
Part-1-Monte Carlo First-visit

Epoch-0

----N(s)----

[[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]]

----S(s)----

[[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]]

----V(s)----

[[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]]

Epoch- 1

----N(s)----

[[0. 0. 1. 1. 1.]

[1. 1. 1. 1. 1.]

[1. 1. 1. 1. 1.]

[1. 1. 1. 1. 1.]

[1. 1. 1. 1. 0.]]

----S(s)-----

[[0. 0. -9.99856659 -9.99944467 -9.99988566]

[-5.6953279 -9.99978485 -9.99993924 -9.99997094 -9.99997881]

[-9.99588902 -9.99976095 -9.99993248 -9.99997384 -9.99998093]

[-9.0152291 -9.99492471 -9.99140496 -9.99044995 -9.83576797]

[-9.47665237 -9.99436079 -9.72187161 -9.61847958 0.]]

----V(s)-----

[[0. 0. -9.99856659 -9.99944467 -9.99988566]

[-5.6953279 -9.99978485 -9.99993924 -9.99997094 -9.99997881]

[-9.99588902 -9.99976095 -9.99993248 -9.99997384 -9.99998093]

[-9.0152291 -9.99492471 -9.99140496 -9.99044995 -9.83576797]

[-9.47665237 -9.99436079 -9.72187161 -9.61847958 0.]]

k, s, r, γ, and G(s)

k s r gamma gs

1 14 -1.0 0.9 -9.999981

2 9 -1.0 0.9 -9.999979

3 14 -1.0 0.9 -9.999976

4 13 -1.0 0.9 -9.999974

5 8 -1.0 0.9 -9.999971

6 9 -1.0 0.9 -9.999968

7 14 -1.0 0.9 -9.999964

8 14 -1.0 0.9 -9.999960

9 9 -1.0 0.9 -9.999956

10 9 -1.0 0.9 -9.999951
11 8 -1.0 0.9 -9.999945
12 7 -1.0 0.9 -9.999939
13 12 -1.0 0.9 -9.999932
14 7 -1.0 0.9 -9.999925
15 8 -1.0 0.9 -9.999917
16 9 -1.0 0.9 -9.999907
17 9 -1.0 0.9 -9.999897
18 4 -1.0 0.9 -9.999886
19 4 -1.0 0.9 -9.999873
20 9 -1.0 0.9 -9.999859
21 9 -1.0 0.9 -9.999843
22 8 -1.0 0.9 -9.999826
23 7 -1.0 0.9 -9.999806
24 6 -1.0 0.9 -9.999785
25 11 -1.0 0.9 -9.999761
26 6 -1.0 0.9 -9.999734
27 7 -1.0 0.9 -9.999705
28 6 -1.0 0.9 -9.999672
29 11 -1.0 0.9 -9.999636
30 12 -1.0 0.9 -9.999595
31 7 -1.0 0.9 -9.999550
32 8 -1.0 0.9 -9.999500
33 3 -1.0 0.9 -9.999445
34 3 -1.0 0.9 -9.999383
35 8 -1.0 0.9 -9.999314
36 9 -1.0 0.9 -9.999238
37 4 -1.0 0.9 -9.999154
38 3 -1.0 0.9 -9.999060

39 3 -1.0 0.9 -9.998955
40 8 -1.0 0.9 -9.998839
41 3 -1.0 0.9 -9.998710
42 2 -1.0 0.9 -9.998567
43 3 -1.0 0.9 -9.998407
44 3 -1.0 0.9 -9.998230
45 8 -1.0 0.9 -9.998034
46 9 -1.0 0.9 -9.997815
47 9 -1.0 0.9 -9.997573
48 8 -1.0 0.9 -9.997303
49 7 -1.0 0.9 -9.997003
50 12 -1.0 0.9 -9.996670
51 11 -1.0 0.9 -9.996300
52 10 -1.0 0.9 -9.995889
53 11 -1.0 0.9 -9.995432
54 16 -1.0 0.9 -9.994925
55 21 -1.0 0.9 -9.994361
56 16 -1.0 0.9 -9.993734
57 21 -1.0 0.9 -9.993038
58 16 -1.0 0.9 -9.992264
59 17 -1.0 0.9 -9.991405
60 18 -1.0 0.9 -9.990450
61 17 -1.0 0.9 -9.989389
62 12 -1.0 0.9 -9.988210
63 7 -1.0 0.9 -9.986900
64 8 -1.0 0.9 -9.985444
65 9 -1.0 0.9 -9.983827
66 14 -1.0 0.9 -9.982030
67 14 -1.0 0.9 -9.980033

