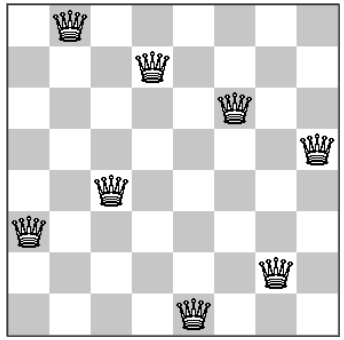
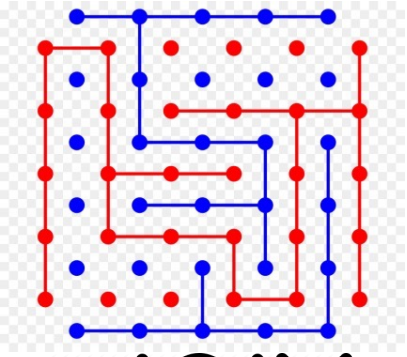
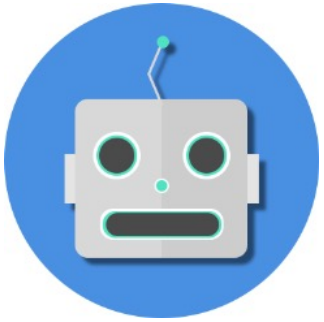
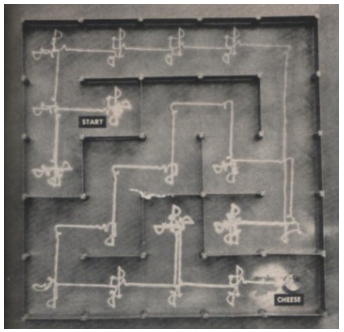
Artificial Intelligence:

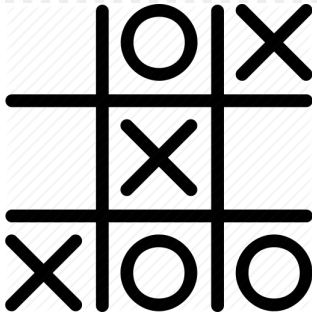
Past, Present and Future











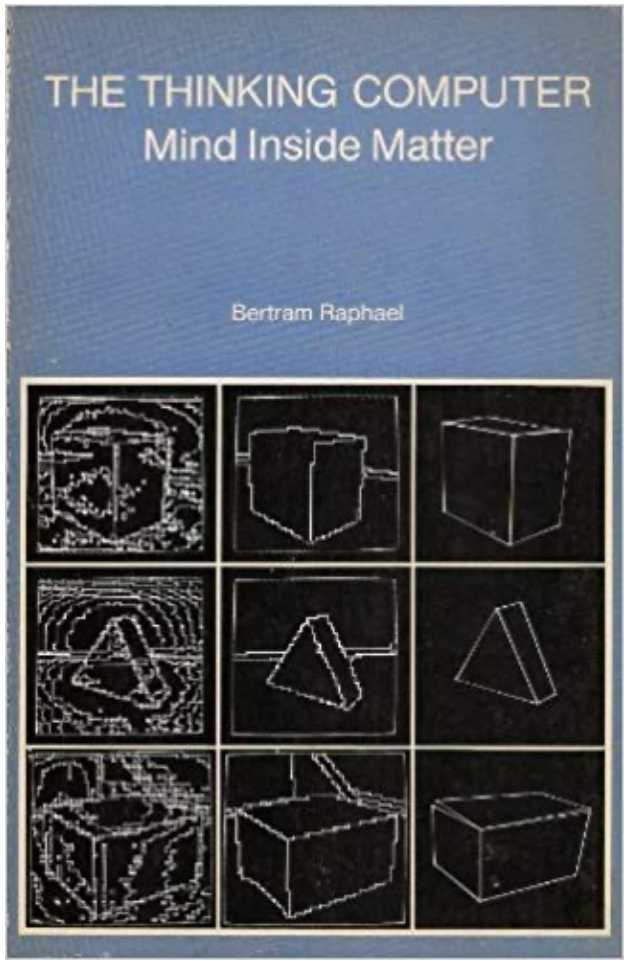
Chee Wei Tan

Requisites and Goals

- In this course, you should have some understanding of freshman basic math (i.e., high-school math).
- Preferably, but not a must, you know some basic computer programming language (since it's useful for your coursework)
- After this course, you should know
  - Basic ideas of AI and past achievements
  - Problem solving skills
  - Critical thinking and algorithmic thinking (deep thinking)
  - Creative applications in computer science

