

CSC 605- Individual Project 2

Find the shortest path (Dijkstra's Algorithm)

Reserving air flights can be a complex problem, especially between cities not connected by a direct flight. The goal of this project is to apply **Dijkstra's Algorithm** to find the shortest path from **starting airport** to **destination airport**, such that minimizes the total travel distance to its destination.

We are given a json file contains a list of airports with some geo-information like city, country and location (longitude, latitude) , airport id as well as airport specific designations (a list of destination airports) as shown below for one airport:

```
{
  "City": "Postville",
  "DBTZ": "A",
  "Name": "Postville Airport",
  "Country": "Canada",
  "IATA/FAA": "YS0",
  "Longitude": "-59.785278",
  "ICAO": "CCD4",
  "Airport ID": "7252",
  "Latitude": "54.910278",
  "Timezone": "223",
  "DST": "-4",
  "destinations": [
    "5492",
    "188",
    "5502"
  ]
}
```

I highly recommend you to follow a given instructions:

1. Read and parse the json file.
2. Create a class called **Airport** taking the information of airport [Airport ID Longitude, Latitude, Destinations] as arguments of its constructor.
3. All airports objects must be stored in **dictionary** (the key is airport id and the value is the airport object)
4. If you need to find the distance between the points (Airports) on the coordinate system given by and then you can **apply Euclidean distance formula** as follows:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} =$$

5. Challenge task: keep tracking the paths from source to destination.
6. To test your program during programming, you have to create a small json file for the connections between 6 airports.
7. I advise you to watch the video in the link below to understand Dijkstra's Algorithm

<https://www.youtube.com/watch?v=XB4MlexjvY0>

In addition, I will explain it later.