FACULTY OF INFORMATION TECHNOLOGY

Artificial Intelligence Fundamentals (NM TTNT)

Semester 1, 2022/2023

Information

- Name:
  Artificial Intelligence Fundamentals
- Credit points: 4
- Lectures: 45 h
- Labs: 30 h

- Name:
  Van Du Nguyen, Ph.D.
- Email:
  nvdu@hcmuaf.edu.vn

Course

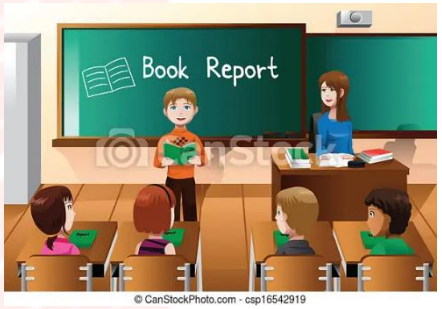
Lecturer

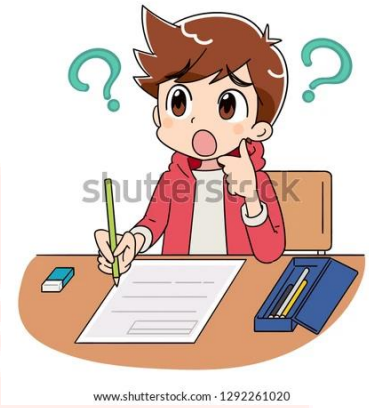
Content

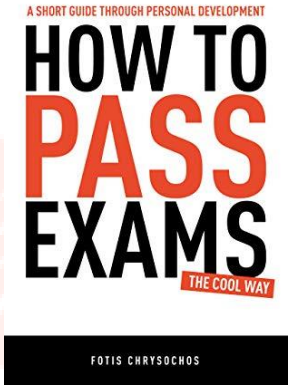
- Chapter 1. Introduction to Artificial Intelligence
- Chapter 2. Intelligent Agents
- Chapter 3. Uninformed Search
- Chapter 4. Informed Search
- Chapter 5. Game
- Chapter 6. Logical Agents
- Chapter 7. First-Order Logic
- Chapter 8. Learning Agents

Assessment

- Labs: 10%
- Project: 30% (10%, 20%)
- Final exam: 60% (writing test)

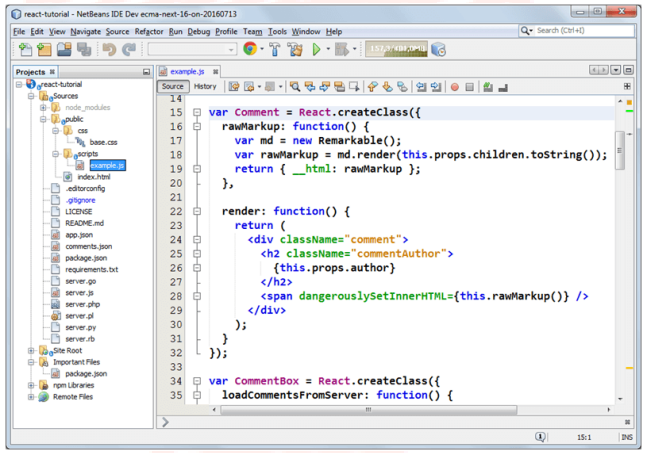






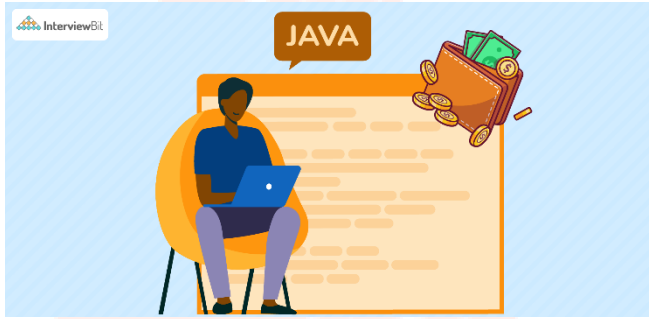
Assessment: Labs

- Coding assignments:
  - 10% of the grade,
  - Programming assignments.



