

Requirements —

1. Install Node.js

To Run the Programme —

1. Place all file in same folder.
2. Run command with providing **Starting Code** as argument.

node pathfinder.js LON

Here LON is the Starting Code code for London.

Sample Input and Output —

Input : —

Starting City Code (Ex -- LON, London)

Output : —

```
naveen@Naveens-MacBook-Pro optimalPath % node pathfinder LON
Minimum distance is: 36316.431855009425
LON ( United Kingdom , europe )
ALG ( Algeria , africa )
FEN ( Brazil , south-america )
GMR ( French Polynesia , oceania )
ITO ( United States , north-america )
DYZ ( Russia , asia )
LON ( United Kingdom , europe )

Maximum distance is: 97933.64468379095
LON ( United Kingdom , europe )
CHT ( New Zealand , oceania )
ALG ( Algeria , africa )
KOA ( United States , north-america )
TAI ( Yemen , asia )
IPC ( Chile , south-america )
LON ( United Kingdom , europe )
```

Algorithm Description:

It is a heuristic algorithm. The answer will be approximate.

Steps:

Generates all valid permutations of going through the continents

For each permutation selects an optimal city from each continent.

To select an optimal city, finds the distance of all the cities in this continent from the previous continent's selected city and selects the one which is the minimum

Example: If the sequence is Europe, Africa, North-America ... and source city is BOM (asia) It will first go through all cities of Europe and select the one which is closest to BOM.

Suppose this results in LON.

Then it will go through all the cities in Africa and select the one which is closest to LON.

This procedure is repeated.

Finally outputs the sequence which had the minimum total distance travelled

Another Example —

Input : —

Starting City Code (Ex -- DEL, NEW DELHI)

Output : —

```
[naveen@Naveens-MacBook-Pro optimalPath % node pathfinder DEL
Minimum distance is: 38296.299505631825
DEL ( India , asia )
OBY ( Greenland , north-america )
PMV ( Venezuela , south-america )
VXE ( Cape Verde , africa )
VDE ( Spain , europe )
CCK ( Cocos (Keeling) Islands , oceania )
DEL ( India , asia )

Maximum distance is: 100390.49674551593
DEL ( India , asia )
GMR ( French Polynesia , oceania )
KZS ( Greece , europe )
ITO ( United States , north-america )
MUB ( Botswana , africa )
IPC ( Chile , south-america )
DEL ( India , asia )
```

Minimum Distance Travel Path —

DEL-OBV-PMV-VXE-VDE-CCK-DEL



Maximum Distance Travel Path —
DEL-GMR-KZS-ITO-MUB-IPC-DEL



References

1. Map Drawed using —
<http://www.gcmap.com/mapui?P=DEL-GMR-KZS-ITO-MUB-IPC-DEL&DU=km>
2. Distance between Two cities in km using lat, lon —
<https://stackoverflow.com/questions/27928/calculate-distance-between-two-latitude-longitude-points-haversine-formula/27943#27943>