

HOMWORK #8

CS262Z

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Question 1. Assume the variables in Figure 8.1 have the following dimensionalities:

$$\begin{aligned} |dom(Z)| &= 2, \\ |dom(X)| &= 3, \\ |dom(Y)| &= 4 \end{aligned}$$

Find the dimensionality of the state-minimal variables required for modeling this problem.

Question 2.

I am not happy with the way the book explains the instrumental inequality. Can you find a more compelling reason for the inequalities in (8.21)?

Question 3.

Show, by example, that the average causal effect of the treatment on recovery can be zero and, simultaneously, the average causal effect of the assignment on recovery is non-zero.

Question 4.

Consider the data provided in Table 3.1, and assume that A smoker named Joe sues the tobacco industry for having caused his lung cancer. Use the data provided in Table 3.1 to decide whether the industry should pay damages in accordance with the "more probable than not" criterion.

Question 5.

A policy makers wishes to estimate the number of existing lung cancer cases that would not have occurred had cigarette smoking been banned. What information does the data in Table 3.1 provide on this question.

Question 6.

In view of Theorem 9.2.15, why do we obtain different values for Q in models 1 and 2 of Figure 1.6??