Assignment2: Problem

Consider grid-world example with termination:

XX	1	2	3
4	5	6	7
8	9	10	11
12	13	14	XX

Over the equiprobable policy, following policy was found to be greedy

XX	L	L	L/D
U	L/U	L/D	D
U	L/R	D/R	D
U/R	R	R	XX

Transition dynamic is now probabilistic:

(i) If say the state = 1, action is then A
Pr(0|1,a) = 0.7
Pr(2|1, a) = PR(5|1, a) = Pr(1|1,) = 0.1

(ii) If state = 5, action is then a
Pr (1|5, a) = Pr(4|5,a) = 0.4
Pr(9|5,a) = Pr(6|5,a) = 0.1

(iii) …

Apply Monte-carlo first visit method over 70 independent simulation runs to estimate Vpi(s) S = {1…14}

Randomize the initial state for each trajectory

Reward Structure = -1 for all states

= 0 for State XX

Plot for all States: 14 Coverage Plots (Vpi ^I (s) }

Tabulate Final values:

States	Vpi(s)
1	
…	
14	

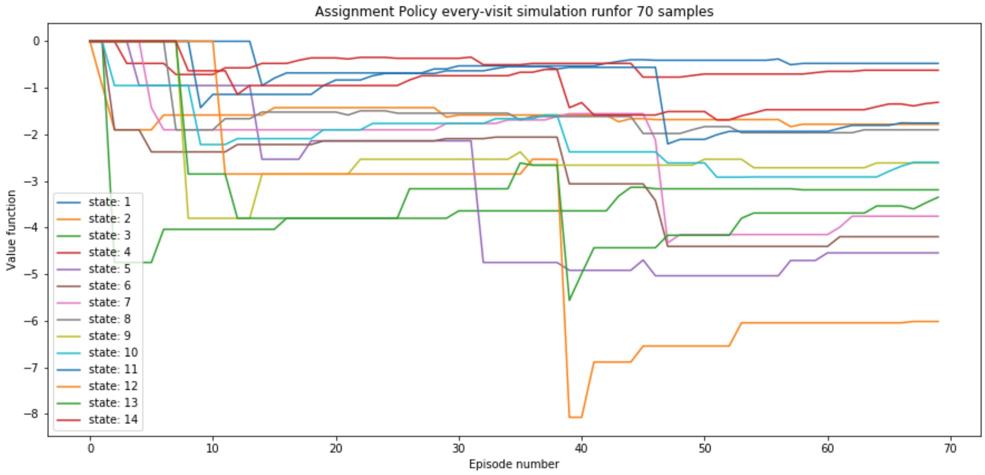
Part2: Repeat the exercise for every visit case

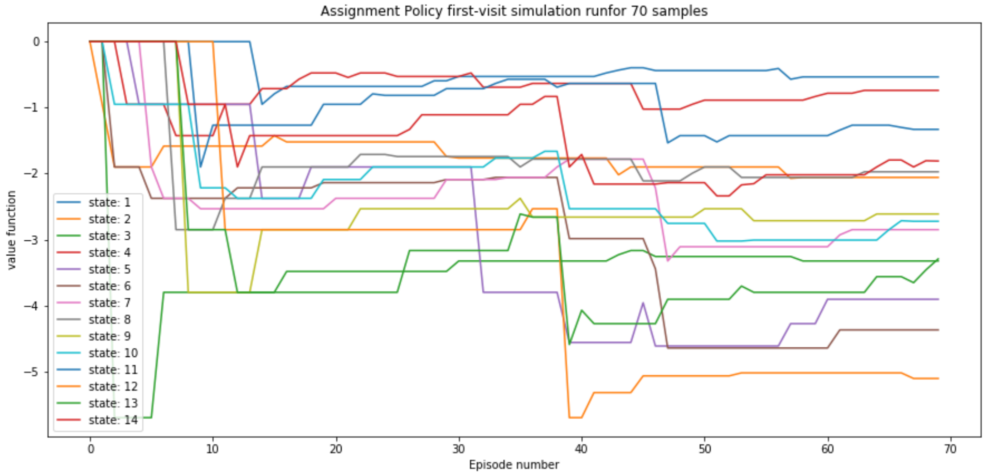
Results:

