

MATH 180 HOMEWORK

DUE THURSDAY, OCTOBER 25 AT THE BEGINNING OF CLASS

- (1) Consider the following two two-person variable-sum games. For each game answer the following questions:
- Discuss the players' possible behavior when the game is played in a noncooperative manner.
 - Are the Nash equilibria in these games sensible? Why or why not?

	Player I			Player I	
Player II	(8, 8)	(2, 5)		(20, 9)	(38, 20)
	(5, 2)	(4, 4)		(9, 38)	(31, 31)

- (2) Your client, Get Rich Investors, is in the retail securities brokerage business. Get Rich has been sued by Quincy Quickbuck, who alleges that his broker at Get Rich misled him into purchasing some risky investments, producing a loss for Quickbuck of \$100,000. Quickbuck's lawyer has just made a final, take-it-or-leave-it settlement offer of \$25,000. Having already investigated and researched the case a bit and talked with your client, you conclude that the pertinent facts are as follows: litigation costs (for each side) would be about \$30,000; Quickbuck has a 10% chance of success (basically, the case is frivolous, but you never know!); if successful, the award would be \$100,000; and a loss in court would have a reputational cost to Get Rich that they value at \$200,000. Should they accept this settlement offer?

- (3) You are a government attorney who is being consulted by the states licensing bureau. The bureau processes applications and collects fees in connection with a wide range of licensed activity, from hunting to trucking to haircutting.

There has been a longstanding problem with one sector in particular: car services (companies, often consisting of a single individual, who offer personal transportation). The annual license fee is \$1000, but many individuals who operate car services simply do not register or pay the fee. There are three-fold damages when these individuals are caught (that is, they must pay a total of \$3000), but in a given year they face only a 10% chance of capture. If they are captured, however, they usually pay twice this amount, \$6000, because it can usually be demonstrated that they cheated on their prior years fee as well. (The statute of limitations precludes levying fines for earlier years.)

It has been proposed that the license bureau follow the lead of many state tax collection agencies and offer an amnesty program. The proposal is that any individual who admits to operating without a license can pay the regular fee of \$1000 and be excused both from the penalty (the additional \$2000) and be immune from prosecution for the prior years fee and penalty.

There would be a modest cost in setting up the program, mainly involving publicizing it widely. Advise the licensing bureau regarding this proposal. In preparing your advice, be sure that you do each of the following:

- Write down the licensing bureau's game tree for the decision whether to offer the amnesty.
- Solve it. Be sure briefly to explain your work in some fashion that will communicate to the licensing bureau how you reached your conclusion.
- Briefly (one or two paragraphs) offer additional comments you think appropriate in advising the licensing bureau on its proposed amnesty program.

- (4) **There may be more problems assigned after the midterm. Check back.**