MAT 364/564 Quiz 3 Answer Sheet

Fall 2020

Quiz ID: QDC Name: _____

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2. ☐
3. ☐
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10. ☐

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http://azrael.digipen.edu/cgi-bin/MAT364quiz.pl

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MAT 364 **Quiz 3** Fall 2020

1. Let Z be the property that a game is equal to its negative. Assume that Z is true for all impartial games of height at most 1. Let G be an impartial game of height 2. Which are true for any Left or Right option H of G?

   i) H is impartial ii) H has height at most 1 iii) $H = -H$

   a) i) and ii) only b) ii) and iii) only c) i) and iii) only d) all of the above e) ii) only

2. Let Z be the property that a game is equal to its negative. Which of the following fails to be true, or fails to be true by assumption, or fails to be provable, in attempting to prove by induction on game tree height that all *impartial* games are equal to their negatives ?

   i) the base case ii) the induction step iii) the induction hypothesis

   a) i) and ii) only b) iii) only c) i) only d) none of the above e) ii) only

3. In the following domineering board, which squares should be crossed out so that the game is equal to 1?

1	2
3	4
5	6

   a) 5,6 b) 3,5 c) 1,5 d) 2,5 e) 1,3,5

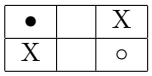
4. Same domineering board as in the previous problem. Which squares should be crossed out so that the game is equal to $*$?

   a) 5,6 b) 3,5 c) 1,5 d) 2,5 e) 1,3,5

5. Same domineering board as in the previous problem. Which squares should be crossed out so that the game is equal to $\frac{1}{2}$?

   a) 5,6 b) 3,5 c) 1,5 d) 2,5 e) 1,3,5

6. Let G be the amazons game below. What is the value of G?



a) 0 b) $1+*$ c) ± 1 d) $\{1|*\}$ e) $*$

7. Let G be the game defined as $G := \{0, 1, *|1, *\}$. Determine the outcome class of G:

a) $\mathcal{P}$ b) $\mathcal{N}$ c) $\mathcal{L}$ d) none of the above e) $\mathcal{R}$

8. Same game G as in the previous question. Find the correct description of $-G$:

a) $\{0, -1, *|0, -1, *\}$ b) $\{-1, *|0, *\}$ c) $\{0, -1, *| - 1, *\}$ d) $\{0, -1| - 1, *\}$ e) $\{-1, *|0, -1, *\}$

9. Which of the following is a dominated option in the game $1+*$? (Draw the game tree then consider comparisons between options on the left side or options on the right side.)

a) 0 b) $*$ c) 1 d) -1 e) $1+*$

10. What is the canonical form of the game $1+*$?

a) $\{*|*\}$ b) $\{*|1\}$ c) $\{1|1\}$ d) $\{0, *|0\}$ e) $\{1|*\}$