Introduction to Artificial Intelligence (G51IAI)

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Module Introduction

An Overview of This Session

‣ What is AI?
‣ Module introduction
  ◦ Aims of the module
  ◦ Module context
  ◦ Textbooks + useful readings
  ◦ Lecture resources
  ◦ Assessments
  ◦ Info of previous exams

What is AI?

- **Artificial intelligence** (AI) is the intelligence exhibited by machines or software. It is an academic field of study which studies the goal of creating intelligence.

- Major AI researchers and textbooks define this field as "the study and design of intelligent agents", where an intelligent agent is a system that perceives its environment and takes actions that maximize its chances of success.

- John McCarthy, who coined the term in 1955, defines it as "the science and engineering of making intelligent machines"

Wikipedia, 2015

What is AI?

- AI is the study of how to make computers do things which, at the moment, people do better.
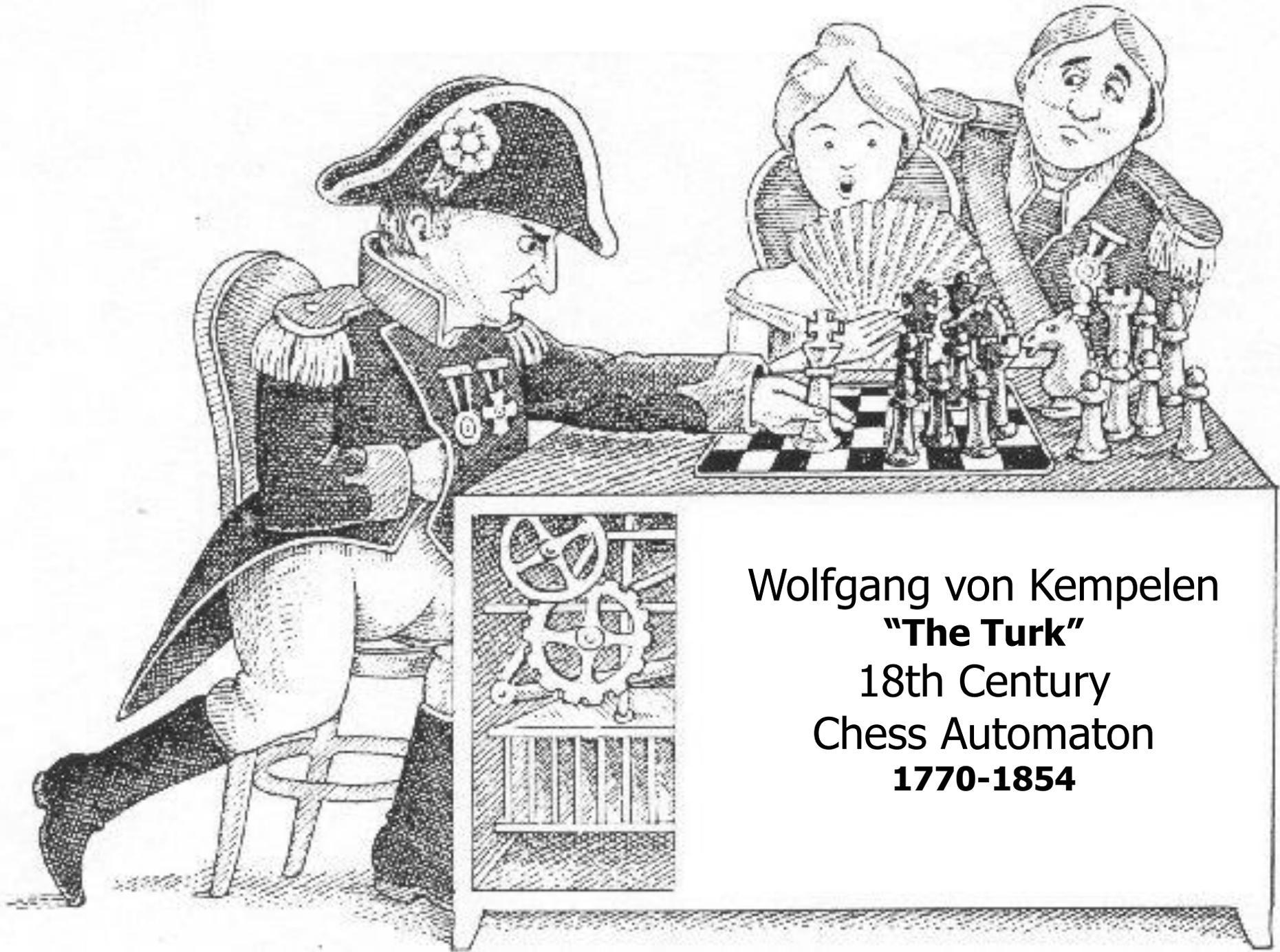
  Elaine Rich, 1991

