

Exercise 8

Instructor of PSYC 573

```
library(dagitty)
```

Instruction

There are four DAGs in the pictures attached to this exercise on Brightspace. For each DAG, identify (a) which path is a causal path from X to Y, (b) which variables need to be adjusted to satisfy the back-door criterion for the causal effect of $X \rightarrow Y$. Below is an example:

Q1: Top Left (Example)

Causal paths are $X \rightarrow Y$. The paths (i) $X \leftarrow Z \rightarrow Y$ and (ii) $X \leftarrow Z \leftarrow A \rightarrow Y$ are not causal. Conditioning on Z is sufficient to block all backdoor paths.

```
dag1 <- dagitty("dag{ X -> Y; X <- Z -> Y; X <- Z <- A -> Y }")
# The part below is optional; it just matches the appearance in the questions
coordinates(dag1) <- list(x = c(X = 0, Z = 1, A = 2, Y = 2),
                          y = c(X = 0, Z = -1, A = -1, Y = 0))
plot(dag1) # verify it's the same as the given graph
# Variables to be conditioned on
adjustmentSets(dag1, exposure = "X", outcome = "Y")
```

Q2: Top Right

Q3: Bottom Left

Q4: Bottom Right