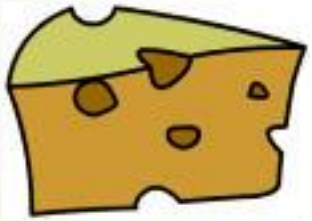
Artificial Intelligence

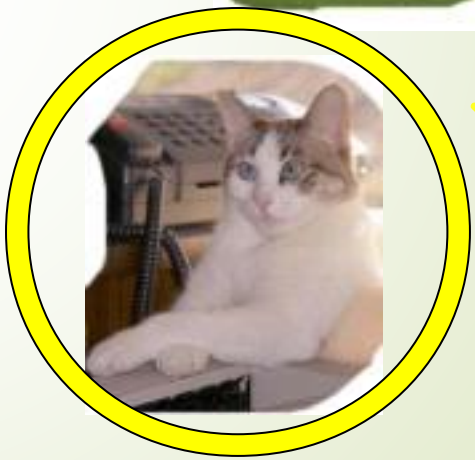
What is Intelligence?

Intelligence

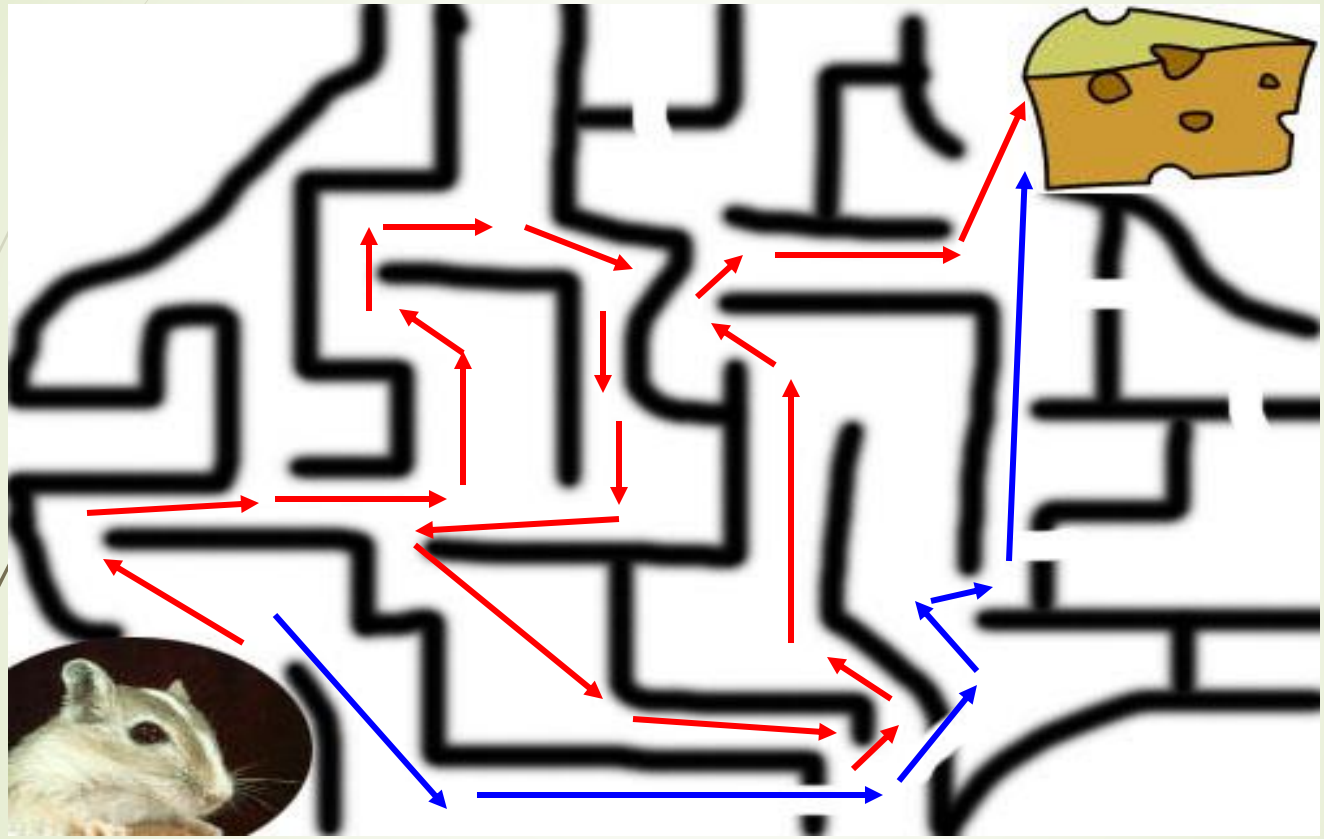
- **Are the things shown below, Intelligent?**




