# Introduction
# To
# Artificial Intelligence

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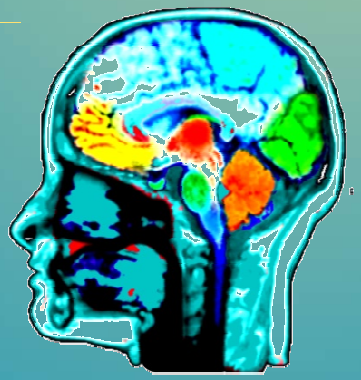


## Introduction

Dr. Hamidreza Hakim
hamid.hakim.u@gmail.com

[These slides were created by Dan Klein and Pieter Abbeel for CS188 Intro to AI at UC Berkeley.]


بسم الله الرحمن الرحيم

Email:

hamid.hakim.u@gmail.com

hakim@iut.ac.ir

yekta.iut.ac.ir

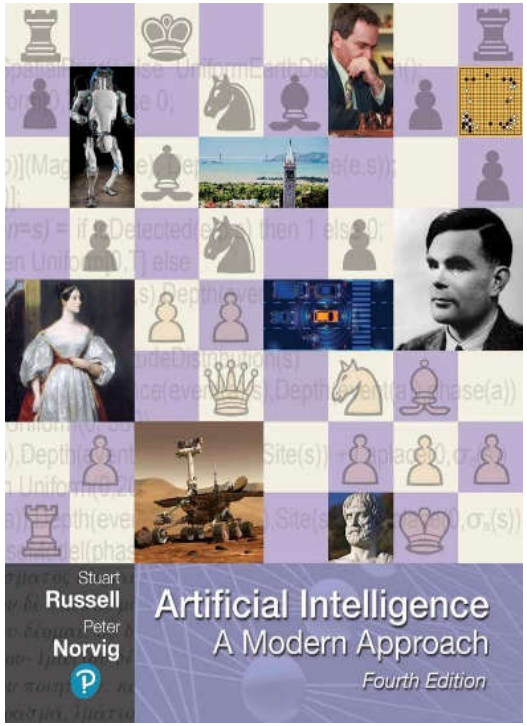
Office :423

# Grades

- Exercises and project: 5 points
- Exams: 15 points

# Textbook

- Not strictly required, but for students who want to read more, I strongly recommend
  - Russell & Norvig, AI: A Modern Approach, 4th Ed.




  - Warning: The presentation here does not necessarily follow the presentation in the book.

## Academic Integrity: Cheating vs Not Cheating

- Not cheating:
  - You work with your project partner
  - You talk with someone about the project
  - You find and use pseudocode in a book

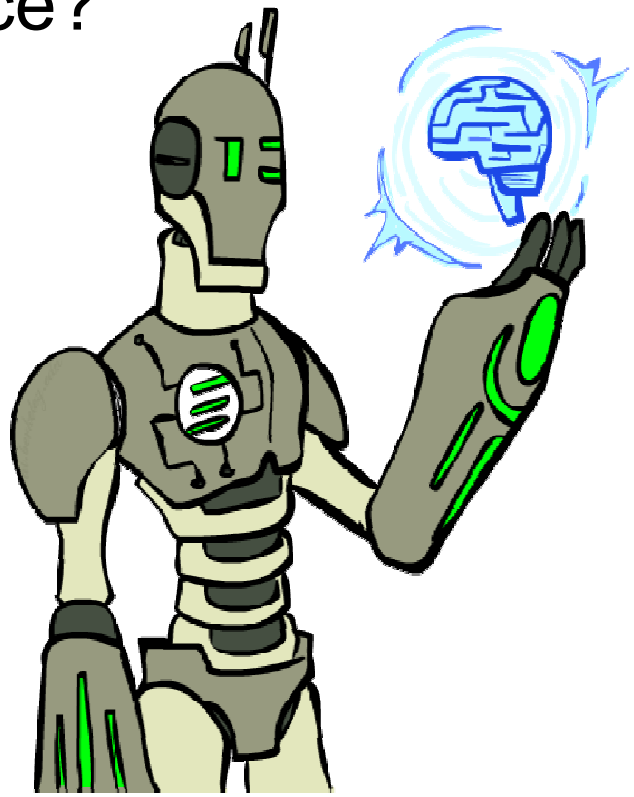
- If in doubt, ask!

# Academic Integrity: Cheating vs. Not Cheating

- Cheating:
  - You visit a homepage with solutions
  - You copy any code from others
  - Someone dictates a solution to you
  - Someone else writes the code for you
    - You *pay* someone else to write the code for you!

