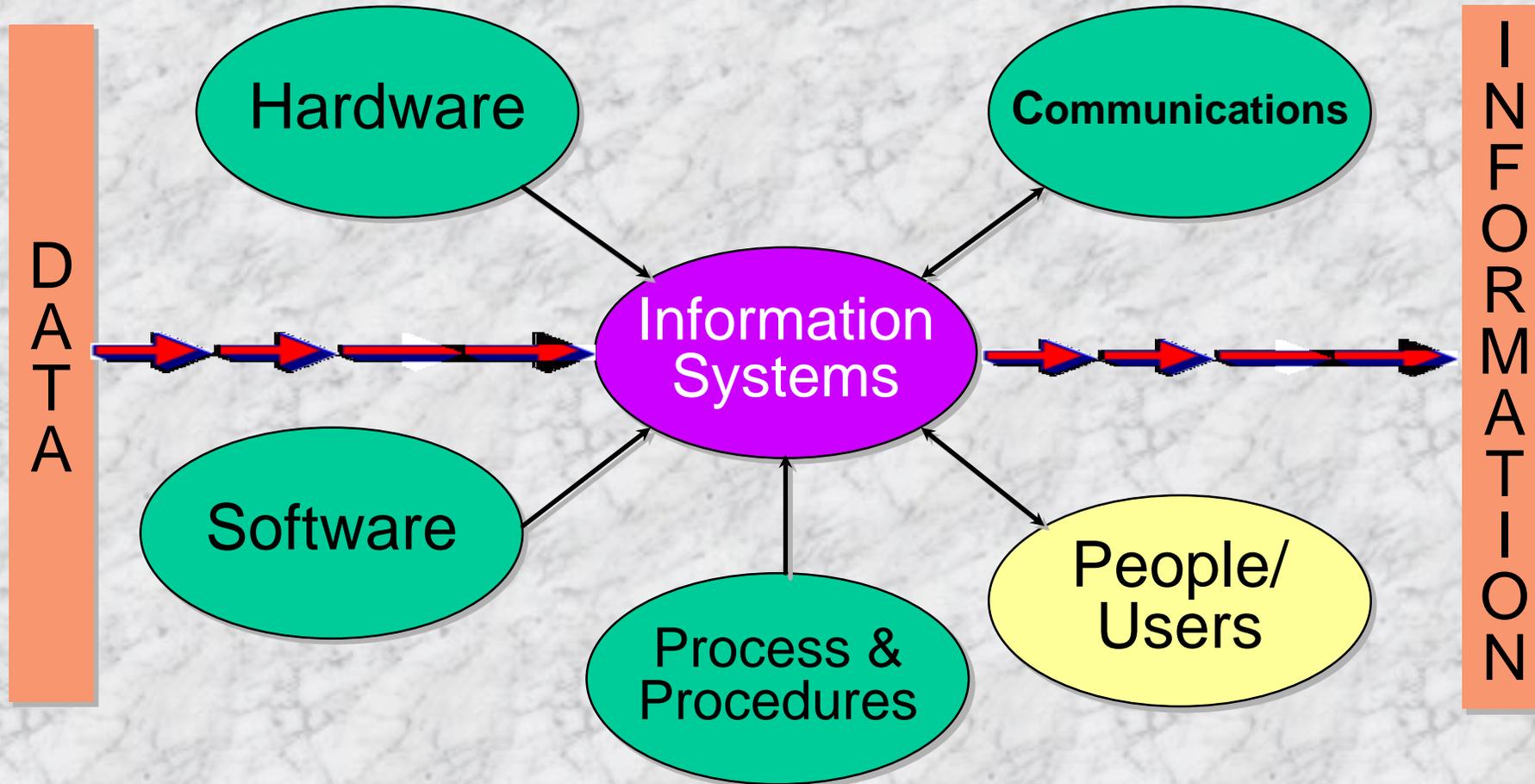


Topics

- Course Basics
- Information Technology (IT)
- Information Systems (IS)
- Nature of Technology & Work
- People/The Organization
- Data/Data Bases/Data Analysis
- Information
- Communications

