

Basics of Information Systems

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Information Concepts: Data, Information, and Knowledge

- **Data:** Collection of raw facts and or figures
 - Alphanumeric, image, audio, and video

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Types of Data

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

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Information

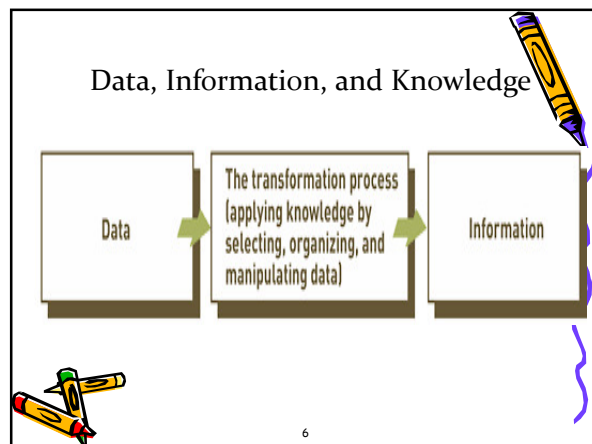
- **Information:** collection of facts organized in such a way that they have additional value beyond the value of the facts themselves

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Information Concepts

- **Value of Information** is directly linked to how it helps decision makers achieve their organization's goals and can be measured
 - in time required to make a decision
 - Increased profits to the company

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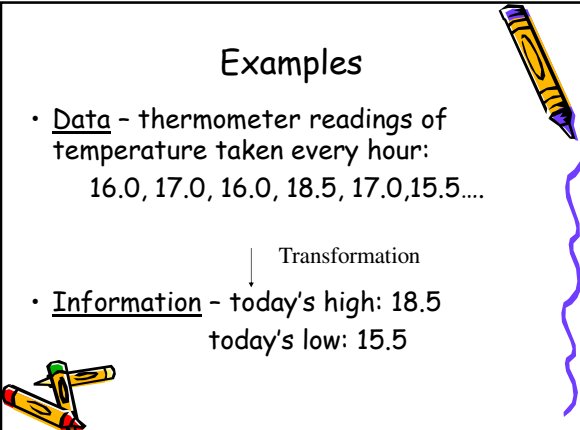


Examples

- Data - thermometer readings of temperature taken every hour:
16.0, 17.0, 16.0, 18.5, 17.0, 15.5....

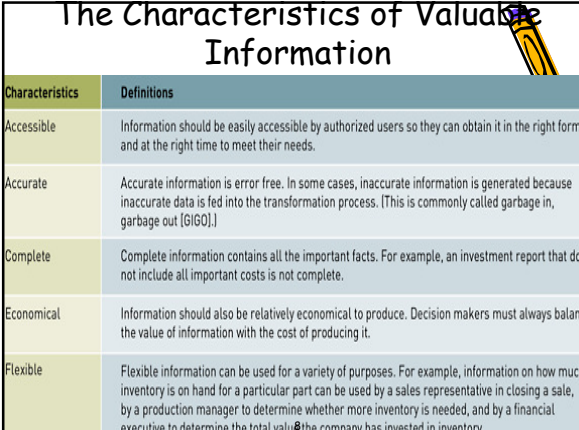
↓ Transformation

- Information - today's high: 18.5
today's low: 15.5



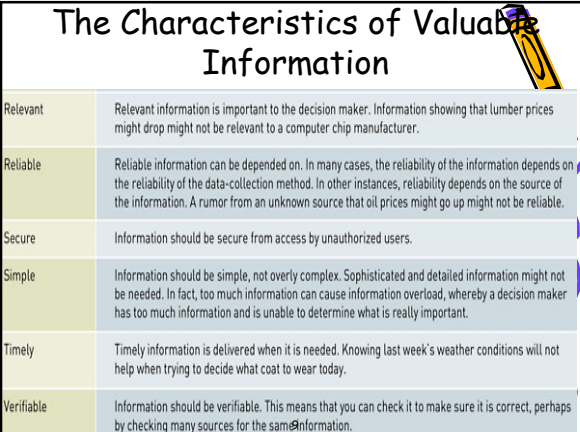
The Characteristics of Valuable Information

Characteristics	Definitions
Accessible	Information should be easily accessible by authorized users so they can obtain it in the right format and at the right time to meet their needs.
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 of the company has invested in inventory.



