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BAN 501

Week 4

Question 1. Plant Location - Formulation

**Variables** *Definitions*

yi {1 if plants with names starting with

P, C, D and A are open respectively,

0 otherwise}

xij Amount of pairs transported

from plant i to distribution center j,

where i = {P,C,D,A} and j = {M,D,C,B,A}

**Parameters** *Definitions*

cij  cost of transporting pairs from plant i to distribution center j,

where i = {P,C,D,A} and j = {M,D,C,B,A}

pi cost of producing pairs from plant i, where i = {P,C,D,A}   
Fi Fixed cost of opening plant in location i, where i = {P,C,D,A}

Obj: **Min**: ∑iyiFi + ∑i∑jcijxij +∑i∑jpixij

Constraints

xPM + xPD + xPC + xPB + xPA ≤ 32000yP

xCM + xCD + xCC + xCB + xCA ≤ 40000yC

xDM + xDD + xDC + xDB + xDA ≤ 40000yD

xAM + xAD + xAC + xAB + xAA ≤ 40000yA

xPM + xCM + xDM + xAM ≥ 10000

xPD + xCD + xDD + xAD ≥ 15000

xPC + xCC + xDC + xAC ≥ 16000

xPB + xCB + xDB + xAB ≥ 19000

xPA + xCA + xDA + xAA ≥ 12000

yP = 1

yD + yC + yA = 1

xij ≥ 0

yi ∈ {0,1} *i* ∈ {P, C, D, A}

Question 2. Police Department - Formulation

**Parameter**

vij {1 if sector *i* is adjacent to sector *j*,

0 otherwise,

where *i* ∈ {S1,S2, S3, S4, S5, S6, S7, S8,

S9, S10, S11, S12, S13, S14, S15}

and *j* ∈ {S1,S2, S3, S4, S5, S6, S7, S8,

S9, S10, S11, S12, S13, S14, S15}}

**Variables** *Definitions*

xj {1 if patrol is assigned to sector *j*,

0 otherwise}

Obj: Min: ∑*j*xj

**Constraints:**

∑(*j*)vijxi ≥ 1 *i* ∈{S1,S2, S3, S4, S5, S6, S7, S8,

S9, S10, S11, S12, S13, S14, S15}

xij ∈ {0,1} i ∈{S1,S2, S3, S4, S5, S6, S7, S8,

S9, S10, S11, S12, S13, S14, S15} **and**

j ∈{S1,S2, S3, S4, S5, S6, S7, S8,

S9, S10, S11, S12, S13, S14, S15}