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**Parameters**

N -> Holes/Points

-> Manhattan distance between and points i ϵ N and j ϵ N

-> : 1 if there is no block on way from point point to point

: 0 otherwise

**Decision Variables**

-> : 1 if the head of the drill goes from point point to point

: 0 otherwise

-> Auxiliary variable for solving sub-tour elimination where i ϵ N

**Model**

**Objective**

min

s.t.

**Constraints**  = 1 ∀ j ϵ N

= 1 ∀ i ϵ N

∀ i ϵ N

(Subtour - + (N – 1)\* ≤ N – 2 ∀ i,j ϵ N

Elimination)

(Block ≥ ∀ i,j ϵ N

Constraint)

Optimal solution is given as 382 units of distance. An example path is given below:

0 -> 13 -> 34 -> 21 -> 10 -> 11 -> 18 -> 3 -> 37 -> 7 -> 8 -> 1 -> 22 -> 16 -> 24 -> 35

-> 23 -> 39 -> 12 -> 30 -> 20 -> 14 -> 28 -> 5 -> 9 -> 43 -> 2 -> 32 -> 38 -> 33 -> 31

-> 45 -> 26 -> 48 -> 36 -> 15 -> 40 -> 6 -> 42 -> 29 -> 41 -> 47 -> 27 -> 4 -> 46 -> 19

-> 44 -> 49 -> 25 -> 17 -> 0

The example path is given below as a plot.