68 9 -1.0 0.9 -9.977815
69 14 -1.0 0.9 -9.975350
70 13 -1.0 0.9 -9.972611
71 14 -1.0 0.9 -9.969567
72 9 -1.0 0.9 -9.966186
73 8 -1.0 0.9 -9.962429
74 3 -1.0 0.9 -9.958254
75 8 -1.0 0.9 -9.953616
76 13 -1.0 0.9 -9.948462
77 14 -1.0 0.9 -9.942736
78 9 -1.0 0.9 -9.936373
79 8 -1.0 0.9 -9.929303
80 7 -1.0 0.9 -9.921448
81 8 -1.0 0.9 -9.912720
82 3 -1.0 0.9 -9.903023
83 8 -1.0 0.9 -9.892247
84 9 -1.0 0.9 -9.880275
85 14 -1.0 0.9 -9.866972
86 14 -1.0 0.9 -9.852191
87 19 -1.0 0.9 -9.835768
88 14 -1.0 0.9 -9.817520
89 13 -1.0 0.9 -9.797244
90 18 -1.0 0.9 -9.774716
91 17 -1.0 0.9 -9.749684
92 22 -1.0 0.9 -9.721872
93 22 -1.0 0.9 -9.690968
94 22 -1.0 0.9 -9.656632
95 23 -1.0 0.9 -9.618480
96 22 -1.0 0.9 -9.576088

97 21 -1.0 0.9 -9.528987
98 20 -1.0 0.9 -9.476652
99 20 -1.0 0.9 -9.418503
100 20 -1.0 0.9 -9.353892
101 21 -1.0 0.9 -9.282102
102 21 -1.0 0.9 -9.202336
103 20 -1.0 0.9 -9.113706
104 15 -1.0 0.9 -9.015229
105 10 -1.0 0.9 -8.905810
106 10 -1.0 0.9 -8.784233
107 11 -1.0 0.9 -8.649148
108 16 -1.0 0.9 -8.499054
109 21 -1.0 0.9 -8.332282
110 22 -1.0 0.9 -8.146980
111 17 -1.0 0.9 -7.941089
112 16 -1.0 0.9 -7.712321
113 15 -1.0 0.9 -7.458134
114 20 -1.0 0.9 -7.175705
115 15 -1.0 0.9 -6.861894
116 15 -1.0 0.9 -6.513216
117 10 -1.0 0.9 -6.125795
118 5 -1.0 0.9 -5.695328
119 6 -1.0 0.9 -5.217031
120 11 -1.0 0.9 -4.685590
121 12 -1.0 0.9 -4.095100
122 13 -1.0 0.9 -3.439000
123 14 -1.0 0.9 -2.710000
124 14 -1.0 0.9 -1.900000
125 19 -1.0 0.9 -1.000000

Epoch- 10

----N(s)-----

[[0. 1. 4. 4. 5.]

[4. 4. 4. 7. 7.]

[4. 6. 5. 6. 7.]

[4. 7. 5. 5. 6.]

[3. 7. 6. 6. 0.]]

----S(s)-----

[[0. -9.99226446 -39.83920118 -39.84511977 -45.10794395]

[-14.2085435 -39.825981 -39.84248622 -63.43151414 -62.7289396]

[-27.12380925 -45.66236542 -48.444305 -54.20806833 -58.17879558]

[-31.90594087 -55.74208446 -42.34202182 -39.66719226 -38.84727325]

[-26.56507737 -58.93887709 -51.60008543 -33.5219915 0.]]