Information Systems Components

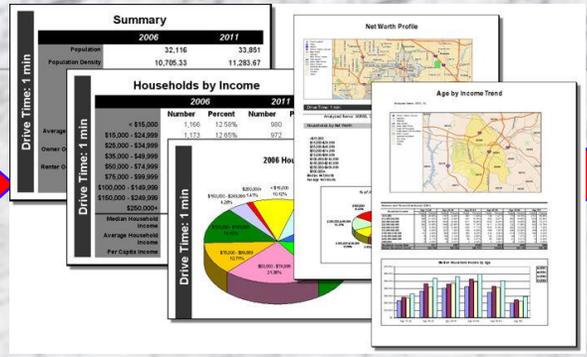


Data

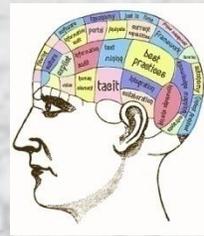
Facts Without A Meaning



Data/Information/Knowledge Cycle



Loss Monitor	S Coord (m)	Meas	Status
wla1.1	164.10	-13,000	0
wla1.2	181.87	-13,000	0
wla1.3	189.83	-13,000	0
wla2.1	199.55	104,000	0
wla10.1	204.35	0,000	0
wla2.2	217.26	104,000	0
wla3.1	234.97	97,000	0
wla3.2	252.68	97,000	0
wla9.1	254.29	0,000	0
wla4.1	270.39	74,000	0
wla7.1	270.78	302,000	0
wla4.2	288.10	74,000	0
wla5.1	302.67	89,000	0
wla5.2	317.91	89,000	0
wla8.1	324.80	151,000	0



Data, Information & Knowledge

- ❖ Data
 - Raw facts; word(s), values, actions, symbols, etc.
 - Data Elements & Processes
- Information
 - Logical output of a Transaction Processing System where Data is collected, organized and reported
- Knowledge
 - The understanding of information - To Enable

Data Elements & Processes

- Components – Defines data
- Data Constraints
- Data Flows – The **movement** or flow of data through the system
- Processing Logic – Steps and rules used to **transform** data into information
- Data Analysis

Other Data Components

- ❖ **Sources**

- Internal
- External

- **Focus** - Distinctness of facts

- ❖ **Accuracy** - Complete, Correct & Valid

- ❖ **Period**

- ❖ Current
- ❖ Short to intermediate
- ❖ Historical



Internal Data Sources

- ❖ Gathered From
 - Personal Experiences & Events or other activity
 - Reports & Memoranda's
 - Process and Procedures Manuals
 - Committees & Group Activities
 - Managers
 - Archived Records
 - Other Sources



External Data Sources

- ❖ Gathered From
 - Client Transactions
 - Data Warehouses
 - Colleagues, Friends & Fellow Professionals
 - Public and Private Agencies
 - Professional Meetings & Conferences
 - Books & Journals
 - Reports
 - Other Sources



Data Focus

⑦ External Focus

- Economic
- Technology
- Political
- Social

Internal Focus

- Physical Assets
- Human Resources
- Security
- Product
- Inertial of Decisions & Views



Processing Logic

Policy for Writing up Sales

Access Price-File by Part-Number from the Incoming-Order.

Copy Unit-Price from Price-File-Record into Unit-Price of Sales-Form.

Set Sub-total to product of Unit-Price and Quantity-Ordered.

Set Sales-Tax to 3% of Sub-Total.

Set Total to Sub-Total Plus Sales-Tax.



Data Analysis

- ⊕ Basic; Pie, Bar, & Line Charts
- ❖ Variations;
 - Pareto – A chart ranked by importance with a 80/20 focus
 - Histograms – Frequency distribution
 - Scattergrams – Relationship of two variables
 - Time Series – Measures over time
 - Control Charts – Other graphic representation of data



