# Project 1 - NoSQL

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#### Reflection

For this project, I broke the problem in 2 parts: retrieving the data based on geographical location and calculating the distances between locations. I wrote two functions:

FindBusinessBasedOnCity and FindBusinessBasedOnLocation, which connect with NoSQL database to retrieve business information based on city search and within a certain radius of a given location respectively. For distance calculations, I used the algorithm given in the assignment to write the DistanceFunction, which calculates the distance between two points on the earth given their latitude and longitude, that helped in filtering the businesses within the given radius.

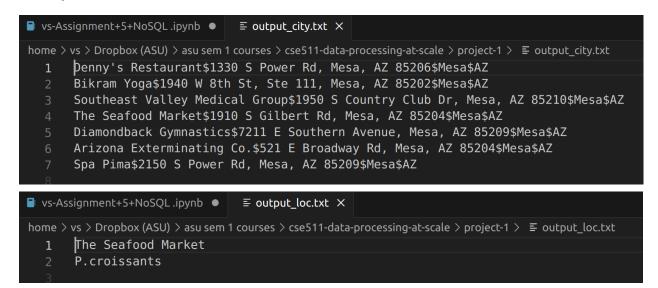
```
def FindBusinessBasedOnCity(cityToSearch, saveLocation1, collection):
   records = collection.all()
   filtered businesses = [record for record in records if record['city']
== cityToSearch]
   with open(saveLocation1, 'w') as file:
       for business in filtered businesses:
           name = business.get('name', '')
           full address = business.get('full address', '')
           city = business.get('city', '')
           state = business.get('state', '')
           line = f"{name}${full address}${city}${state}\n"
           file.write(line)
       print(f"Data saved to {saveLocation1}")
def DistanceFunction(lat2, lon2, lat1, lon1):
  R = 3959
  phi1 = math.radians(lat1)
  phi2 = math.radians(lat2)
  delta phi = math.radians(lat2 - lat1)
   delta lambda = math.radians(lon2 - lon1)
```

```
a = math.sin(delta phi / 2) ** 2 + math.cos(phi1) * math.cos(phi2)
math.sin(delta lambda / 2) ** 2
  c = 2 * math.atan2(math.sqrt(a), math.sqrt(1 - a))
def FindBusinessBasedOnLocation(categoriesToSearch, myLocation,
maxDistance, saveLocation2, collection):
   records = collection.all()
   filtered businesses = []
   for record in records:
       categories = record.get('categories', [])
       if any(category in categoriesToSearch for category in categories):
           business location = (record.get('latitude', 0),
record.get('longitude', 0))
           distance = DistanceFunction(myLocation[0], myLocation[1],
business location[0], business location[1])
           if distance <= maxDistance:</pre>
               filtered businesses.append(record.get('name', ''))
   with open(saveLocation2, 'w') as file:
       for business name in filtered businesses:
           file.write(business name + '\n')
```

#### **Lessons Learned**

In this project, I learned how to use NoSQL databases especially UnQLite, and how to interact with them using Python. I got experience with geospatial data processing, particularly how to search and filter data based on the given geographical constraints and save the final results in a required format. Moreover, I learned how to debug the code and write a clean code that's easier for others to understand and modify for future requirements. I also learned about error handling and debugging techniques by using the test cases provided.

## Output



#### Result

Data saved to output\_city.txt

Correct! You FindBusinessByCity function passes these test cases. This does not cover all possible test edge cases, however, so make sure that your function covers them before submitting!

Correct! Your FindBusinessBasedOnLocation function passes these test cases. This does not cover all possible edge cases, so make sure your function does before submitting.