

Question 1

6 pts

1. Consider a state-action environment. The state space is 10 dimensional, each dimension 10 possible values. There are 20 possible actions in each state.

Consider conventional Q-learning: What is the size of the total Q-table?

Consider deep reinforcement learning: Consider building a 3-layer fully-connected neural network, where each hidden layer has 10 nodes. What will be the total number of weights in the neural network?

The size of total Q-table is $10^{10} * 20 = 2 * 10^{11}$

The total number of weights **without** input layer:

With bias $10*(10+1)+10*(10+1)+20*(10+1)=440$

Without bias $10*10+10*10+20*10=400$

The total number of weights **with** input layer:

With bias $10*(10+1)+10*(10+1)+10*(10+1)+20*(10+1)=550$

Without bias $10*10+10*10+10*10+20*10=500$