----V(s)-----

[[0. -9.99226446 -9.9598003 -9.96127994 -9.02158879]

[-3.55213587 -9.95649525 -9.96062156 -9.06164488 -8.96127709]

[-6.78095231 -7.61039424 -9.688861 -9.03467805 -8.31125651]

[-7.97648522 -7.96315492 -8.46840436 -7.93343845 -6.47454554]

[-8.85502579 -8.41983958 -8.60001424 -5.58699858 0.]]

k, s, r, γ , and G(s)

k s r gamma gs

1 19 -1.0 0.9 -8.649148

2 19 -1.0 0.9 -8.499054

3 14 -1.0 0.9 -8.332282

4 14 -1.0 0.9 -8.146980

5 13 -1.0 0.9 -7.941089
6 8 -1.0 0.9 -7.712321
7 9 -1.0 0.9 -7.458134
8 9 -1.0 0.9 -7.175705
9 9 -1.0 0.9 -6.861894
10 9 -1.0 0.9 -6.513216
11 9 -1.0 0.9 -6.125795
12 4 -1.0 0.9 -5.695328
13 4 -1.0 0.9 -5.217031
14 4 -1.0 0.9 -4.685590
15 9 -1.0 0.9 -4.095100
16 8 -1.0 0.9 -3.439000
17 13 -1.0 0.9 -2.710000
18 14 -1.0 0.9 -1.900000
19 19 -1.0 0.9 -1.000000

Epoch- 100

----N(s)-----

[[0. 48. 50. 41. 35.]

[37. 50. 54. 51. 45.]

[37. 49. 60. 61. 42.]

[36. 47. 57. 54. 43.]

[31. 44. 45. 49. 0.]]

----S(s)-----

[[0. -281.41197193 -371.70010432 -362.64688208 -313.37195592]

[-231.62142134 -396.28519016 -429.08214357 -443.0374051 -401.16104341]

[-294.33646573 -397.7304177 -503.3869481 -499.78968173 -351.03258252]

[-320.5190544 -407.29476928 -465.09585848 -360.64015975 -227.44788222]

[-272.6590156 -384.6718393 -378.09074385 -265.95287769 0.]]

----V(s)-----

[[0. -5.86274942 -7.43400209 -8.8450459 -8.95348445]

[-6.26003841 -7.9257038 -7.94596562 -8.68700794 -8.91468985]

[-7.95503961 -8.1169473 -8.38978247 -8.19327347 -8.35791863]

[-8.90330707 -8.66584615 -8.15957646 -6.67852148 -5.28948563]

[-8.79545212 -8.7425418 -8.40201653 -5.42760975 0.]]

k, s, r, γ, and G(s)

k s r gamma gs

1 1 -1.0 0.9 -9.998034

2 6 -1.0 0.9 -9.997815

3 11 -1.0 0.9 -9.997573

4 16 -1.0 0.9 -9.997303

5 15 -1.0 0.9 -9.997003

6 16 -1.0 0.9 -9.996670

7 15 -1.0 0.9 -9.996300

8 20 -1.0 0.9 -9.995889

9 15 -1.0 0.9 -9.995432

10 15 -1.0 0.9 -9.994925

11 16 -1.0 0.9 -9.994361

12 15 -1.0 0.9 -9.993734

13 15 -1.0 0.9 -9.993038

14 20 -1.0 0.9 -9.992264

15 15 -1.0 0.9 -9.991405

16 15 -1.0 0.9 -9.990450

17 20 -1.0 0.9 -9.989389

18 15 -1.0 0.9 -9.988210

19 10 -1.0 0.9 -9.986900
20 15 -1.0 0.9 -9.985444
21 20 -1.0 0.9 -9.983827
22 15 -1.0 0.9 -9.982030
23 16 -1.0 0.9 -9.980033
24 21 -1.0 0.9 -9.977815
25 20 -1.0 0.9 -9.975350
26 20 -1.0 0.9 -9.972611
27 20 -1.0 0.9 -9.969567
28 20 -1.0 0.9 -9.966186
29 21 -1.0 0.9 -9.962429
30 20 -1.0 0.9 -9.958254
31 21 -1.0 0.9 -9.953616
32 22 -1.0 0.9 -9.948462
33 22 -1.0 0.9 -9.942736
34 23 -1.0 0.9 -9.936373
35 23 -1.0 0.9 -9.929303
36 23 -1.0 0.9 -9.921448
37 22 -1.0 0.9 -9.912720
38 22 -1.0 0.9 -9.903023
39 17 -1.0 0.9 -9.892247
40 12 -1.0 0.9 -9.880275
41 7 -1.0 0.9 -9.866972
42 6 -1.0 0.9 -9.852191
43 11 -1.0 0.9 -9.835768
44 16 -1.0 0.9 -9.817520
45 21 -1.0 0.9 -9.797244
46 20 -1.0 0.9 -9.774716
47 20 -1.0 0.9 -9.749684

