaningful form
- System - set of elements that interact to accomplish a goal
- Systems development - creating or modifying existing business systems

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Assignment for Next Class

- Read chapter 2 (p. 42 - 73)
- Self-Assessment test (p. 73)
- Check that you know the key terms listed on p. 74
- Prepare review questions 5, 14, 15, and 16 (p. 74)

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Thank you!

Any questions? Please send an e-mail to mhepp@computer.org!

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