### Chomp 2x2 Game Tree





= 10 unique game states

### Chomp 2x2 Game Graph









# **Chomp Properties**

- Chomp has the property of being *impartial*.
  - *Impartial game*: a game where
    - the legal moves depend on the position, not which player is the current player, and
    - payoffs are symmetric.
  - That is, the only difference between the players is who goes first.
- Chomp is also symmetric on the board diagonal.
  - Any game position has the same outcome (win/loss) as the same position flipped diagonally about the poison square.

# Simplified 2x2 Chomp Game Graph

- Chomp states for the 2x2 game can be represented as nonincreasing pairs of integers indicating how many column remain to be chomped in the rows starting with the poison square row: 22, 21, 20, 11, 10, 00. (6 pairs)
- However, we can treat 20 and 11 as equivalent, since these are symmetric with each other.
- Thus, the game graph for a impartial game can be alternately built from the bottom up as follows...

# Simplified 2x2 Chomp Game Graph (cont.)





*winning* game position. The current player has won.

#### Value of All Game States for Current Player



("retrograde analysis") solves

each game position.