48 20 -1.0 0.9 -9.721872
49 21 -1.0 0.9 -9.690968
50 21 -1.0 0.9 -9.656632
51 20 -1.0 0.9 -9.618480
52 20 -1.0 0.9 -9.576088
53 21 -1.0 0.9 -9.528987
54 20 -1.0 0.9 -9.476652
55 20 -1.0 0.9 -9.418503
56 15 -1.0 0.9 -9.353892
57 16 -1.0 0.9 -9.282102
58 15 -1.0 0.9 -9.202336
59 15 -1.0 0.9 -9.113706
60 20 -1.0 0.9 -9.015229
61 20 -1.0 0.9 -8.905810
62 20 -1.0 0.9 -8.784233
63 20 -1.0 0.9 -8.649148
64 20 -1.0 0.9 -8.499054
65 15 -1.0 0.9 -8.332282
66 15 -1.0 0.9 -8.146980
67 10 -1.0 0.9 -7.941089
68 11 -1.0 0.9 -7.712321
69 16 -1.0 0.9 -7.458134
70 11 -1.0 0.9 -7.175705
71 12 -1.0 0.9 -6.861894
72 7 -1.0 0.9 -6.513216
73 12 -1.0 0.9 -6.125795
74 13 -1.0 0.9 -5.695328
75 8 -1.0 0.9 -5.217031
76 7 -1.0 0.9 -4.685590

77 2 -1.0 0.9 -4.095100

78 2 -1.0 0.9 -3.439000

79 1 -1.0 0.9 -2.710000

80 6 -1.0 0.9 -1.900000

81 5 -1.0 0.9 -1.000000

Part-2-Monte Carlo Every-visit

Epoch-0

----N(s)----

[[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]]

----S(s)----

[[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]]

----V(s)----

[[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]]

Epoch- 1

----N(s)----

[[0. 2. 1. 4. 10.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]]

----S(s)----

[[0. -2.9 -2.71 -27.6305824 -61.76888113]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]]

----V(s)----

[[0. -1.45 -2.71 -6.9076456 -6.17688811]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]

[0. 0. 0. 0. 0.]]

k, s, r, γ , and G(s)

k s r gamma gs

1 3 -1.0 0.9 -8.332282

2 3 -1.0 0.9 -8.146980

3 4 -1.0 0.9 -7.941089

4 3 -1.0 0.9 -7.712321

5 4 -1.0 0.9 -7.458134
6 4 -1.0 0.9 -7.175705
7 4 -1.0 0.9 -6.861894
8 4 -1.0 0.9 -6.513216
9 4 -1.0 0.9 -6.125795
10 4 -1.0 0.9 -5.695328
11 4 -1.0 0.9 -5.217031
12 4 -1.0 0.9 -4.685590
13 4 -1.0 0.9 -4.095100
14 3 -1.0 0.9 -3.439000
15 2 -1.0 0.9 -2.710000
16 1 -1.0 0.9 -1.900000
17 1 -1.0 0.9 -1.000000

Epoch- 10

----N(s)----

[[0. 11. 14. 14. 21.]

[13. 10. 9. 8. 4.]

[25. 18. 6. 0. 0.]

[17. 16. 8. 2. 0.]

[22. 25. 14. 13. 0.]]

----S(s)----

[[0. -34.56700838 -112.01928629 -118.60990645 -167.09017247]

[-59.23456042 -60.3916849 -76.46815363 -74.0986487 -39.28510088]

[-167.73591534 -119.5322958 -39.75145572 0. 0.]

