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Workbook: Adversarial Search

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Learning objectives

- ▶ To know the basics of adversarial search.
- ▶ To apply the *minimax* algorithm

Basic *minimax* algorithm

```
mm( $s$ ,  $d$ ,  $max$ )           // state, depth,  $max$ ="Does MAX move?"  
if  $s$  is terminal: return utility for  $s$   
if  $d = 0$ :                return heuristic value for  $s$   
// if max, return maximum minimax value from children  
if  $max$ :  $v = -\infty$ ;  $\forall n \in \text{succ}(s)$ :  $v = \max(v, \mathbf{mm}(n, d - 1, \text{FALSE}))$   
// if min, return minimum minimax value from children  
else:     $v = \infty$ ;     $\forall n \in \text{succ}(s)$ :  $v = \min(v, \mathbf{mm}(n, d - 1, \text{TRUE}))$   
return  $v$ 
```

- **Question 1:** Draw the search tree of applying the *minimax* algorithm to the search space of a game shown in the following figure:

- **Question 2:** What is the best move from the root node applying the *minimax* algorithm to the previous search space? **Branch C**