

CSE 512 Assignment 4 (Mini Project)

Maximum Points Possible – 10

The required task is to write two functions, which will perform some textual and spatial searching on MongoDB. Details are explained below.

Steps for Assignments: -

1. Install one of the versions of *MongoDB 4*.
2. Install *pymongo* to act as helper interface with MongoDB.
3. Run the tester file to check everything runs and nothing fails.

```
Creating database in MongoDB named as ddsassignment4
Creating a collection in ddsassignment4 named as businessCollection
Loading testData.json file in the businessCollection present inside ddsassignment4
Executing FindBusinessBasedOnCity function
Executing FindBusinessBasedOnLocation function
```

4. Now, Implement the function provided in Assignment4_Interface.py to perform the operations as listed below:
 - a. *FindBusinessBasedOnCity(cityToSearch, minReviewCount, saveLocation1, collection)*

This function searches the 'collection' given to find all the business present in the city provided in 'cityToSearch' and have at least 'review_count' of minReviewCount and save it to 'saveLocation1'. For each business you found, you should store name Full address, city, state of business in the following format.

Each line of the saved file will contain,

Name\$FullAddress\$City\$State\$Stars. (\$ is the separator and must be present)

Example Output:

```
MIJANA$1290 N SCOTTSDALE RD, TEMPE, AZ 85281$TEMPE$AZ$3.5
PHO CAO RESTAURANT & BAR$710 E GILBERT DR, TEMPE, AZ 85281$TEMPE$AZ$4.0
```

- b. *FindBusinessBasedOnLocation(categoriesToSearch, myLocation, minDistance, maxDistance, saveLocation2, collection)*

This function searches the 'collection' given to find name of all the business present in the 'maxDistance' from the given 'myLocation' that covers **all** the given categories (the business category needs to match at least one of the given categories) (please use the distance algorithm given below) and save them to 'saveLocation2'. Each line of the output file will contain the **name of the business only**.

- categoriesToSearch: a list of categories need to be covered
- 'myLocation' will be given with format ["40.3", "51.6"].
- minDistance and maxDistance: the search range distance
- saveLocation2: output location

Example Output:

```
Everything Bagels
Fredericks Of Hollywood-Outlet
Oils & Olives Kierland
```

NOTE: - Please Make sure all fields are in Uppercase while writing in file, makes it easy to check. ☺

Files given to you: -

Assignment4_Interface.py - You should complete this file. You would need to implement the function present in this file.

testData.json – This is the json file which is used as a document to put inside MongoDB. The structure of one record of this file is < Key value pair>: -

```
{
  'type': 'business',
  'business_id': (encrypted business id),
  'name': (business name),
  'neighborhoods': [(hood names)],
  'full_address': (localized address),
  'city': (city),
  'state': (state),
  'latitude': latitude,
  'longitude': longitude,
  'stars': (star rating, rounded to half-stars), 'review_count': review count,

  'categories': [(localized category names)]
  'open': True / False (corresponds to permanently closed, not business hours),
}
```

Example: -

```
{
  "city": "Ahwatukee",
  "review_count": 3,
  "name": "McDonald's",
  "neighborhoods": [],
  "type": "business",
  "business_id": "LNdwp-9Isnd6xmBKUz4K_A",
  "full_address": "10823 S 51st St\nAhwatukee, AZ 85044",
  "state": "AZ",
  "longitude": -111.975004,
  "stars": 2.0,
  "latitude": 33.348560900000003,
  "open": true,
  "categories": ["Burgers", "Fast Food", "Restaurants"]}
}
```

Note: - The order of key value pair does not matter.

tester.py – DO NOT change this file. This is just to help you run the code for your implementation.

Distance Algorithm needs to be used:

Given two pair of latitude and longitude as [lat2, lon2] and [lat1, lon1], you can calculate the distance between them using the formula given below:

DistanceFunction(lat2, lon2, lat1, lon1):

```
var R = 3959; // miles
var φ1 = lat1.toRadians();
var φ2 = lat2.toRadians();
var Δφ = (lat2-lat1).toRadians();
var Δλ = (lon2-lon1).toRadians();

var a = Math.sin(Δφ/2) * Math.sin(Δφ/2) +
        Math.cos(φ1) * Math.cos(φ2) *
        Math.sin(Δλ/2) * Math.sin(Δλ/2);
var c = 2 * Math.atan2(Math.sqrt(a), Math.sqrt(1-a));
var d = R * c;
```

d is the distance between the given pair of latitude and longitude. The distance is in **miles**. Reference: <http://www.movable-type.co.uk/scripts/latlong.html>

Instructions for Assignment: -

Please follow these instructions closely **else Marks will be deducted.**

1. Please follow the function signature as provided in the Assignment4_Interface.py.
2. Please use the same database name and collection name as provided in the tester to keep it consistent.
3. Please use the same distance algorithm given above to make it consistent for everyone.
4. Please make sure to run the file before submitting and make sure there is no indentation error. In case of any compilation error, 0 marks will be given.
5. Do not modify any function signature in Assignment4_Interface.py. In case any modification is needed, please post the same on discussion board.
6. For any case of doubt in the assignment, PLEASE USE Discussion Boards, Individual mails would not be entertained.
7. Also, It is an individual's responsibilities to clarify his/her doubts, so read and use discussion Board extensively.

Submission Instructions: -

Only submit **Assignment4_Interface.py**. No zip.

Note: -

Failure to follow the instructions provided in the document will result in the loss of the points.

