JOHNS HOPKINS
CENTER for TALENTED YOUTH

CTY SUMMER PROGRAM FINAL EVALUATION

Student: ADAM CHEONG

Course: The Mathematics of Competitive Behavior

Date: August 2, 2024

Instructor: Patrick Kennedy

Site: Baltimore, MD

Teaching Assistant: Alex Granado

Congratulations, Adam, on successfully completing The Mathematics of Competitive Behavior!

Overall Performance

Your work in this class was excellent! You developed a firm grasp of game theory, probability, and combinatorics. With diligence and attention to detail, you developed well-reasoned and sometimes counter-intuitive solutions to many challenging problems.

Content Proficiency

Throughout the course, you successfully solved a wide variety of difficult problems, quickly mastering each topic along the way. Early on, you acquired fundamental knowledge in combinatorics and probability, then learned how to find optimal strategies for simple games represented as matrices and tree diagrams. Moving to more complex games, your success continued. For example, you derived players' optimal moves in a mock hostage situation based on a complicated game tree and various payoff levels. During the last week, you explored connections between game theory and economics, presenting to your classmates about stock market strategy and hedge funds. Your framing the stock market as a (more or less) zero-sum game was particularly insightful.

Reasoning and Problem Solving

Your advanced organizational strategies helped you to analyze difficult problems and model situations well throughout the course. By way of example, you came up with an efficient method for counting the number of six-digit numbers with digit sum 51 on one of the first days of class. When playing the iterated prisoner's dilemma with your classmates, you employed a mostly cooperative strategy that earned your classmates' trust, though you also anticipated your classmates' "betrayals" and sprinkled in enough "betrayals" of your own to earn you a solid score. Each significant in its own right, these accomplishments underscore your powerful reasoning skills.

Collaboration and Participation

Your friendly demeanor and ability to work with each of your peers contributed to a congenial classroom atmosphere. Always smiling and ready to participate in a game or problem solving activity, you set an example for others, like when you worked with a classmate to create and test the interesting dice game Foura. Moreover, your explanations of solutions to challenging problems, such as when it's in a rational player's best interest to provide a threat or promise, aided your classmates' understanding of important strategic points.

Suggestions and Recommendations

Once focused on a challenge, you worked diligently to find a solution. I encourage you to seek out and construct challenges for yourself; you will be amply rewarded. For a treatment of topics closely related to our course, I encourage you to read *Game Theory and Strategy* by Philip Straffin or *Winning Ways for Your Mathematical Plays* by Berlekamp, Conway, and Guy.

Alex and I were delighted to have you in class, Adam! We wish you the best in your future endeavors!

JOHNS HOPKINS
CENTER *for* TALENTED YOUTH

ADAM CHEONG

has successfully completed the course

The Mathematics of Competitive Behavior

in Academic Year 2023-24

Amy Lynne Shelton, PhD, *Executive Director*