

SCHEDULING OF RESERVATIONS FOR A RENT-A-CAR COMPANY

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Scheduling problems concerning acceptance of reservations for air travel has been widely studied since travellers frequently buy flight tickets with 1 or 2 scales, see for instance [1, 2]. These problems can be modeled using flows and networks where nodes stand for cities at different hours, and edges are used for representing flights or for staying at the airport waiting for a connection. Capacities of the flights impose the restrictions in order to accept or reject a reservation. With such a model, the acceptance of a reservation can be solved by using Ford-Fulkerson algorithm in a suitable way. This application of graph theory let companies to accept or not on-line reservations via web in few seconds.

The structure of this problem can be partially taken into account in order to modelize car reservations for a rent-a-car company that operates at a multi-city level. In this case, nodes play again the role of cities at different hours and edges represent either reservations or to stay at the parking. Nevertheless, both problem has some differences. Firstly, the flow in the first one are people and in the second one the cars. But the main difference is the following: flight reservations are made attending to the maximum capacity of the flights, and they are accepted or not depending on the maximization of the flow in a network. On the contrary, for a rent a car company the acceptance of a reservation depends on finding an admissible flow in the network with minimum capacities at certain edges, where these minimum capacities stand for the reservations between two nodes. In addition, in this second problem the capacities of the parking place at every city must be taken into account.

We also discuss the upgrade policy that the rent a car company can offer to the clients.

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