19% Coffee, not roasted, not decaffeinated

5.8% Tobacco, unmanufactured, not stemmed or stripped

4.1% Transmission apparatus for radio, telephone and

4.0% Cement clinkers

3.9% Oils petroleum, bituminous, distillates, except

2.9% Tea, green (unfermented) in packages < 3 kg

15% Cut flowers and flower buds for bouquets, etc, fresh

14% Palm nuts and kernels

099% Maize (corn) seed

2.5% Cuttings and slips, not rooted

096% Rice in the husk (paddy) rough

090% Palm oil, crude

1.7% Animal fats, oils, fractions, hydrogenated, esterified

083% Peas dried, shelled

32% Cocoa beans, whole or broken, raw or roasted

31% Raw sugar, cane

070% Parts of hoists and winches

12% Snowmobiles, golf cars, similar vehicles

065% Dump trucks designed

065% Electrical energy

12% Pipe (plastic) iron or steel, nes, diameter < 40.6 cm

11% Bagged, iron or non-alloy steel, forged

16% Gold powder non-monetary

089% Soaps, for toilet use, solid

11% Beer made from malt

066% Cobalt, unwrought, matte, waste or

065% Mattress supports

6.5% Fish fillet or meat, fresh or chilled, not liver, roe

1.2% Flours, meals & pellets of fish for human

057% Salmon, Pacific

048% Milk not concentrated

1.1% Trout, fresh or chilled, whole

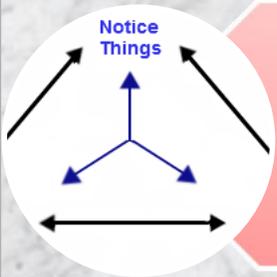
091% Cotton, carded or combed

080% Cotton, not carded or combed

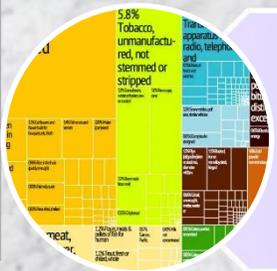
Data Types



Quantitative – Numeric values



Qualitative – Word or phrase descriptions



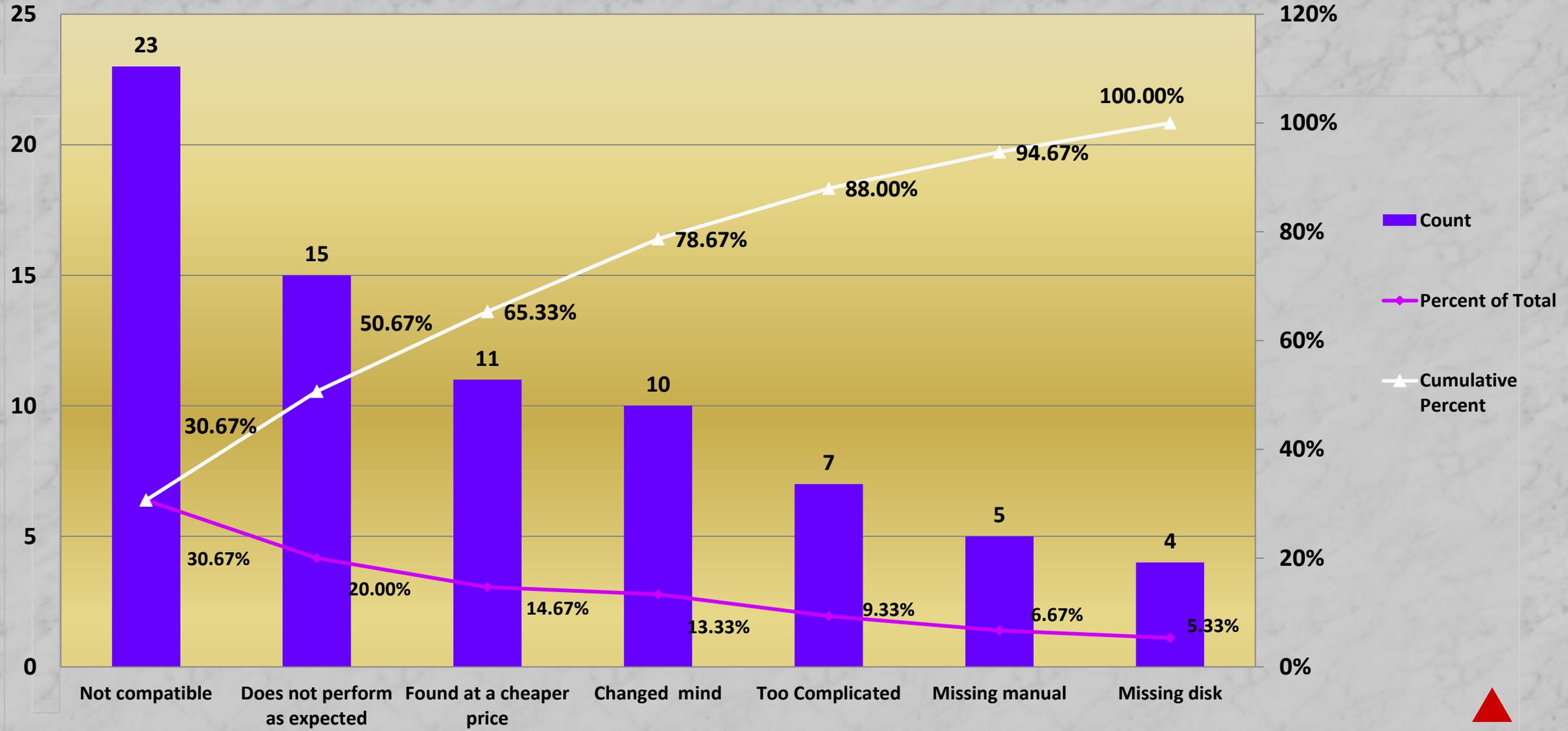
Visual Characteristic of Data



Some Data Constraints

- ❖ Source of data **input**
- ❖ **Devices** used for input & output of data
- ❖ **Recipients** & **handling** of data
- ❖ Conversion **processes**, the converted form the input and output data will take
- ❖ How often the data will be **updated**

