

# CCIS 4100: in-class exercise on value iteration

Byron C. Wallace

Complete the following either on your own or in small groups.

## Value iteration

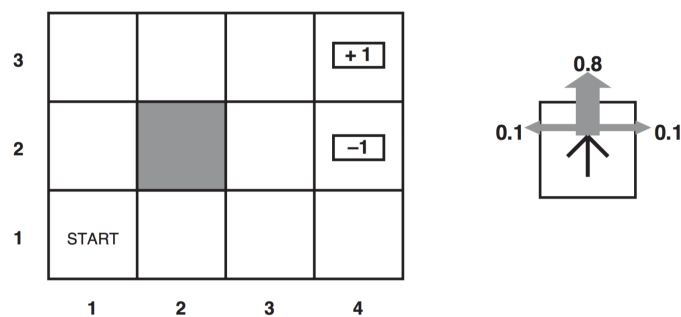


Figure 1: Exciting gridworld from the text (Figure 17.1). Assume  $R = -0.3$  (i.e., the ‘living penalty’ is  $-0.3$ ).

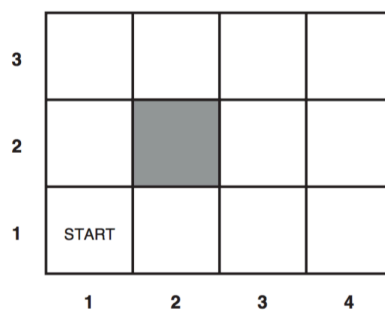


Figure 2: Blank grid.

1. *Value iteration* says to initialize all states to 0. Assume that’s been done, and now fill out the cells according to value iteration algorithm. Hint: as noted above, assume all initial values are 0. Also, note that the instantaneous rewards in the the two upper cells are  $+1$  and  $-1$ , and again the ‘living penalty’  $R$  is  $-0.3$ .

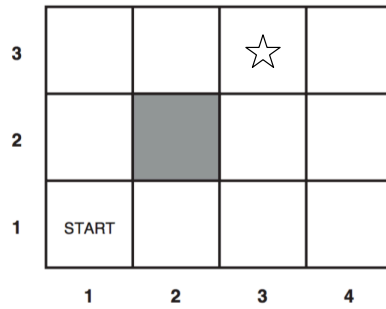


Figure 3: Calculate

2. With the above as your starting point, perform value iteration to calculate the utility for the state demarcated with a star.

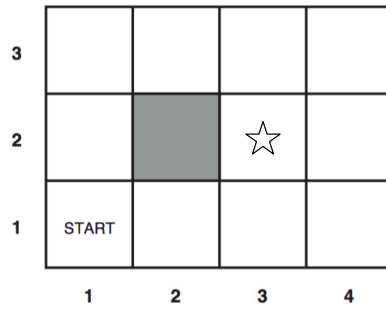


Figure 4: Calculate

3. Finally, using (in part) the state-utility calculated above, calculate the utility (apply the Bellman equation) for the square demarcated in Fig. 4.