Communications and Transport Systems
Department of Science and Technology
Linköping University

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TNSL20 - basic logistic algorithms

Homework Set 3, 2017

Solutions are due October 3, 2017.

Question 1 (Independent Sets and Vertex Coloring):
Use algorithms 6.3 and 6.9 to find a maximal independent set and $(\Delta + 1)$-coloring of the graph from Figure 1. Use algorithm 6.5 to compute a maximum independent set for the graph from Figure 2. Do not only present the results, but the intermediate steps of the algorithms.

Question 2 (Scheduling Conflicting Jobs): At a small company 6 jobs need to be completed (j1, ... , j6), the company has three machines (M1, M2, and M3) that are needed for these jobs, and three workers (Joe, Jack and James) that are also needed for some of the jobs. The following table tells you exactly who and what is needed for which job. The execution of each

job	machine	workers needed
j1	M1	Joe
j2	M1	Jack
j3	M1	Joe
j4	M2	Jack
j5	M2	James
j6	M3	Joe

single job takes exactly one working day.
Use the given information to construct the corresponding graph for scheduling conflicting jobs. Apply the appropriate algorithm from the lecture to tell the company after how many days they can complete all their jobs.

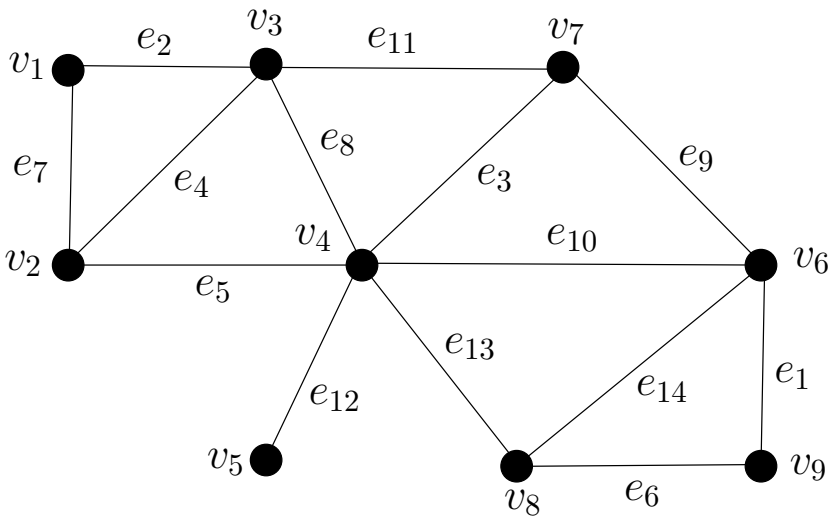

Figure 1: A graph G.

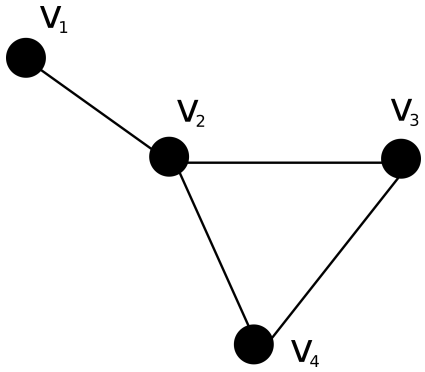

Figure 2: A second graph G.