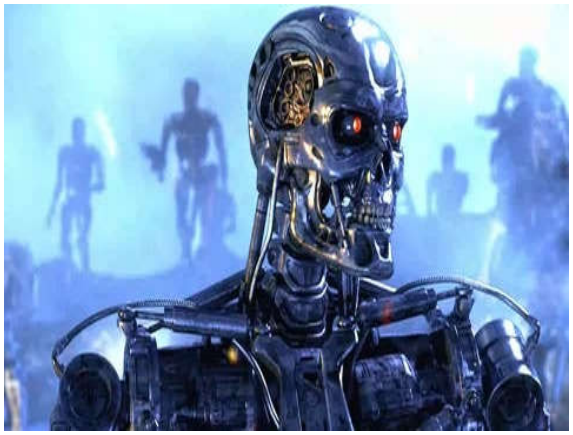
# Today

- What is artificial intelligence?
- What can AI do?
- What is this course?



# Sci-Fi AI?

*Star Wars* (1977)




# What is Artificial Intelligence (AI)?

Views of AI fall into four categories in Two dimensions:

- Thought processes/reasoning vs. behavior/action
- Success according to human standards vs. success according to an ideal concept of intelligence (rationality):

| 1 | 2 |
|---|---|
| Act like humans | Act rationally |
| Think like humans | Think rationally |

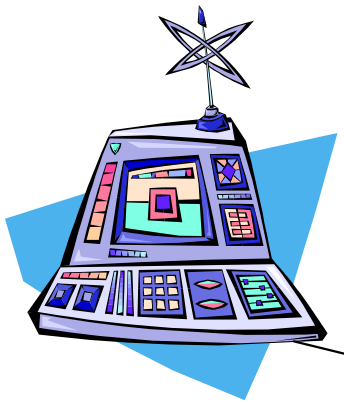
The textbook advocates "acting rationally"

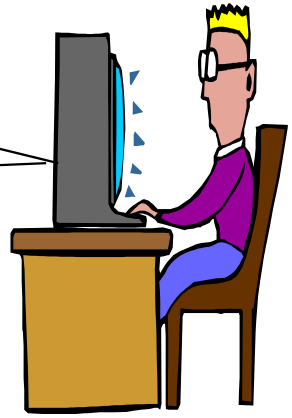
# Acting humanly

- Turing (1950) "Computing machinery and intelligence":
- Operational test for intelligent behavior: the Turing Test
- Suggested major components of AI:
  knowledge, reasoning, language understanding, learning

# Turing test

AI system





Human

Experimenter

# Eliza, 1965

- Patient: You are like my father in some ways.
- Doctor: What resemblance do you see?
- Patient : You are not very aggressive.
- Doctor : What makes you think I am not very aggressive?
- Patient : You don’t argue with me.
- Doctor : Why do you think I don’t argue with you?
- Patient : You are afraid of me.
- Doctor : Does it please you to believe I am afraid of you?
- Patient : My father is afraid of everybody.
- Doctor : What else comes to mind when you think of your father?
- Patient : Bullies.

