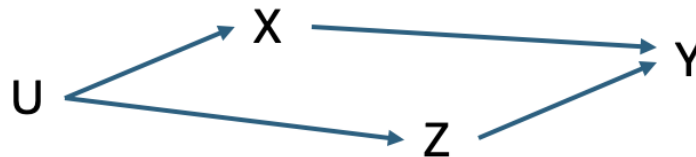


Stat 156 HW #4
Due 10/22/2024 by 11:59 pm PT

Note that points will be deducted if you fail to

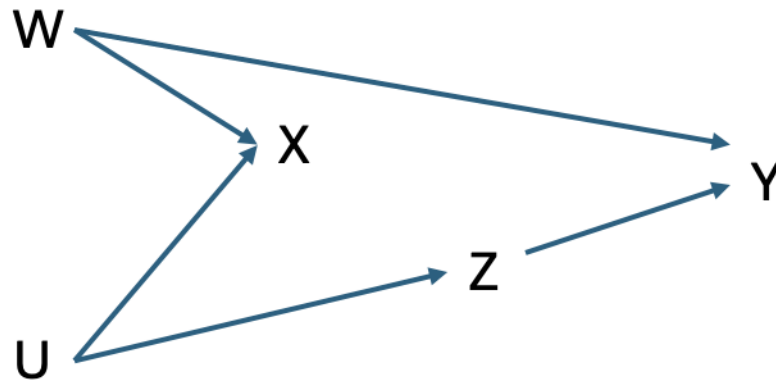
- Submit code for coding problems
- Assign pages to the corresponding problem in Gradescope

1. Suppose that you are in charge of a non-profit working to improve graduation rates in West Africa. You read a study about an RCT that shows that direct cash transfer significantly improved graduation rates in Mexico. You'd like to investigate whether your non-profit should roll out a direct transfer program in West Africa. What other information would you want to know to inform your decision? (Note there is no right or wrong way to answer this question. A thoughtful answer that explains your reasoning will get full credit).
2. Problem 15.4 from *A First Course in Causal Inference*
3. Consider the graph



- A. Describe the path(s) of association between Z and Y. Are there any causal paths? Any backdoor paths?
- B. Identify what variable(s) we need to condition on in order to achieve Ignorability.

4. Consider the graph



- A. Is there confounding of Z and Y in this graph? In other words, do we need to adjust for any variables in order to identify the causal relationship between Z and Y? Explain why or why not.
 - B. Can we identify the heterogeneous average causal effect $E[Y(1) - Y(0) | X]$? If yes, provide the identification. If no, describe why not.
5. Provide a real-life example of M-bias. Draw the M-bias graph structure and describe what each node corresponds to in your example
 6. Problem 16.2 from *A First Course in Causal Inference*
 7. Problem 21.1 from *A First Course in Causal Inference*
 8. Problem 21.8 from *A First Course in Causal Inference*
 9. Problem 21.9 from *A First Course in Causal Inference*