ECS427 Assignment 01

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1 Question 1

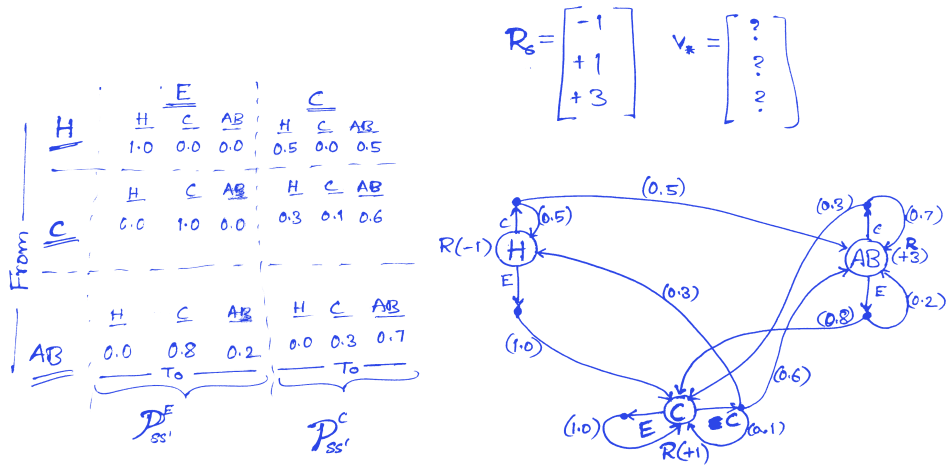

Figure 1: Solution for Q1

1.1 Value Iteration

State	Value
H	18.95
A	20.94
C	19.81

Figure 2: Optimal values table

State	Action
H	`attend_class`
A	`attend_class`
C	`attend_class`

Figure 3: Optimal Policy from Value Iteration

1.2 Policy Iteration

State	Value
H	18.95
A	20.94
C	19.81

Figure 4: Optimal Values from Policy Iteration

State	Action
H	`attend_class`
A	`attend_class`
C	`attend_class`

Figure 5: Optimal Policy from Policy Iteration

1.3 Conclusion

Both the methods produce the **same value function and policy**.

