The whole exam is about cereal. You have been hired by Kellogg’s to estimate the demand for cereal. Kellogg’s proposes that they can buy some data from supermarkets in Iowa that will provide you with information on individual consumers. For each consumer, you get a small set of relevant personal characteristics, and you get to see the price and quantity of every item they purchase at the supermarket over a 6 month period.

1) Write down a model of cereal demand that takes into account brand choices and demand over time. It should explicitly allow for censoring at zero.

2) Describe how to estimate your model in detail given your data from the supermarket.

3) Kellogg’s comes back and says they are particularly interested in how deals that provide quantity discounts (e.g., buy one box and get the second box at half price) affect demand. How do you estimate such an effect? Be careful to model the fact that cereal is sold in discrete units called “boxes.”

4) Kellogg’s wants to know something about the distribution of times between cereal purchases. How do you help them with this concern? Be detailed and precise.

5) Kellogg’s is concerned about the complementarity/substitutability of their cereals with other goods (e.g., milk, fruit). How can you alter your model in part (1) and estimate it to take into account such issues?

6) It turns out that the supermarket data is very expensive, so Kellogg’s asks you to look for alternative data. Describe alternatives, how to estimate demand functions for each alternative, and new problems that would occur.