Reinforcement Learning
Exercise 8

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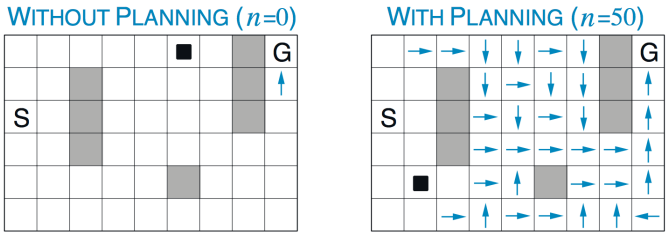
1 n-step and eligibility traces (4P)

a) The nonplanning method looks particularly poor in the figure below; a method using n-step bootstrapping would do better. Do you think one of the n-step bootstrapping methods could do as well as the Dyna-Q method? Explain why or why not. (2P)



b) The λ-return is given by:

$$G_t^\lambda = (1-\lambda)\sum_{n=1}^{\infty} \lambda^{n-1} G_{t:t+n}$$

with:

$$G_{t:t+n} = R_{t+1} + \gamma R_{t+2} + \gamma^2 R_{t+3} + \ldots + \gamma^{n-1} R_{t+n} + \gamma^n V(S_{t+n})$$

Give the λ-return G_t^λ as recursive function in terms of the first reward R_{t+1} and itself one step later G_{t+1}^λ. (2P)

2 n-step sarsa on the FrozenLake (5P)

The code template can be found on github (`https://github.com/humans-to-robots-motion/rl-course`) in *ex08-nstep/ex08-nstep.py*.

Implement n-step Sarsa and evaluate it on the 8×8 *Frozen Lake* environment. Evaluate the performance for different choices of n and α. Visualize your results (plot the performance over α for different choices of n, similar to lecture 8 slide 9).