

INTRODUCTION TO INFORMATION SYSTEMS & DECISION MAKING

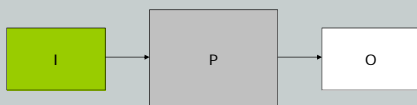
(August 26, 2015)

LEARNING GOALS

- Explain basic information systems concepts
- Explain difference b/w data and information
- Identify main components of info. systems
- Describe kinds of information systems.

Data versus Information

- Data = raw facts that represent the characteristics of an event
 - Example 1:
 - Event: High temperature
 - Data: 100° F
 - Example 2:
 - Event: Sale
 - Data: Sale's date, item number, item description, etc.
- Information = facts within a given context
 - Information results from transforming data by adding context and meaning to make it more useful.
 - The temperature **today** at **noon** in **Times Square, NYC** was **100° F**



Essentials of Business Information Systems
Chapter 1 Business Information Systems in Your Career

It Isn't Simply Technology: The Role of People and Organizations

Functions of an Information System

Figure 1-2
An information system contains information about an organization and its surrounding environment. Three basic activities—input, processing, and output—produce the information organizations need. Feedback is output returned to assist the people or activities in the organization to evaluate and refine the input. Environmental factors, such as customers, suppliers, competitors, stockholders, and regulatory agencies, interact with the organization and its information systems.

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Data Vs Information

The output could be a report

Data and Information

ITEM NO.	DESCRIPTION	UNITS SOLD
531	Brite Dish Soap	7,156
YTD SALES \$9,231.24		

Figure 1-f

The Value of Information

- ▣ Accuracy (Is information correct? Can we rely on it?)
- ▣ Timeliness (How current is the information?)
- ▣ Accessibility (Can the information be accessed when needed?)
- ▣ Engagement (Is the information capable of affecting a decision?)
- ▣ Application (Is the information relevant to the current context?)
- ▣ Rarity (Is the information previously known?)

6

Information System?

- ❑ Information system: set of **interrelated components** that work together **in order to** collect (or retrieve), store, process, and distribute information to support decision-making and control in organizations
- ❑ Major **components** of information systems
 - **Hardware** (physical parts of a computer or other computing devices)
 - **Software** (Instructions that tell hardware what to do)
 - **Databases** (Software that enables storage/retrieval of data)
 - **Networks** (Computing devices that communicate with each other)
 - **People** (**individuals** and **organizational** units)
- ❑ **Information technology (IT)**: Computer-based tool that people use to work with information and support the information and information-processing needs of an organization

Information Technologies

7

ROLES AND RESPONSIBILITIES IN IT

- ❑ Information Technology is a relatively new functional area, having only been around formally for around 40 years
- ❑ Recent IT strategic positions include:
 - **Chief Information Officer (CIO)**
 - **Chief Technology Officer (CTO)**
 - **Chief Security Officer (CSO)**
 - **Chief Privacy Officer (CPO)**
 - **Chief Knowledge Officer (CKO)**

8

ROLES AND RESPONSIBILITIES IN IT

- ❑ **Chief Information Officer (CIO)**
 - Oversees all uses of IT
 - Ensures the strategic alignment of IT with business goals and objectives
- ❑ **Chief Security Officer (CSO)**
 - Responsible for ensuring the security of IT systems
 - Responsible for developing security policies and strategies
 - Responsible for controlling implementation of security policies and strategies
- ❑ **Chief Knowledge Officer (CKO)**
 - Responsible for collecting, maintaining, and distributing the organization's knowledge
 - Responsible for supervising the implementation of knowledge systems

9

Information Systems in Organizations

- An organization is an administrative and functional structure where people work toward a specific goal.
- Understanding the organizations' IT needs means understanding the administrative and functional structure.
 - Hierarchical
 - Matrix
 - Other

10

IS & Hierarchical Organizational structure

- **Information Requirements of Key Decision-Making Groups in a Firm**

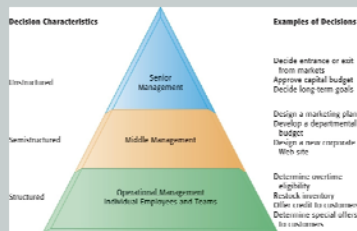


Figure 10-1

11

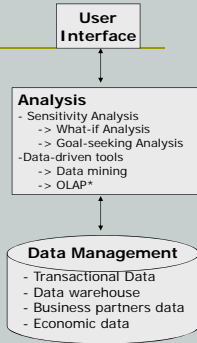
Administrative Information Systems

- Transaction Processing Systems (TPS)
 - Basic business system that serves the **operational level** (analysts) in an organization
- Office Automation Systems (OAS)
 - Systems designed to help **office workers** in doing their job.
- Decision Support Systems (DSS)
 - Systems designed to support **middle managers** and business professionals during the decision-making process
- Executive Information Systems (EIS) or Executive Support Systems (ESS)
 - Specialized DSS that help senior level **executives** make decisions.
- GDSS: computer-based systems that facilitate solving of unstructured problems by **set of decision makers**

12

DSS structure

- Systems designed to help middle managers make decisions
- Major components
 - Data management subsystem
 - Internal and external data sources
 - Analysis subsystem
 - Typically mathematical in nature
 - User interface
 - How the people interact with the DSS
 - Data visualization is the key
 - Text
 - Graphs
 - Charts



13

* OLAP: OnLine Analytical Processing

DSS Analysis Tools

- Simulation is used to examine proposed solutions and their impact
 - Sensitivity analysis
 - Determine how changes in one part of the model influence other parts of the model
 - What-if analysis
 - Manipulate variables to see what would happen in given scenarios
 - Goal-seeking analysis
 - Work backward from desired outcome

What-if Analysis	Change in Interest Rate	Loan Amount	*Interest Rate	Monthly Payment
		\$10,000	5.00%	\$234.29
		\$10,000	5.50%	\$232.56
		\$10,000	6.00%	\$234.85
		\$10,000	6.50%	\$237.14
		\$10,000	7.00%	\$239.46
		\$10,000	7.50%	\$241.78
		\$10,000	8.00%	\$244.12

Determine monthly payment given various interest rates.

