Shopping Problem

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Every week, we go to Provigo/Metro to buy the food we need for a week. For balance nutrition, we usually need to buy meat (beef, pork, chicken and fish etc.), vegetables (carrot, potato, tomato, celery, broccoli, eggplant, lettuce etc.), fruit, and milk (Natural, Quebec etc.). This means we at least need to buy one kind of meat, vegetable, fruit and milk together.

Every week, we have a budget for no more than $50. For meat, we usually buy 2 different types, but no more than 3 types. We usually need 2 kilograms meat. But usually we spent no more than $20 budget on meat. For vegetables, we at least buy 2 different types. If we buy potatoes, the weight we buy will not exceed 2 kilograms (Because it's too heavy to bring those things back home). If we buy tomatoes, the weight we buy will also not exceed 2 kilograms. If we buy both tomato and potato, the total weight of them will not exceed 3 kilograms. We also spent no more than $20 budget on vegetables. If we buy fruit, the total weight cannot exceed 3 kg. Besides, we hope that the total weight of food will not exceed 15kg. Here is the price list for the foods:

	Price
Beef Type 1	8 $/kg
Beef Type 2	12$/kg
Pork	10$/kg
Chicken wing	8$/10
Chicken	10$/kg
fish	15$/kg
Potatoes	3.99$/lb
Tomatoes	3.99$/lb
celery	2.29$/each bunch
broccoli	3.29$/each bunch
eggplant	3.29$/lb
lettuce	3.99$/each
Banana	0.99$/lb
Orange	1.99$/lb
Quebec Milk	3.99$/2L
Natural Milk	4.25$/2L

(All the data above is not so accurate. They need to be verified).

In Provigo, there will be a 10% rebate if the total price is over 50$ on Monday. So usually, we have 4 persons to check together to get this rebate.

Now our objective is that each person wants to buy as many types of food as possible and meanwhile the price total will be the lower the better. (How to elegantly define the Objective functions here? We have to consider the flavor in the real life which cannot be reflected in this problem description.)

(We can assume that all the amount of the food we buy is an integer to meet the IP requirement. Some of the data above still need to be refined.)