[-143.94065575 -121.00932751 -49.8477052 -8.76189404 0.]

[-172.48518681 -187.32653783 -98.23151407 -91.36639534 0.]]

----V(s)----

```
[[ 0.      -3.14245531 -8.00137759 -8.47213617 -7.95667488]
 [-4.55650465 -6.03916849 -8.49646151 -9.26233109 -9.82127522]
 [-6.70943661 -6.6406831 -6.62524262 0.      0.    ]
 [-8.4670974 -7.56308297 -6.23096315 -4.38094702 0.    ]
 [-7.84023576 -7.49306151 -7.01653672 -7.02818426 0.    ]]
```

k, s, r, γ , and G(s)

k s r gamma gs

1	6	-1.0	0.9	-8.332282
2	1	-1.0	0.9	-8.146980
3	2	-1.0	0.9	-7.941089
4	2	-1.0	0.9	-7.712321
5	7	-1.0	0.9	-7.458134
6	12	-1.0	0.9	-7.175705
7	17	-1.0	0.9	-6.861894
8	16	-1.0	0.9	-6.513216
9	21	-1.0	0.9	-6.125795
10	16	-1.0	0.9	-5.695328
11	17	-1.0	0.9	-5.217031
12	12	-1.0	0.9	-4.685590
13	11	-1.0	0.9	-4.095100
14	10	-1.0	0.9	-3.439000
15	10	-1.0	0.9	-2.710000
16	5	-1.0	0.9	-1.900000
17	5	-1.0	0.9	-1.000000

Epoch- 100

----N(s)-----

[[0. 101. 154. 182. 202.]

[90. 120. 151. 169. 184.]

[142. 142. 155. 138. 163.]

[153. 138. 148. 128. 128.]

[175. 161. 142. 94. 0.]]

----S(s)-----

[[0. -532.80219466 -1256.57473913 -1607.699087

-1792.54184369]

[-474.74198881 -800.27603583 -1256.07368173 -1473.3312476

-1627.93195566]

[-1095.6815698 -1166.07104682 -1323.12880272 -1162.47423174

-1236.00400425]

[-1317.50911354 -1164.60546259 -1228.50393768 -914.48804953

-666.49497326]

[-1538.9911642 -1354.74618243 -1120.15780173 -589.18931674

0.]]

----V(s)-----

[[0. -5.27526925 -8.15957623 -8.83351147 -8.87396952]

[-5.27491099 -6.66896697 -8.31836875 -8.71793638 -8.84745628]

[-7.71606739 -8.21176794 -8.53631486 -8.42372632 -7.58284665]

[-8.61117068 -8.43917002 -8.30070228 -7.14443789 -5.20699198]

[-8.79423522 -8.41457256 -7.88843522 -6.26797145 0.]]

k, s, r, γ , and G(s)

k s r gamma gs

1 15 -1.0 0.9 -9.975350

2 10 -1.0 0.9 -9.972611

3 10 -1.0 0.9 -9.969567
4 5 -1.0 0.9 -9.966186
5 5 -1.0 0.9 -9.962429
6 6 -1.0 0.9 -9.958254
7 1 -1.0 0.9 -9.953616
8 2 -1.0 0.9 -9.948462
9 2 -1.0 0.9 -9.942736
10 1 -1.0 0.9 -9.936373
11 6 -1.0 0.9 -9.929303
12 7 -1.0 0.9 -9.921448
13 8 -1.0 0.9 -9.912720
14 7 -1.0 0.9 -9.903023
15 12 -1.0 0.9 -9.892247
16 7 -1.0 0.9 -9.880275
17 12 -1.0 0.9 -9.866972
18 11 -1.0 0.9 -9.852191
19 12 -1.0 0.9 -9.835768
20 7 -1.0 0.9 -9.817520
21 2 -1.0 0.9 -9.797244
22 7 -1.0 0.9 -9.774716
23 8 -1.0 0.9 -9.749684
24 3 -1.0 0.9 -9.721872
25 2 -1.0 0.9 -9.690968
26 3 -1.0 0.9 -9.656632
27 8 -1.0 0.9 -9.618480
28 13 -1.0 0.9 -9.576088
29 18 -1.0 0.9 -9.528987
30 23 -1.0 0.9 -9.476652
31 22 -1.0 0.9 -9.418503