- AI is a branch of computer science and engineering that deals with intelligent behaviour, learning, and adaptation in machines.
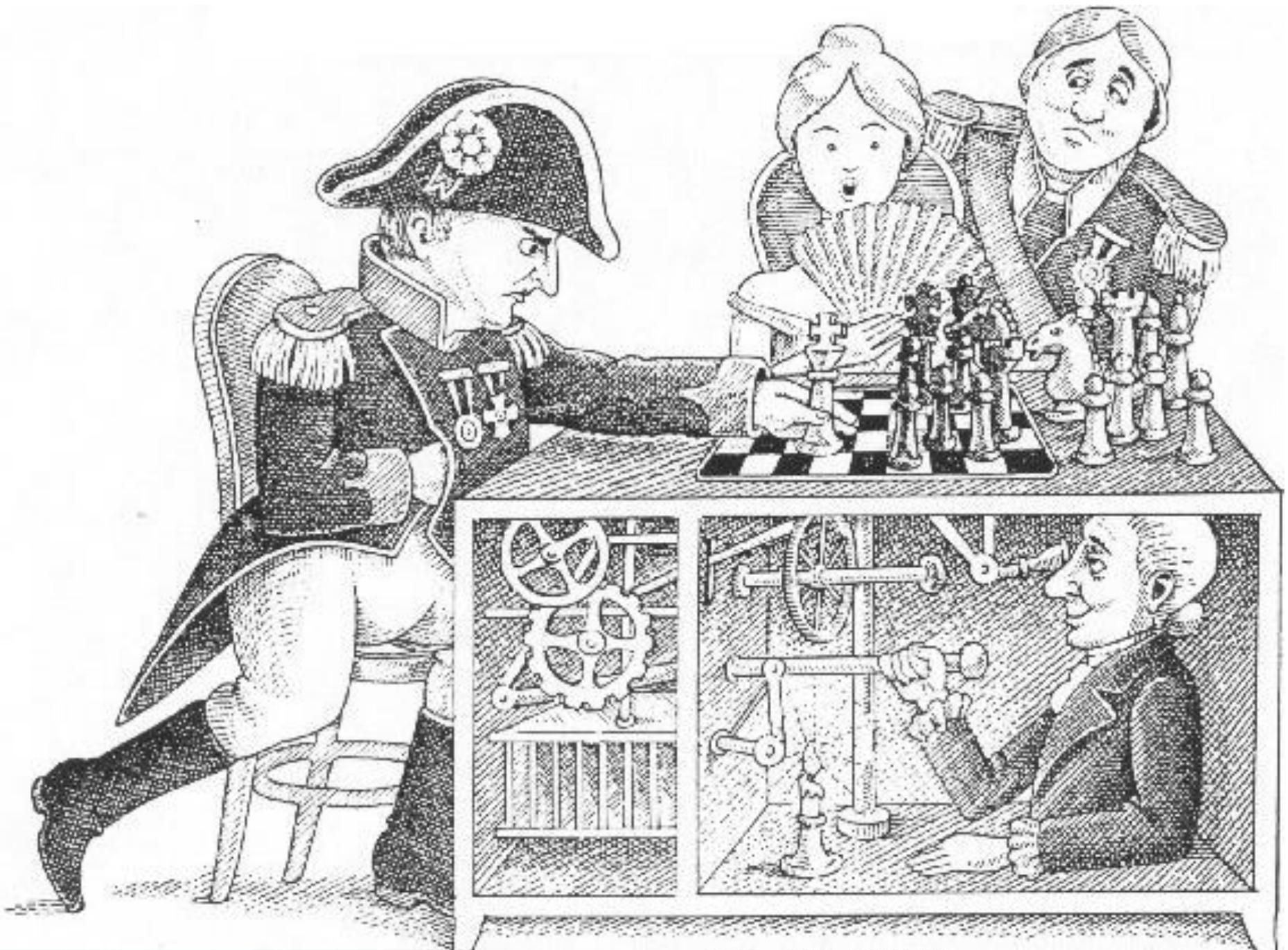
  Wikipedia, 2009

