

Studying for the Exam. The best method of studying for the class exams is to (i) review the class notes and readings, (ii) work through the study guide and (iii) review the problems in the lecture notes. Everything covered in the notes and in class may be included on the exams, although clearly the exam will focus most of its attention on the material covered in lecture.

The hardest questions on the study guide are more difficult than the hardest questions on the final. So, if you can do everything on the study guide you should be in good shape for the exam. The actual problems on the exam will be similar to, but somewhat different from the practice problems included below.

A. Identify and or Define

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| a. Aristotle | k. utilitarian |
| b. More | l. invisible hand |
| c. Grotius | m. virtue |
| d. Baxter | n. Nash equilibrium |
| e. Franklin | o. coordination game |
| f. Smith | p. assurance game |
| g. Bentham | q. prisoner's dilemma game |
| h. Mill | r. work ethic |
| i. Spencer | s. gains from trade |
| j. civil ethics | t. externality |

B. Matching exercise: link the following philosophers with their ideas.

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| Aristotle | Protestant work ethic launched capitalism |
| More | utility principle |
| Grotius | impartial spectator |
| Baxter | the sea as common property |
| La Court | happiness as the ultimate end |
| Locke | religious tolerance |
| Franklin | profits as divine obligation |
| Smith | co-evolution of man, morality, and society |
| Kant | better to be a human unsatisfied than a pig satisfied |

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| Bentham | harmony of economic and moral interests |
| Bastiat | utopia as a monastery |
| Mill | he that gets all he can honestly and saves all he can, will certainly become rich |
| Spencer | categorical imperative |
| Weber | taxation can undermine virtue |

- C.** Create a table of 10 philosophers in temporal order, listing the century in which they wrote and at least two of their ideas.
- D.** Use a two person two strategy matrix of payoffs to characterize the following social settings:
- i. The Prisoner's Dilemma
 - ii. The Hobbesian Dilemma
 - iii. The Free Riding Dilemma
 - iv. The gains from a mutually beneficial exchange
 - v. The Shirking Dilemma of Team Production
 - vi. Develop a game that illustrates the "den of thieves" dilemma, under which thieves as predicted by Smith have a good reason not to steal from each other.
- E.** On the Advantage of Peace: Hobbesian Anarchy
- i. Use a 3 by 3 game matrix to characterize the "Hobbesian Jungle."
 - a. Is there a Nash equilibrium?
 - b. Is the Nash equilibrium Pareto Optimal?
 - c. Now assume that both players have internalized a "wrong to attack" norm. Show how the payoffs may change enough to escape from the Hobbesian dilemma.
 - d. In a larger society would it be necessary for everyone to internalize this norm for peace to emerge?
 - ii. On the advantages of Promise Keeping. Construct a 3x3 game in which two persons can keep their promises all of the time, half of the time, or none of the time. Assume that for this community, keeping one's promises always yields the greatest aggregate utility, but that individually each benefits when he/she breaches their promise and the other keeps it.
 - a. Characterize the Nash equilibrium of this game
 - b. Are their mutual gains from adopting a norm of promise keeping?

- c. Are their mutual gains from paying an enforcer (government) to enforce promises/contracts?
- d. Show how either of the above can increase aggregate utility. (Hint: show how internal and external sanctions can change the payoffs and equilibrium.)
- e. Show that either of the above solutions can be a Pareto Superior move.
- iii. On the advantages of Team Production. Construct a 3x3 game in which two persons contribute to each others productivity. The team's total output increases with each person's (team member's) work. However, suppose that the private rewards of free riding are always greater than those of working hard.
 - a. Characterize the Nash equilibrium of this game
 - b. Are their mutual gains from internalizing a norm of working hard?
 - c. Are their mutual gains from paying an enforcer (firm owner or coop manager) to punish shirking?
 - d. Show how either of the above can increase aggregate output and utility. (Hint: show how the internal and external norms change the payoffs, etc.)
 - e. How do these results relate to Max Weber's theory of the emergence of capitalism?
 - f. How do these results relate to Mill's theory that prosperity (and aggregate utility) tend to increase as persons become "better" at cooperation.

