IE-400 Project

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1 Mathematical Model

1.1 Parameters

$C_{i,j} =$ cost of going from point i to point j

1.2 Variables

$X_{i,j} =$ 1 if path from point i to point j exists, 0 otherwise

1.4 Objective Function

$$min \sum_{i=0}^{n} \sum_{j \neq i, i=0}^{n} C_{i,j} X_{i,j}$$

1.5 Constraints

$$\sum_{i=0,\, i \neq j}^{n} X_{i,j} = 1 \quad \forall\, j = 0, \ldots, n$$

$$\sum_{j=0,\, j \neq i}^{n} X_{i,j} = 1 \quad \forall\, i = 1, \ldots, n$$

$$\sum_{i \in S} \sum_{i \notin S} X_{i,j} \geq 1 \quad \forall\, S \subseteq N,\ S \neq \varnothing$$

$$X_{i,i} = 0 \qquad \forall\, i = 0, \ldots, n$$

$$X_{i,j} \in \{0, 1\} \qquad \forall\, i,j$$

The Best Path: 40 35 33 46 47 28 50 43 31 29
49 6 48 21 1 27 19 2 15 36 23 12 13
20 44 5 39 9 10 24 3 26 37 25 8 17
42 41 14 18 22 32 16 30 38 7 11 45 4
34 40