- Collaborations:
  - Individual homework assignments

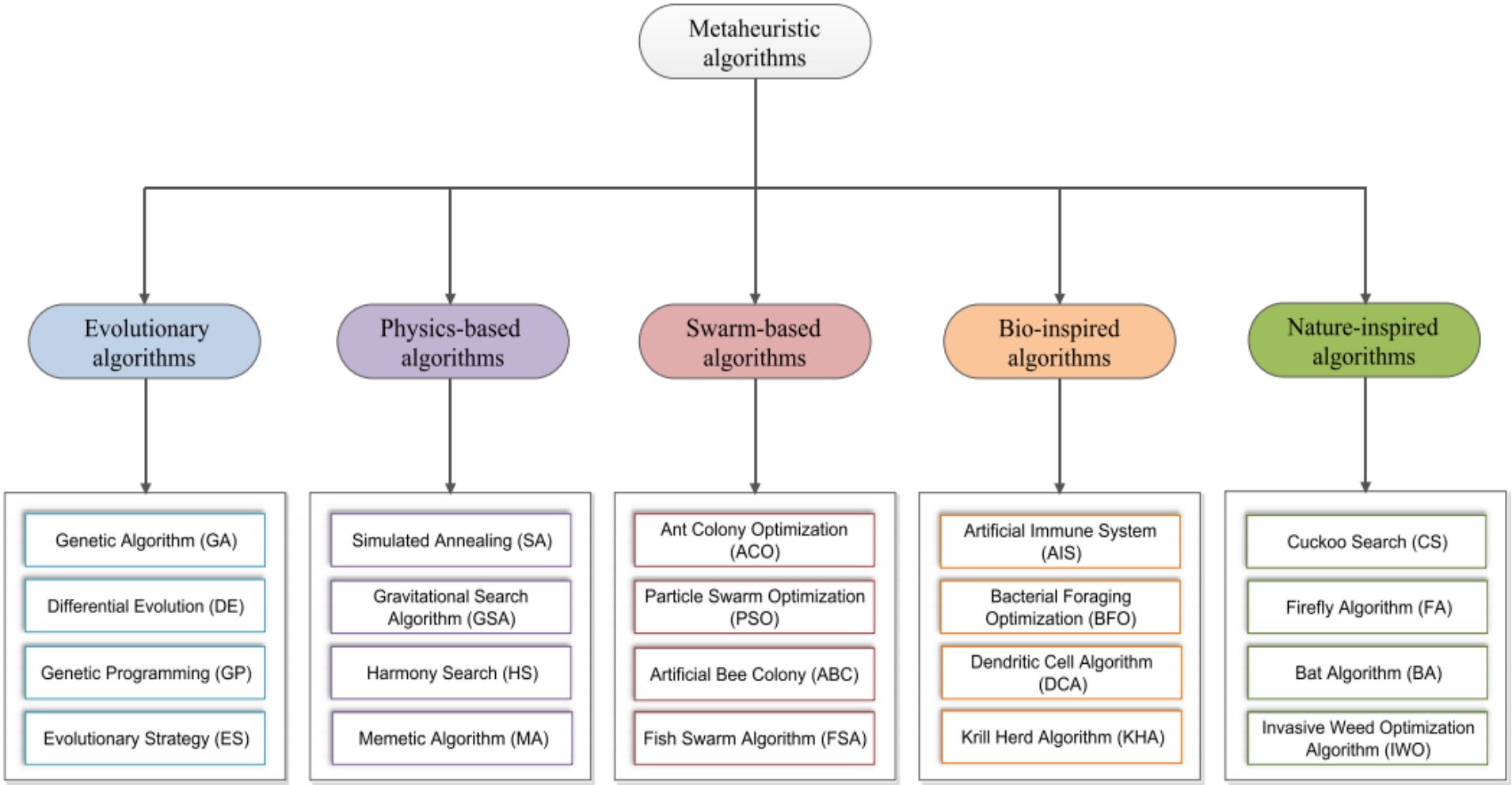
- Programming language:
  - Java



Assessment: Project

- ~4 students/group
- Desktop/Web/mobile applications
- Scope: Applying an **AI techniques (API, algorithms)** to solve a specific problem

Project Suggestion: metaheuristic algorithms

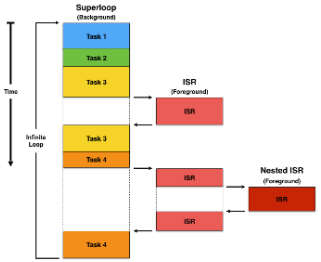


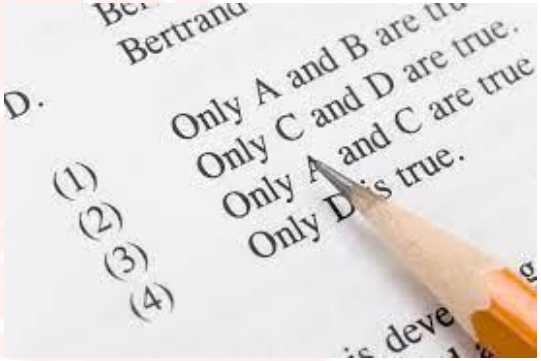
Spotted Heyna Optimizer(SHO)

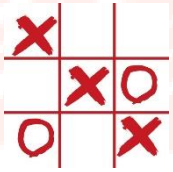
Project Suggestion: metaheuristic algorithms (cont.)

