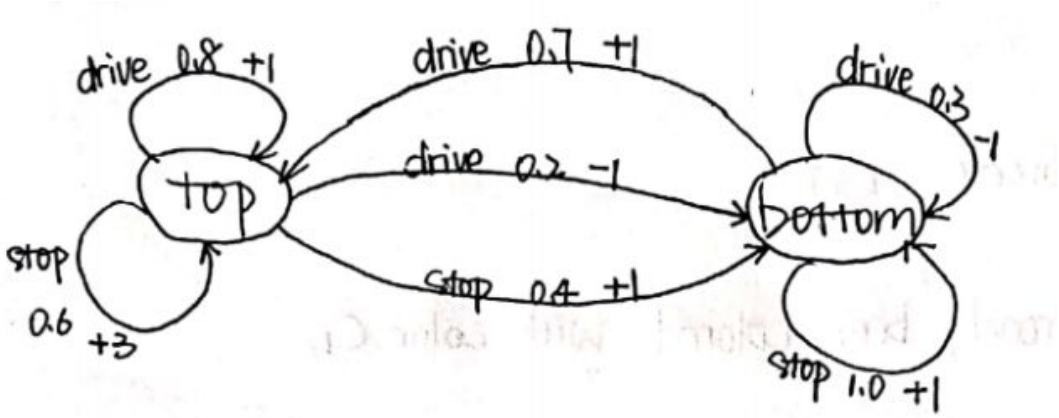
HW2 Answers

1a. S: B (bottom), T (top)
A: drive, stop
T: T(B, drive, B) = 0.3 T(B, drive, T) = 0.7
T(B, stop, B) = 1 T(B, stop, T) = 0
T(T, drive, T) = 0.8 T(T, drive, B) = 0.2
T(T, stop, T) = 0.6 T(T, stop, B) = 0.4
R: R(B, drive, B) = -1 R(B, drive, T) = 1
R(B, stop, B) = 1 R(B, stop, T) = 3
R(T, drive, T) = 1 R(T, drive, B) = -1
R(T, stop, T) = 3 R(T, stop, B) = 1



1b.
(Collect from student's answer)

1c. V1(T) = max(0.8*(1+0.8*0)+0.2(-1+0.8*0), 0.6*(3+0.8*0)+0.4*(1+0.8*0)) = 2.2
V1(B) = max(0.7*(1+0.8*0)+0.3(-1+0.8*0), 1*(1+0.8*0)) = 1
V2(T) = max(0.8*(1+0.8*2.2)+0.2(-1+0.8*1), 0.6*(3+0.8*2.2)+0.4*(1+0.8*1)) = 3.576
V2(B) = max(0.7*(1+0.8*2.2)+0.3(-1+0.8*1), 1*(1+0.8*1)) = 1.872

1d. V1(T) = 0.8*(1+0.8*0)+0.2*(-1+0.8*0) = 0.6
V1(B) = 0.7*(1+0.8*0)+0.3(-1+0.8*0) = 0.4
V2(T) = 0.8*(1+0.8*0.6)+0.2(-1+0.8*0.4) = 1.048
V2(B) = 0.7*(1+0.8*0.6)+0.3(-1+0.8*0.4) = 0.832

1e. pi(T) = argmax[drive: 0.8*(1+0.8*1.048)+0.2*(-1+0.8*0.832),
stop: 0.6*(3+0.8*1.048)+0.4*(1+0.8*0.832)] = stop
pi(B) = argmax[drive: 0.7*(1+0.8*1.048)+0.3*(-1+0.8*0.832),
stop: 1*(1+0.8*0.832)] = stop

2a. -color(X, C2)
2b. -color(X, C)

2c. “Neighbor” is a symmetric restatement of “arc”. To get the same results, we will need to state both arc(A,B) and arc(B,A), and replace the “neighbor” instances with “arc”. Removing the “neighbor” rule will let the program miss half of the connections. For instance, the program won’t know “belgium and france” are adjacent from arc(france, belgium). As a consequence, you might find the program suggesting the same color to adjacent countries.