project_notebook-zh

August 22, 2019

1 123

A*“Google-maps”

```
In [1]: # Run this cell first!

        from helpers import Map, load_map, show_map
        from helper import Maps, load_maps, show_maps
        from student_code import shortest_path

        %load_ext autoreload
        %autoreload 2
```

1.0.1 Map

```
In [2]: map_10 = load_map('map-10.pickle')
        show_map(map_10)
```

show_maps(map_10)Jupyter.html
1022
MapA *intersectionsroads
Intersections
intersections
10xy

```
In [3]: map_10.intersections
```

```
Out[3]: {0: [0.7798606835438107, 0.6922727646627362],
         1: [0.7647837074641568, 0.3252670836724646],
         2: [0.7155217893995438, 0.20026498027300055],
         3: [0.7076566826610747, 0.3278339270610988],
         4: [0.8325506249953353, 0.02310946309985762],
         5: [0.49016747075266875, 0.5464878695400415],
         6: [0.8820353070895344, 0.6791919587749445],
         7: [0.46247219371675075, 0.6258061621642713],
         8: [0.11622158839385677, 0.11236327488812581],
         9: [0.1285377678230034, 0.3285840695698353]}
```

Roads

roadsi roads[i]i

```
In [4]: # this shows that intersection 0 connects to intersections 7, 6, and 5
        map_10.roads[0]
```

```
Out[4]: [7, 6, 5]
```

```
In [5]: # This shows the full connectivity of the map
        map_10.roads
```

```
Out[5]: [[7, 6, 5],
         [4, 3, 2],
         [4, 3, 1],
         [5, 4, 1, 2],
         [1, 2, 3],
         [7, 0, 3],
         [0],
         [0, 5],
         [9],
         [8]]
```

```
In [6]: # map_40 is a bigger map than map_10
        map_40 = load_map('map-40.pickle')
        show_map(map_40)
```

show_maps(map_40)Jupyter.html

1.0.2

40039

show_map

- start - “”
- goal - “”
- path -

```
In [7]: # run this code, note the effect of including the optional
        # parameters in the function call.
        show_map(map_40, start=5, goal=34, path=[5,16,37,12,34])
```

1.0.3

student_code.pyFile > Open

show_mappath[5, 16, 37, 12, 34]

```
In [8]: %%bash
        > shortest_path(map_40, 5, 34)
        [5, 16, 37, 12, 34]
```

```
bash: line 1: syntax error near unexpected token `('
bash: line 1: `> shortest_path(map_40, 5, 34)'
```

```
In [11]: path = shortest_path(map_40, 5, 34)
         if path == [5, 16, 37, 12, 34]:
             print("great! Your code works for these inputs!")
         else:
             print("something is off, your code produced the following:")
             print(path)
```

```
shortest path called
great! Your code works for these inputs!
```

1.0.4

1.
2. A*
3.
4.

“”

```
In [12]: from test import test

         test(shortest_path)
```

```
shortest path called
shortest path called
shortest path called
All tests pass! Congratulations!
```

```
In [11]: map_40.intersections
```

```
Out[11]: {0: [0.7801603911549438, 0.49474860768712914],
          1: [0.5249831588690298, 0.14953665513987202],
          2: [0.8085335344099086, 0.7696330846542071],
          3: [0.2599134798656856, 0.14485659826020547],
          4: [0.7353838928272886, 0.8089961609345658],
          5: [0.09088671576431506, 0.7222846879290787],
          6: [0.313999018186756, 0.01876171413125327],
          7: [0.6824813442515916, 0.8016111783687677],
          8: [0.20128789391122526, 0.43196344222361227],
          9: [0.8551947714242674, 0.9011339078096633],
```

```
            10: [0.7581736589784409, 0.24026772497187532],
            11: [0.25311953895059136, 0.10321622277398101],
            12: [0.4813859169876731, 0.5006237737207431],
            13: [0.9112422509614865, 0.1839028760606296],
            14: [0.04580558670435442, 0.5886703168399895],
            15: [0.4582523173083307, 0.1735506267461867],
            16: [0.12939557977525573, 0.690016328140396],
            17: [0.607698913404794, 0.362322730884702],
            18: [0.719569201584275, 0.13985272363426526],
            19: [0.8860336256842246, 0.891868301175821],
            20: [0.4238357358399233, 0.026771817842421997],
            21: [0.8252497121120052, 0.9532681441921305],
            22: [0.47415009287034726, 0.7353428557575755],
            23: [0.26253385360950576, 0.9768234503830939],
            24: [0.9363713903322148, 0.13022993020357043],
            25: [0.6243437191127235, 0.21665962402659544],
            26: [0.5572917679006295, 0.2083567880838434],
            27: [0.7482655725962591, 0.12631654071213483],
            28: [0.6435799740880603, 0.5488515965193208],
            29: [0.34509802713919313, 0.8800306496459869],
            30: [0.021423673670808885, 0.4666482714834408],
            31: [0.640952694324525, 0.3232711412508066],
            32: [0.17440205342790494, 0.9528527425842739],
            33: [0.1332965908314021, 0.3996510641743197],
            34: [0.583993110207876, 0.42704536740474663],
            35: [0.3073865727705063, 0.09186645974288632],
            36: [0.740625863119245, 0.68128520136847],
            37: [0.3345284735051981, 0.6569436279895382],
            38: [0.17972981733780147, 0.999395685828547],
            39: [0.6315322816286787, 0.7311657634689946]}

In [12]: map_40.roads

Out[12]: [[36, 34, 31, 28, 17],
          [35, 31, 27, 26, 25, 20, 18, 17, 15, 6],
          [39, 36, 21, 19, 9, 7, 4],
          [35, 20, 15, 11, 6],
          [39, 36, 21, 19, 9, 7, 2],
          [32, 16, 14],
          [35, 20, 15, 11, 1, 3],
          [39, 36, 22, 21, 19, 9, 2, 4],
          [33, 30, 14],
          [36, 21, 19, 2, 4, 7],
          [31, 27, 26, 25, 24, 18, 17, 13],
          [35, 20, 15, 3, 6],
          [37, 34, 31, 28, 22, 17],
          [27, 24, 18, 10],
          [33, 30, 16, 5, 8],
```

```
[35, 31, 26, 25, 20, 17, 1, 3, 6, 11],
[37, 30, 5, 14],
[34, 31, 28, 26, 25, 18, 0, 1, 10, 12, 15],
[31, 27, 26, 25, 24, 1, 10, 13, 17],
[21, 2, 4, 7, 9],
[35, 26, 1, 3, 6, 11, 15],
[2, 4, 7, 9, 19],
[39, 37, 29, 7, 12],
[38, 32, 29],
[27, 10, 13, 18],
[34, 31, 27, 26, 1, 10, 15, 17, 18],
[34, 31, 27, 1, 10, 15, 17, 18, 20, 25],
[31, 1, 10, 13, 18, 24, 25, 26],
[39, 36, 34, 31, 0, 12, 17],
[38, 37, 32, 22, 23],
[33, 8, 14, 16],
[34, 0, 1, 10, 12, 15, 17, 18, 25, 26, 27, 28],
[38, 5, 23, 29],
[8, 14, 30],
[0, 12, 17, 25, 26, 28, 31],
[1, 3, 6, 11, 15, 20],
[39, 0, 2, 4, 7, 9, 28],
[12, 16, 22, 29],
[23, 29, 32],
[2, 4, 7, 22, 28, 36]]
```

In [ ]: