

Econ 603 Part II Homework #2  
 Spring 2008  
 Iowa State University

1. Consider the following complete information public good contribution game. There are  $N$  individuals, each of whom has valuation  $v$  of the public good where  $v$  is common knowledge. Each individual can contribute either 0 or  $c$  to the public good, and the public good costs  $c$  to be provided. Thus, it will be provided if at least one individual contributes. The individuals simultaneously make their contribution decisions. Assume  $c < v$ .

- (1) Find all the pure strategy Nash equilibria of the game.
- (2) Find the symmetric mixed strategy Nash equilibrium.
  - (a) In this equilibrium, what is the probability that the public good is provided? How does it depend on  $v$ ?
  - (b) What is the expected welfare of each individual in the equilibrium (or what's the equilibrium payoff of each individual)?
  - (c) Coordination failure occurs when nobody contributes and when more than one individual contributes. Calculate the probability of coordination failures in the MSNE. Can you come up with a correlated equilibrium that avoids the coordination failures? (Specify the state space, the signals to each individual, and the equilibrium strategies.) What is the expected payoff of each player in your correlated equilibrium?

2. Consider the following game:

	a	b	c	d
T	4,2	1,1	0,0	0,-1
M	1,1	2,4	1,1.5	0,-5
B	0,0	0,1	0,2	5,-3

Find all the Nash equilibria (pure and mixed) of the game.

3. A crime is observed by  $N$  people. Each would like the crime to be reported, but reporting the crime is costly. If the crime gets reported to the police (by at least one person), each gets a value of  $v$ . If a person reports the crime, he bears the cost of  $c$ , with  $v > c > 0$ . If the crime is not reported, each receives a value of zero. Each of the people decides simultaneously whether or not to report the crime.

- (1) Formulate a strategic game that captures the above situation, and find all its pure strategy NE.
- (2) Find the symmetric mixed strategy NE of the game.

4. MWG, 8.D.9 (except for the part in (c) dealing with rationalizable strategies).