(Easting house) Easting house sells air conditioners. The annual demand for air conditioners in each region of the country is as follows: East, 100,000; South, 150,000; Midwest, 110,000; and West, 90,000. Easting house is considering building its air conditioners in four different cities: New York, Atlanta, Chicago, and Los Angeles. The cost of producing an air conditioner in a city and shipping it to a region of the country is given in the file P06\_57.xlsx. Any factory can produce up to 150,000 air conditioners per year. The annual fixed cost of operating a factory in each city is given in the same file. At least 50,000 units of the Midwest demand for air conditioners must come from New York, and at least 50,000 units of the Midwest demand must come from Atlanta. Determine how Easting house can minimize the annual cost of meeting demand for air conditioners.





**Discussion: -**

In this problem, our objective is to minimize the total cost. Total cost is summation of annual fixed cost and shipping cost. To calculate the Annual fixed cost, we need to decide on the cities where production needs to be done. So, our first decision variable is binary which will decided the cities which were used for production of air conditioners. To calculate the shipping cost we need to decide on the units that were shipped from each city to location.

**Mathematical Model: -**

*Parameters (Inputs):*

*Decision Variables:*

*Objective:*

*Constraints:*

In constraint 3, if we don’t multiply the decision variable on R.H.S of the constraint, as it is a minimization problem, our optimal solution will make sure that there is no Annual fixed cost by consider all the binary decisions as Zero (0)

*Excel Implementation:* Please find the attached spreadsheet for solution.