Ex-1: Searching a path …



Different mice might follow different paths based to their intelligence
In other words: The problem can be solved in many ways

Ability to solve problems demonstrates Intelligence

Ex-2: Next number in the sequence …

- Consider the following sequence …

1,3,7,13,21,__

- **What is the next number ?**

- **Key: Adding the next EVEN number …**

1+2 = 3; 3+4 = 7; 7+6 = 13; 13+8 =21; 21+10 = 31

1,3,7,13,21,31

Ability to solve problems demonstrates Intelligence

So, Let's Summarize…

- Ability to solve problems
- Ability to plan and schedule
- Ability to memorize and process information
- Ability to answer fuzzy questions
- Ability to learn
- Ability to recognize
- Ability to understand
- Ability to perceive
- And many more …

Food for thought: Can only humans beings and animals possess these qualities?

What if?

- A machine searches through a mesh and finds a path?
- A machine solves problems like the next number in the sequence?
- A machine develops plans?
- A machine diagnoses and prescribes?
- A machine answers ambiguous questions?
- A machine recognizes fingerprints?
- A machine understands?
- A machine perceives?
- A machine does MANY MORE SUCH THINGS …
- A machine behaves as HUMANS do? HUMANOID!!!

- Learning and Understanding about Brain

Systems that THINK Like Humans

- **"[The automation of] activities that we associate with human thinking, activities such as decision making, problem solving, learning …" (Bellman, 1978)**
- **"The exciting new effort to make computers think … machines with minds, in the full and literal sense" (Haugeland, 1985)**
- **"The study of computation that make it possible to perceive, reason and act" (Winston 1992)**
- **"The study of mental faculties through the use of computational models" (Charniak and McDermott)**

Systems that ACT Like Humans

- "The art of creating machines that perform functions that require intelligence when performed by people" (Kurzweil 1990)
- "A field of study that seeks to explain and emulate intelligent behavior in terms of computational processes" (Schalkoff, 1990)
- "The branch of computer science that is concerned with the automation of intelligent behavior" (Luger and Stubblefield, 1993)
- "The study of how to make computers do things which, at the moment, people do better" (Rich and Knight, 1991) On the face of it, this definition may appear simplistic
- However, the term "at the moment" has a significant time element

Strong and Weak AI

- Strong AI means that machines act intelligently and they have real conscious minds.
  - strong AI actually tries to recreate the functions of the inside of the brain as opposed to simply emulating behavior.
- Weak AI says that machines can be made to act as if they are intelligent.
  - Weak AI treats the brain as a black box and just emulates its functionality.

