Solution to Practice Problems: Game Theory

1. Modeling a situation as a game

For each of the following situations, come up with a game (in normal form – the matrix representation we have been using) to describe the situation. For each one, decide if the game is zero-sum or not. Also, if the game appears to be equivalent to some game we've already seen in lecture, indicate which one.

There are many possible solutions to these. The important thing is NOT to get the exact same numbers as I have. But you should try to get the same relative ordering between the payoffs.

a. Two gentlemen are engaged in a duel. They each have two choices: shoot straight (to try to kill the other) or duck (to try to avoid being killed). If they both shoot straight, they both die; if they both duck, they live, but both lose some "face". If one ducks and one shoots straight, they both live, but the one who shoots earns "honor" and "respect" from his peers, while the one who ducks loses "face" and is branded a coward. Shooting and living gives a higher reward than ducking and living, regardless of what the other person does.

	Shoot	Duck
Shoot	-10, -10	-1, +1
Duck	+1, -1	-1, -1

This is essentially a variant of the game of Chicken, which I showed in class.

Game Theory Examples Solved Problems

DJ Losen

Game Theory Examples Solved Problems:

Strategy and Game Theory Felix Munoz-Garcia,Daniel Toro-Gonzalez,2016-08-10 This textbook presents worked out exercises on game theory with detailed step by step explanations While most textbooks on game theory focus on theoretical results this book focuses on providing practical examples in which students can learn to systematically apply theoretical solution concepts to different fields of economics and business The text initially presents games that are required in most courses at the undergraduate level and gradually advances to more challenging games appropriate for masters level courses The first six chapters cover complete information games separately analyzing simultaneous move and sequential move games with applications in industrial economics law and regulation Subsequent chapters dedicate special attention to incomplete information games such as signaling games cheap talk games and equilibrium refinements emphasizing common steps and including graphical illustrations to focus students attention on the most relevant payoff comparisons at each point of the analysis In addition exercises are ranked according to their difficulty with a letter A C next to the exercise number This allows students to pace their studies and instructors to structure their classes accordingly By providing detailed worked out examples this text gives students at various levels the tools they need to apply the tenets of game theory in many fields of business and economics This text is appropriate for introductory to intermediate courses in game theory at the upper undergraduate and master s level *Game Theory for Next Generation Wireless and Communication Networks* Zhu Han,Dusit Niyato,Walid Saad,Tamer Başar,2019-06-27 A unified treatment of the latest game theoretic approaches for designing modeling and optimizing emerging wireless communication networks Covering theory analytical tools and applications it is ideal for researchers and graduate students in academia and industry designing efficient scalable and robust protocols for future wireless networks **Game Theory Evolving** Herbert Gintis,2009-02-15 This revised edition contains new material shows students how to apply game theory to model human behaviour in ways that reflect the special nature of sociality individuality It continues its in depth look at cooperation in teams agent based simulations experimental economics the evolution diffusion of preferences *Game Theory: A Nontechnical Introduction To The Analysis Of Strategy (3rd Edition)* Roger A Mccain,2014-04-29 The objective of the third edition of Game Theory A Nontechnical Introduction to the Analysis of Strategy is to introduce the ideas of game theory in a way that is approachable intuitive and interdisciplinary Relying on the Karplus Learning Cycle the book is intended to teach by example Noncooperative equilibrium concepts such as Nash equilibrium play the central role In this third edition increased stress is placed on the concept of rationalizable strategies which has proven in teaching practice to assist students in making the bridge from intuitive to more formal concepts of noncooperative equilibrium The Instructor Manual and PowerPoint Slides for the book are available upon request for all instructors who adopt this book as a course text Please send your request to sales wspc com <u>Game Theoretic Problems in Network Economics and Mechanism Design Solutions</u> Y. Narahari,Dinesh Garg,Ramasuri Narayanam,Hastagiri

