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 travelPlan.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 solution % node travelplan.js LON
Minimum Distance is ->  36316.431855009425 KMs
LON ( United Kingdom  , europe )
ALG ( Algeria  , africa )
FEN ( Brazil  , south-america )
GMR ( French Polynesia  , oceania )
ITO ( United States  , north-america )
DYR ( Russia  , asia )
LON ( United Kingdom  , europe )

Maximum Distance is ->  97933.64468379095 KMs
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 )
```

Solution Description —

Step 1 : — Read cities.json file and from going through keys ("id") check if input provided as city code is valid or not. Only Proceed in case of Valid city code provided.

Step 2 : —
1. getDistanceBetweenTwoCities(City i, City j) = Function find distance in Kilometers between two cities i and j using (lat,lon) of both.
2. getMinimumDistanceForASinglePermutation(permutation, continentWiseCities) —> For a given path (example — Asia, Europe, North America, South America, Africa, Oceania) —

Function will find the total distance travelled when distance minimum between one city to another. .
3. permutationsGenerator(arr) — For a given arr it will return possible permutation of same length (Example = Arr = {asia, europe, africa} = has 6 possible permutation.)
4. findMinimumDistanceCity(sourceCity, continent) —> From a given sourcecity to finding minimum distance city in another given continent.

Step 3 : —

1. Calculating minimum total distance travelled by all possible ways (permutations and return minimum total distance and related path.

Bonous Answer –– *Find the Maximum possible total distance travelled*.

Extra Steps —

1. findMaximumDistanceCity (sourceCity, continent) —> From a given sourcecity to finding maximum distance city in another given continent.
2. getMaximumDistanceForASinglePermutation(permutation, continentWiseCities) ––> For a given path (example — Asia, Europe, North America, South America, Africa, Oceania) stored in permutation array — Function will find the total distance travelled when distance maximum between one city to another.
3. Calculating maximum total distance travelled by all possible ways (permutations and return maximum total distance and related path.

Another Example —
Input : —

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

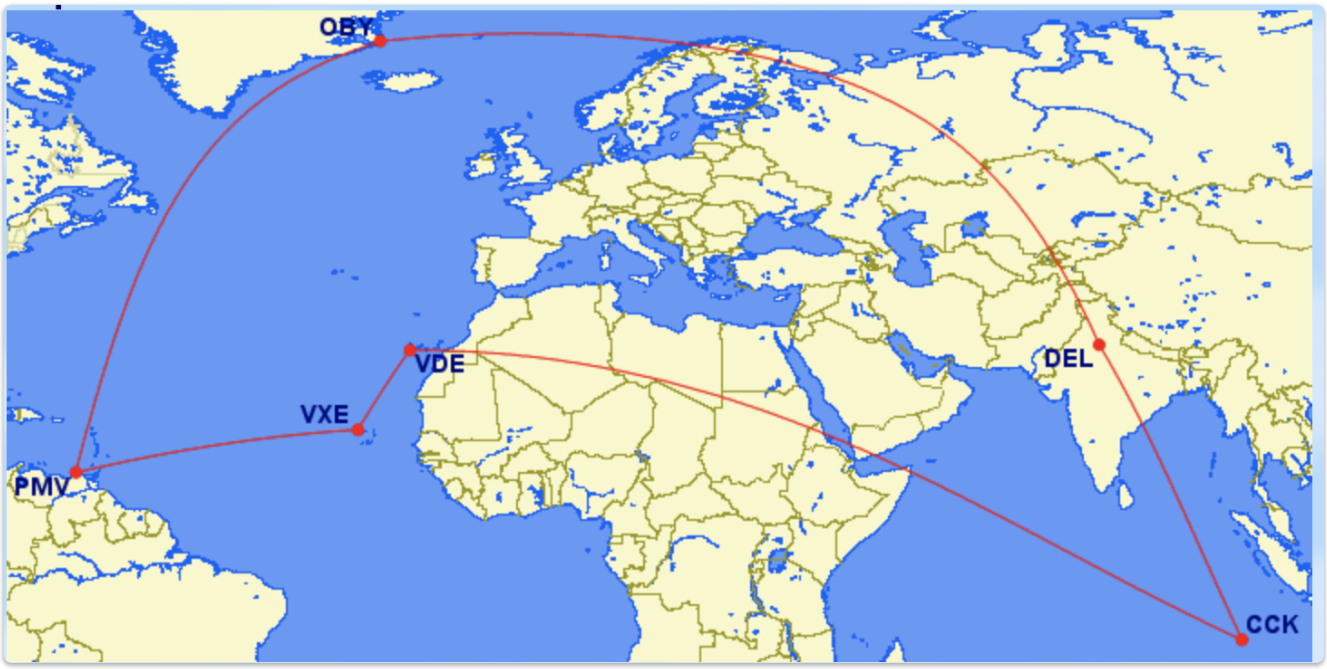
Output : —

```
naveen@Naveens-MacBook-Pro solution % node travelplan.js DEL
Minimum Distance is ->  38296.299505631825 KMs
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 KMs
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 )
```

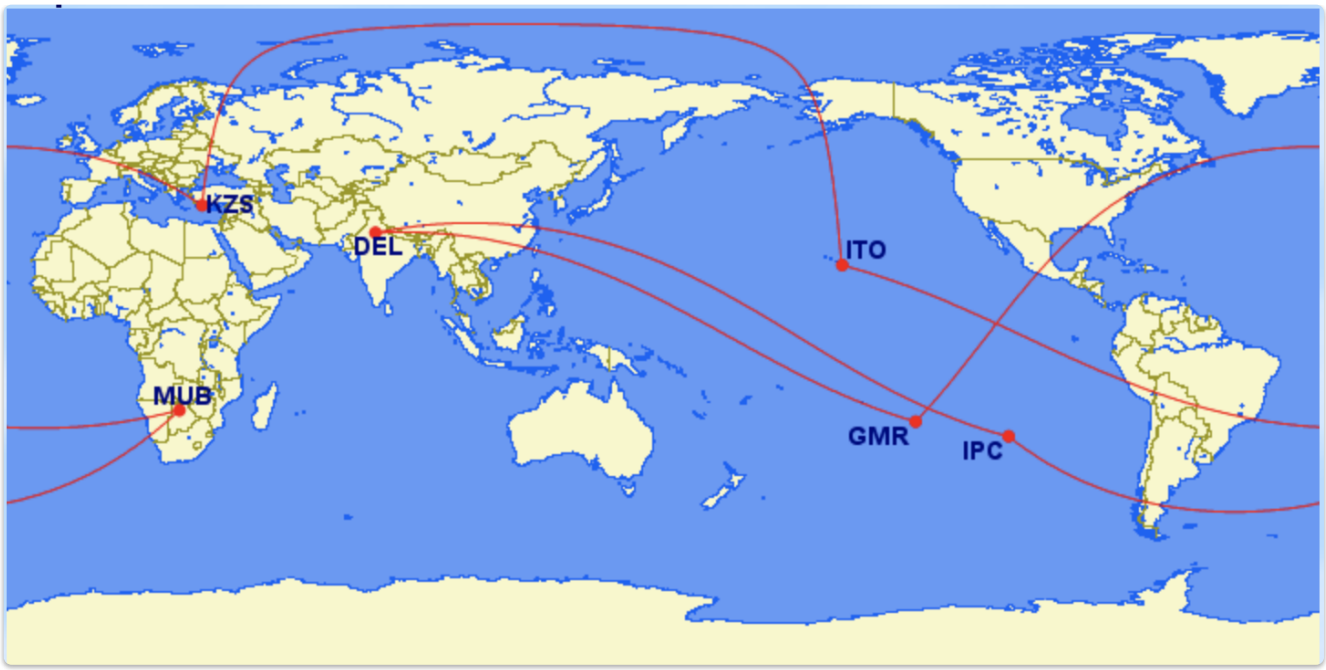
Minimum Distance Travel Path —

DEL-OBY-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