Multidisciplinary Aspect of AI

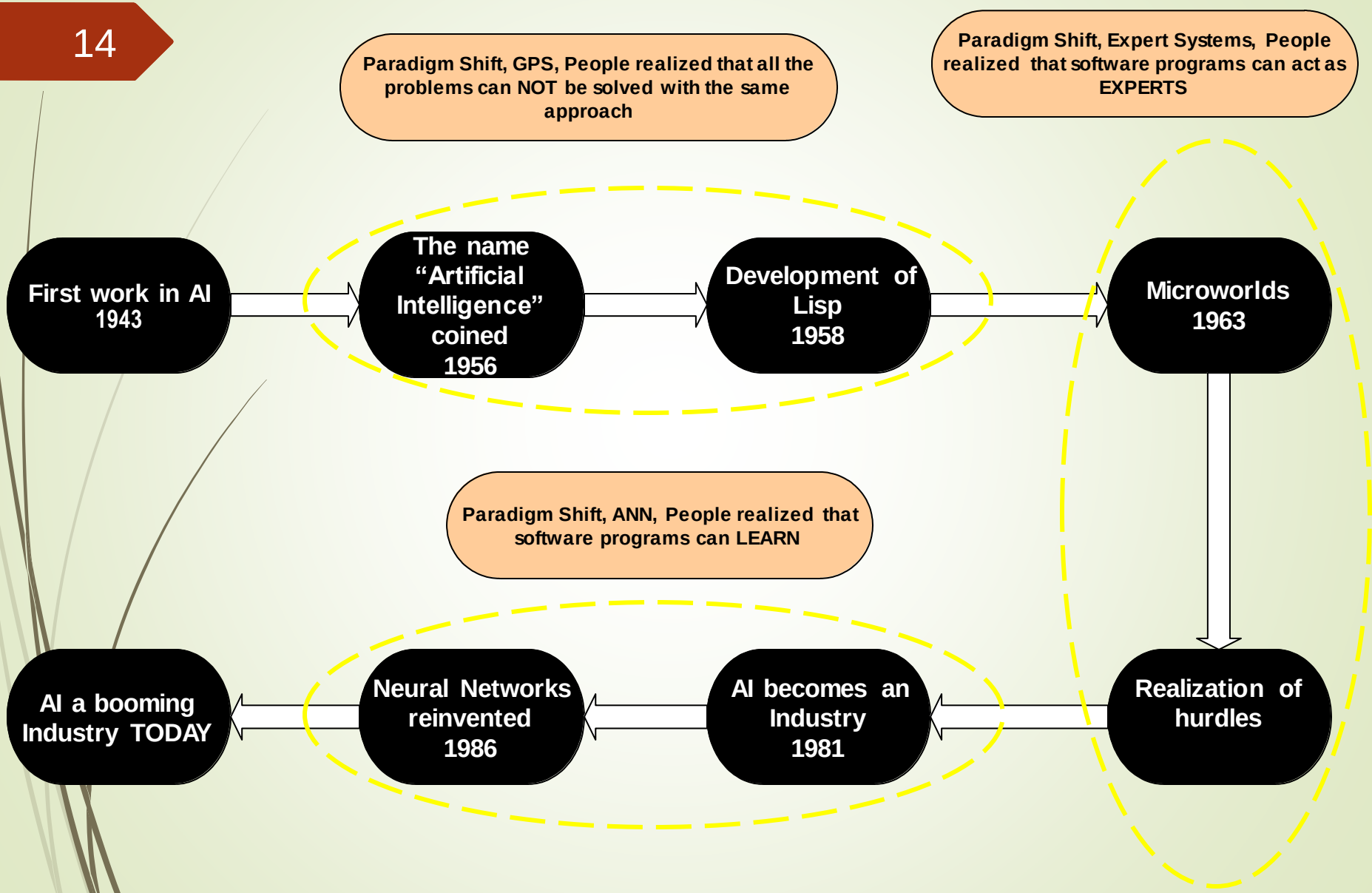
- Psychology
- Logics
- Linguistics
- Mathematics…..