Prakash,2009-04-03 This monograph focuses on exploring game theoretic modeling and mechanism design for problem solving in Internet and network economics For the first time the main theoretical issues and applications of mechanism design are bound together in a single text **Game Theory** Roger A. McCain,2010 Fundamentals Two Person Games Larger Numbers and Uncertainty Games in Extensive Form and Repeated Play Cooperation Behavioral Game Theory Selected Applications **Game Equilibrium Models II** Reinhard Selten,2013-04-18 The four volumes of Game Equilibrium Models present applications of non cooperative game theory Problems of strategic interaction arising in biology economics political science and the social sciences in general are treated in 42 papers on a wide variety of subjects Internationally known authors with backgrounds in various disciplines have contributed original research The reader finds innovative modelling combined with advanced methods of analysis The four volumes are the outcome of a research year at the Center for Interdisciplinary Studies of the University of Bielefeld The close interaction of an international interdisciplinary group of researchers has produced an unusual collection of remarkable results of great interest for everybody who wants to be informed on the scope potential and future direction of work in applied game theory Volume II Methods Morals and Markets contains areas of research which will attract the interest of economists political scientists mathematicians and philosophers The papers deal with the methodology of analysis of games game theoretic contributions to fundamental ethical questions facing societies and game theoretic analyses of market environments **Solving Eight Treasures of Game Theory Problems Using Bi-criteria Method** Zhineng Ye,2016 Game theory is a strategic mathematics model of how we make decisions It is widely applied in fields like economics and psychology to make our decisions more competitive and favorable Nash equilibrium the foundation of game theory is always the first method attempted to solve a problem especially in a two person game In Goeree and Holt s 2001 paper Ten little treasures of game theory and ten intuitive contradictions they did ten experiments on different kinds of two person games each game associates with a basic version and a contradictive version From the experiment result the basic version matches our assumption and intuition for most of the games while the contradictive version disagrees with that which the Nash equilibrium can t explain the latter But if certain weights are assigned to the payoffs of the two players and the additive weighted payoff is used as the new payoff for one player then it may become possible to solve the new game and explain the result using Nash equilibrium This is how the bi criteria method works in game theory Logically the weight is assigned to the payoffs because the other player s payoff is important to a decision maker Using this method almost all of the games in Goeree and Holt s paper 2001 can be solved **Game Theory** Hans Peters,2008-08-15 This book presents the basics of game theory both on an undergraduate level and on a more advanced mathematical level It covers topics of interest in game theory including cooperative game theory Every chapter includes a problem section **Game Theory. A Handbook of Problems and Excercises** Leonardo Badia,Thomas Marchioro,2022-01-18 Since the origins in its modern form due to the seminal works of von Neumann and Nash Game theory