32 22 -1.0 0.9 -9.353892
33 17 -1.0 0.9 -9.282102
34 12 -1.0 0.9 -9.202336
35 13 -1.0 0.9 -9.113706
36 18 -1.0 0.9 -9.015229
37 19 -1.0 0.9 -8.905810
38 14 -1.0 0.9 -8.784233
39 9 -1.0 0.9 -8.649148
40 9 -1.0 0.9 -8.499054
41 8 -1.0 0.9 -8.332282
42 9 -1.0 0.9 -8.146980
43 9 -1.0 0.9 -7.941089
44 4 -1.0 0.9 -7.712321
45 3 -1.0 0.9 -7.458134
46 4 -1.0 0.9 -7.175705
47 4 -1.0 0.9 -6.861894
48 4 -1.0 0.9 -6.513216
49 9 -1.0 0.9 -6.125795
50 8 -1.0 0.9 -5.695328
51 3 -1.0 0.9 -5.217031
52 3 -1.0 0.9 -4.685590
53 2 -1.0 0.9 -4.095100
54 2 -1.0 0.9 -3.439000
55 7 -1.0 0.9 -2.710000
56 6 -1.0 0.9 -1.900000
57 1 -1.0 0.9 -1.000000

Part-3-Q-Learning

Q-Learning Rewards Matrix (R)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
0	100	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
1	100	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
2	-1	0	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
3	-1	-1	0	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
4	-1	-1	-1	0	-1	-1	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
5	100	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
6	-1	0	-1	-1	-1	0	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
7	-1	-1	0	-1	-1	-1	0	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
8	-1	-1	-1	0	-1	-1	-1	0	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
9	-1	-1	-1	-1	0	-1	-1	-1	0	-1	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
10	-1	-1	-1	-1	-1	0	-1	-1	-1	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
11	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1
12	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1
13	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1
14	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	-1	-1	-1	0	-1	-1	-1	-1	-1	-1
15	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1
16	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	0	-1	0	-1	-1	-1	0	-1	-1	-1	-1
17	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	0	-1	0	-1	-1	-1	0	-1	-1	-1
18	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	0	-1	0	-1	-1	-1	0	-1	-1
19	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	100
20	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	-1	-1	0	-1	-1	-1
21	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	0	-1	-1	-1
22	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	0	-1	-1
23	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	100	-1
24	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	100	-1

[illegible]

[illegible]

24 0

Iteration: 10

[illegible]

Iteration: 100

[illegible]

24 0 171 0 0 0 227 100

Part-4-SARSA

Q-Learning Rewards Matrix (R)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
0	100	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
1	100	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
2	-1	0	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
3	-1	-1	0	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
4	-1	-1	-1	0	-1	-1	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
5	100	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
6	-1	0	-1	-1	-1	0	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
7	-1	-1	0	-1	-1	-1	0	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
8	-1	-1	-1	0	-1	-1	-1	0	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
9	-1	-1	-1	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
10	-1	-1	-1	-1	-1	0	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1
11	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1
12	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1
13	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	-1
14	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	-1	-1	-1	0	-1	-1	-1	-1	-1	-1
15	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1
16	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	0	-1	-1	-1	0	-1	-1	-1
17	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	0	-1	-1	-1	0	-1	-1
18	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	0	-1	-1	-1	0	-1
19	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	-1	-1	-1	-1	100
20	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	-1	-1	0	-1	-1	-1

21	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	0	-1	-1
22	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	0	-1
23	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	-1	100
24	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	0	100

Q-Learning Value Matrix (Q)

Initial values

[illegible]

[illegible]

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	64	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	0	0	0	0	0	0	0

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
0	0	0	0	0	0	0	220	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	241	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	129	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	298	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	268	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	194	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	174	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	268	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	241	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	216	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	117	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	306	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	241	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	241	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	306	0	0	0	0	0	0

19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	341
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	216	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	130	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	145	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	268	0	0	0	0	0	0	0	0