Code can be found @: https://github.com/s-vyasraj/Assignment2-RL

Tabulated for simulation run of 70 Episodes

```
Multi-visit

 |   0.0   |  -0.48  |  -1.78  |  -3.19

 |  -0.62  |  -4.54  |  -4.2   |  -3.76

 |  -1.9   |  -2.61  |  -2.6   |  -1.76

 |  -6.02  |  -3.35  |  -1.31  |  0.0

First visit

 |  0.0  |  -0.53  |  -2.06  |  -3.32

 |  -0.74  |  -3.91  |  -4.37  |  -2.85

 |  -1.97  |  -2.61  |  -2.72  |  -1.33

 |  -5.11  |  -3.29  |   -1.81  |  0.0
```


Assignment Policy every-visit simulation runfor 70 samples


Assignment Policy first-visit simulation runfor 70 samples

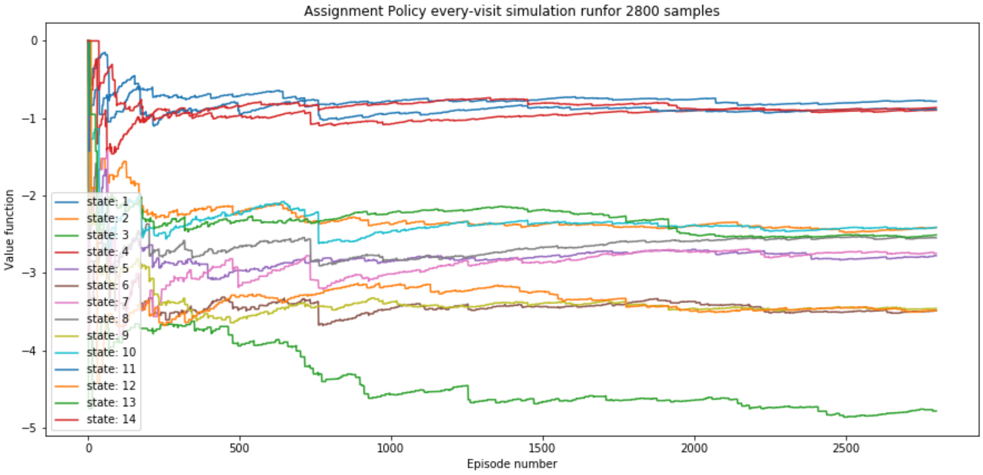
Values for: Assignment Policy – 2800 Episodes

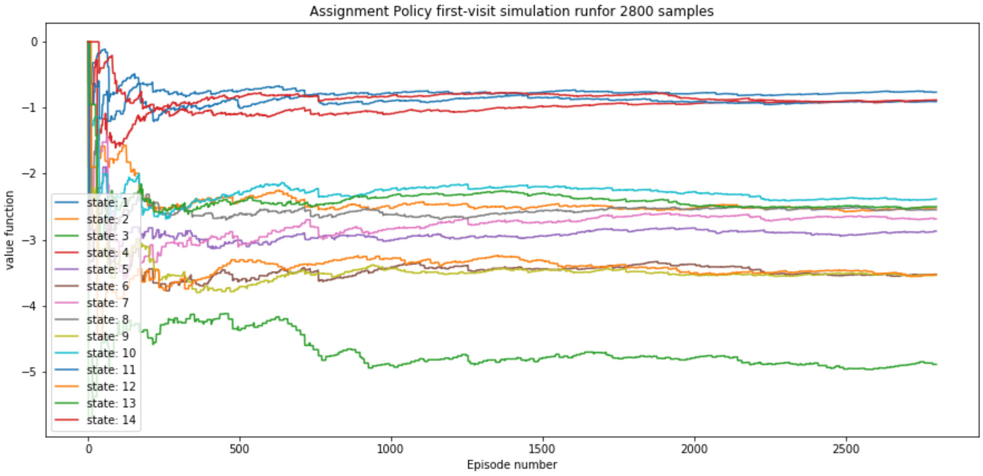
Multi-visit

```
 |   0.0  |  -0.78  |  -2.41  |  -4.78

 |  -0.9  |  -2.78  |  -3.49  |  -2.75

 |  -2.54  |  -3.46  |  -2.41  |  -0.89

 |  -3.49  |  -2.51  |  -0.86  |  0.0
```

First visit

```
 |  0.0  |  -0.76  |  -2.52  |  -4.89

 |  -0.89  |  -2.87  |  -3.53  |  -2.69

 |  -2.55  |  -3.54  |  -2.38  |  -0.91

 |  -3.54  |  -2.5  |   -0.88  |  0.0
```





It can be clearly seen that with large number of 2800 episodes convergences of both the every-visit and first-visit is good

First visit seem to perform better.