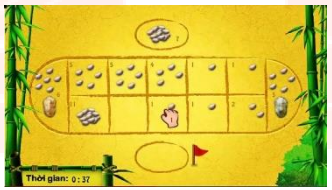
- Scheduling tasks:
  - examination,
  - Timetable for university,
  - Timetable for highschool,
  - …
- knapsack problems
- Multi-choice tests generation
- NO GAME (if possible)!!!

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
9:00		...still working on it...		Lin. Algebra Lecture	Running	Catching up sleep	Dream about solution to Q4
10:00	Library	Finishing it off for deadline	Maths supervision	Finishing off assignment...	Analysis Study Group	Still sleeping	Getting this on paper...
11:00	Probability Lecture	Analysis Lecture	Probability Study Group	...for noon deadline!	Revise Analysis	Still sleeping	...doesn't actually work
12:00	Working on assignment...	Probability Lecture	Probability Lecture	Practice clarinet	Analysis Lecture		Running club
13:00	...for Stat Lab...			Probability Tutorial	Stat Lab Lecture	Out and about	
14:00		Stat Lab Computer Lab	Back to assignment...		Lin. Algebra Lecture	Out and about	Fix bicycle
15:00	Probability Problem Class	Stat Lab Study Group	...still working on it	Analysis Lecture		Out and about	Install R-packages,...
16:00	Spanish Class	Stat Lab Lecture	Athletics	Stat Lab Lecture	Library	Start Analysis assignment...	...try sample code
17:00	Spanish Class	Lin. Algebra Lecture	Athletics	Write Blog entry	Econ Lecture	...still working on it until...	Practice clarinet
18:00		Econ Lecture	Nap (unplanned)		Grocery shopping group	...stuck in Question 4	Laundry
19:00	...still working on it...		still napping	Ensemble practice...	Cooking and cleaning team		Reading for Econ
20:00	...still working on it...	Probability assignment...	Society Social	Ensemble practice...	Dinner...	Off to Leamington...	Film club...
21:00	...still working on it...	...still working on it...	Society Social	Watch tele	together...	...clubbing...	Film club...



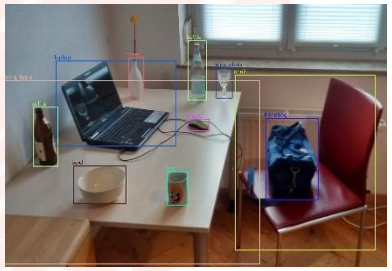


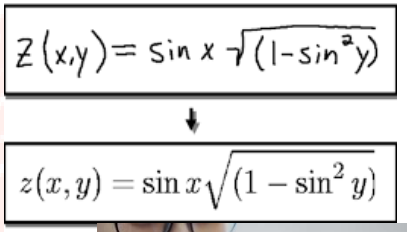


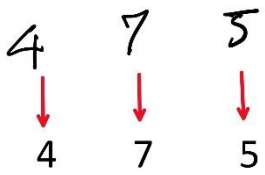


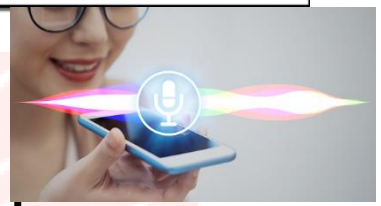
Project Suggestion (cont.)

- Using API (OpenCV, Yolo, Keras, Tensorflow, …) for recognition tasks
  - Face recognition
  - Object recognition
  - Fingerprint recognition
  - Mathematical expression recognition
  - Handwritten recognition
  - …









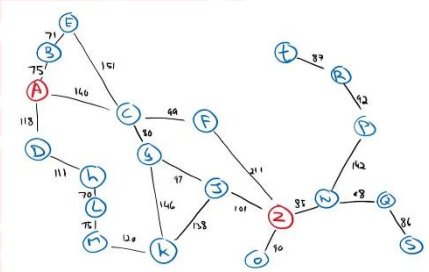
- Using Sphinx for voice recgonition tasks
- Other APIs for recognition tasks

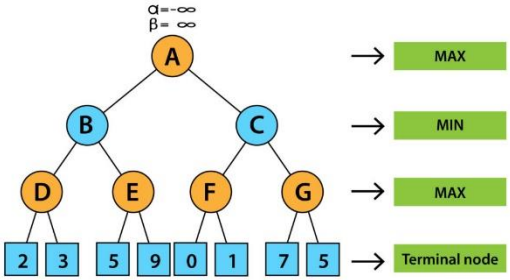
Assessment: Project (cont.)

- Deadlines:
  - Project proposal: **by 01/10/2022**
    - Including (problem statement, algorithm/API)
    - Link: **TBA**
    - Project proposal **acceptance**: **by 20/10/2022**
  - Presentation: TBA
    - Presentation form: ppt file
    - 20'/group (15' for presentation + 5' for Q&A)

Assessment: Final exam

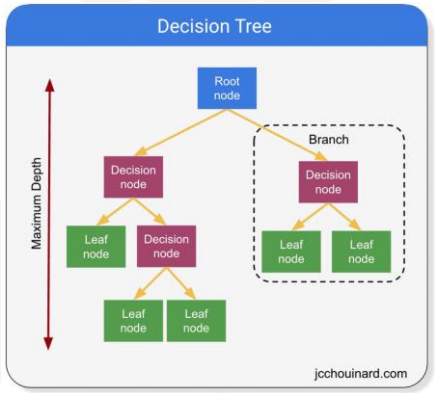
- 60% of the grade
- All course contents are possible
- Writing test





∧	*and* [conjunction]
∨	*or* [disjunction]
⇒	*implies* [implication]
¬	*not* [negation]
∀	*For all*
∃	*There exists*

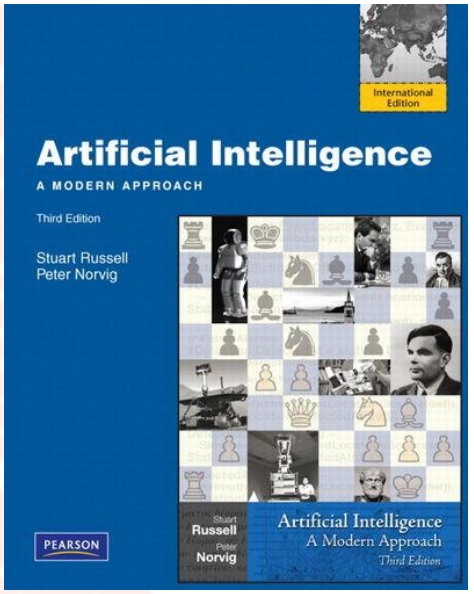
English	First-Order
At least one x is P	$\exists x P(x)$
All x are P	$\forall x P(x)$
Some x are P	$\exists x P(x)$
Not all x are P	$\exists x \neg P(x)$
No x are P	$\forall x \neg P(x)$



Material

- Course textbook:
  - S. Russell and P. Norvig, *Artificial Intelligence: A Modern Approach* Third Edition, Prentice Hall, 2010.

  https://bit.ly/2S9nNwm



- Other textbooks:
  - E. Charniak and D. McDermott, Introduction to Artificial Intelligence, 1999, Second Edition.
  - J.Finlay and A.Dix, Introduction to Artificial Intelligence, UCL Press Limited, 1997.
  - N.Forbes, Imitation of Life: How Biology is Inspiring Computing, Cambridge MA, MIT Press, 2004.
  - M.Sipper, Machine Nature: The Coming of Bio-Inspired Computing, Cambridge MA, MIT Press, 2002. (ISBN 0071387048*).*
  - …

Course textbook: AIMA

http://aima.cs.berkeley.edu/

http://norvig.com/gsoc-ideas.html

AIMA Home ⌂
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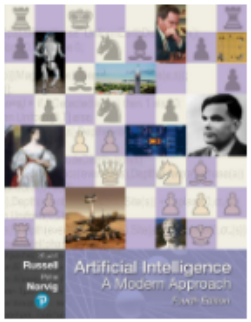

Artificial Intelligence: A Modern Approach

(Fourth edition, 2020)

by Stuart Russell and Peter Norvig

The leading textbook in Artificial Intelligence, used in **1500** schools in **135** countries and regions.

