The whole exam is about cereal. You have been hired as a consultant by a cereal producer to help them estimate demand for their products. Please answer all questions in as much detail and as precisely as possible.

1) The cereal producer gives you data on weekly purchases of cereal by consumers; i.e., you observe a large sample of consumers over a long period of time and, for each one, you observe which brand of cereal she buys for each week in the sample. Assume that each consumer buys at most one box of cereal per week. Assume that there is a lot of variation in purchase patterns across consumers, some of which can potentially be explained by observed consumer characteristics and some of which can not. Describe in detail how to construct and estimate a model of when a consumer purchases a particular brand of cereal, ignoring substitution issues across different brands.

2) After completing the assignment in question (1), you are told by the cereal producer that substitution across different brands is, in fact, very important. Redo question (1), taking into account substitution across different brands. Hint: you need to worry about how buying brand A today affects one’s demand for brand A and brand B next week.

3) After completing the assignment in question (2), you are told by the cereal producer that you are a luney bin and your work is too hard to understand. He suggests that you aggregate your data by store by week and then estimate aggregate demand (by store/week). Provide details how to construct and estimate a model of store demand per week. You observe advertising promotions that are specific to stores and last over a few weeks. Suggest a test statistic to test for advertising effects on demand. Also suggest a test statistic testing if the advertising effect varies across stores.