What is AI?

▸ Can machines ever be intelligent?
  ◦ A.I. Artificial Intelligence (2001)
  ◦ Director: Steven Spielberg
  ◦ Philosophy film

  ◦ Other movies about AI?
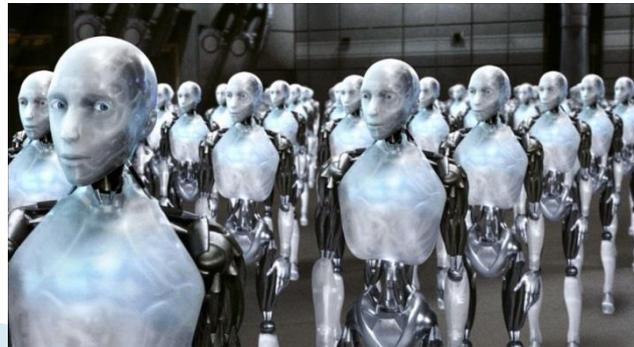
Wolfgang von Kempelen
"The Turk"
18th Century
Chess Automaton
1770-1854

What is AI?

▶ IBM Deep Blue
  ◦ Chess champion Garry Kasparov
  ◦ 11 May 1997

  ◦ 2 vs. 1, three draws

What is AI?

▸ What is intelligence?
  ◦ Understanding languages
  ◦ Automated reasoning
  ◦ Usually require knowledge
  ◦ **Understanding**
    ⋅ Chinese room experiment
    ⋅ How Siri works?

  ◦ Computers can play strong games, and a chimpanzee can play poor games?
    ⋅ There are non-intelligent ways to achieve intelligent tasks

Module Context

G51IAI - Introduction to AI

G52PAS - Planning and Search

G53FUZ – Fuzzy Techniques

G53MLE - Machine Learning

G53DIA - Design Intelligent Agents

G53KRR - Knowledge Representation and Reasoning

G53ARB - Advanced Robotics

G53IDS - Individual Project

Module Introduction

▸ G51IAI Web Page at Moodle
  ◦ All lecture slides and additional notes
  ◦ Assessments
  ◦ Textbooks
  ◦ Module schedule (being updated)
  ◦ Other resources
  ◦ Previous exam paper/example questions

Module Introduction

- Lectures
  - Handouts/notes, summary of each lecture
  - Willingness to answer questions, i.e. mailing list
  - Course content not too much / too little

- Teaching method
  - Lectures, office hours: approx. 25 hours
  - Private study: approx. 40 hours
  - Lab exercises: approx. 5 hours
  - Revision: approx. 30 hours

Module Introduction

▶ Assessment

  ◦ 100% examination
    ・ 2 hours
    ・ **4** compulsory questions
    ・ Each question 25%, roughly 30 minutes
    ・ Covers ALL lectures content excl. lab exercises

