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CSCE686 – Dr. Lamont

Homework 6

**A)**

**1.11:**

Input: A node subset X ⊂ V , a fleet K of vehicles and a capacity C ≥ 0.

Output: Routes {Ai ⊆ Vi : i ∈ K} for each vehicle with each route of capacity at most C.

Objective: maximize | ∪i∈K Ai ∩ X|, the number of nodes covered

Greedy Algorithm for CVRP:

input : A fleet K of vehicles, a subset X ⊂ V and a capacity C

output: A set H of routes with capacity at most C, one route for each vehicle

X0 ← X

for i ∈ K do

Ai = O(X0 ∩ Vi , C, i)

X0 ← X0\Ai

end

return H = {Ai : i ∈ K}

Some additional constraints for the CVRP problem would be: to minimize the distance each vehicle travels, each route needs to be completed in a given amount of time, and vehicles are picking up new deliveries along the route.

**1.17:**

The objective function for minimizing total distance for all vehicles in the VRP is difficult, because when a customer is moved between vehicles, both routes need recalculated entirely. Which, in itself, is difficult, as it is unlikely the customer will be at the beginning or end of the old or new route.

**B)**

**i)**

**ii)**

**iii)**

**iv)**

**v)**

**References:**

[1] Pisinger, D., & Røpke, S. (2007). A general heuristic for vehicle routing problems. Computers & Operations Research, 34(8), 2403-2435. <https://doi.org/doi:10.1016/j.cor.2005.09.012>

[2] Astar\_example.doc

[3] <http://www.optimization-online.org/DB_FILE/2018/06/6645.pdf>

[4] <https://en.wikipedia.org/wiki/Vehicle_routing_problem>