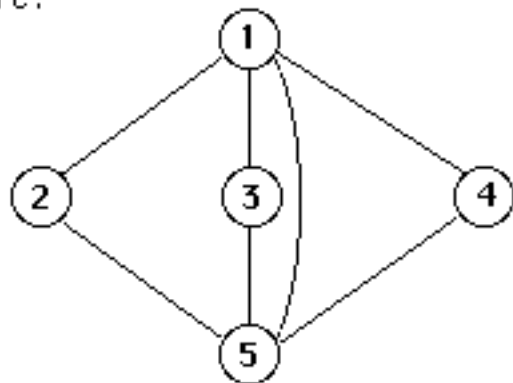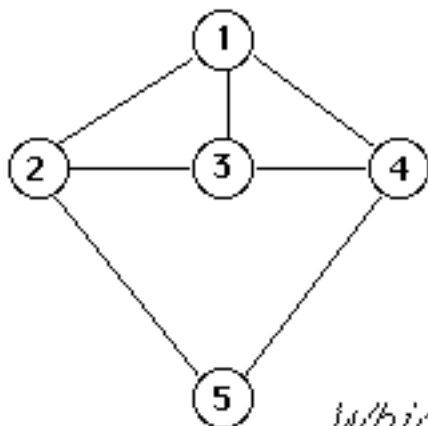# TRAVELING SALESMAN PROBLEM

author

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A **Hamiltonian Circuit** of a graph or network is a path which visits each node *exactly once* and terminates at the initial node.

A **Hamiltonian Graph** is a graph for which there is a Hamiltonian circuit.

Which of these graphs is Hamiltonian?

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Traveling Salesman Problem

The Traveling Salesman Problem (**TSP**) is that of finding the *shortest* Hamiltonian circuit *(tour)* in a Hamiltonian network.

Usually, the problem is posed for a **complete** *network, which is, of course, always Hamiltonian.*

A TSP in a complete network can be further classified as:

● Symmetric Traveling Salesman Problem

Complete, Undirected Network

$$d_{ij} = d_{ji} \quad \forall \; i \; \& \; j$$

● Asymmetric Traveling Salesman Problem

Complete, Directed Network

$$d_{ij} \neq d_{ji} \quad \forall \; i \; \& \; j$$

☞ **Applications**

☞ **Integer & Mixed-Integer Models**

☞ **Branch-&-Bound Algorithms**

☞ **Heuristic Algorithms**