**Problem A: Middle Aged Uncle Crisis**

Profile of a university professor:

■ 45-year-old formerly athletic male

■ Weight 98 kg

■ Height 180 cm

■ Exercises no more than once a week. Walks 0.5 kilometers daily to and from the car while carrying a 5 kg briefcase.

■ Family history of adult diabetes.

I need help! My diet is terrible, and I have been gaining weight and feeling more tired.

It would be great if you could tell me what to eat during each day. So, because I’m a firm believer in mathematical models, I want you to use mathematical programming model to determine a reasonable diet for me to eat during a week. It is your job to collect data for use in the model.

I have the following requirements for the diet:

■ I like variety. You cannot prescribe a diet in which I eat just one food during the entire week. I would like to eat at least 15 different foods during the week.

■ You have to give me something from each of the four basic food groups (dairy, fruit and vegetable, meat, and grains)—not Mcfood, frozen food, pizza food, or food on a stick.

■ I like nutrition. You cannot prescribe a diet that does not meet minimum daily requirements for essential minerals and vitamins. You cannot prescribe a diet in which I gain a lot of weight. I could stand to lose a few kilos.

■ I hate Brussels sprouts, sweet potatoes, pears, and organ meats such as liver and kidney.

■ Forget about any canned fruits or vegetables. Yuck.

■ I am not a big fan of frozen dinners, no matter how nutritious or convenient they are.

■ I don’t drink milk with any meal except breakfast.

■ I work for the university, so I have a limited budget for food. Try to keep costs less than ¥500 per week (the lower the better).

■ I might consider taking vitamin pills to get nutritional requirements, but I would rather eat food.

Key Questions

■ What should I eat at each meal?

■ If I allowed less variety, would your recommendation change?

■ If I allowed more than ¥800 per week, would your recommendation change? How?

■ What key minerals and vitamins constrain the solution?