The Travelling Salesman Problem

* Code up the solution to travelling salesman problem.
* Identify a set of cities (up to 10) with a grid framework along x and y coordinates.
* The distance between cities can be calculated using Pythagoras.
* Solve the problem using brute force (ie try every combination)
* Solve the problem using an Heuristic algorithm: Use the greedy algorithm, that is you visit the next nearest city.
* Return the order of cities you wish to visit and the overall final distance.
* Plot the route using mapplotlib

Greedy algorithm

1. Find the distance to all unvisited cities
2. Travel to the next nearest city
3. Repeat steps 1 and 2 until all cities have been visited

Calculating the distance between cities

To calculate the distance between the two cities, we use Euclidian geometry

Example

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  |  |

# Extension 1

Use a GUI

# Extension 2

Use another Heuristic algorithm, The genetic algorithm is a great one, but you will need to do a bit of research.

# Extension 3

Use OOP