1) You have just been hired by EnviroPoultry, Inc., a relatively new poultry company that plans to specialize in the production of “environmentally friendly” poultry. They have been in business for only about 1 year, and have focused most of their efforts on the implementation of several novel waste-management strategies that reduce ammonia volatilization and reduce the risk of nutrient run-off. Your job is to evaluate their current nutritional practices and find ways to decrease the nutrient density of their poultry waste. After looking over their current diets, you notice that they are formulating diets to meet the requirement of the 1st limiting amino acid (Met), but they are not using any synthetic amino acids. Remembering back to a class you took in college, ANSC324, you remember that by using synthetic amino acids, you can reduce the overall N content of the diet. Using the following ingredients, formulate a diet to meet the first limiting amino acid (Met) for 0-3 wk old broilers. To ensure, that your diet stays properly balanced, and that an excess of synthetic Met is not used, formulate the diet to also meet the requirement of the second limiting amino acid (Lys). Also, make sure that the diet meets, but does not exceed the nutrient requirements for Ca, aP, Na and ME. A vitamin and TM premix should be included in the diet at 0.25%. Make sure that in addition to the Met requirement, that your diet also meets the Met + Cys content of the diet. If it does not, you will need to place only a minimum restriction on Met, and a minimum and maximum restriction on Met + Cys.

**Ingredients:**

- Ground corn (79)
- Soybean meal, 47.5% CP (216)
- Vitamin and TM premix (720)
- Fat (98)
- Limestone (410)
- Dicalcium phosphate (407)
- Salt (488)
- DL-Methionine (305)

2) Calculate the decrease in the N content of the diet formulated in part one compared with the same diet formulated to meet the Met requirement without synthetic amino acids. Report your results as grams of N reduced per kilogram of diet. (Hint: remembering back to your ANSC324 class, you should remember how the N content of the diet is used to estimate the CP content. By reversing this calculation, you can estimate the N content from the CP content located on your Brill printout.)
3) While formulating the diet based on the first limiting amino acid did reduce the N content of the diet, your employers would like to see a greater decrease in dietary N content. They have asked you, to use as many commercially available synthetic amino acids as possible to formulate your diet. This will allow them to see the potential impact of nutrition on N excretion. Again, remembering back to ANSC 324, you recall that Lysine, Methionine, Threonine, and Tryptophan are commercially available. However, you know that Tryptophan is not the 4th limiting amino acid, and therefore you will not be able to use this in your diet formulation. To incorporate synthetic Lysine, Methionine, and Threonine into your ration, you will need to formulate your diet based on the 4th limiting amino acid. Unfortunately, you are not certain which amino acid this is. You feel fairly confident that the 4th limiting amino acid in 0-3 wk old broilers is either Ile or Val. However, you are unsure which is 4th. Use Brill to determine which amino acid is 4th limiting, and then formulate your diet using the same ingredients and restraints as listed in problem #1. (Hint: you may want to place minimum restrictions on your amino acids and see which amino acid requirement is met exactly). You will also need to add L-Thr (301) to your ingredient list.

4) Calculate the decrease in the N content of the diet formulated in part three compared with the same diet formulated to meet the Met requirement without synthetic amino acids. Report your results as grams of N reduced per kilogram of diet.
1) As head nutritionist for EnviroPoultry, Inc., you realize that there is considerable variability in the amino acid content of corn and soybean meal. Therefore, you routinely have each new batch of corn and soybean meal analyzed for amino acid content. Your last batch of corn and soybean meal came back with the following analysis:

<table>
<thead>
<tr>
<th></th>
<th>Corn</th>
<th>SBM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Met, %</td>
<td>0.15</td>
<td>0.63</td>
</tr>
<tr>
<td>Lys, %</td>
<td>0.26</td>
<td>3.00</td>
</tr>
<tr>
<td>N, %</td>
<td>1.34</td>
<td>7.50</td>
</tr>
</tbody>
</table>

Edit the Met, Lys, and CP content of these two grains and use them to formulate a diet for 3-6 wk old broilers. Make sure that you record the original values for Met, Lys, and CP so that you can switch these values back to their original values after completing this assignment. Formulate the diet to meet, but not exceed, the requirements for Lys, Met, Ca, aP, and ME. Include a vitamin and trace mineral premix in your diet at a level of 0.35%, and include salt in the diet at a level of 0.40%. Make sure that in addition to the Met requirement, that your diet also meets the Met + Cys content of the diet. If it does not, you will need to place only a minimum restriction on Met, and a minimum and maximum restriction on Met + Cys. **NOTE:** If your diet brings in two synthetic amino acids, then you need to place a restriction (min. and max.) on the 3rd most limiting amino acid.

**Ingredients:**

- Ground corn (79)
- Soybean meal, 47.5% CP (216)
- Vitamin and TM premix (720)
- Fat (98)
- Limestone (410)
- Dicalcium phosphate (407)
- Salt (488)
- DL-Methionine (305)
- Lysine-HCL (300)

Turn in a copy of the diet formulated with the adjusted values and a copy of the diet with the original nutrient values.