

function VALUE-ITERATION(mdp, ϵ) **returns** a utility function

inputs: mdp , an MDP with states S , actions $A(s)$, transition model $P(s' | s, a)$,
rewards $R(s, a, s')$, discount γ

ϵ , the maximum error allowed in the utility of any state

local variables: U, U' , vectors of utilities for states in S , initially zero

δ , the maximum relative change in the utility of any state

repeat

$U \leftarrow U'; \delta \leftarrow 0$

for each state s **in** S **do**

$U'[s] \leftarrow \max_{a \in A(s)} \text{Q-VALUE}(mdp, s, a, U)$

if $|U'[s] - U[s]| > \delta$ **then** $\delta \leftarrow |U'[s] - U[s]|$

until $\delta \leq \epsilon(1 - \gamma)/\gamma$

return U