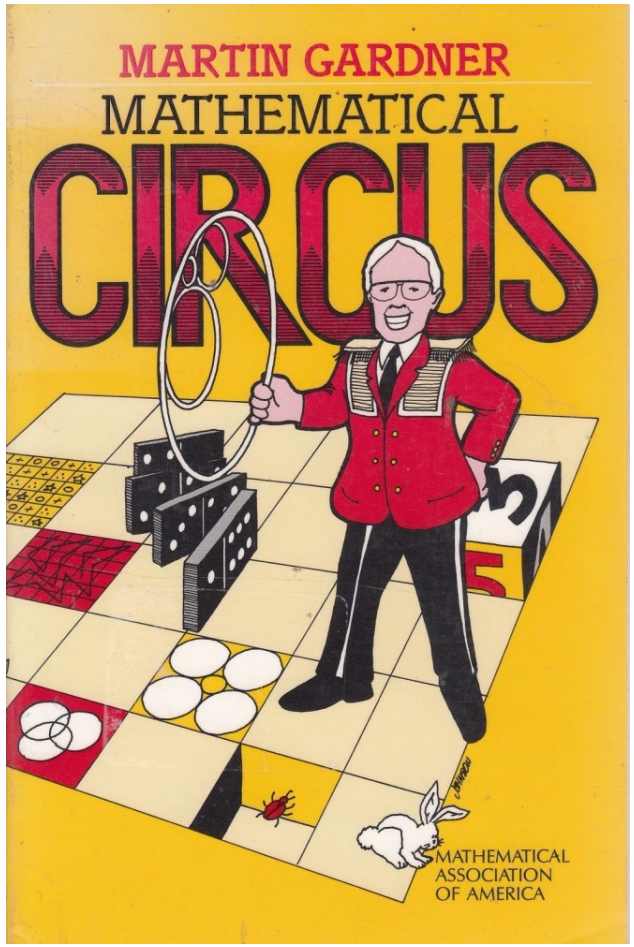
Reference Books

Bertram Raphael. **The Thinking Computer**. MWH Freeman and Co., 1976. ISBN: 0-7167-0723-3.



https://archive.org/details/thinkingcomputer00raph

Martin Gardner. **Mathematical Circus**. The Mathematical Association of America, 1992. ISBN: 978-0883855065.



https://archive.org/details/B-001-018-093/page/n287

Pre-Class and In-Class Quizzes

- Pre-class Quiz
  - MCQ and *sent out before each Lecture*, typically on Thursday
  - Related to pre-class reading, video watching
  - Around 2-3 Quiz questions and no time limit
- In-class Quiz
  - MCQ and *sent out during each Lecture in-class*
  - A warm-up poll first, then peer discussions and then quiz sent
  - Around 2-3 Quiz questions and are time-limited
- Grading of Pre-class and In-class Quizzes
  - Typically 1 point for each correct quiz answer, and for some of the Pre-class quizzes, more points may be given (e.g., 2 points or 3 points for a more challenging one)
  - Final score is normalized to the highest overall score, the difficulty level of the quiz and the difficulty-level spread
  - Try not to miss in-class quiz, as they are not re-issued

Motivation

- "the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it."

