

function ALPHA-BETA-SEARCH($state$) **returns** an action
 $v \leftarrow \text{MAX-VALUE}(state, -\infty, +\infty)$
 return the *action* in ACTIONS($state$) with value v

function MAX-VALUE($state, \alpha, \beta$) **returns** a utility value
 if TERMINAL-TEST($state$) **then return** UTILITY($state$)
 $v \leftarrow -\infty$
 for each a **in** ACTIONS($state$) **do**
 $v \leftarrow \text{MAX}(v, \text{MIN-VALUE}(\text{RESULT}(s, a), \alpha, \beta))$
 if $v \geq \beta$ **then return** v
 $\alpha \leftarrow \text{MAX}(\alpha, v)$
 return v

function MIN-VALUE($state, \alpha, \beta$) **returns** a utility value
 if TERMINAL-TEST($state$) **then return** UTILITY($state$)
 $v \leftarrow +\infty$
 for each a **in** ACTIONS($state$) **do**
 $v \leftarrow \text{MIN}(v, \text{MAX-VALUE}(\text{RESULT}(s, a), \alpha, \beta))$
 if $v \leq \alpha$ **then return** v
 $\beta \leftarrow \text{MIN}(\beta, v)$
 return v

Figure 5.7 The alpha-beta search algorithm. Notice that these routines are the same as the MINIMAX functions in Figure 5.3, except for the two lines in each of MIN-VALUE and MAX-VALUE that maintain α and β (and the bookkeeping to pass these parameters along).