SET09117 report

# Introduction

The travelling salesman problem is a mathematical problem which seeks to find the best, or ‘cheapest’ solution for a tour of cities. Cheapest refers to a solution which visits each city on the tour only once and only once with the shortest overall distance. (Applegate, et al., 2007) This problem suffers from an exponential increase in possible results as the number of points on the tour increases. This can best be represented with the equation where n equals the number of points and shows that as the number of cities or points increases, the number of possible permutations increases exponentially. While no one is sure of the origin of this problem it is believed that one of the earliest descriptions of the travelling salesman problem can be found in an 1832 German handbook “Der Handlungsreisende—wie er sein soll und was er zu thun hat, um Aufträge zu erhalten und eines glücklichen Erfolgs in seinen Geschäften gewiss zu sein—Von einem alten Commis-Voyageur” and Princeton university started making developments in TSP in the 1930s. (Applegate, et al., 2007)

The simplest solution in terms of complexity is to just attempt all the possible permutations and to see which one is the ‘cheapest’. This brute force search is suffers from an exponential increase in running time as the number of points on a tour increases, illustrated by the equation . this means that this method of calculating the cheapest solution is impractical for larger point sets.

{\displaystyle O(n!)}

# Method

# Result

# Conclusions & Reflections

# Appendix

# References

Applegate, D. L., Bixby, R. E., Chvátal, V. & Cook, W. J., 2007. [Online]   
Available at: http://press.princeton.edu/chapters/s8451.pdf  
[Accessed 23 October 2016].