  – John McCarthy,

  When he coined the term "artificial intelligence" in a proposal:

  McCarthy, J., Minsky, M., Rochester, N., and Shannon, C., A proposal for the Dartmouth Summer Research Project in Artificial Intelligence, August 31, 1955

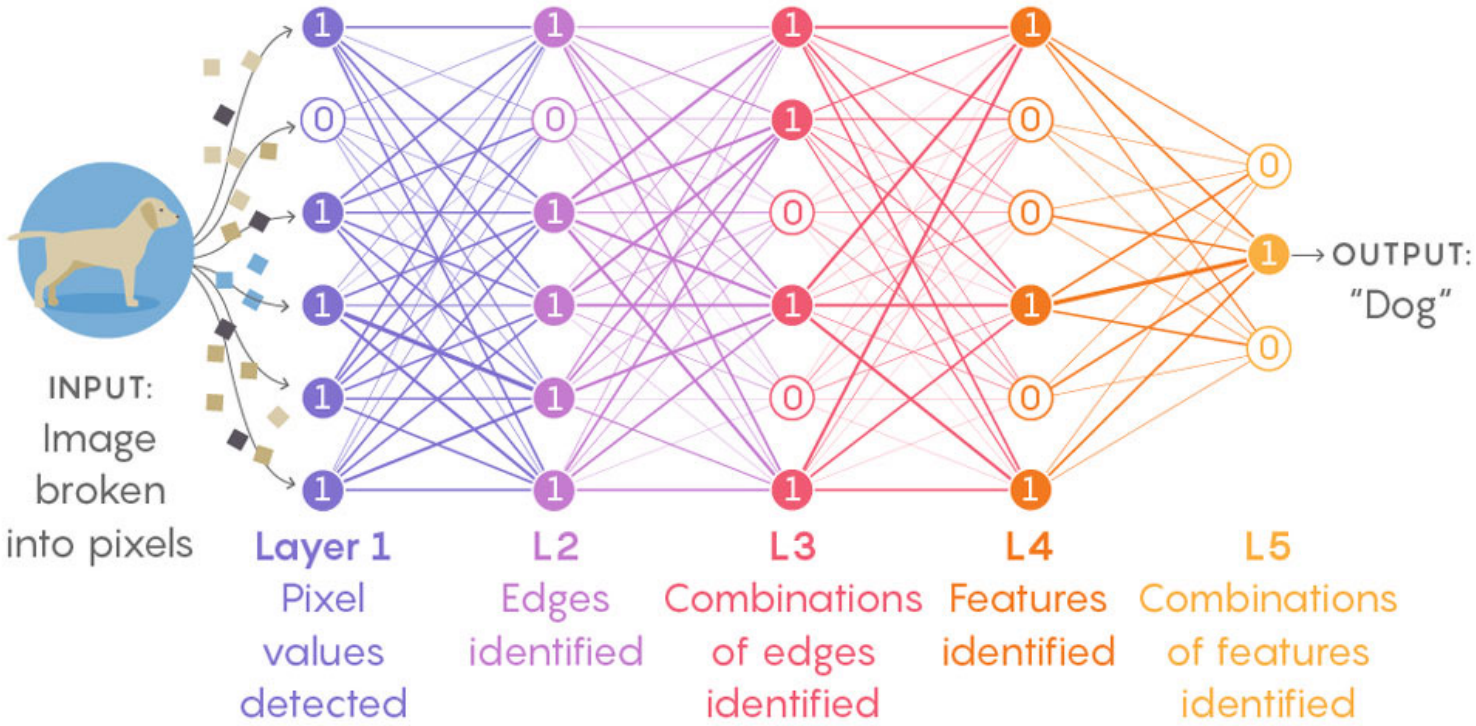
  Reprint in AI Magazine, Vol 27, Number 4, pp 12-14, 2016. https://doi.org/10.1609/aimag.v27i4.1904

Motivation

- Deep learning - The hottest AI idea in town

Learning From Experience

Deep neural networks learn by adjusting the strengths of their connections to better convey input signals through multiple layers to neurons associated with the right general concepts.



https://www.quantamagazine.org/new-theory-cracks-open-the-black-box-of-deep-learning-20170921/