Homework 3 -- Due: see website (Released: March 5)

1. [20p] [Generalized Euler formula]. Euler's formula works only for connected graphs. Suppose now a planar graph has *k* connected components (each component with two or more edges), *e* edges, and *v* vertices overall. Also suppose that the plane is divided into *f* regions (or faces) by a planar representation of the graph. Find a formula for *f* in terms of *e*, *v* and *k*.

2. [20p] Problem 26 page 674. The algorithm you have to write pseudo-code for is right after problem 24 on the same page

3. [20p] Devise an algorithm to construct a maximum spanning tree for a connected weighted graph. Present the pseudo-code for this algorithm.

4. [20p] Show that an edge with the smallest in a connected weighted graph must be part of any minimum spanning tree.

Practice problems – not graded: (problem_number/page)

17/742; 16/742; 24/674; 20/674; 16/665 (A bipartite graph is a graph for which nodes can be partitioned in two sets such no edge links two nodes within the same set. As a direct consequence it is two colourable). 46/610.