has most often been considered for its applications to economic and social sciences However its mathematical roots are more general and its set of analytical tools that can be used to predict the outcome of interactive decision situations can be very relevant for many other scientific fields especially including information and industrial engineering where it has recently become a common curricular subject in university programs To train the brain muscles to solve problems in a game theoretic way students may find it useful to practice on concrete examples For this reason this book presents a collection of exercises that can be suitable for any entry level course on Game theory While there is no specific major for which such a practical activity can be useful the book is conceived with an engineering spirit and a general regard for modeling and optimization from technological scenarios to childish gameplay Still some useful considerations can also be derived for other fields such as social psychology biology or humanities Rather than in depth speculative discussions the book covers mostly practical cases however providing a preliminary theoretical justification for the solution methods Covered topics include static games of complete information zero sum games and minimax problems lotteries sequential games multistage games Bayesian games This may also encourage the reader to approach more advanced topics with a solid methodological background and a full rounded appreciation of the subject **Game Theory** E. N. Barron,2024-05-13 Authoritative and quantitative approach to modern game theory with applications from areas including economics political science computer science and engineering Game Theory acknowledges the role of mathematics in making logical and advantageous decisions in adversarial situations and provides a balanced treatment of the subject that is both conceptual and applied This newly updated and revised Third Edition streamlines the text to introduce readers to the basic theories behind games in a less technical but still mathematically rigorous way with many new real world examples from various fields of study including economics political science military science finance biological science and general game playing The text introduces topics like repeated games Bayesian equilibria signaling games bargaining games evolutionary stable strategies extensive games and network and congestion games which will be of interest across a wide range of disciplines Separate sections in each chapter illustrate the use of Mathematica and Gambit software to create analyze and implement effective decision making models A companion website contains the related Mathematica and Gambit data sets and code Solutions hints and methods used to solve most problems to enable self learning are in an Appendix Game Theory includes detailed information on The von Neumann Minimax Theorem and methods for solving any 2 person zero sum matrix game Two person nonzero sum games solved for a Nash Equilibrium using nonlinear programming software or a calculus method Nash Equilibria and Correlated Equilibria Repeated games and punishment strategies to enforce cooperation Games in Extensive Form for solving Bayesian and perfect information games using Gambit N Person nonzero sum games games with a continuum of strategies and many models in economics applications duels auctions of Nash Equilibria and the Stable Matching problem Coalitions and characteristic functions of cooperative games an exact nucleolus for three player games bargaining Game theory in evolutionary processes

and population games A trusted and proven guide for students of mathematics engineering and economics the Third Edition of Game Theory is also an excellent resource for researchers and practitioners in economics finance engineering operations research statistics and computer science   Handbook of Game Theory with Economic Applications: Zero-sum two-person games Robert J. Aumann,Sergiu Hart,1992   **Problem Solving in School Mathematics** ,1980   *Game Theory through Examples* Erich Prisner,2014-12-31 Game Theory through Examples is a thorough introduction to elementary game theory covering finite games with complete information The core philosophy underlying this volume is that abstract concepts are best learned when encountered first and repeatedly in concrete settings Thus the essential ideas of game theory are here presented in the context of actual games real games much more complex and rich than the typical toy examples All the fundamental ideas are here Nash equilibria backward induction elementary probability imperfect information extensive and normal form mixed and behavioral strategies The active learning example driven approach makes the text suitable for a course taught through problem solving Students will be thoroughly engaged by the extensive classroom exercises compelling homework problems and nearly sixty projects in the text Also available are approximately eighty Java applets and three dozen Excel spreadsheets in which students can play games and organize information in order to acquire a gut feeling to help in the analysis of the games Mathematical exploration is a deep form of play that maxim is embodied in this book Game Theory through Examples is a lively introduction to this appealing theory Assuming only high school prerequisites makes the volume especially suitable for a liberal arts or general education spirit of mathematics course It could also serve as the active learning supplement to a more abstract text in an upper division game theory course   **Game Theory and Political Science** Peter C. Ordeshook,1978   *U.S. Government Research & Development Reports* ,1967   *Economic Game Theory* Emiel F. M. Wubben,1992   *Does Game Theory Work?* K. G. Binmore,2007 This volume brings together all of Ken Binmore s influential experimental papers on bargaining along with newly written commentary in which Binmore discusses the underlying game theory and addresses the criticism leveled at it by behavioral economists BOOK JACKET   **Aeronautical Engineering Review** ,1957   **An Introduction to Linear Programming and Game Theory** Paul R. Thie,1988-03-08 A rigorous introduction to the theoretical concepts and computational techniques of linear programming and game theory Illustrates how mathematics can be used to understand and resolve real world problems Standard topics are covered the simplex algorithm duality sensitivity integer programming the transportation problem two person zero sum and non zero sum games and in the process mathematical model building is explained Material includes meaningful examples and numerous exercises to reinforce and enhance understanding Examples are used extensively and the exercises over 500 range in nature from model building and computation to theory In this edition five new sections have been added new problems included and material expanded and improved

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