Prof. Dr. Christian Scheideler

Paderborn, November 17, 2017
Submission: November 24, 2017

Fundamental Algorithms

WS 2017

Exercise Sheet 6

Exercise 1:

Construct a Patricia trie (including the msd-nodes) for the following keyset: 8, 15, 21, 39, 42, 55, 63. Remember that a trie only contains binary numbers. The key length W is 7.
On the resulting trie, perform Insert(14) and Delete(42).

Exercise 2:

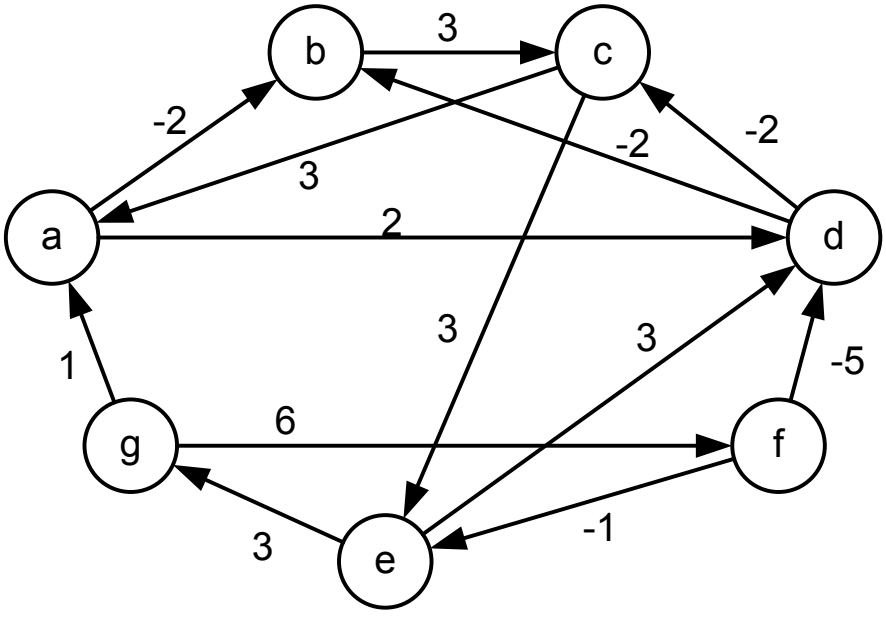
Prove Lemma 4.2 on Slide 14:

a) Show that if no distance label decreases in a round, then $d[v] = \mu(s, v)$ for all $v \in V$.

b) Show that if the distance label of a node v decreases in round n, then $d[v] = -\infty$.

Exercise 3:

Use Johnson's method in order to solve the APSP problem for the following graph:



Provide the outcome of each of the 5 stages of the algorithm. You do not have to show each intermediate step of the executions of Dijkstra's algorithm.