# Act Like Humans

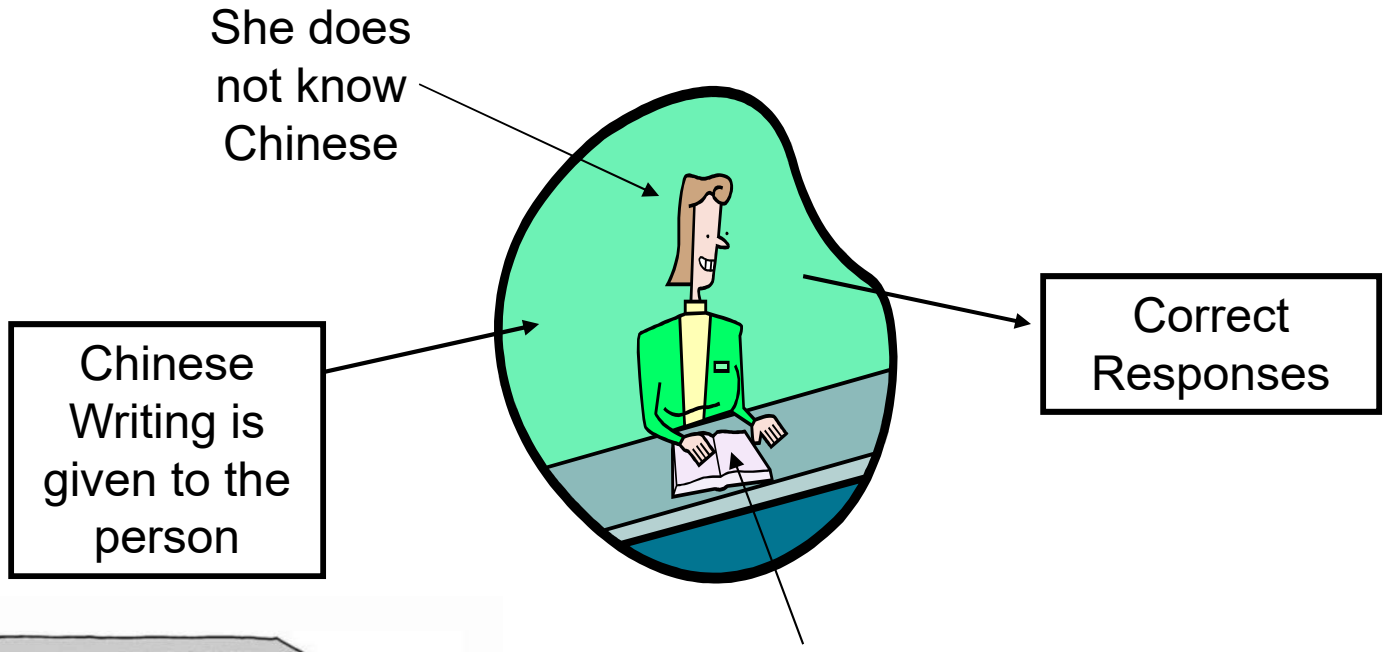
- AI is

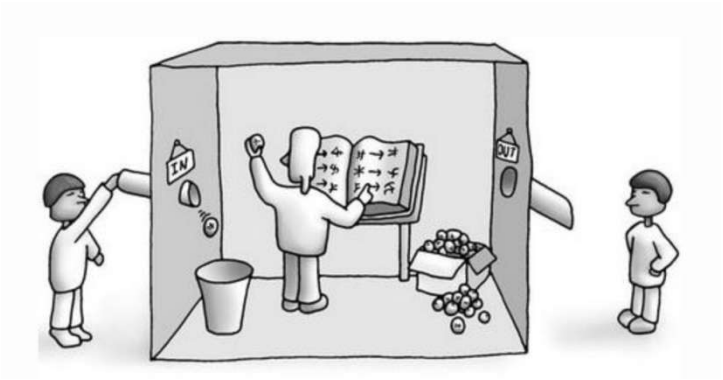
  the art of creating machines that perform functions that require intelligence when performed by humans

- Methodology: Take an intellectual task at which people are better and make a computer do it

  - Prove a theorem
  - Play chess
  - Diagnose a disease
  - Navigate in a building

# The Chinese Room



# Think like humans

- How do humans think?
- Need to get inside the actual working of human brain
- Cognitive Science:
  - Joins computer models from AI and experimental techniques from psychology
  - to construct testable theories about the workings of the human mind
- AI and CS fertilize each other, especially in the areas of vision, natural language, and learning

**Think Rationally**

# Think Rationally

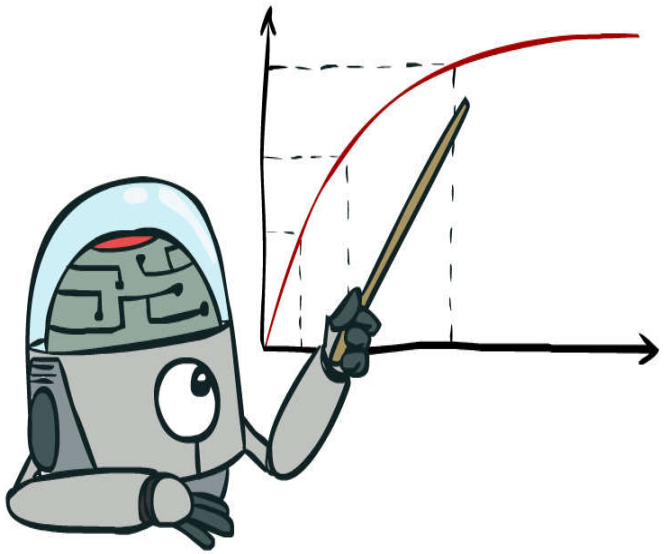
- Capturing the laws of thought
  - Aristotle was one of the first who attempted to codify the "right thinking"
  - Syllogisms: Socrates is a man; all men are mortal; therefore Socrates is mortal.
  - This study initiated the field of logic.
  - The so-called "logicist" tradition in AI hopes to create intelligent systems using logic programming.
  - Some problems not solved!! (fazzi logic,…)

