

# Foundations and Basic Concepts

- What are the objects?
- What are the relationships between objects?
- What are the properties (meta-data) of these objects and relationships?
- How do we represent objects/relationships/properties?
- What is their quality, accuracy?
- Where do they come from?
- What is their temporal behavior?
- How do we measure their size?
- How do we measure their similarity/relatedness?
- How do we manipulate/process/search/mine and reason about them?
- How do we interact/interface with them?
- How do we ascribe semantics to objects?

## **Information/Computation Duality Principle:**

Information and Computation are Interchangeable!

- if SyntaxOk(program) then Run(program)  
else exit.
- Run(program); Output(log); Examine(log);  
Run(corrected program) etc.

## **Data/Knowledge and Search Component**

- IR / Web
- Databases
- Data mining
- AI courses
- etc

## Systems component

- OS/file systems; programming environments
- browsers, navigational engines (clicks)
- text search engines (information retrieval)
- search engines (text + links)
- semi-structured and structured database systems (XML, relational)
- knowledge engines (case-based, expert system)
- data mining engines (association rules, clustering)
- large-scale, integrated, heterogenous, distributed information systems
- visualization system

## **Other components**

- HCI/Design Component
- Social/Legal/Ethics Component
- Domain specific component