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Travelling Salesman Problem

Biologically Inspired Computing

# Introduction

The travelling salesman problem is an optimization problem about finding the shortest route between cities around the world. I will in this report implement various optimization methods and test performance on time and result.

# Tools

I program the methods using python 3.6. The data used comes from “European\_citites.CSV”.

# Exhaustive search

## Questions

1. Question: What is the shortest route and what is the distance?

Answer: Implementing exhaustive search for 10 cities yielded following route:

*The shortest route using exhaustive search:*

*Barcelona Belgrade Istanbul Bucharest Budapest Berlin Copenhagen Hamburg Brussels Dublin Barcelona*

*The total distance is 7486.31km*

*Code execution: 4.921797513961792s*

1. Question: How long did it take the program to find it?

Answer: The code used about 47.5s when finding optimal route for 10 cities

1. Question: How long would you expect it take with all 24 cities?

Answer: When testing for 6 cities it yielded:

*The shortest route using exhaustive search:*

*Barcelona Brussels Berlin Budapest Belgrade Bucharest*

*The total distance is 3167.32km*

*Code execution: 0.005983829498291016s*

The increase in time from 6 cities to 10 cities is:

Which will increase more exponentially