Module Introduction

- Lecture time – location
  - Thursday 14.00–16.00, EXCH LT2
  - Lecture schedule might be slightly adjusted (if so enough notice will be given)

- Office hours
  - Friday 12.00–13.00, C71
  - Starting from Week 3 in Spring
  - Except 27th Feb and 20th March

Module Introduction

- Aims of the module
  - Define what we mean by **AI**
  - Allow the students to become familiar with AI **software**
  - Provide an understanding of the basic theory of a **range of AI techniques**

Module Introduction

▸ Aims of the module
- ◦ Introduce insights of AI history, i.e. key milestones
- ◦ Provide necessary knowledge to implement some AI techniques
- ◦ Introduce game playing techniques
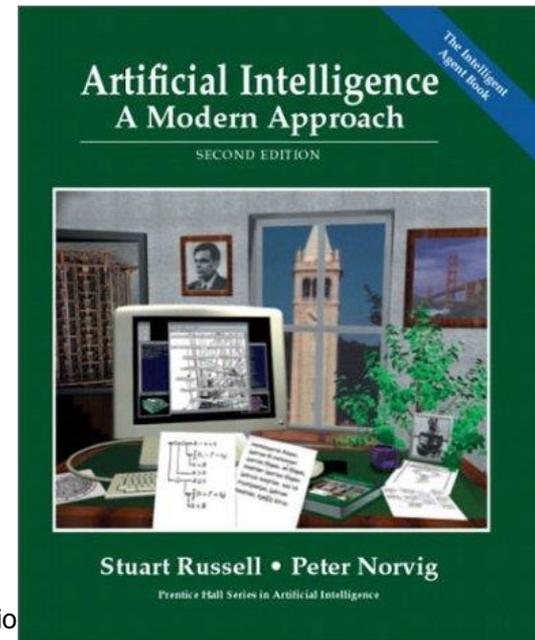- ◦ Introduce a number of AI applications

Textbooks

▸ **Artificial Intelligence – A Modern Approach (AIMA) (Russell/Norvig), 1995 & 2003**

"Artificial Intelligence (AI) is a big field and this is a big book" (Preface to AIMA)

Most comprehensive textbook in AI

Much of the material for this course is from this book, available from library.

Artificial Intelligence
A Modern Approach
SECOND EDITION

The Intelligent Agent Book

Stuart Russell • Peter Norvig

Prentice Hall Series in Artificial Intelligence

Textbooks

- **Artificial Intelligence – A Modern Approach (AIMA) (Russell/Norvig), 1995 & 2003**

  Web site: http://aima.cs.berkeley.edu/
  Textbook in many courses

  Better to be used as reference book
  You don't have to learn and read the **whole** book
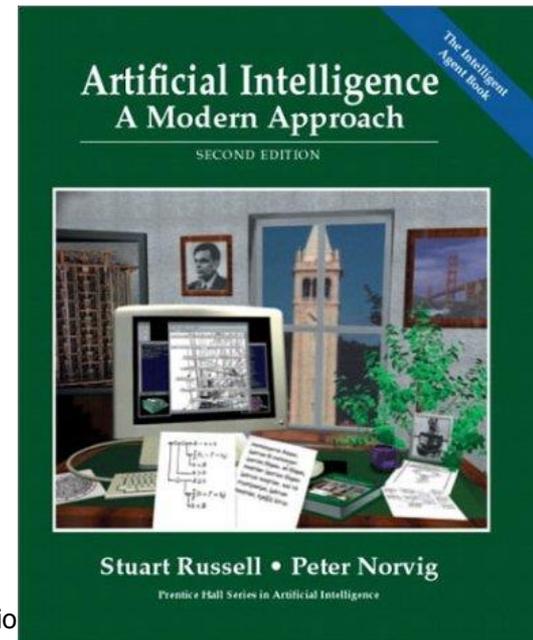
Textbooks

