Applied Stochastic Processes, 18-751, TX Brown, Fall 2017
Homework #11

Due 8pm Monday November 20.

Read ch 11 in JW.

1. Consider a routing network with three nodes: the start node s, the destination node, d, and an intermediate node, r. There is a direct path from s to d with travel time 20. The travel time from s to r is 7. There are two paths from r to d. They have independent travel times that are uniformly distributed between 8 and 20.

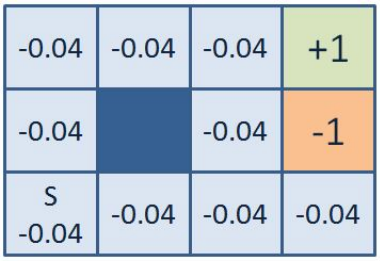
   (a) Draw the states and transition times as we did in class.

   (b) If you want to do pre-planning (i.e. use only expected times), which path should be chosen to go from s to d?

   (c) What is the expected value of the minimum of the two random variables X and Y both uniformly distributed between 8 and 20?

   (d) If the travel times from r to d are revealed upon arrival at r, which path should be chosen?

   (e) If more links from r to d are added would you expect the travel time from r to d to increase, decrease, or stay the same?



2. Consider the maze above as we discussed in class. The numbers represent the reward that is gained upon entering the state. The start state is the lower left and the path through the maze ends upon entering the states labeled "+1" or "−1".

   (a) Consider the robot Fido. When you send him in a direction he will go in that direction with 80% probability but will veer to the left or to the right of that direction with probability 10% as shown below. Compute the value function for each state and the resulting best policy for Fido the robot.

   (b) Consider the robot Righty. When you send him in a direction he will go in that direction with 80% probability but will veer to the right of that direction with probability 20% as shown below. Compute the value function for each state and the resulting best policy for Righty the robot.