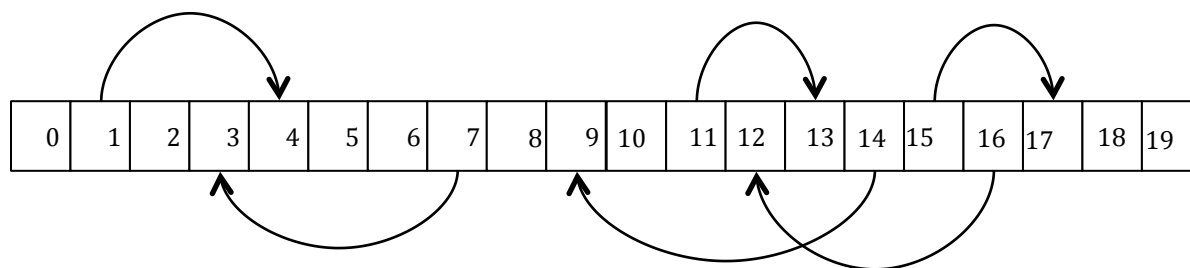


CS 3600 – Introduction to Artificial Intelligence

Adversarial Games with Dice

Consider the following board game, based loosely on chutes and ladders. Two players race from position 0 to position 19. The first person to land exactly on position 19 wins. If you land on any position with an arc emanating, you automatically leap to the position at which the arc terminates. For example, if you stop on position 1, you are teleported to position 4.



On each turn, a player may perform one of the following actions:

- Move one position forward or backward.
- Roll one 4-sided die (1D4) and move the resultant number of positions forward or backward.
- Roll two 4-sided dice (2D4) and move the resultant summed number of positions forward or backward.

Problems:

1. Design a state representation. What is the initial state?
2. Write the pseudocode for a successor function. What kinds of states are there? What does each ply in an adversarial search tree represent?
3. Write the pseudocode for a terminal function.
4. Write the pseudocode for a utility function.
5. Draw out a portion of the adversarial search tree. Show enough ply for at least two turns.
6. Suppose the board is very long and it is impractical to reach terminal states each time. Design a cut off function and evaluation function that returns the value of intermediate, non-terminal states.