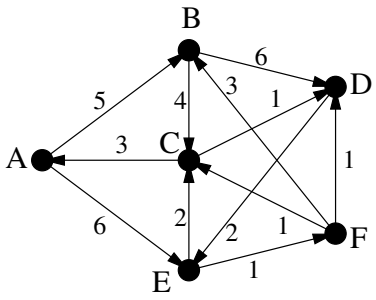
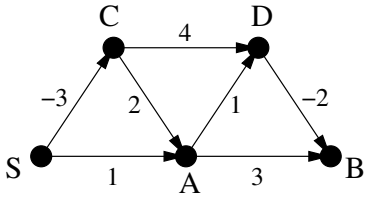
Exercise-set 12.

1. We change the weight of the edge (C, A) from 3 to -3 in the graph below. Can we use the Bellman-Ford algorithm for finding the shortest paths from vertex B to the other vertices? If yes, then run the algorithm.



2. Determine the shortest paths from vertex S to the other vertices in the graph below using the Bellman-Ford algorithm.



3. We want to change money for our summer travel. At the exchange office n currencies are handled. For one unit of the jth type we have to pay r_{ij} units of the ith type. (E.g. if the jth is the US dollar, and the ith is the forint, then $r_{ij} = 348$ approximately.) Using the array r_{ij}, give an algorithm which determines the best exchange rate from our currency to the one used at our destination in $c \cdot n^3$ steps, if we suppose that there is no commission at the office. (We can change currency i to currency j in more than one steps.)

4. In the software market there are programs converting n graphical formats to each other (back and forth). The price of the program converting the ith format to the jth format (back and forth) is p_{ij} and the running time of the same program is t_{ij} (if the program exists).
a) Suggest a method for designing which programs to use if we want to convert each format to the format understood by our own graphics terminal as fast as possible. (The price does not matter.)
b) Suggest a method for deciding which programs to buy so that with the help of those we can convert any format to any other format as cheap as possible. (Here the runtime does not matter).