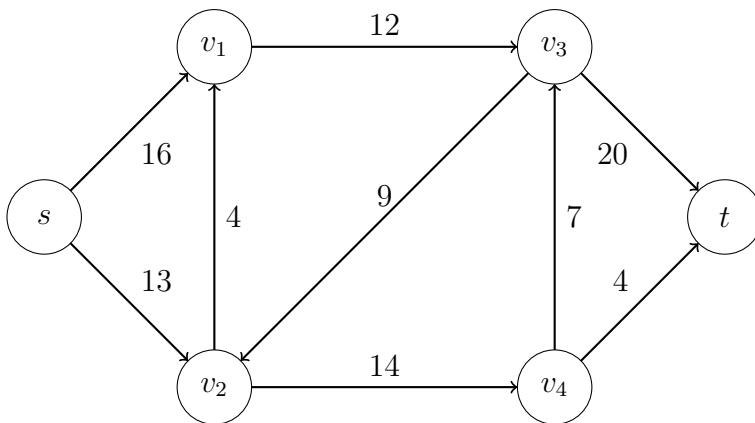


CS 550 Algorithmics, Spring 2020
Exercise Sheet 3

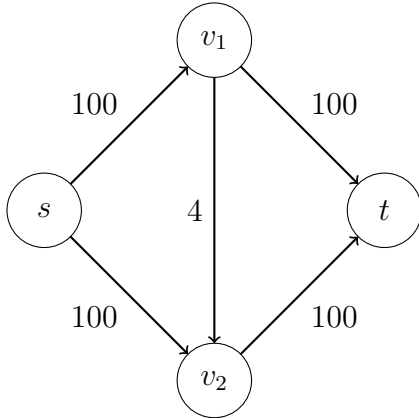
Exercise 3.1:

Show the execution of the Edmonds-Karp algorithm on the following flow network with source s and sink t :



Exercise 3.2:

Consider the following flow network with source s and sink t :



- a) Show the execution of the Edmonds-Karp algorithm on this flow network.
- b) What is the worst-case number of possible iterations for the (general) Ford-Fulkerson method in this case?

Exercise 3.3:

Find a maximum bipartite matching for the undirected Graph $G = (V, E)$, defined by the vertex partition $V = A \cup B$, $A = \{a_1, \dots, a_5\}$, $B = \{b_1, \dots, b_4\}$ and

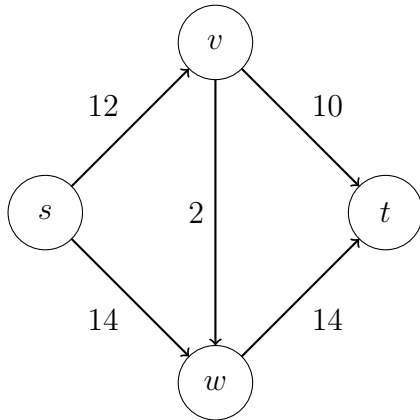
$$E = \{\{a_1, b_1\}, \{a_2, b_1\}, \{a_2, b_3\}, \{a_3, b_2\}, \{a_3, b_3\}, \{a_3, b_4\}, \{a_4, b_3\}, \{a_5, b_3\}\}.$$

In each iteration, pick the augmenting path that is lexicographically smallest.

Exercise 3.4:

For each of the following flow networks with source s and sink t provide a minimal cut (S, T) and its capacity $c(S, T)$.

a)



b)

