Practice Problem #6

1 Reconsider The Problem From Practice #5

Naval Airlines must determine how many connecting flights daily can be arranged between Fairbanks, Alaska, and Houston, Texas. Connecting flows must stop in Seattle or Portland and then stop in either Los Angeles, Denver, or Phoenix. Because of limited landing space, Naval Airlines is limited to making the number of daily flights between pairs of cities shown in the table below.

Flight	Max # of Flights
Fairbanks-Seattle	15
Fairbanks-Portland	11
Seattle-LA	5
Seattle-Denver	12
Seattle-Phoenix	4
Portland-LA	6
Portland-Denver	7
Portland-Phoenix	11
LA-Houston	12
Denver-Houston	13
Phoenix-Houston	9

Table 1: Flight Capacities

2 Complete the Following Exercises

2.1 Concrete Model:

Formulate the problem above as a **concrete** mathematical programming model to minimize the total cost. Clearly define and describe all decision variables (You can copy and paste from your previous practice problem set).

a. Add a constraint(s) to ensure that if at least 8 flights travel from Fairbanks to Seattle, then you must have no more than 8 flights from Fairbanks to Portland. You may need to include new variables, as well.

b. Add a constraint(s) (and possible variables) to ensure that at least 3 flights travel through LA.

c. Add a constraint(s) (and possible variables) to ensure that half of all flights arriving in Houston are coming from Phoenix.

d. Add a constraint(s) (and possible variables) to ensure that at least some number of flights travel through every city.

3 Updated problem