

TRAVELING SALESMAN PROBLEM

The Traveling Salesman Problem (TSP) is a classic problem in computer science and optimization theory. It is a problem of finding the shortest possible route that visits each given city exactly once and returns to the origin city. The problem is computationally challenging because it is NP-hard, meaning that there is no known efficient algorithm that can solve all instances of the problem optimally in polynomial time.

Problem Statement: Given a set of cities and the distances between each pair of cities, the objective of the TSP is to find the shortest possible route that visits each city exactly once and returns to the origin city.

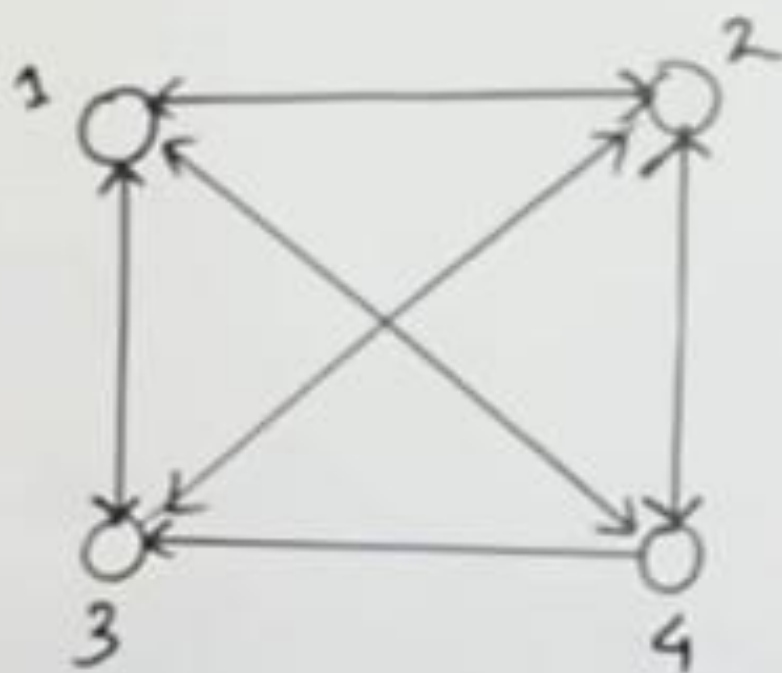
Key Points:

1. **Cities and Distances:** The TSP involves a set of cities (or nodes) connected by a network where each pair of cities has a defined distance or cost associated with traveling between them.
2. **Objective:** The goal is to determine the order in which to visit these cities such that the total distance traveled is minimized, returning to the starting city after visiting all other cities exactly once.
3. **Optimization Challenge:** The TSP is a well-known NP-hard problem, which means that as the number of cities grows, the number of possible solutions increases exponentially, making it computationally intensive to find the optimal solution for large problem instances.

Applications:

The TSP has numerous practical applications across various fields including:

1. Logistics and Transportation
2. Manufacturing
3. Networking
4. Genetics and Biology
5. Tourism and Sightseeing
6. Chip Design
7. Robotics



	1	2	3	4
1	0	10	15	20
2	5	0	25	10
3	15	30	0	5
4	15	10	20	0