Working Through "Causal Inference in Statistics: A Primer"

Dominic DiSanto

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```
1  import numpy as np
2  import networkx as nx
3  import matplotlib.pyplot as plt
```

Chapter 1

Sections 1.1 through 1.4 omitted

1.5

1.5.1 (Paraphrased)

SCM 1.5.1

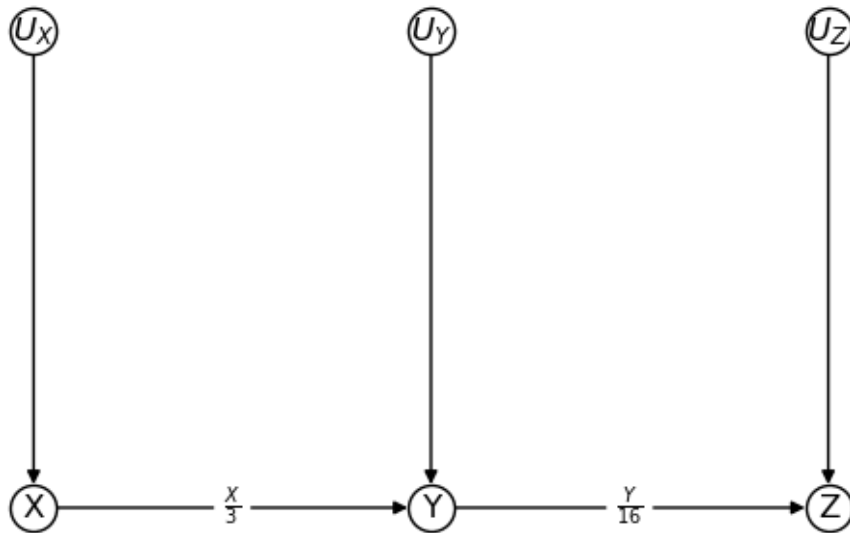Assume exogenous variables in U are independent with expectation 0.

$$V = \{X, Y, Z\}; \quad U = \{U_X, U_Y, U_Z\}; \quad F = \{f_x, f_y, f_z\}$$

$$f_X : X = U_X f_Y : Y = \frac{X}{3} + U_Y f_Z : Z = \frac{Y}{16} + U_Z$$

a) Draw the graph that complies with SCM 1.5.1.

Code presented below the graph.

Question 1.5.1-A: Causal Graph


```
1   edges = [['X', 'Y'], ['Y', 'Z'],
2           ['$U_X$', 'X'], ['$U_Y$', 'Y'], ['$U_Z$', 'Z']]
3
4   G = nx.DiGraph()
5   G.add_edges_from(edges)
6
7   pos = {
8       'X':[1, 0],
9       'Y':[1.25, 0],
10      'Z':[1.5, 0],
11      '$U_X$':[1, 0.3],
12      '$U_Y$':[1.25, 0.3],
13      '$U_Z$':[1.5, 0.3],
14  }
15
16  plt.figure()
17
18  nx.draw(G, pos2, with_labels=True, node_color='white'
19          , edge_color='black', edgecolors='black')
20
21  nx.draw_networkx_edge_labels(
```

```
22      G, pos,
23      edge_labels={('X', 'Y'): '$\\frac{X}{3}$',
24                   ('Y', 'Z'): '$\\frac{Y}{16}$'},
25      font_color='black'
26  )
27  plt.title("Question 1.5.1-A: Causal Graph")
28
29
30  plt.rcParams["figure.figsize"] = (5, 3)
31
32  plt.axis('off')
33  plt.show()
```