

MAT 364/564

Quiz 2

Fall 2018

1. Assume that a property X of games is verified to be true for games of height zero. It is then also shown that if property X is assumed to be true for all games of height at most $n - 1$, then property X must be true for all games of height n . Now suppose that G is a particular game of height 12. In addition to the above, what do we need to do in order to prove that G has property X ?
- a) nothing b) verify property X for $n = 12$ c) verify property X for $n = 11$ d) verify property X for $n \leq 11$
 e) verify property X for $n \leq 12$

Correct Answer: nothing

2. Let Y be the property that a game is impartial. (A game is impartial if the options are the same for either player at any node of the game tree.) 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 games are impartial?
- i) the base case ii) the induction step iii) the induction hypothesis
- a) i) only b) ii) only c) iii) only d) i) and ii) only e) none of the above

Correct Answer: ii) only

3. Let Y be the property that a game is in Lwpcf or Rwps. 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 games are in Lwpcf or Rwps?
- i) the base case ii) the induction step iii) the induction hypothesis
- a) i) only b) ii) only c) iii) only d) i) and ii) only e) none of the above

Correct Answer: none of the above

4. How many *impartial* games (up to isomorphism) are there with height *at most one*?
- a) 0 b) 1 c) 2 d) 3 e) 4

Correct Answer: 2

5. Suppose G and H are combinatorial games with G in \mathcal{L} and H in \mathcal{N} . What are the *possible* outcomes classes of the game $G + H$?
- a) \mathcal{L} , \mathcal{N} or \mathcal{P} only b) \mathcal{L} or \mathcal{P} only c) \mathcal{N} , \mathcal{L} , \mathcal{R} or \mathcal{P} d) \mathcal{L} only e) \mathcal{N} or \mathcal{L} only

Correct Answer: \mathcal{N} or \mathcal{L} only

6. Suppose G and H are combinatorial games with G in \mathcal{P} and H in \mathcal{N} . What are the *possible* outcomes classes of the game $G + H$?

- a) \mathcal{L} or \mathcal{R} only b) \mathcal{N} or \mathcal{P} only c) $\mathcal{N}, \mathcal{L}, \mathcal{R}$ or \mathcal{P} d) \mathcal{P} only e) \mathcal{N} only

Correct Answer: \mathcal{N} only

7. Suppose H is the 2×5 domineering rectangle. What is the outcome class of H ?

- a) \mathcal{P} b) \mathcal{R} c) \mathcal{L} d) \mathcal{N} e) none

Correct Answer: \mathcal{L}

8. Suppose H is the 2×5 domineering rectangle. What is the height of the game tree?

- a) 1 b) 2 c) 3 d) 4 e) 5

Correct Answer: 5

9. Suppose H is the 2×5 domineering rectangle. Suppose that Right's hand is tied by not allowing Right to play moves that cover columns 3 and 4. Using the One Hand Tied Principle, what conclusion can be made about the 2×5 rectangle?

- a) in Rwpf b) in Rwps c) in Lwpf d) in Lwps e) no conclusion

Correct Answer: no conclusion

10. Suppose H is the 2×6 domineering rectangle. Suppose that Right's hand is tied by not allowing Right to play moves that cover columns 4 and 5. Using the One Hand Tied Principle, what conclusion can be made about the 2×6 rectangle?

- a) in Rwpf b) in Rwps c) in Lwpf d) in Lwps e) no conclusion

Correct Answer: in Rwpf