

AI/Intelligent Systems

- ▶ Perception — vision, speech
- ▶ Natural Language Processing — understanding, generation, translation
- ▶ Commonsense Reasoning
- ▶ Robotics
- ▶ Game Playing
- ▶ Mathematics
- ▶ Expert Systems
- ▶ Learning
- ▶ Intelligent Network Agents (Softbots)
- ▶ Semantic Web
- ▶ Decision Support Systems

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Topics

Problem Solving Methods

1. Search
2. Logic, Deduction
3. Constraint Satisfaction

Also

1. Planning
2. Learning (symbolic, neural networks)
3. Natural Language Processing

Also

- ▶ How to implement these concepts
- ▶ Real-World Applications

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Artificial Intelligence
(AI)
+

Information Systems
(IS)
(Practical Applications of Computer Technology)

Artificial Intelligence with a focus on practical applications.

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AI Languages

- ▶ LISP: Invented in 1956, by John McCarthy. designed primarily for symbolic processing.
- ▶ Prolog: Programming in logic logic programming language, early 1970's, Kowalski, Colmerauer
- ▶ CLIPS: Expert System Tool/Environment NASA 1980's
- ▶ Java
- ▶ JESS

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Definitions of AI

Systems that think like humans	that like	Systems that think rationally
Systems that act like humans	like	Systems that act rationally

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Approaches to doing AI

- ▶ Symbolic
 - ▶ neat
 - ▶ scruffy
- ▶ Non-symbolic
 - ▶ PDP, neural nets, connectionism
 - ▶ Situated Action

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What is AI?

Artificial intelligence (AI) is the design and study of computer programs that behave intelligently. These programs are constructed to perform as would a human or an animal whose behavior we consider intelligent.

Dean, Allen, and Aloimonos

Artificial Intelligence (AI) may be defined as the branch of computer science that is concerned with the automation of intelligent behavior.

Luger and Stubblefield

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What is AI?

Acting rationally means acting in such a way as to achieve one's goals given one's beliefs. An agent is just something that perceives and acts. In this approach, AI is viewed as the study and construction of rational agents.

Russell and Norvig

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Deduction

1. All rich men are chauvanists.
2. Fred is a man.
3. Fred is rich

Is Fred a chauvanist?

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Java

- ▶ Development began in 1991 within Sun Microsystems as a language to be used for small consumer devices.
- ▶ Project changed into a language for the internet.
- ▶ Java was first demonstrated in 1995 and then released in 1996.
- ▶ Java Language Specification
 - ▶ <http://java.sun.com/docs/books/jls/html/index.htm>
 - ▶ Java FAQ
 - ▶ <http://java.sun.com/people/linden/intro.html>
 - ▶ Java White Paper
 - ▶ <http://java.sun.com/docs/white/langenv/>

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My Interests

1. Automated Reasoning
 - ▶ modal logics
2. Knowledge Representation and Reasoning
 - ▶ actions and their effects on the world and on the knowledge of agents.
3. Computational Linguistics/Cognitive Science
4. Agents, Semantic Web

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Deduction

1. Janet likes anyone who is rich.
 2. Programmers are rich if they use Prolog.
 3. John is bald.
 4. Janet uses COBOL.
 5. John uses Prolog.
 6. John is a programmer.
- Does Janet like John?

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Java Example

```
class HelloWorld {
    public static void main(String[] args) {
        System.out.println("Hello, world");
    }
}

>javac HelloWorld.java

>java HelloWorld
Hello, world

>
```

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Applet (cont)

```
<HTML>
<HEAD>
<TITLE>Course Materials for CS 520</TITLE>
</HEAD>
<BODY BGCOLOR="#7aaad0" text="#000000">
<H2>CS520: Introduction to
    Intelligent Systems</H2>
<APPLET code = "FirstApplet.class"
    width=150 height=100>
</Applet>
```

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Java Characteristics

- ▶ Simple
- ▶ Object Oriented
- ▶ Distributed
- ▶ Robust
- ▶ Secure
- ▶ Portable
- ▶ Interpreted
- ▶ High Performance
- ▶ Multithreaded
- ▶ Dynamic

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Applet

```
import java.applet.*;
import java.awt.*;

/** This applet just says "Hello World! */
public class FirstApplet extends Applet {
    // This method displays the applet.
    // The Graphics class is how you do all
    // drawing in Java.
    public void paint(Graphics g) {
        g.drawString("Hello World", 25, 50);
    }
}
```

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Another Example

```
class Fibonacci {
    /** Print out the Fibonacci sequence for */
    /** values < 50 */
    public static void main(String [] args){
        int lo = 1;
        int hi = 1;
        System.out.println(lo);
        while (hi < 50) {
            System.out.println(hi);
            hi = lo + hi;
            lo = hi - lo;
        }
    }
}
```