Name: .....

ISyE 3103 Introduction to Supply Chain Modeling: Logistics
Summer 2011
Quiz 4
July 27, 2011

Instructions

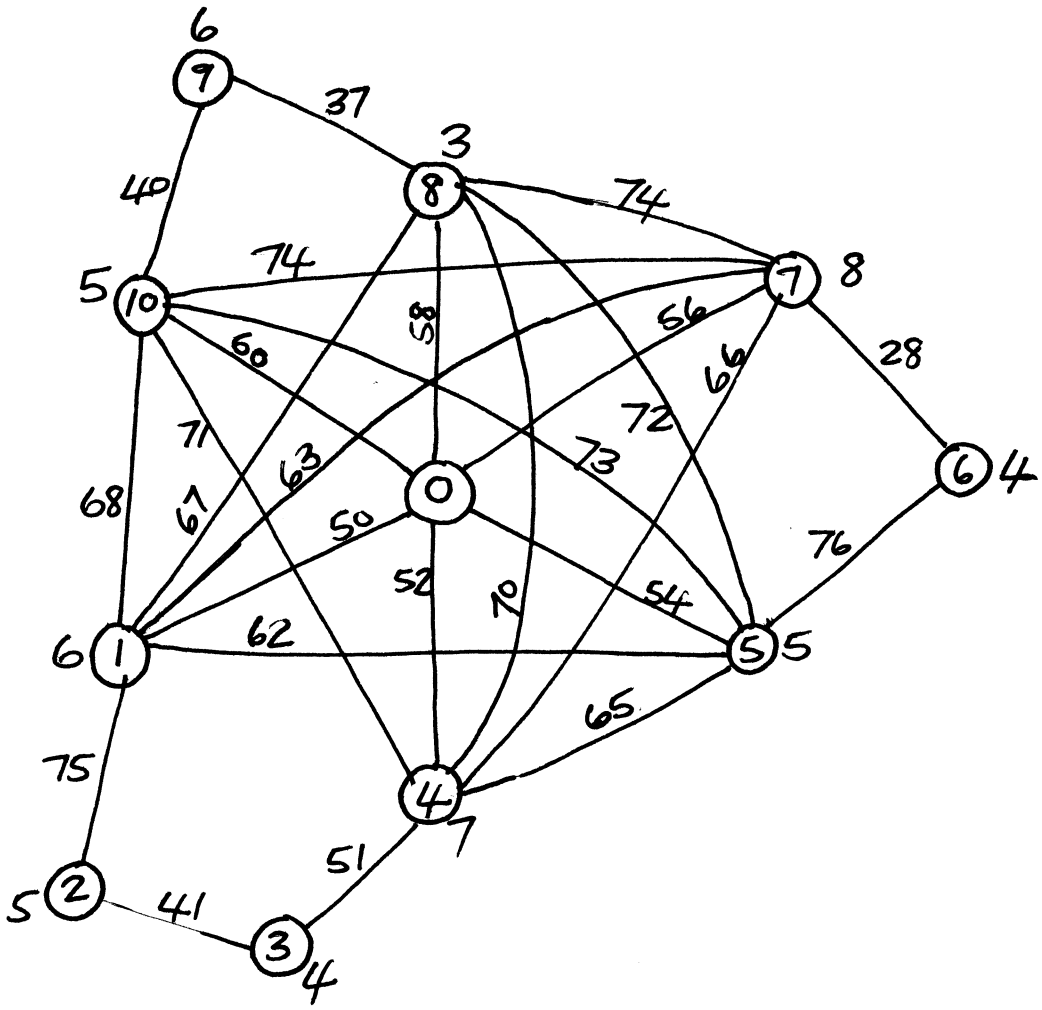
1. There is 1 page. The quiz counts 10 points.
2. Only pen, pencil, paper, eraser allowed. No books, notes, computers, calculators, phones, or other devices allowed.
3. Do your own work.
4. Show all calculations.

Vehicle Routing

The figure below shows a network. Node 0 represents the depot, and the other nodes represent customers that require delivery of palletized loads. The number of pallets to be delivered to each customer is written next to the customer's node. Delivery will take place with vehicles, and each vehicle can carry 40 pallets. The cost incurred if a vehicle travels between nodes is written on the link between the nodes.

We want to use the Clarke-Wright Savings Heuristic to construct vehicle routes that minimize the total travel cost, subject to the capacity constraint of the vehicle. At the current iteration of the Clarke-Wright Savings Heuristic there are the following 3 routes:
Route 1: $0-1-2-3-4-0$
Route 2: $0-5-6-7-0$
Route 3: $0-8-9-10-0$
Complete the next iteration of the Clarke-Wright Savings Heuristic. Clearly show your calculations.

Answer: Savings if Routes 1 and 2 are merged $= \max\{50+54-62, 50+56-63, 52+54-65, 52+56-66\} = \max\{42, 43, 41, 42\} = 43$.
Savings if Routes 1 and 3 are merged $= \max\{50+58-67, 50+60-68, 52+58-70, 52+60-71\} = \max\{41, 42, 40, 41\} = 42$.
Savings if Routes 2 and 3 are merged $= \max\{54+58-72, 54+60-73, 56+58-74, 56+60-74\} = \max\{40, 41, 40, 42\} = 42$.
Thus, merge Routes 1 and 2 by connecting nodes 1 and 7 to give savings of 43.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