

Selecting Ideal Hotels in the DC Area

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Problem

- Finding the best hotel in a new city like Washington, D.C. that has many hotels
- Differing priority levels for preferences regarding location, price, and other travelers' ratings

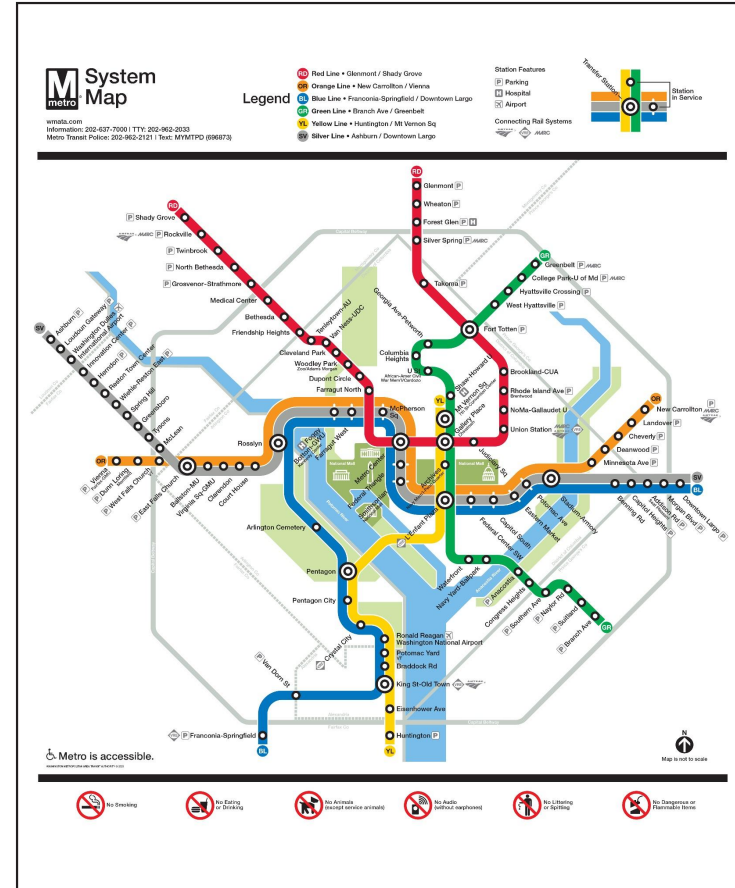


Applications of the Code

- Tourists and travelers to Washington, D.C.
- Business trips

Goals of the Code:

- Find the 5 best hotels for visitors to the DC area based on user specifications
- List landmarks near the top 5 hotel
- Based on nearby metro stops

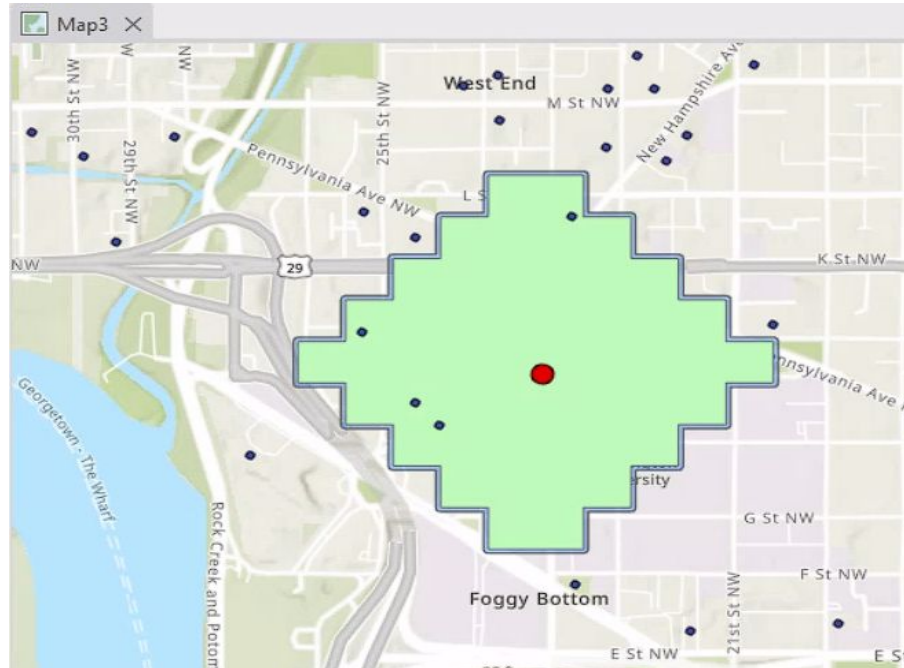


Solution

- Setup workspace
- Load data
- Get user inputs [max distance, price range, rating range, metro station]
- Perform geospatial computation using **Raster** and **Manhattan distance** to filter hotels which are located within specified distance from the selected metro station.
[select_hotels_raster_method]
- Calculate exact manhattan distance and multi-criterion evaluation (MCE) for each selected hotel.
- Getting list of landmarks for each selected hotel using **Euclidean distance**, with a **scaling factor** added to account for walking distance.
- Display top 5 hotels with highest MCE and landmarks near them.

