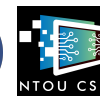# Economics and Computation

Introduction

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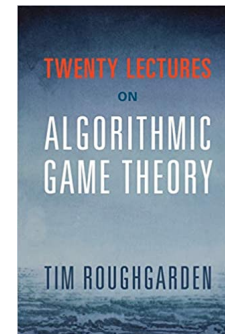National Taiwan Ocean University

Taiwan

Textbooks and Materials

- Textbooks/Lectures:
  - *Twenty Lectures on Algorithmic Game Theory.* Tim Roughgarden. Cambridge University Press. 2016.
  - *Algorithmic Game Theory*. Noam Nisan, Tim Roughgarden, Eva Tardos, and Vijav V. Vazirani. Cambridge University Press. 2011.
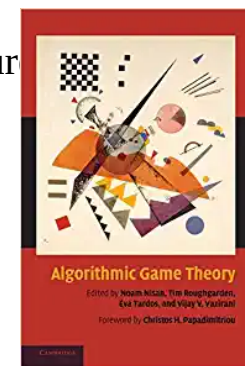
- Other materials:
  - *Essentials of Game Theory: A Concise, Multidisciplinary Introduction* (Synthesis Lectur on Artificial Intelligence and Machine Learning). Leyton- Brown and Kevin, Shoham. Cambridge University Press. 2008.

- Course website:
  - https://josephcclin.github.io/courses/ec_and_agt.htm

Prerequisites

- Basic CS undergraduate courses in
  - Algorithms
  - Calculus
  - Probability theory
  - Programming

- Motivation.

- Curiosity.

Topics (adjusted accordingly)

- Introduction and Preliminaries

- Minimax Principles

- Social Choice

- Stable Matchings

- A Sketch of Nash's Theorem from Fixed Point Theorems

- Auctions & Mechanism Design Basics

- Algorithmic Mechanism Design (Knapsack Auctions)

- Revenue Maximizing Auctions

- Simple Near-Optimal Auctions

- Multi-Parameter Mechanism Design

- Other Selected Topics

Grading Policy

- Attendance (10%)

- Assignments (40%)

- Final Presentation (50%)
  - Research papers

Grading policy for the presentations

- Order:
  - Midterm: According to the book chapters.
  - Final: According to the seat number ordering.
- Complete the presentation: 60 point
  - Duration for each presentation: 30~50 minutes.
- Raising questions: +2 point for each one (maximum +20 point)
- Clearly answering the teacher's ≥ 4 questions: +5 point for each one.

Where to find the paper? (suggestions)

***Please look for papers in 2020—present.**

- **International conferences:**
  - **EC**: Proceedings of the ACM conference on Electronic commerce.
  - **NeurIPS**: Conference on Neural Information Processing Systems.
  - **AAAI**: Association for the Advancement of Artificial Intelligence.
  - **IJCAI**: International Joint Conferences on Artificial Intelligence.
  - **AAMAS**: International Conference on Autonomous Agents and Multiagent Systems.
  - **SAGT**: Symposium on Algorithmic Game Theory.
  - **WINE**: International Conference on Web and Internet Economics.
  - ...
- **Journals:**
  - **Games and Economic Behavior**
  - **International Journal of Game Theory**
  - **Social Choice and Welfare**