History and Evolution

- Games
- General Problem Solving
- Specific Problems
- Expert Systems

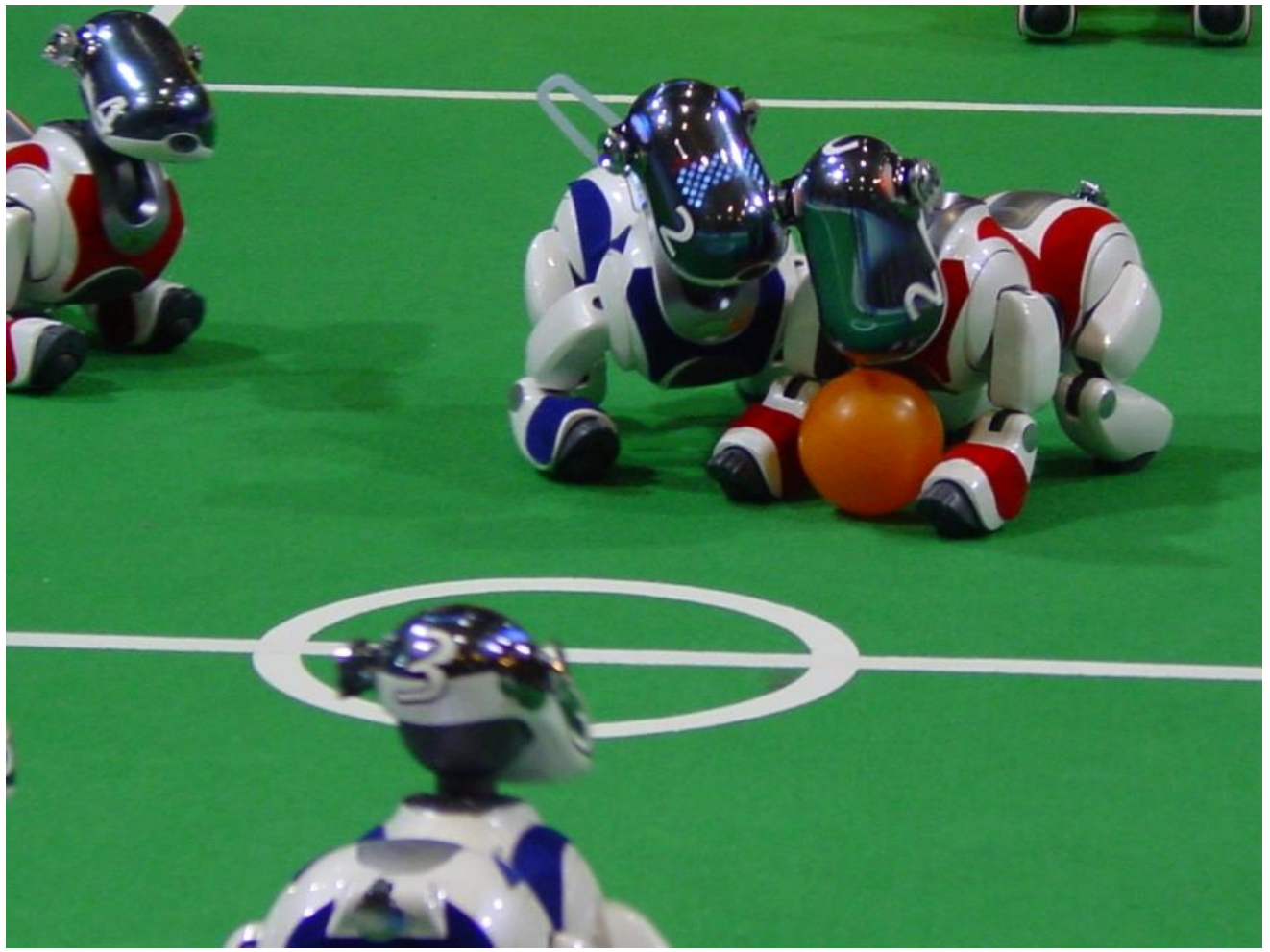
AI Evolution

- xCon of Dec
- MYCIN of Stanford
- dendral for Chemistry


Paradigm Shift, GPS, People realized that all the problems can NOT be solved with the same approach
Paradigm Shift, Expert Systems, People realized that software programs can act as EXPERTS
First work in AI 1943
The name "Artificial Intelligence" coined 1956
Development of Lisp 1958
Microworlds 1963
Paradigm Shift, ANN, People realized that software programs can LEARN
AI a booming Industry TODAY
Neural Networks reinvented 1986
AI becomes an Industry 1981
Realization of hurdles

Robot Control

Robot Control



Course Outline