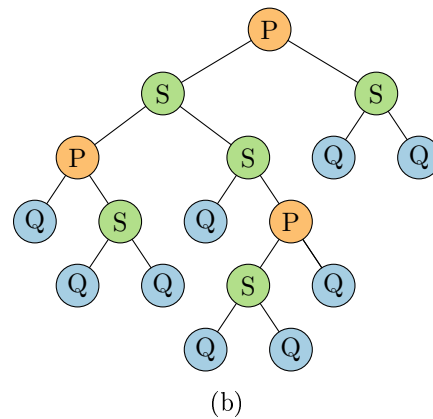
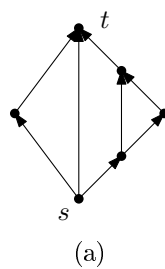


Exercise sheet 3

Exercise 1 – SPQ-trees

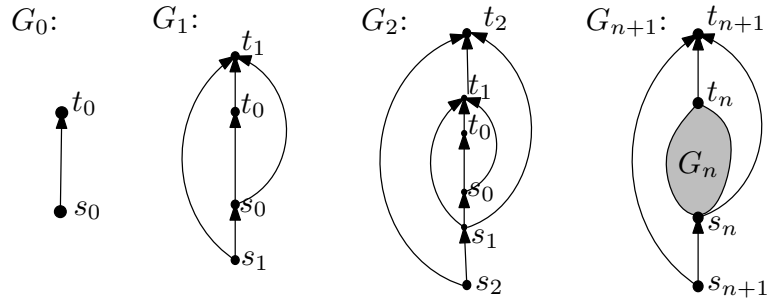
- a) Use the SPQ-tree decomposition of the graph to the left, in order to compute all its possible embeddings. **4 Points**
- b) Find the graph whose SPQ-tree decomposition is shown to the right of the figure below. **2 Points**



Exercise 2 – SP-graph with exponential area

Let G_k be the graph defined recursively as follows (see following figure). For $k = 0$, G_0 consists of a single edge s_0, t_0 . Let s_k and t_k denote the

source and sink of G_k respectively. Graph G_{k+1} is constructed from G_k by adding vertices s_{k+1} and t_{k+1} , and edges $s_{k+1}t_{k+1}$, $s_{k+1}s_k$, $s_k t_{k+1}$ and $t_k t_{k+1}$ embedded as shown below.



Prove that G_k , $k \geq 0$, is a series-parallel graph.

4 Points

Exercise 3 – area of straight-line drawings of SP-graphs

Prove that the algorithm described in the lecture for straight-line drawings of series-parallel graphs produces drawings whose area has width at most m and height at most $2m$, where m is the number of edges of the input graph.

4 Points

Due by: Thursday, November 10 by 6pm.
