

Assignment 5 Report

This assignment is an implement of Markov Decision Processes.

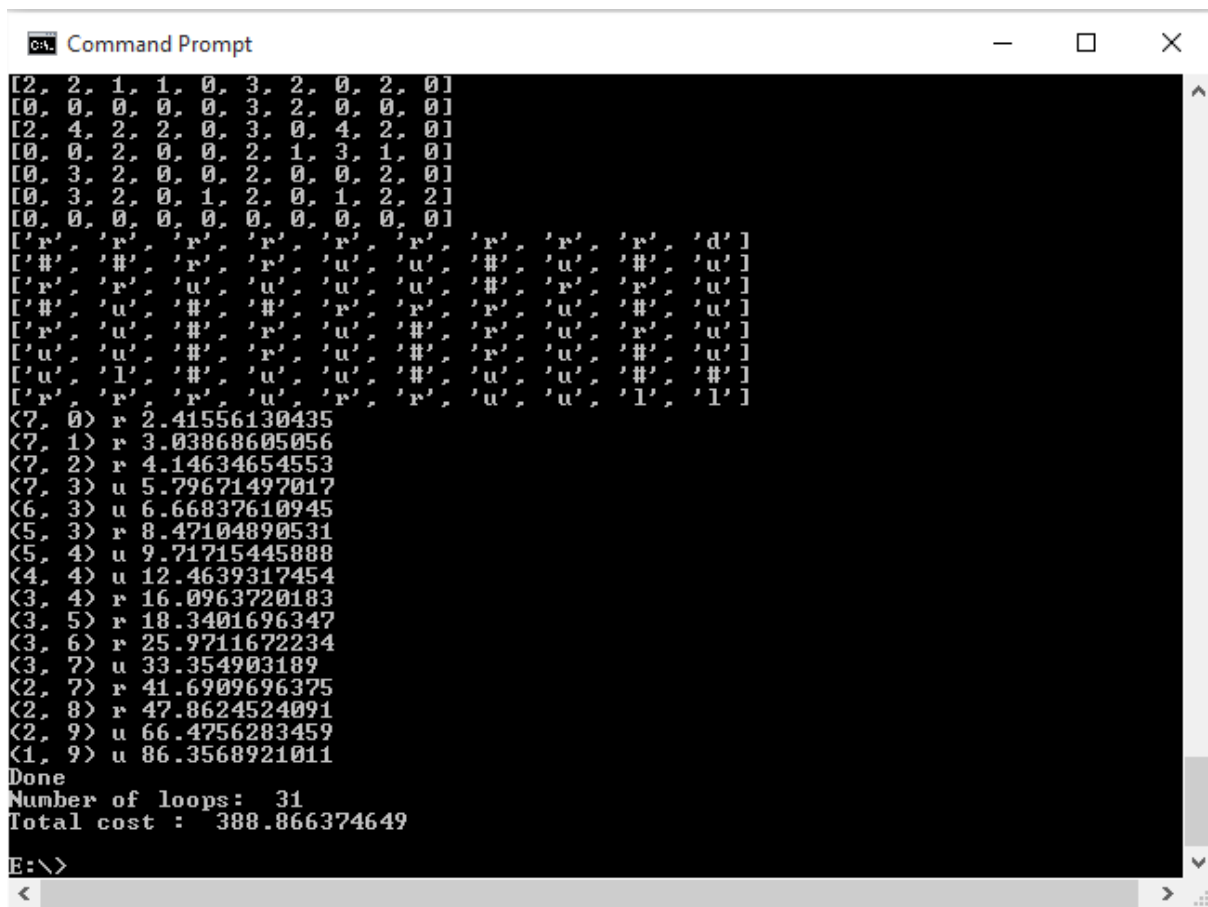
The mdp.py program will take two arguments.

The first argument is the file name of the world "World1MDP.txt"

The second argument is the value of epsilon.

e.g. "Python mdp.py World1MDP.txt 0.5"

When epsilon is 0.5:



```
Command Prompt
[2, 2, 1, 1, 0, 3, 2, 0, 2, 0]
[0, 0, 0, 0, 0, 3, 2, 0, 0, 0]
[2, 4, 2, 2, 0, 3, 0, 4, 2, 0]
[0, 0, 2, 0, 0, 2, 1, 3, 1, 0]
[0, 3, 2, 0, 0, 2, 0, 0, 2, 0]
[0, 3, 2, 0, 1, 2, 0, 1, 2, 2]
[0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
['r', 'r', 'r', 'r', 'r', 'r', 'r', 'r', 'r', 'd']
['#', '#', 'r', 'r', 'u', 'u', '#', 'u', '#', 'u']
['r', 'r', 'u', 'u', 'u', 'u', 'r', 'r', 'u', 'u']
['#', 'u', '#', '#', 'r', 'r', 'r', 'u', '#', 'u']
['r', 'u', '#', 'r', 'u', '#', 'r', 'u', 'r', 'u']
['u', 'u', '#', 'r', 'u', '#', 'r', 'u', '#', 'u']
['u', 'l', '#', 'u', 'u', '#', 'u', 'u', '#', '#']
['r', 'r', 'r', 'u', 'r', 'r', 'u', 'u', 'l', 'l']
(<7, 0> r 2.41556130435
(<7, 1> r 3.03868605056
(<7, 2> r 4.14634654553
(<7, 3> u 5.79671497017
(<6, 3> u 6.66837610945
(<5, 3> r 8.47104890531
(<5, 4> u 9.71715445888
(<4, 4> u 12.4639317454
(<3, 4> r 16.0963720183
(<3, 5> r 18.3401696347
(<3, 6> r 25.9711672234
(<3, 7> u 33.354903189
(<2, 7> r 41.6909696375
(<2, 8> r 47.8624524091
(<2, 9> u 66.4756283459
(<1, 9> u 86.3568921011
Done
Number of loops: 31
Total cost : 388.866374649
E:\>
```