Pareto Chart



Quantitative Data Types

Counts

- Number of;
 - Orders
 - Students
 - Rooms
 - People
 - Items sold
 - complaints

Measures

- Units of;
 - Weight
 - Cost
 - Size
 - Grade
 - Mile
 - Interest rate

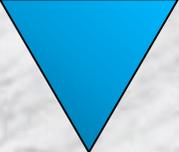
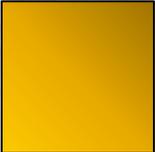
Constance & Variables

- Pay Rate
- Formulas
- Parameters
- Days in a Year/Month
- Holidays

Visual Characteristic of Data

❖ Examples;

- Color - Red, Green, Blue, etc.

- Shapes -    

- Region - Midwest, South, Willow Glen

- Indicators & Symbols - Check marks, Binary, Choice, degree    \neq   \$



Quantitative vs. Qualitative

Quantitative

- 175 lbs.
- 5'11"
- 256 orders
- 190 db
- 21 points
- 25 mph

Qualitative

- Fat/Skinny
- Tall/Short (symbols)
- Good/Poor performance
- Soft/Loud
- Low/High score
- Slow/fast
- (Partly) Cloudy day
- A sick person
- No paper in printer



Data vs. Information

<u>Data</u>	<u>Information</u>
Deposits, withdrawals, interest, and service charges for a certain month, plus the forwarding balance from the previous month	Bank Statement
Moving images, dialog, music, and commentary	Television News Report
Titles, subtitles, words, paragraphs, quotations, and pictures	Newspaper Report
Names, email address, SID, phone number, department, course, course-id, course-name section, quarter, year, days	Class Roster
Loud obnoxious noises, a black and white vehicle behind your vehicle, a uniform person driving, blue lights flashing, "PULL OVER" on the speaker.	A police vehicle directing you to pull over



Information Purpose

<u>Information</u>	<u>Purpose</u>
Bank Statement	Reports how much money you had in your account at the beginning of the month, the amounts that you deposited or withdrew during the month, bank charges, and how much you have now.
Television News Report	Communicates (or tries to communicate) the what, when, how and (perhaps why) of an event to the audience.
Newspaper Report	To inform the public
Class Roster	Provides the professor with name and contact information for class members
Year-End Report	Attempts to tell an audience how well the organization did in the previous year, why, and what to expect in the future.



\$525,600
Per Year
With
Monthly
Payments
In a Year



Rich Data Element Composition

- ❖ Name
- ❖ Value
- ❖ Precision
- ❖ Data qualifier (e.g., greater than, \pm)
- ❖ Uncertainties (single or multi-valued)
- ❖ Measurement units (standard or custom)
- ❖ Data history/management (Data Dictionary)
- ❖ Initialization scripts
- ❖ Other attributes - names, symbols, synonyms, presentation formats

Knowledge

- ❖ Knowledge - the application of reasoned analysis of information, but
- ❖ Information does not produce knowledge
 - Knowledge implies synthesis of information
 - Therefore, useful knowledge must be;
 - Complete
 - Accurate
 - Relevant and
 - Timely

Knowledge, an Organization's Resource

- ❖ Knowledge Based Society
 - Called **digital society** or new economy
 - **Brains** not hands
 - **Education** is critical
 - Issues - Digital **divide, privacy, etc.**

- ❖ Knowledge Worker
 - A well-educated professional who **creates, modifies, or synthesizes knowledge** in one's profession