Discussion Questions and other Puzzles

F. Ethics and Commerce issues

- i. Several of the authors read in the first part of the course were skeptical about the effect of markets on virtue (as with More, Erasmus, and Montesquieu). Summarize their arguments. If those views were dominant, how would this affect the size of markets, if a significant number of persons (say 30%) take virtue into account when they choose their careers.
- ii. Mill suggests that governments should promote the development of a subset of virtues because they tend to increase progress. Review his argument and use a game to illustrate why increasing one of those virtues tends to increase social utility or social output (GNP).
- iii. Spencer argues that utilitarians neglect the ambiguity of their aggregate happiness norm. List at least 3 reasons why a utilitarian may have a difficult

time choosing virtuous actions in a setting where his/her choice affects dozens of persons.

- iv. Laboratory experiments suggest that a good deal of human behavior is inconsistent with the predictions of game theory. For example, experiments normally find a good deal of cooperation in PD games, which is far more than the "zero" predicted. On the other hand, there is significant defection.
 - a. What do these experiments tell you about the limits of game theory as a model of human decision making?
 - b. What do these experiments imply about the norms participants bring to the game?

G. Philosophical issues:

- a. One very difficult problem for utilitarians is that utility cannot be directly observed. How then can we tell when a policy increases aggregate utility? Are we implicitly making use of Smith's conception of moral sentiments?
- b. Spencer argues that people have moral instincts that are analogous to their geometric sense. Explain why he believes that utilitarians must rely upon that instinct, but that utilitarian ethics should not stop with that instinct. Why does Spencer believe that rational analysis can improve ethics, if everyone already has moral intuitions?
- c. Compare Mill's list of virtues that increase progress with Aristotle's list of virtues that increase lifetime happiness. Are there any important differences in the items on the list? If so, do these appear to represent differences between private and civil ethics?
- d. Consider (i) Smith's idea of moral sentiments and the impartial spectator, (ii) Spencer's idea of moral instincts, and (iii) Grotius' idea of natural law. Discuss differences and similarities in their analyzes. Under what circumstance, could they be regarded as the same theory of ethics?

H. Use a game matrix to represent the "paper, rock, scissors" game.

- i. Show that there is no Nash equilibrium in pure strategies.
- ii. Find a Nash equilibrium mixed (random) strategy for your game.
- iii. In what sense is your solution an equilibrium?

I. Who said: "Virtue is the best guard against the many unavoidable evils incident to us; nothing better alleviates the weight of the afflictions, or gives a truer relish of the blessings, of human life."

Some game theoretic exercises

A. Find the Nash Equilibria to the following games and determine whether there is a “dilemma” or not. If there is one, explain the nature of the dilemma. If not explain why there is not.

Game Matrix 1

Al \ Bob	Work (A, B)	Shirk (A, B)
Ea = 8	10, 10	6, 12
Ea = 4	12, 6	8, 8

Game Matrix 2

Al \ Bob	Accept Offer (A, B)	Reject Offer (A,B)
Make Offer	10, 8	-3,-1
Don't Make Offer	-1, -3	5, 5

Game Matrix 3

Al \ Bob	Eb= 8 (A, B)	Eb=6 (A,B)	Eb=4 (A, B)	Eb=2 (A, B)
Ea = 8	10, 10	8,11	6, 12	5, 13
Ea = 6	11, 8	9, 9	7, 7	6, 11
Ea = 4	12, 6	10, 7	8, 8	6, 9
Ea = 2	13, 5	11, 6	9, 6	7, 7

Game Matrix 4

Al \ Bob	Eb= 8 (A, B)	Eb=6 (A,B)	Eb=4 (A, B)	Eb=2 (A, B)
Ea = 8	10, 10	8,11	6, 12	5, 13
Ea = 6	11, 8	8, 8	7, 7	5, 6
Ea = 4	12, 6	7, 7	6, 6	5, 5
Ea = 2	13, 5	6, 5	5, 5	4, 4

B. As an exercise, construct a 3x3 game with an Pareto optimal equilibrium (i) in the middle cell (ii) in the upper lefthand cell, (iii) in the upper righthand and lower lefthand cells.

C. As an exercise, construct a 3x3 game with a dilemma equilibrium (i) in the middle cell (ii) in the upper lefthand cell, (iii) in the upper righthand and lower lefthand cells. Explain the nature of the dilemma in each case.