Math 30210 — Introduction to Operations Research

Assignment 13 (35 points total; each question worth 5 points)

Solutions

1. Taha 13.4A Q1b): Value of game is -5, A should play A_1 and B should play B_3.

2. Taha 13.4A Q2b): Any $p \leq 7$, any $q \geq 7$.

3. Taha 13.4A Q3b): Somewhere between 0 and 7.

4. Taha 13.4A Q4: A stupid question; I'm sorry. Taha suggests that there are eight potential strategies for each player (one for each possible subset of {TV, Newspaper, Radio}, including the empty set, representing no advertising at all). I thought perhaps there should be four (no advertising, advertising on TV, advertising on radio, advertising on newspaper). Either way, the game is fair (value 0, no larger range, so part b) is a bust), and both players have a pure strategy (all media in the first case, TV only in the second).

5. Taha 13.4A Q5: Let r_i be the minimum in row i and C_j th e maximum in column j. We have, for any i, j, $r_i \leq a_{ij} \leq C_j$. So all row minimums are less than all column maximums, and in particular the maximum row minimum is less than the minimum column maximum.

6. Taha 13.4B Q2: Robin's two strategies are Route A and Route B. The polices three strategies are All A, Mixed and All B. The payoff matrix for Robin is as follows:

	All A	Mixed	All B
Route A	-100	-50	0
Route B	0	-30	-100

The solution of this game for Robin is to use each route half the time. The solution for the police is to use strategy All A half the time, and All B half the time. The payoff of the game for Robin is -50 (so the game is stacked in favour of the police).

7. Taha 13.4B Q3b): A should play A_1 with probability $1/4$ and A_2 with probability $3/4$. B should play B_1 with probability $3/4$ and B_2 with probability $1/4$. The value of the game is 5.75 (in favour of A).