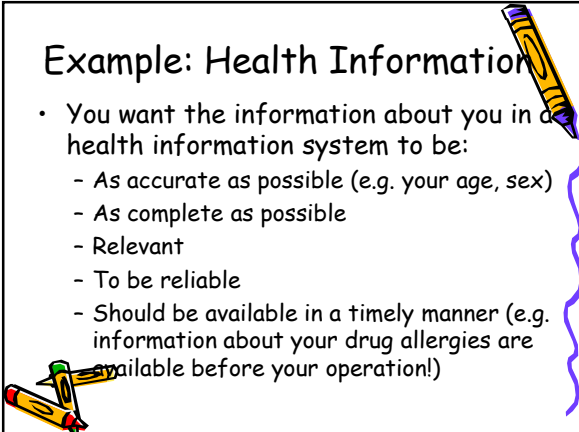
The Characteristics of Valuable Information

Relevant	Relevant information is important to the decision maker. Information showing that lumber prices might drop might not be relevant to a computer chip manufacturer.
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 might not be reliable.
Secure	Information should be secure from access by unauthorized users.
Simple	Information should be simple, not overly complex. Sophisticated and detailed information might 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.



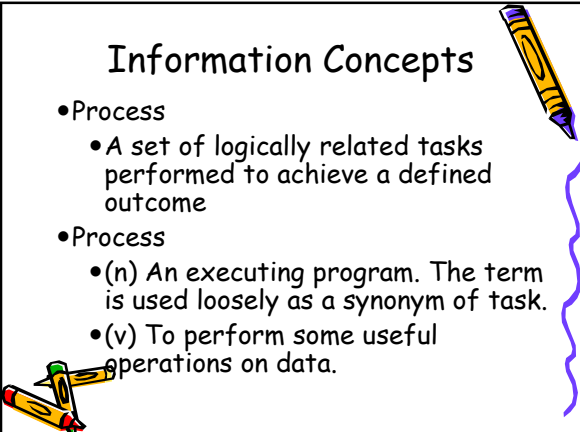
Example: Health Information

- You want the information about you in a health information system to be:
 - As accurate as possible (e.g. your age, sex)
 - As complete as possible
 - Relevant
 - To be reliable
 - Should be available in a timely manner (e.g. information about your drug allergies are available before your operation!)



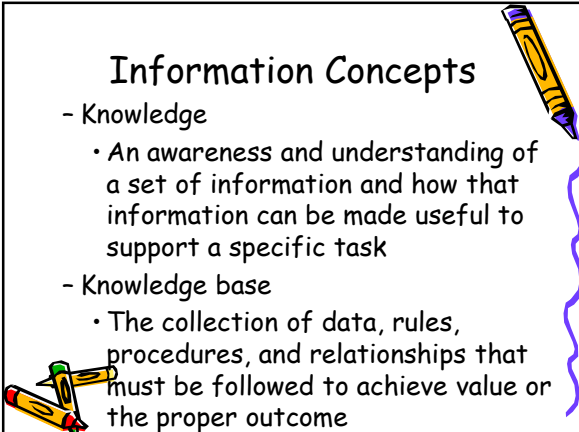
Information Concepts

- Process
 - A set of logically related tasks performed to achieve a defined outcome
- Process
 - (n) An executing program. The term is used loosely as a synonym of task.
 - (v) To perform some useful operations on data.





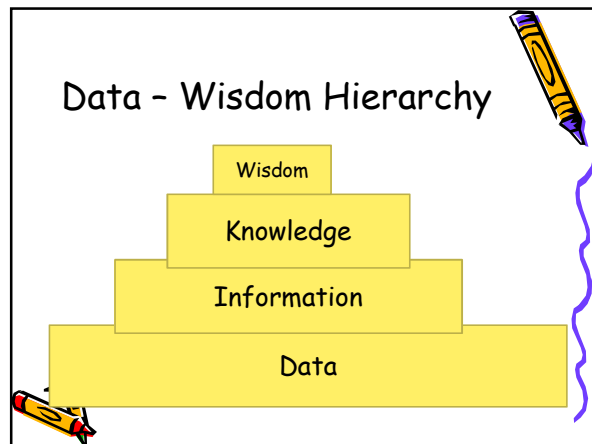
Information Concepts

- Knowledge
 - An awareness and understanding of a set of information and how that information can be made useful to support a specific task
- Knowledge base
 - The collection of data, rules, procedures, and relationships that must be followed to achieve value or the proper outcome





Information Concepts

- Wisdom
 - Acquired Knowledge used for the betterment of Mankind
 - The fear of the Lord is the beginning of Wisdom:

How does information support managers?