Information

Processed Data with a Purpose

Information

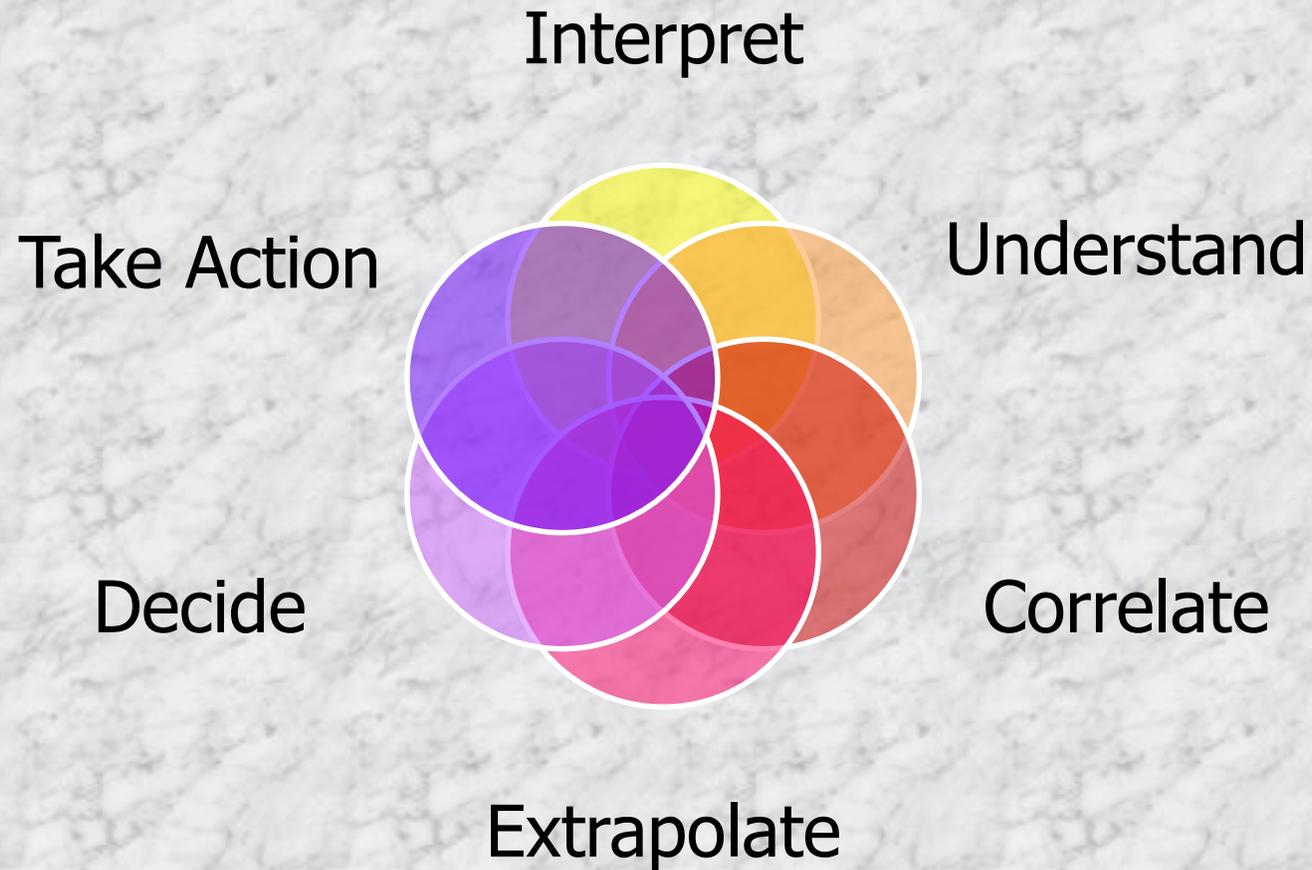
- ❖ What is Information?

. . . . The logical result of processing, manipulating and organizing data in a way that adds to the knowledge of the receiver. . . .

Information Classes

- ❖ Class 1 – Derived from quantifiable facts
 - Events and Transactions
 - Demographics
 - Product Reliability Statistics
- ❖ Class 2 - From non quantifiable facts
 - Descriptions; person or object
 - How things are done
 - Observations

Users Responses to Information



Information Impact

Enables;

- ❖ Problem Detection
- ❖ Decision Making
- ❖ Productivity Enhancements &
- ❖ Knowledge Work

Information Properties

Qualities

- Cost Effective
- Accuracy
- Relevance & Complete
- Time-sensitive
- Reliable & Auditable

Attributes

- Detail, General or Specific
- Level of summarization
- Past/Present/Future
- Internal Vs. External
- Scope, Reliability and non subjective

Structures

- ⇒ Structured
- ⇒ Unstructured
- Semi Structured
 - Some Structured
 - Some Semi Structured



Structured Information

- ❖ Detailed
- ❖ Current
- ❖ Concerned with past events
- ❖ Highly accurate, not subjective data
- ❖ Narrow range of facts
- ❖ Internal activities



Unstructured Information

- ❖ Broad range of facts
- ❖ Summarized
- ❖ Less current
- ❖ Concerned with future events
- ❖ Includes subjective data
- ❖ Outside and inside sources



Data Flow Diagram

- ❖ Components of DFD's
 - Data Source/Sink
 - Processes (P)
 - Data Stores
 - Data Flow (DF)
 - Data Distribution

