**MATHEMATICAL MODEL VEHICLE ROUTING PROBLEM**

**1.1 Sets and indices**

Set of customers

Set of nodes

Set of arcs

**1.2 Parameters**

Cost/distance between customer i and customer j

Service time per customer i

Demand per customer

**1.3 Decision variables**

The route of the truck from location i to j, 1 = arc, 0 = no arc

Time counter of elapsed time at the arrival of location i

Load counter after delivery at location i

**1.4 Objective function (minimizing the total distance)**

Total distances travelled

**1.5 Constraints**

The sum of every row and column in the route variable x is equal to 1

Making sure the truck does not stay at the same location

The sum of outgoing arcs is equal to the sum of incoming arcs (unnecessary due to constraint 1 & 2)

The timer at i plus the costs between i and j plus the service time at i is smaller or same as the timer at j

The load after delivery at i minus the demand of j is greater or same as the load after delivery at j

The load after delivery at i plus the demand of customer i is smaller or same as the capacity