3.16 Graph algorithms

# Checklist

## What you should know

By the end of this subtopic you should be able to:

- define the following terms related to graph theory:
  - path
  - trail
  - cycle
  - circuit
  - connected graph
  - strongly connected graph
  - tree
  - Eulerian trails and circuits
  - Hamiltonian paths and cycles
- use Kruskal's algorithm to find the minimum spanning tree for a graph
- use Prim's algorithm to find the minimum spanning tree for a larger graph
- use Prim's algorithm on a weighted adjacency matrix without drawing a graph
- determine the shortest Chinese postman route around a weighted graph with up to four odd-degree vertices
- explain why the Chinese postman problem works and justify your choice of an algorithm based on the number of odd-degree vertices within the graph
- use the nearest neighbour algorithm to find an upper limit for the shortest Hamiltonian cycle within a graph
- use the deleted vertex algorithm to find a lower limit for the shortest Hamiltonian cycle within a graph.