▸ **Artificial Intelligence – A Modern Approach (AIMA) (Russell/Norvig), 1995 & 2003**

Chap 1 : Introduction
Chap 3 : Solving Problems by Search
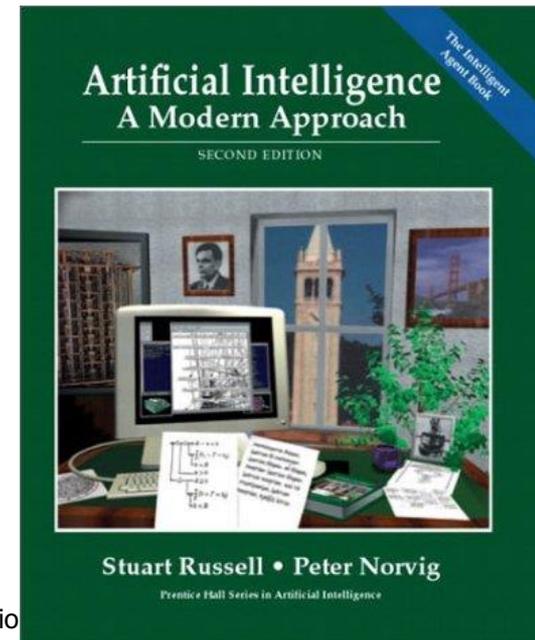Chap 4.1 : Informed (Heuristic) Search
Sections 5.1 & 5.2 : Backtracking Search
Chap 6 : Adversarial Search
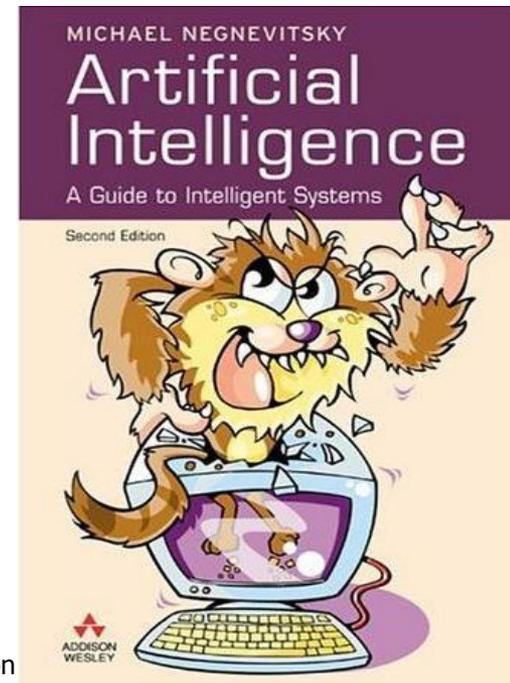Section 20.5 : Neural Networks
Chap 26 : Philosophical Foundation
Etc …

Artificial Intelligence
A Modern Approach
SECOND EDITION

Stuart Russell • Peter Norvig

Prentice Hall Series in Artificial Intelligence

Textbooks

▸ **Artificial intelligence: a guide to intelligent systems. Addison-Wesley, 2002.** *Negnevitsky*

- ◦ Good AI textbook, mainly concerns intelligent systems
- ◦ Easy to read while in depth
- ◦ Available from the library

Lecture Schedule

- Session 1 : Introduction & History of AI (today)
- Session 2 : Problem Space & Search
- Session 4 : Heuristic Search
- Session 5 : Artificial Neural Networks
- Session 6 : Data Mining
- Session 7 : Game Playing
- Session 8 : Theorem Proving & Knowledge Representation
- Session 9 : Lab (to practice ANN in Matlab, optional)
- Session 10 : Office hour (Q&A, feedback)

- Office hours : most Fridays 12.00–13.00, C71, from Week 3 (check Moodle)