**Hands On 4**

**Due Wed, Oct 17th, 11:59pm**

1. Please open HandsOn2.gms (Feeding Problem) and save it as HandsOn4\_LastName.gms. Then update and expand the model using data from the tables below. Observe what happens to the model. Make sure you can easily switch from the large model to previous small model.

Table Nutrition Contents of Ingredients

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Corn | Hay | Soybean | Wheat | Oats | Rice |
| Protein | 0.01 | 0.07 | 0.03 | 0.02 | 0.04 | 0.02 |
| Vitamin A | 0.02 | 0.14 | 0.1 | 0.015 | 0.02 | 0.05 |
| Vitamin D | 600 | 700 | 700 | 1600 | 1500 | 2000 |

Table Cost of Ingredients

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Corn | Hay | Soybean | Wheat | Oats | Rice |
| Price (Cost) | 3.0 | 4.0 | 5.0 | 2.0 | 2.4 | 3.0 |

Table Nutrient Minimum Requirement

|  |  |  |  |
| --- | --- | --- | --- |
|  | Protein | Vitamin A | Vitamin D |
| Minimum Requirement | 0.05 | 0.09 | 1200 |
| Maximum Requirement | 0.35 | 0.20 | 2200 |

*Hint: Check the slide on “Subset”.* *Use a line of code “****Subset (Set) = Yes;****” to expand the model.*

*Requirement: In this part, I would like to see you create a \*.gms file that can be easily switched between the small model and the expanded model. I do not want to receive a \*.gms file that only contains the large model.*

2. Now Suppose there’s a 30 percent decrease in prices (costs) of ingredients **except** wheat. Also, the minimum requirement for Vitamin A increases to 0.11. Modify the data entry. How would you know the data has been successfully modified?

*Hint: You may use conditionals ($) with “SAMEAS” and “NOT SAMEAS” to modify the data entry. For how to use conditionals, you can refer to the Lecture 6.*

*Requirement: You have to write code within one \*.gms file and use the DISPLAY command to check if you successfully modify the data.*

3. **Display and comment** on your results of **the two models**.

*Hint: If you use the same variable to solve a new model, the optimal solution of previous model will be overwritten. You must display your results before your second model.*

*Requirement: When I refer to results I mean, mainly, variable levels, shadow prices, reduced costs and objective function levels. Write your comments in Word or PDF file.*

4. Please email me one \*.gms file with \* group members’ names in the first line, and One Word or PDF file with group members’ names.