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# Information Systems

## ISM 3011

Spring 2004  
Unit 1B

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## 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

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## Information System

**FIGURE 1.2**  
The Process of Transforming Data into Information

**IPO: Input – Processing – Output**

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## Data vs. Information

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

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## 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

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## 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

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# Machine-readable Content vs. Unstructured Data





The screenshot shows a window titled "19.wav - Audiotrecorder". It has a menu bar with "Datei", "Bearbeiten", "Effekte", and "?". Below the menu bar is a waveform display. On the left, it says "Position: 13,00 Sek.". On the right, it says "Dauer: 100,55 Sek.". A speech bubble points to the waveform with the text: "Please send me 3 pieces of item no. 1234."

ORDER  
QTTY=3  
ITEMNO=1234

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## Further Examples

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

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 RUSTAMJI, Warananagar, Yavatol

# 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.

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
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# The Characteristics of Valuable Information

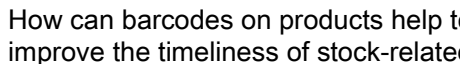
Relevant	Relevant information is important to the decision maker. Information that lumber prices might drop may not be relevant to a computer chip manufacturer.
Simple	Information should also be simple, not overly complex. Sophisticated and detailed information may not be needed. In fact, too much information 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.

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## Timeliness

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



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# Should Information 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.

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## 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.

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## 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.

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## System and Modeling Concepts



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## System

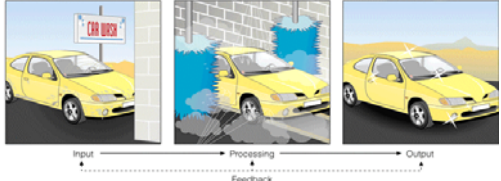
- A set of elements or components that interact to accomplish goals
- Input
- Processing mechanism
- Output
- Feedback
- System boundary

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## Components of a System

**FIGURE 1-3**  
Components of a System  
A system's four components consist of input, processing, output, and feedback.



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System	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  
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## System Performance and Standards

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

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## System Variables and System Parameters

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

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## Systems Classification

**TABLE 1.3**  
Systems Classifications and Their Primary Characteristics

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

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## System Performance and Standards

**FIGURE 1.4**  
System Performance Standards

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## 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

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## Why makes it sense to use models instead of reality?

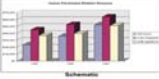

- Reality is complex. It is easier to **understand the functionality** of a system once it has been reduced to its essential structure.
- Automation implies that we **treat a set of individuals or items equally**. That means, we must find a form of representation which is suited for each.

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## Modeling a System

**Models should be validated!**

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## What Is An Information System?

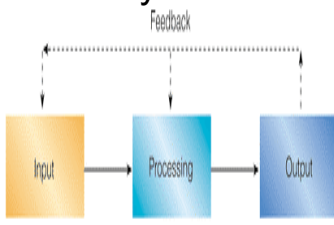
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## Components of an Information System

**FIGURE 1.7**  
The Components of an Information System

Feedback is critical to the successful operation of a system.



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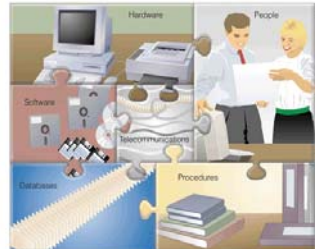
## Computer-Based Information Systems (CBIS)

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## Components of a CBIS

**FIGURE 1.8**  
The Components of a Computer-Based Information System



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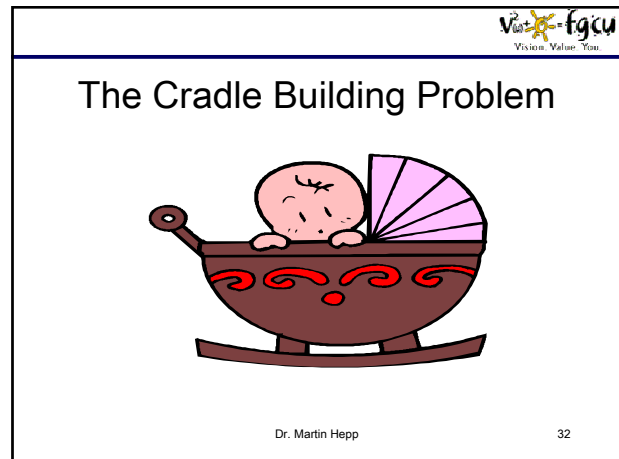
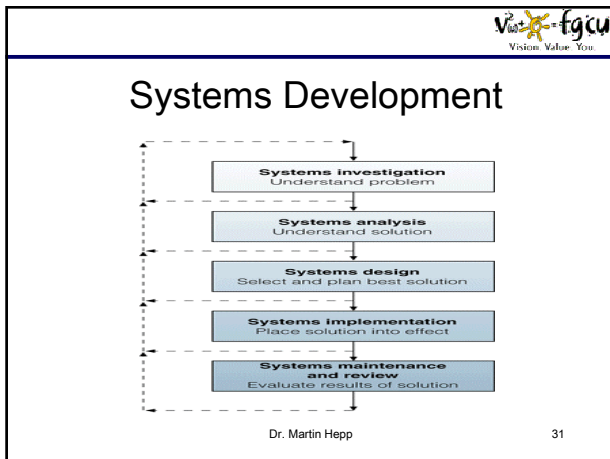
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## “...changing the way organizations conduct business.”

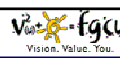
What do you think is the better approach:


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

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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)
  - **Prepare Cases** (p. 76 – 81)
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## Thank you!

The slides will be available on the internet at  
<http://ruby.fgu.edu/courses/mhepp/>  
(-> CRN10033)

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