Algorithm to calculate a minimal spanning tree of a weighted graph.

1. Mark a vertex

2. Among the edges of G which connect marked vertices to unmarked vertices, find one of least possible weight.

3. Mark the edge and previously unmarked vertex found in 2.

4. If there are any unmarked vertices, return to 2. Otherwise stop.

This algorithm produces a spanning tree of minimum total weight.
PROBLEM

Is it true that any map (consisting of coloured regions to represent countries, or sea) can be coloured with at most four colours so that no two adjacent regions have the same colour?

Represent the map by drawing a point (dot) for each region and connecting adjacent regions with a line.
Printed circuit board design

Think of a printed circuit board as a set of terminals connected by lines of conducting material. Because the conducting material is not insulated, no two such lines must meet, except at a terminal. When can we achieve this?

We must be able to draw the corresponding set of lines and points (terminals) in the plane with no 'accidental' crossings.