Advanced Algorithms: Selected Topics

Test

4 march 2004

1. Devise a polynomial algorithm to test if a graph is bipartite.

2. Design a graph G such that the size of the largest clique is 2 and the chromatique number is strictly larger than 2.

3. Describe the Edmonds and Karp algorithm which computes the maximum flow of a given network. Apply that algorithm to the following network $N = (V, E)$, with $V = \{s, 1, 2, p\}$,
$E = \{[(s, 1), 1], [(1, p), 3], [(s, 2), 4], [(2, p), 7], [(1, 2), 2]\}$, where $[(i, j), c]$ denote the edge (i, j) of capacity c.

4. Draw, if possible, a graph G whose vertices have degree $1, 1, 2, 2, 1, 3$.