# Act Rationally

Rational behavior: doing the right thing

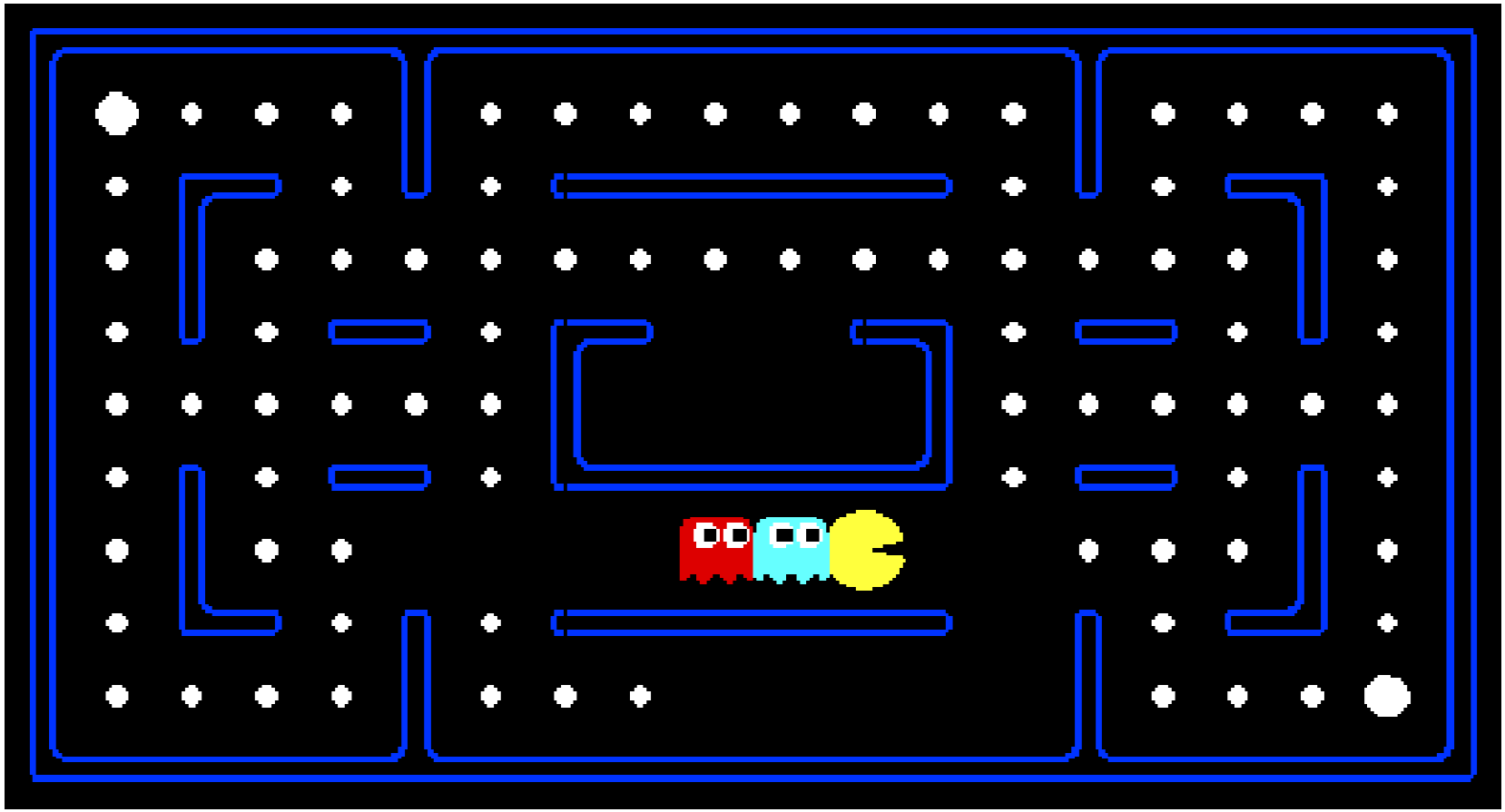
- "The right thing":
  - that which is **expected** to maximize goal achievement, **given the available information**
  - Limited resource, imperfect knowledge
  - Rationality ≠ Omniscience, Rationality ≠ Clairvoyance, Rationality ≠ Successes
- Doesn't necessarily (but often) involve thinking
- Doesn't necessarily have anything to do with how humans solve the same problem.


# Maximize Your Expected Utility



# Example: Problems with Humans

**What is rational behavior?**



How many dots?

# What About the Brain? Is rational?

- Brains (human minds) are very good at making rational decisions,

  but not perfect

- Brains aren't as modular as software, so hard to reverse engineer!
- "Brains are to intelligence as wings are to flight"
- Lessons learned from the brain:
  memory and simulation are key to decision making