Goal-Seeking Analysis	Set Payment Amount	Loan Amount	*Interest Rate	Monthly Payment
	\$300.00	\$10,000.00	19.190%	\$300.00
	\$300.00	\$11,000.00	11.899%	\$300.00
	\$300.00	\$12,000.00	9.243%	\$300.00
	\$300.00	\$13,000.00	5.100%	\$300.00
	\$300.00	\$14,000.00	1.389%	\$300.00
	\$300.00	\$15,000.00	Impossible	\$300.00

Works backward from a given monthly payment to determine various loans that would give that payment.

Artificial Intelligence (AI) systems

- Common categories of AI systems:
 1. **Expert system** – computerized advisory programs that imitate the reasoning processes of experts in solving difficult problems
 2. **Neural Network** – attempts to emulate the way the human brain works
 - **Fuzzy logic** – a mathematical method of handling imprecise or subjective information
 3. **Genetic algorithm** – an artificial intelligent system that mimics the evolutionary, survival-of-the-fittest process to generate increasingly better solutions to a problem
 4. **Intelligent agent** – special-purposed knowledge-based information system that accomplishes specific tasks on behalf of its users

15

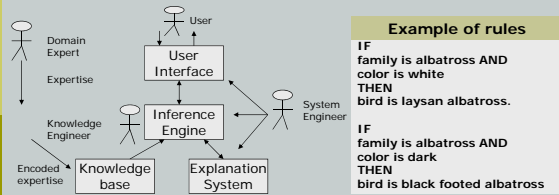
Expert Systems

- Artificial Intelligence systems that codify **human expertise** in a computer system
 - Main goal is to transfer knowledge from one person to another
 - Wide range of subject areas
 - Medical diagnosis
 - Computer purchasing
 - Knowledge engineer elicits the expertise from the expert and encodes it in the expert system

16

Expert Systems Components

- Knowledge base: database of the expertise, often in IF THEN rules.
- Inference engine: derives recommendations from knowledge base and problem-specific data
- User interface: controls the dialog between the user and the system
- Explanation system: Explain the *how* and *why* of recommendations



Example of rules

```

IF
family is albatross AND
color is white
THEN
bird is laysan albatross.

IF
family is albatross AND
color is dark
THEN
bird is black footed albatross
    
```

- Knowledge engineer codify the human expert's expertise into the systems' knowledge base.
- System engineer is the IT professional who develop the user interface, the inference engine, and the explanation system.

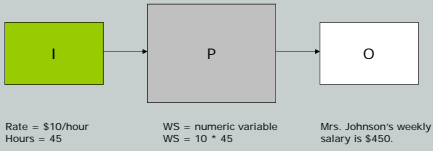
17

Summary Questions

	Notes
1) Distinguish between Data and Information	3
2) List/Explain main components of an information system	7
3) What is the difference between GDSS and DSS in terms of their target users?	12
4) What is the difference between Decision Support Systems (DSS) and Executive Information Systems (EIS) in terms of their target users.	12
6) What is a Chief Information Officer responsible for?	9
7) (a) What are the major components in a DSS? (b) What is the function of each?	13
8) What is an Expert System? What are the main components of an Expert system? What is a knowledge engineer?	17

18

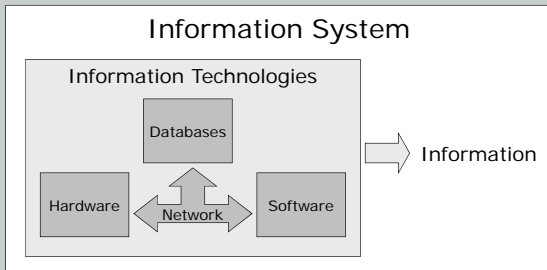
Summary Questions (cont.)



- Given the illustration above, what could be an information?
 - a) Rate = \$10/hour
 - b) Mrs. Johnson's weekly salary is \$450
 - c) $WS = 10 * 45$
- The accuracy of an information could be affected by the accuracy of the input data? T F

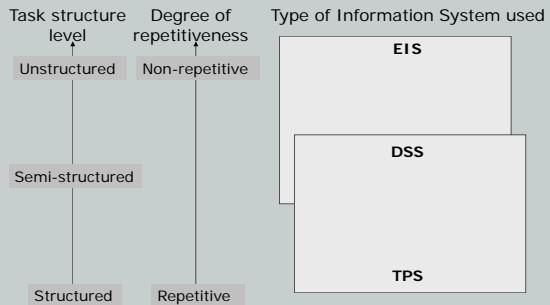
19

Information system vs. Information Technology



20

Organizations and IS



21
