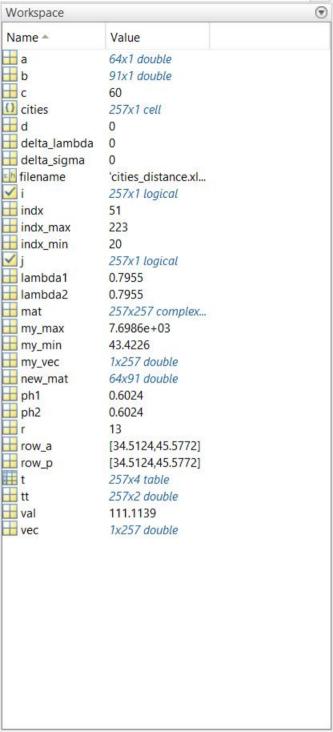
```
Editor - E:\Downloads\m\q4\q4.m
                                                                                                           ⊕ ×
   q4.m × +
       clc
       clear
       %read the table
 4
       t = readtable('worldcities-short.xlsx');
5 -
6 -
      t.country = categorical(t.country);
       i = (t.country == 'Iran') | (t.country == 'Japan') | (t.country == 'Iraq') | (t.country == 'Turk
7 -
       t=t(i,:);
8 -
       filename = 'cities distance.xlsx';
9 -
      cities = table2array(t(:,1));
10 -
11 -
       xlswrite(filename, cities, 'Sheet1', 'A2');
      xlswrite(filename, cities.', 'Sheet1', 'B1');
12 -
      tt = table2array(t(:,2:3));
13 -
14
15
      %compute the distances
16 -
      r = 6371;
17 -
       mat = [];
     \Box for i = 1:size(tt,1)
18 -
19 -
           row p = tt(i,:);
20 -
           vec = [];
           for j = 1:size(tt,1)
21 -
22 -
               row a = tt(j,:);
               ph1 = deg2rad(row p(1,1));
23 -
               ph2 = deg2rad(row a(1,1));
24 -
               lambda1 = deg2rad(row p(1,2));
25 -
               lambda2 = deg2rad(row a(1,2));
26 -
27 -
               delta lambda = abs(lambda1-lambda2);
               delta sigma = acos( sin(ph1)*sin(ph2) + cos(ph1)*cos(ph2)*cos(delta lambda) );
28 -
               d = r*delta sigma;
29 -
                vec = [vec,d];
30 -
31 -
           end
           mat=[mat;vec];
32 -
33 -
       end
```

```
34 -
       xlswrite(filename, mat, 'Sheet1', 'B2');
35
36
       %part 1
37 -
       indx = find(ismember(cities, 'Tehran'));
38 -
       my vec=mat(indx,:);
39 -
       my \ vec(my \ vec == 0) = NaN;
40 -
       [my min, indx min]=min(my vec);
41 -
       [my max, indx max]=max(my vec);
       disp("Min distance to Tehran:")
42 -
43 -
       disp(cities(indx min))
44 -
       disp (my min)
45 -
       disp("Max distance to Tehran:")
46 -
       disp(cities(indx max))
47 -
       disp(my max)
48
49
       %part 2
50
       %all available cities are less than 20000km to Tehran! change 20000 to 2000
51 -
       indx=find(my vec<2000);
       disp('number of citier closer than 2000km to Tehran: ')
52 -
53 -
       disp(size(indx,2))
54 -
       disp(cities(indx))
55
       %part 3
56
57 -
       i=(t.country=='Japan');
58 -
       [val , indx]=min(my vec(i));
       disp('nearest Japanese city to Tehran: ')
59 -
60 -
       disp(cities(indx))
61 -
       disp(val)
62
```

```
63
       %part 4
64 -
       i=(t.country=='Iran');
65 -
       j=(t.country=='Iraq');
       new mat=mat(i,j);
66 -
67 -
       val = min(new mat(:));
68 -
       [r,c] = find(new mat==val);
69 -
       a=find(i>0);
70 -
       b=find(j>0);
71 -
       disp('Iran-Irag closest cities:')
72 -
       disp(cities(a(r)))
       disp(cities(b(c)))
73 -
74 -
       disp(val)
75
76 -
       j=(t.country=='Turkey');
77 -
       new mat=mat(i,j);
78 -
       val = min(new mat(:));
79 -
       [r,c] = find(new mat==val);
80 -
       a=find(i>0);
81 -
       b=find(j>0);
82 -
       disp('Iran-Tuekey closest cities:')
83 -
       disp(cities(a(r)))
84 -
       disp(cities(b(c)))
85 -
       disp(val)
86
87
```



Min distance to Tehran: 'Karaj'			
43.4226			
Max distance to Tehran: 'Chiba'	i.		
7.6986e+03			

number of citier closer than 2000km to Tehran:

nearest Japanese city to Tehran: 'Nagano' 6.9839e+03

Iran-Irag closest cities: 'Madan' 'Al Basrah' 49.0974 Iran-Tuekey closest cities: 'Orumiveh' 'Hakkari' 111.1139