2 Question 2

2.1 Value Iteration

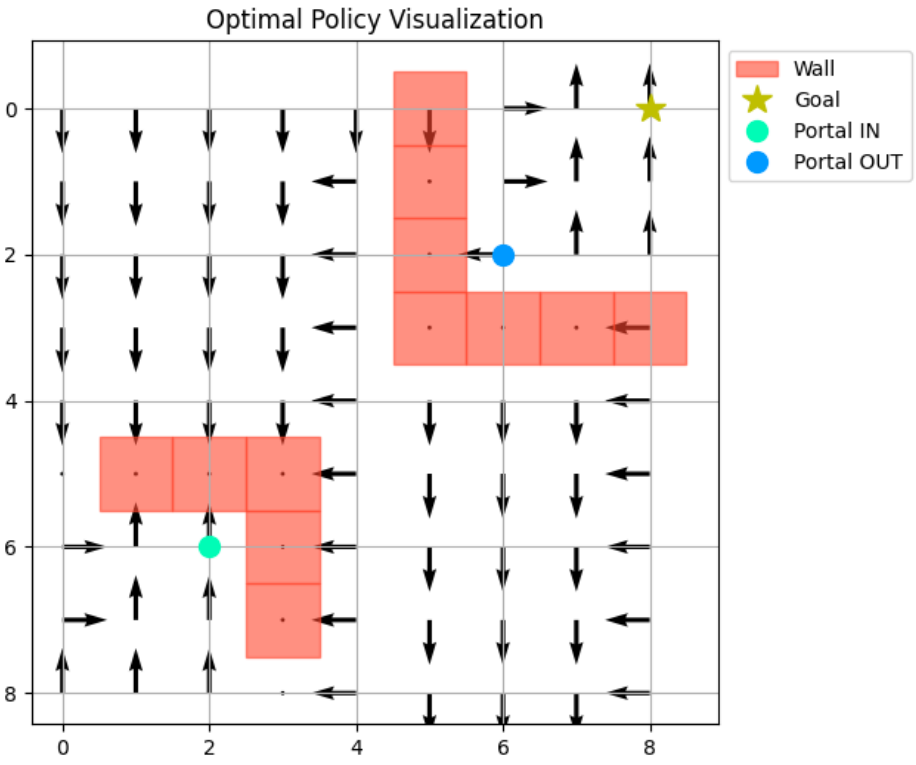

Figure 6: Policy obtained from value iteration

The state-value function obtained from value iteration was

$$v_* = \begin{bmatrix} 3.138 & 2.824 & 2.542 & 2.288 & 2.059 & 0. & 9. & 10. & 10. \\ 3.487 & 3.138 & 2.824 & 2.542 & 2.288 & 0. & 8.1 & 9. & 10. \\ 3.874 & 3.487 & 3.138 & 2.824 & 2.542 & 0. & 7.29 & 8.1 & 9. \\ 4.305 & 3.874 & 3.487 & 3.138 & 2.824 & 0. & 0. & 0. & 0. \\ 4.783 & 4.305 & 3.874 & 3.487 & 3.138 & 2.824 & 2.542 & 2.288 & 2.059 \\ 5.314 & 0. & 0. & 0. & 3.487 & 3.138 & 2.824 & 2.542 & 2.288 \\ 5.905 & 6.561 & 5.905 & 0. & 3.874 & 3.487 & 3.138 & 2.824 & 2.542 \\ 5.314 & 5.905 & 6.561 & 0. & 4.305 & 3.874 & 3.487 & 3.138 & 2.824 \\ 4.783 & 5.314 & 5.905 & 5.314 & 4.783 & 4.305 & 3.874 & 3.487 & 3.138 \end{bmatrix}$$

2.2 Policy Iteration

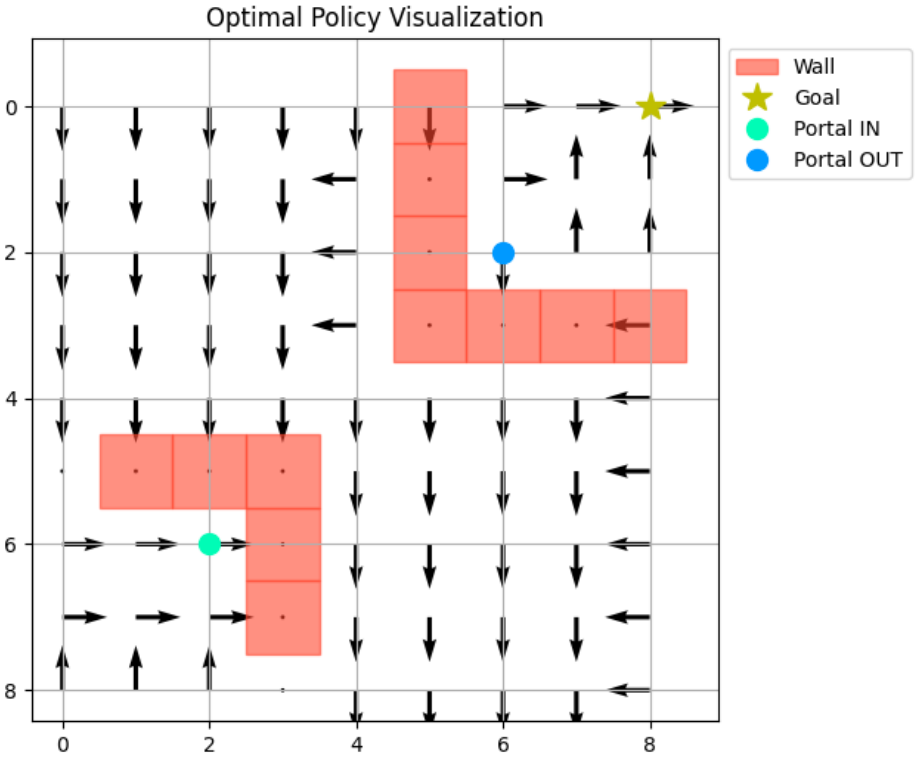

Figure 7: Policy obtained from policy iteration

The state-value function obtained from policy iteration was

$$v_* = \begin{bmatrix} 3.138 & 2.824 & 2.542 & 2.288 & 2.059 & 0. & 9. & 10. & 10. \\ 3.487 & 3.138 & 2.824 & 2.542 & 2.288 & 0. & 8.1 & 9. & 10. \\ 3.874 & 3.487 & 3.138 & 2.824 & 2.542 & 0. & 7.29 & 8.1 & 9. \\ 4.305 & 3.874 & 3.487 & 3.138 & 2.824 & 0. & 0. & 0. & 0. \\ 4.783 & 4.305 & 3.874 & 3.487 & 3.138 & 2.824 & 2.542 & 2.288 & 2.059 \\ 5.314 & 0. & 0. & 0. & 3.487 & 3.138 & 2.824 & 2.542 & 2.288 \\ 5.905 & 6.561 & 5.905 & 0. & 3.874 & 3.487 & 3.138 & 2.824 & 2.542 \\ 5.314 & 5.905 & 6.561 & 0. & 4.305 & 3.874 & 3.487 & 3.138 & 2.824 \\ 4.783 & 5.314 & 5.905 & 5.314 & 4.783 & 4.305 & 3.874 & 3.487 & 3.138 \end{bmatrix}$$