

## Chapter Summary

Two definitions of Artificial Intelligence are:

1. **Artificial intelligence** is the study of systems that act in a way that to any observer would appear to be intelligent.
2. **Artificial Intelligence** involves using methods based on the intelligent behavior of humans and animals to solve complex problems.

Classification of AI systems into four categories:

	Human	Rationally
Reasoning	Systems that <i>think</i> like humans.	Systems that <i>think</i> rationally.
Behavior	Systems that <i>act</i> like humans.	Systems that <i>act</i> rationally.

The classic example of **DAI** (distributed AI) architecture is the so-called **blackboard** system. The "blackboard" is a global memory accessible to all the agents. It contains the current state of the problem. Actions by the agents gradually modify the data structures on the blackboard so that they come to represent the solution state of the problem.

**Artificial Life:** For example, see the **Ascape API**.

**Multi Agent Systems (MAS)** : for example: **RoboCup**.

### Types of AI Tasks

1. **Mundane Tasks:** Vision & Speech
2. **Formal Tasks:** Games & Mathematics
3. **Expert Tasks :** Engineering & Medicine

Systems for logical reasoning are based on the **logic** invented by **Aristotle**. Aristotle invented the idea of the **sylogism**, in which certain things follows from others.

**Leibniz** did **not** succeed in creating his **universal language**.

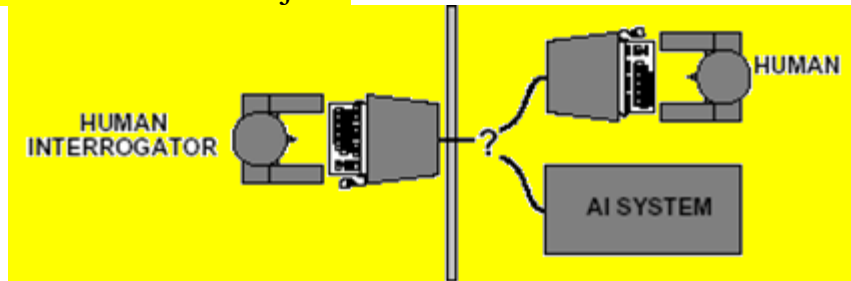
**Charles Babbage** invented the world's first computer—the **Analytic Engine**.

**Alan Turing** published in 1950, **Computing Machinery & Intelligence** paper.

**Turing test** is example of **acting humanly**. The test state that if a person who interrogated the computer could not tell if it was a human or a computer, then to all intents and purposes, it is intelligent.

The computer would need the following capabilities to pass Turing Test:

- **machine learning** to learn;
- **knowledge representation** to store information;
- **automated reasoning** to think;
- **natural language processing** to communicate in English
- **computer vision** to see objects



From **Chinese Room Problem**, passing the Turing test is **sufficient** to prove intelligence but it is not necessary to prove intelligence.

**Weizenbaum's ELIZA**, was designed to **mimic human conversation**.

In 1956, the term **Artificial Intelligence** was first used by **John McCarthy**

In 1957, **Simon** invented **GPS** (general problem solver) to solve any logical problem.

In 1958, **McCarthy** invented the **LISP** programming language.

Evans' **Analogy** and Mitchell's **Copycat Architecture** were designed to solve problems that involve analogies, such as "**ABC is to CBA as DEF is to**"???"

**Descartes** believed in **dualism**, the idea that the universe consists of two entirely separate things: mind (or soul) and matter (or body). Descartes did not believe that this dualism extended to animals.

Natural Language Processing came from the writings of **Noam Chomsky**, who in the 1950s proposed his theory of **Syntactic Structures**.

**McCulloch and Pitts's electronic neurons**, which are used to build neural networks.

**PROLOG (PROgramming in LOGic)** is a language designed to enable programmers to build a database of facts and rules, and then answer questions. PROLOG is not an efficient programming language, and so for many problems a language such as C++ would be more appropriate.

**LISP (LISt Programming)** is a language closely resembles the imperative programming languages such as C++ and Java.