# Business Problem

A contractor is trying to start their own business. This report is a recommendation for where to setup their Toronto office.

The primary domain of consulting that is undertaken by the contractor is beach/water activities and tourism. While this report would analyze his requirements specifically and try to conclude on an ordered list of suitable locations, it is by no means a limitation on the scope of this business problem and a domain-parametrised solution could be proposed going forward.

The requirements put forth by the contractor are as follows:

1. Identify a set of viable locations for setting up an office space which would be conducive to customer interfacing. The business area is beach-related goods/food/pets contracting.
2. The location should enable efficient distributorship of beach sports wear, seafood, aquarium animals, etc.

The identified venues in Toronto that would need to be spatially close to a potential office space are:

1. Athletics/Sports
2. Beach
3. Harbor/Marina
4. Fish Market
5. Boat/Ferry
6. Japanese/Korean/Taiwanese/Thai/Mediterranean/Vietnamese/Asian/Caribbean/Chinese/Filipino Restaurant
7. Fish & Chips Shop
8. Lake (?)
9. Aquarium
10. Pet Store
11. Seafood Restaurant
12. Scenic Lookout
13. Sporting Goods Shop
14. Supermarket
15. Sushi Restaurant
16. Swim School (?)

Usecase: Contracting lifeguards out to potential clients. Providing life guard training, equipment for water sports, swimming activities. Drawing tourists towards the water bodies, other aquatic tourist attractions.

Requirements include close proximity to :

1. Swim School
2. Boat or Ferry
3. Sporting Goods Shop
4. Beach
5. Harbor / Marina
6. Lake
7. Scenic Lookout
8. Athletics & Sports

# Data

### Datasets:

1. Toronto\_boroughs.csv -<https://github.com/arvindnrao/Coursera_Capstone/blob/master/Toronto_boroughs.csv>
   * + - * This was obtained from the Wikipedia page <https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M> and contains the postal codes and neighbourhoods in each of the boroughs of the city of Toronto.
2. Geospatial\_Coordinates.csv - <https://github.com/arvindnrao/Coursera_Capstone/blob/master/Geospatial_Coordinates.csv>
   * + - * This was obtained from the Coursera course pages and contains the geospatial coordinates (latitudes and longitudes) of all the neighbourhoods in Toronto.

### Data science:

1. Use the location data above to find the Foursquare venues in all the neighbourhoods in Toronto.
2. Filter out the venues of interest in accordance with the requirements in the Business Problem section. It has the list of venue types.
3. Assign each venue type with a weightage w.
4. Generate a table containing the venues of interest with their geospatial coordinates.
5. The final Dataframe contains the list of neighbourhoods (with their spatial coordinates) and the venues (with their spatial coordinates) that they require to be in close proximity with.
6. Perform k-means clustering to group the neighbourhoods based on proximity.
7. The clusters which have the least proximity are most viable for the office space.

~~Non-data science method:~~

1. ~~Use the location data to find root mean squared (RMS) distance of a neighbourhood from each venue type.~~
2. ~~Assign RMS distance from each venue type with a weightage w.~~
3. ~~Calculate the weighted proximity of a neighbourhood by summing weighted RMS distance for all venue types.~~
4. ~~Score each neighbourhood in Toronto based on weighted proximity.~~
5. ~~List the top 5 neighbourhoods based on highest score.~~