Initial worksheet

Exporting computer chips

Super chip: has five manufacturing facilities in the commonwealth (Alexandria, Richmond, Norfolk, Roanoke, Charlottesville)

Each facility can manufacture 30 types of chips.

Each facility has a production capacity level.

There are five different cost of manufacturing 30 chips.

There are 23 regions across the us.

Modeling this problem: We need to formulate a mathematical model that captures the key elements of the problem, including production capacity, demand, shipping costs, and production costs.

First before we start, I will use the method of minimizing cost.

We have production cost and shipping cost.

But it is not just the cost of each chip manufacture but each chip type manufactured from each facility to each region

j = number of facilities i.e., 1-5

Alexandria = 1

Richmond = 2

Norfolk = 3

Roanoke = 4

Charlottesville = 5

i = number of chips i.e., 1-30

k = number of sales regions i.e., 1-23

Yijk = Chips i manufactured in facility j and shipped to region k (decision variables)

Decision variable 1: no of chip i produced in facility j

Decision variable 2: no of chip i shipped from facility j to region k

Pij = production cost of chip i in facility j

Sijk =. Shipping cost of chip i from facility j to region k

Constraint 1: so production capacity constraint should be xij j=1-5 for the facility <= capacity

x11+x21+x31+..........xnm<=production capacity for 1 \*1000

x12+x22+x32+..........xnm<=production capacity for 2 \*1000

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I have added the above code, I want to recreate the demand constraint, I will also add sample of the sheet

Constraint 2: this will be the demand constraint.

Chip produced is greater or equal to demand for chips i

X11 + x12 + x13 + x14 + x15 >= demand for chip i \* 1000

X21 + x22 + x23 + x24 + x25 >= demand fro chip i \* 1000

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Constraint 3: shipping constraint to ensure each chip i from facility j to region k is less than chip i produced in facility j

CURRENT POLICY

Production cost

Qij = Production quantity for chip i at facility j

Cj = Production Capacity at facility j

Di =Demand for Chip i

Pij = Production cost of chip i in facility j

Sijk = Shipping cost fpr chip i from facilty j to region k

Total production cost = sum(Pij \* Qij )

For I,j in Q

For k in regions

Total shipping cost sum(Qij \* Sijk )

Total cost = production cost plus shipping cost