To manage is to forecast and plan, to make decisions to organise, to command, to coordinate and to control.'

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Different decision types

- **Decision behaviour:** Describes how managers make decisions and the factors that influence them.
- **Structured decisions:** Situations where the rules and constraints governing the decision are known.



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Different decision types

Unstructured decisions: Complex situations, where the rules governing the decision are complicated or unknown.



Cognitive style: This describes the way in which a manager absorbs information and reaches decisions.

A manager's cognitive style will fall between analytical and intuitive styles.

Decision characteristics and management level

Management level	Decision			
	Type of decision	Timescale	Impact on organisation	Frequency of decisions
Strategic	Unstructured	Long	Large	Infrequent
Tactical	↔	Medium	Medium	↔
Operational	Structured	Short	Small	Frequent

Information characteristics for decisions by management levels

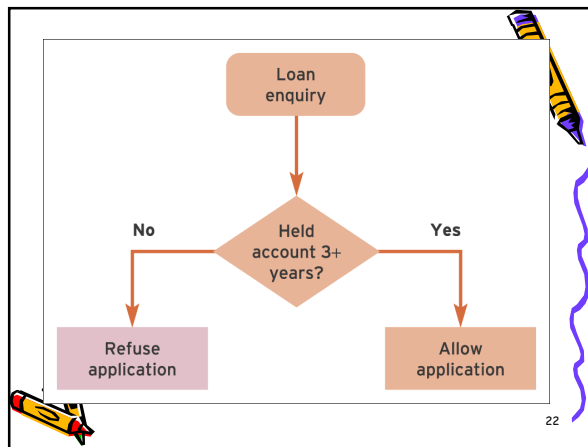
Management level	Information					
	Time period	Frequency	Source	Certainty	Scope	Detail
Strategic	Wide	Infrequent	External	Less certain	Wide	Summarised
Tactical	↔	↔	↔	↔	↔	↔
Operational	Narrow	Frequent	Internal	More certain	Narrow	Detailed

A model of decision making

Stage	Activities
Intelligence	<ul style="list-style-type: none"> Awareness that a problem exists Awareness that a decision must be made
Design	<ul style="list-style-type: none"> Identify all possible solutions Examine possible solutions Examine implications of all possible solutions
Choice	<ul style="list-style-type: none"> Select the best solution
Implementation	<ul style="list-style-type: none"> Implement the solution
Evaluation	<ul style="list-style-type: none"> Evaluate effectiveness or success of decision

Business rules

- Business rule:** A rule describing what action the organisation should take when a particular situation arises.
- As an example, a bank might have a rule specifying that customers applying for a loan will only be considered if they have held an account for three years or more.



Knowledge management

Knowledge Management (KM) is a deliberate, systematic business optimization strategy that selects, distills, stores, organizes, packages, and communicates information essential to the business of a company in a manner that improves employee performance and corporate

Knowledge management

- Many organisations have adapted to the knowledge economy by adopting new structures and by creating new roles for managers.
- The term **knowledge worker** describes a person whose role is based around creating, using, sharing and applying knowledge.

Knowledge management

- The work of a **knowledge engineer** focuses on eliciting knowledge from experts so that it can be recorded and shared with others within the organisation.



Knowledge management

- Knowledge can be thought of as the combined result of a person's experiences and the information they possess.
- In general, knowledge can be described as explicit or tacit.



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Knowledge management

- Explicit knowledge is easily captured and stored within documents and other media.
- This type of knowledge tends to be highly detailed, formal and systematic.
- It is often stored in the form of manuals, documents, procedures and database files.



Knowledge management

- Tacit knowledge is characterised by factors such as perceptions, beliefs, values, intuition and experience.
- Since a great deal of tacit knowledge may be held unconsciously, it is difficult to elicit, describe or record.



Knowledge management

- Knowledge management is involved with collecting (eliciting) knowledge and converting (codifying) it into a form that allows it to be shared across the organisation.
- A key part of this process involves gathering tacit knowledge and converting it into explicit knowledge



Questions