Sample section of the code:

- `select_hotels_raster_method` function



Sample section of the code:

- Find_nearby_landmarks and display_results function

```
1 Data loaded successfully!
2
3 ===== Available Metro Stations =====
4 1. Takoma                                2. Friendship Heights          3. Fort Totten
5 4. Tenleytown-AU                        5. Van Ness-UDC                6. Georgia Ave Petworth
6 7. Cleveland Park                      8. Brookland-CUA               9. Columbia Heights
7 10. Woodley Park-Zoo Adams Morgan      11. Rhode Island Ave           12. U St/African-Amer Civil War Memorial/Cardozo
8 13. Shaw-Howard Univ                   14. Dupont Circle              15. Deanwood
9 16. NoMa - Gallaudet U                 17. Mt Vernon Sq - 7th St Convention Center 18. Farragut North
10 19. McPherson Sq                      20. Farragut West              21. Foggy Bottom-GWU
11 22. Minnesota Ave                     23. Gallery Pl-Chinatown       24. Metro Center
12 25. Union Station                     26. Judiciary Sq              27. Archives-Navy Mem'l
13 28. Federal Triangle                  29. Benning Road              30. Smithsonian
14 31. Stadium Armory                    32. Federal Center SW          33. Capitol South
15 34. L'Enfant Plaza                    35. Eastern Market             36. Potomac Ave
16 37. Navy Yard - Ballpark              38. Waterfront                 39. Anacostia
17 40. Congress Heights
18 =====
19
```

Sample section of the code:

- Find_nearby_landmarks and display_results function

```
19
20 Top Hotels Based on Your Preferences:
21 -----
22 Rank Hotel Name Price Level Rating Manhattan Distance (m) MCE Score
23 -----
24 1 ONE WASHINGTON CIRCLE HOTEL $$$ 5 443.8 1.00
25
26 Nearby Landmarks:
27 - Stevens, Thaddeus, School
28 - Square 38 - 23rd St, NW
29 - Square 38 - Pennsylvania Ave, NW
30 - Square 38 - 24th St, NW
31 - Schneider Triangle
32 - Square 38 - Washington Circle, NW
33 - Square 38 - L St, NW
34 - Washington, George, Statue
35 - Columbia Hospital for Women
36 - Keystone, The
37 -----
38 2 RESIDENCE INN WASHINGTON, DC/FOGGY BOTTOM $ 5 340.8 0.78
39
40 Nearby Landmarks:
41 - Saint Mary's Episcopal Church (Saint Mary's Chapel)
42 - Milton Hall
43 - Munson Hall
44 - Everglades, The
45 - Flagler, The
46 -----
```


Sample section of the code:

- Find_nearby_landmarks and display_results function

```
46 -----
47 3      ARC THE HOTEL          $$          4      334.9      0.76
48
49  Nearby Landmarks:
50  - Saint Mary's Episcopal Church (Saint Mary's Chapel)
51  - Watergate Complex
52  - Milton Hall
53  - Munson Hall
54  - Everglades, The
55 -----
56 4      THE RIVER INN         $$          2      486.1      0.49
57
58  Nearby Landmarks:
59  - Sweeney-Plowman Houses (Cooper Houses)
60  - Luzon, The (The Westover)
61  - Square 38 - Pennsylvania Ave, NW
62  - Square 38 - 24th St, NW
63  - Mullett Rowhouses
64  - Square 38 - Washington Circle, NW
65 -----
66
67 Temporary files cleaned up successfully
68 Script completed !
```


Areas for Further Improvement

- Based on metro station
- Creation of an MCE that takes landmarks into account
- Distance calculations, do not take traffic into account
- Higher prices might correlate with better ratings



Conclusion

- Code is useful for business visitors
- Code is useful for tourists who know the area of the city they want to visit.
 - Provides additional information through the inclusion of nearby landmarks
- With some modifications, it could be adapted for visitors who have no knowledge of a certain region, or whose preferences are less specific than a metro station (i.e., a neighborhood)
- Key geospatial techniques used include raster analysis, Euclidean and Manhattan distance calculations, MCE, landmark proximity analysis

