

# CMPUT 355 Quiz 6 Marking Rubric

## Grading Rubric

### Problem 1

- a) 1 point for correct row  
1 point for explanation (containing no incorrect information) that shows an understanding of domination
- b) 2 points for simplified matrix
- c) 2 points for simplified matrix
- d) 1 point for identifying that no rows can be removed from the matrix  
1 point for explanation (containing no incorrect information) that shows an understanding of domination

Note: your answer to this question will be marked based on the matrix you gave in part c).

### Problem 2

- 0.333 points for each correct payoff position  
Note: 0.1 points were deducted for not adding the rows

### Problem 3

- a) 1 point for each correct move  
Note: if indices are named differently/incorrectly, 0.5 points are deducted
- b) 3 points given for correct number of positions and explanation  
Note: if correct formula given, but the sum is incorrect, 0.1 points are deducted

### Problem 4

- a) 2 points for correct stochastic minimax strategy (1 mark for each blank)
- b) 2 points for correct linear program
- c) 4 points:
  - 1 point for Rose's minimax strategy (0.5 points for each blank)
  - 1 point for Colin's minimax strategy (0.5 points for each blank)
  - 1 point for correct game value
  - 1 point for showing work

## Quiz 6f

1. (a) Rose can ignore row z because it is dominated by rows x and y.

(b)

$$\begin{array}{rcc} \text{row x} & -1 & 2 & -1 \\ \text{row y} & 3 & 1 & 2 \end{array}$$

(c)

$$\begin{array}{rcc} \text{row x} & 2 & -1 \\ \text{row y} & 1 & 2 \end{array}$$

- (d) The matrix cannot be simplified further because no row (or column) is dominated.

2. (1st row)  $0.7 \times 0.4 \times 1 + 0.7 \times 0 \times 0 + 0.7 \times 0.6 \times -2$

(2nd row)  $0.1 \times 0.4 \times 3 + 0.1 \times 0 \times 5 + 0.1 \times 0.6 \times -4$

(3rd row)  $0.2 \times 0.4 \times -6 + 0.2 \times 0 \times 7 + 0.2 \times 0.6 \times 8$

3. (a) B[2] W[0]

i. B[0] W[2] is immediately incorrect due to repetition of positions, i.e. Superko

ii. In Go, a state is defined by its history not just its current position. Therefore, assuming that it is possible to always prune symmetric or rotational positions is not valid. Superko only cares whether a position is repeated or not. So the responses indicating due to illegal positions are also incorrect.

(b)  $3 \times 4 + 3 \times 2 + 1 = 19$

i. Note: Legal positions in Trigo have at least one empty cell

4. (a)  $\max_{0 \leq x, y \leq 1, x+y=1} \{\min\{4y, x-y\}\}$

(b) Maximize  $z$  such that

$$\begin{aligned} z &\leq 4y \\ z &\leq x - y \\ 0 &\leq x, y \leq 1 \\ x + y &= 1 \end{aligned}$$

- (c) Rose's minimax strategy is  $(5/6, 1/6)$  Colin's minimax strategy is  $(1/3, 2/3)$  Game's value:  $2/3$

## Quiz 6g

1. (a) Rose can ignore row y because it is dominated by rows x and z.

(b)

row x	3	1	2
row z	-1	2	-1

(c)

row x	1	2
row z	2	-1

- (d) The matrix cannot be simplified further because no row (or column) is dominated.

2. (1st row)  $0.2 \times 0.4 \times 1 + 0.2 \times 0 \times 0 + 0.2 \times 0.6 \times -2$

(2nd row)  $0.3 \times 0.4 \times 3 + 0.3 \times 0 \times 5 + 0.3 \times 0.6 \times -4$

(3rd row)  $0.5 \times 0.4 \times -6 + 0.5 \times 0 \times 7 + 0.5 \times 0.6 \times 8$

3. (a) B[2] W[0]

i. B[0] W[2] is immediately incorrect due to repetition of positions, i.e. Superko

ii. In Go, a state is defined by its history not just its current position. Therefore, assuming that it is possible to always prune symmetric or rotational positions is not valid. Superko only cares whether a position is repeated or not. So the responses indicating due to illegal positions are also incorrect.

(b)  $3 \times 4 + 3 \times 2 + 1 = 19$

i. Note: Legal positions in Trigo have at least one empty cell

4. (a)  $\max_{0 \leq x, y \leq 1, x+y=1} \{\min\{y, 3x - y\}\}$

(b) Maximize  $z$  such that

$$\begin{aligned} z &\leq y \\ z &\leq 3x - y \\ 0 &\leq x, y \leq 1 \\ x + y &= 1 \end{aligned}$$

- (c) Rose's minimax strategy is  $(2/5, 3/5)$  Colin's minimax strategy is  $(4/5, 1/5)$  Game's value:  $3/5$

## Quiz 6h

1. (a) Rose can ignore row x because it is dominated by rows y and z.

(b)

$$\begin{array}{rcc} \text{row y} & -1 & 2 & -1 \\ \text{row z} & 3 & 1 & 2 \end{array}$$

(c)

$$\begin{array}{rcc} \text{row y} & 2 & -1 \\ \text{row z} & 1 & 2 \end{array}$$

- (d) The matrix cannot be simplified further because no row (or column) is dominated.

2. (1st row)  $0.1 \times 0.4 \times 1 + 0.1 \times 0 \times 0 + 0.1 \times 0.6 \times -2$

(2nd row)  $0.6 \times 0.4 \times 3 + 0.6 \times 0 \times 5 + 0.6 \times 0.6 \times -4$

(3rd row)  $0.3 \times 0.4 \times -6 + 0.3 \times 0 \times 7 + 0.3 \times 0.6 \times 8$

3. (a) B[2] W[0]

i. B[0] W[2] is immediately incorrect due to repetition of positions, i.e. Superko

ii. In Go, a state is defined by its history not just its current position. Therefore, assuming that it is possible to always prune symmetric or rotational positions is not valid. Superko only cares whether a position is repeated or not. So the responses indicating due to illegal positions are also incorrect.

(b)  $3 \times 4 + 3 \times 2 + 1 = 19$

i. Note: Legal positions in Trigo have at least one empty cell

4. (a)  $\max_{0 \leq x, y \leq 1, x+y=1} \{\min\{-x+y, 2x\}\}$

(b) Maximize  $z$  such that

$$z \leq -x + y$$

$$z \leq 2x$$

$$0 \leq x, y \leq 1$$

$$x + y = 1$$

- (c) Rose's minimax strategy is  $(1/4, 3/4)$  Colin's minimax strategy is  $(1/2, 1/2)$  Game's value:  $1/2$