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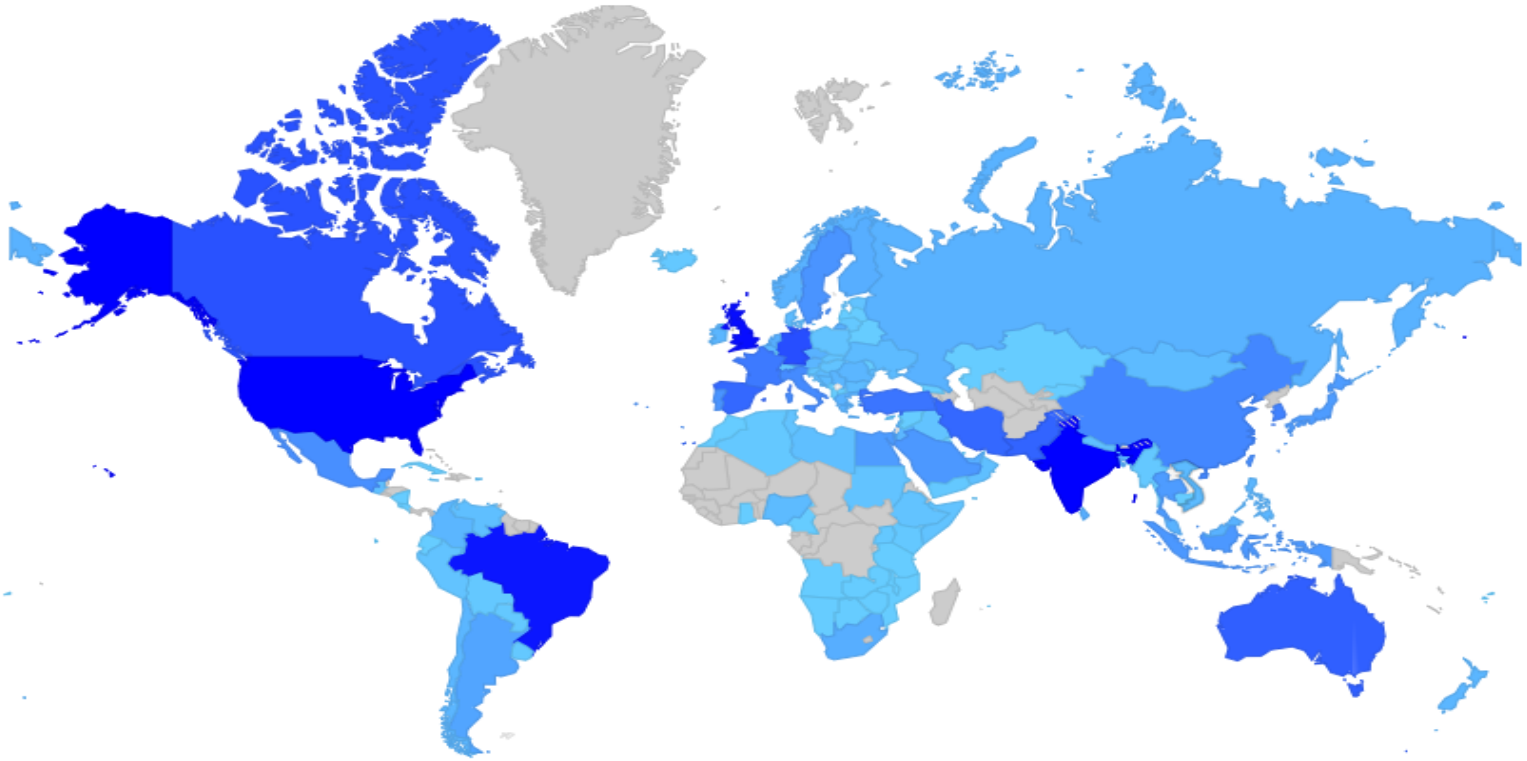
1408 Schools Worldwide That Have Adopted AIMA

Artificial Intelligence: A Modern Approach has been adopted for use by at least **1408 schools** in **128 countries** or regions. Please let peter@norvig.com know of any we missed. Hover over a country in the map or word cloud below to see the number of adoptions. Each @ after a school name links to a course.



Education

- AI:
  - FPT University (2019)
  - Hanoi University of Science & Technology (2019)
  - University of Technology and Education Ho Chi Minh city (2019)
  - Industrial University of Ho Chi Minh City (2020)
  - ...
- Data Science:
  - Hanoi University of Science & Technology (2019)
  - Ho Chi Minh City University of Science (2020)
  - International University – VNU-HCM (2020)
  - University of Information Technology (2020)
  - Banking University HCM (2020)
  - …

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