Artificial and Computational Intelligence

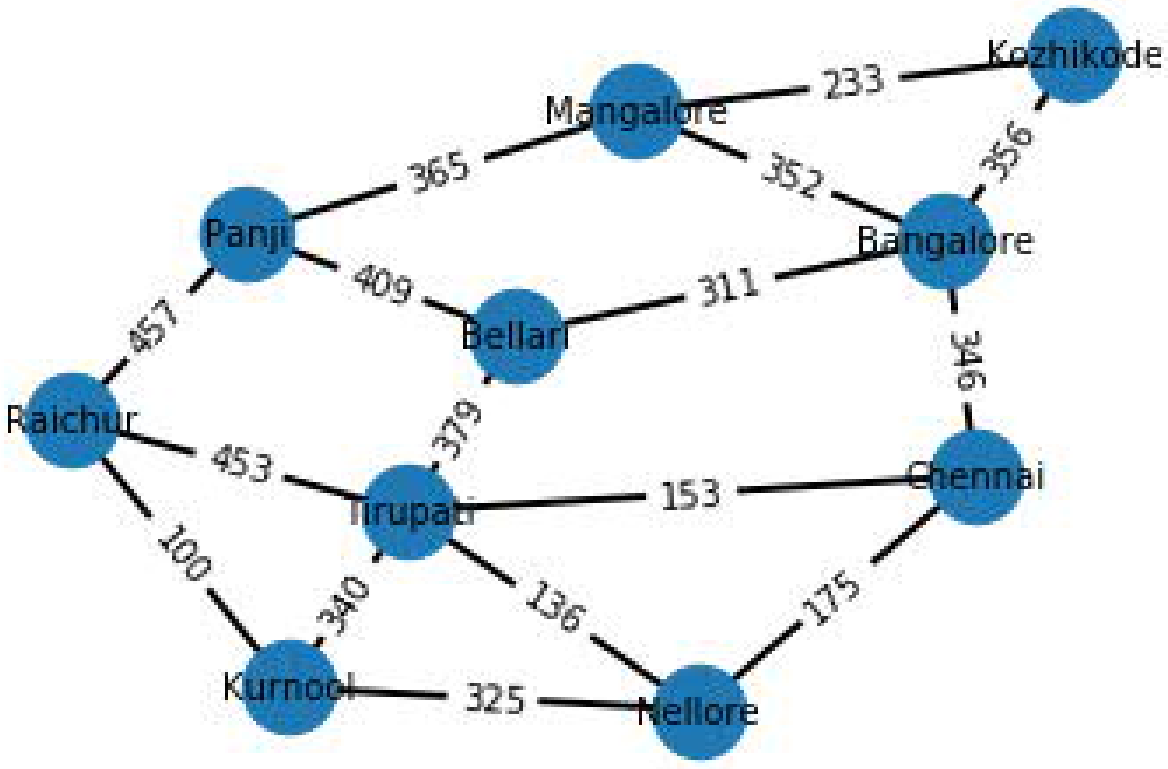
Assignment #1

- Date of Posting: 9th Dec 2019
- Deadline : 24th Dec 2019
- Weightage : 13%

Problem Statement:

Having a refreshing vacation in Panaji, you are headed home to Chennai. However, due to a weather emergency, all flights from Panaji have been cancelled and the only way for you to get home in time is opting for road transport.

Matters have been further complicated by some technical issue with Google maps making them unavailable for the time being. Your only saving grace is your knowledge of A star algorithm which will help you create a search agent to find the most optimal path to home. Below is a map of road connectivity between various cities.



1) Explain the environment of the agent [15% weightage]
2) You decide to use the 'haversine' formula to calculate the great-circle distance between two points – that is, the shortest distance over the earth's surface between two points. Using the below latitude and longitude data for the cities, create a function which calculates the heuristic distance from each city to the destination city (refer link https://www.movable-type.co.uk/scripts/latlong.html for more information on Haversine formula). [25% weightage]

City	Latitude	Longitude
Panji	15.4909° N	73.8278° E
Raichur	16.2076° N	77.3463° E
Mangalore	12.9141° N	74.8560° E
Bellari	15.1394° N	76.9214° E
Tirupati	13.6288° N	79.4192° E
Kurnool	15.8281° N	78.0373° E
Kozhikode	11.2588° N	75.7804° E
Bangalore	12.9716° N	77.5946° E
Nellore	14.4426° N	79.9865° E
Chennai	13.0827° N	80.2707° E

3) Implement A* search to find the optimal path to the destination city. Your output should contain the path taken by the agent (e.g. Panji, Raichur, Kurnool, Nellore, Chennai) and the total cost incurred in taking that path. [60% weightage]

NOTE:

- You are provided with the python notebook template which stipulates the structure of code and documentation. You are free to add as many code cells as possible. Use well intended python code!
- You cannot use any python library such as boost to implement A*. The implementation code must be completely original.
- Please keep your work (code, documentation) confidential. If your code is found to be plagiarized, you will be penalized severely. Parties involved in the copy will be considered equal partners and will be penalized severely.

*** ALL THE BEST ***