## Chomp 2x2 Game Tree



## Chomp 2x2 Game Tree Nodes and States



## Chomp 2x2 Game Graph



## Chomp 2x2 Game Graph Minimax Values



## Chomp 2x2 Game Graph Minimax Values



## Chomp 2x2 Game Graph Optimal Play



## 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 $2 \times 2$ Chomp Game Graph

- Chomp states for the $2 \times 2$ 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.)



## Value of End Game State for Current Player



## Value of All Game States for Current Player