When epsilon is 1: Both paths are the same, the 1 epsilon can save 3 loops

```
Command Prompt
[2, 2, 1, 1, 0, 3, 2, 0, 2, 0]
[0, 0, 0, 0, 0, 3, 2, 0, 0, 0]
[2, 4, 2, 2, 0, 3, 0, 4, 2, 0]
[0, 0, 2, 0, 0, 2, 1, 3, 1, 0]
[0, 3, 2, 0, 0, 2, 0, 0, 2, 0]
[0, 3, 2, 0, 1, 2, 0, 1, 2, 2]
[0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
['r', 'r', 'r', 'r', 'r', 'r', 'r', 'r', 'd', 'l']
['#', '#', 'r', 'r', 'u', 'u', 'u', 'u', 'u', 'l']
['r', 'r', 'u', 'u', 'u', 'u', 'u', 'u', 'u', 'l']
['#', 'u', 'u', 'u', 'u', 'u', 'u', 'u', 'u', 'l']
['r', 'u', 'u', 'u', 'u', 'u', 'u', 'u', 'u', 'l']
['u', 'u', 'u', 'u', 'u', 'u', 'u', 'u', 'u', 'l']
['u', 'l', 'u', 'u', 'u', 'u', 'u', 'u', 'u', 'l']
['r', 'r', 'r', 'r', 'u', 'u', 'u', 'u', 'l', 'l']
<7, 0> r 2.36186685231
<7, 1> r 2.93345207116
<7, 2> r 4.09961113702
<7, 3> u 5.69390767612
<6, 3> u 6.62644746895
<5, 3> r 8.38818634465
<5, 4> u 9.68411713095
<4, 4> u 12.4016396703
<3, 4> r 16.0686289678
<3, 5> r 18.2937886212
<3, 6> r 25.9498678432
<3, 7> u 33.3152862563
<2, 7> r 41.6733631432
<2, 8> r 47.8324411997
<2, 9> u 66.4602739501
<1, 9> u 86.3268808918
Done
Number of loops: 28
Total cost : 388.109759225
E:\>
```

Both paths are the same, the 1 epsilon can save 3 loops.

When epsilon is 0.1, the path is the same, but it takes more loops.

```
Command Prompt
[2, 2, 1, 1, 0, 3, 2, 0, 2, 0]
[0, 0, 0, 0, 0, 3, 2, 0, 0, 0]
[2, 4, 2, 2, 0, 3, 0, 4, 2, 0]
[0, 0, 2, 0, 0, 2, 1, 3, 1, 0]
[0, 3, 2, 0, 0, 2, 0, 0, 2, 0]
[0, 3, 2, 0, 1, 2, 0, 1, 2, 2]
[0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
['r', 'r', 'r', 'r', 'r', 'r', 'r', 'r', 'd', 'l']
['#', '#', 'r', 'r', 'u', 'u', 'u', 'u', 'u', 'l']
['r', 'r', 'u', 'u', 'u', 'u', 'u', 'u', 'u', 'l']
['#', 'u', 'u', 'u', 'u', 'u', 'u', 'u', 'u', 'l']
['r', 'u', 'u', 'u', 'u', 'u', 'u', 'u', 'u', 'l']
['u', 'u', 'u', 'u', 'u', 'u', 'u', 'u', 'u', 'l']
['u', 'l', 'u', 'u', 'u', 'u', 'u', 'u', 'u', 'l']
['r', 'r', 'r', 'r', 'u', 'u', 'u', 'u', 'l', 'l']
<7, 0> r 2.47648285037
<7, 1> r 3.08257784003
<7, 2> r 4.19884716177
<7, 3> u 5.83925694462
<6, 3> u 6.71543530975
<5, 3> r 8.50530747512
<5, 4> u 9.75422012099
<4, 4> u 12.4896743044
<3, 4> r 16.1274923523
<3, 5> r 18.3593341688
<3, 6> r 25.9950584368
<3, 7> u 33.3712725949
<2, 7> r 41.7107185216
<2, 8> r 47.8748527835
<2, 9> u 66.4928510882
<1, 9> u 86.3692924756
Done
Number of loops: 37
Total cost : 389.362674429
E:\>
```