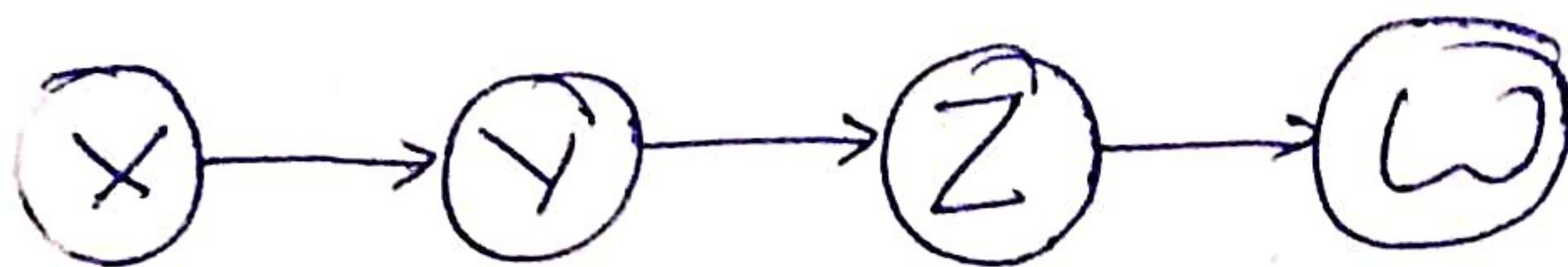


(13)

BN: Independence



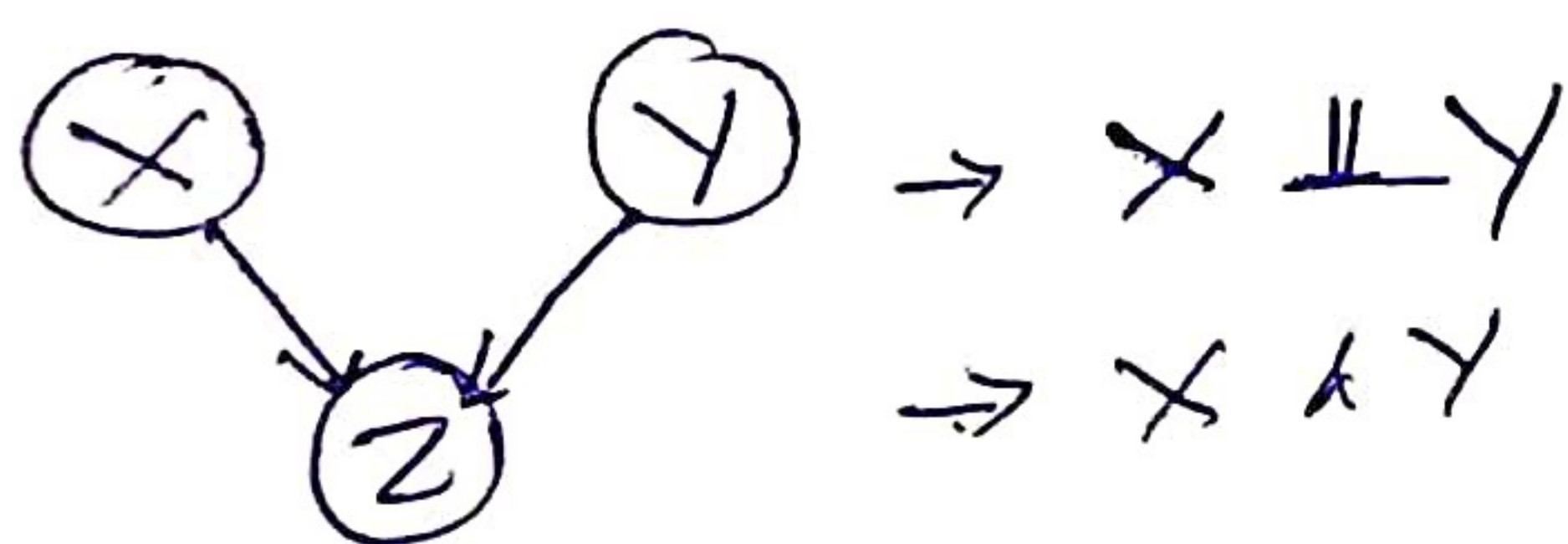
- Conditional independence assumptions directly from simplifications in chain rule:

$$Z \perp\!\!\!\perp X | Y \quad W \perp\!\!\!\perp X, Y | Z$$

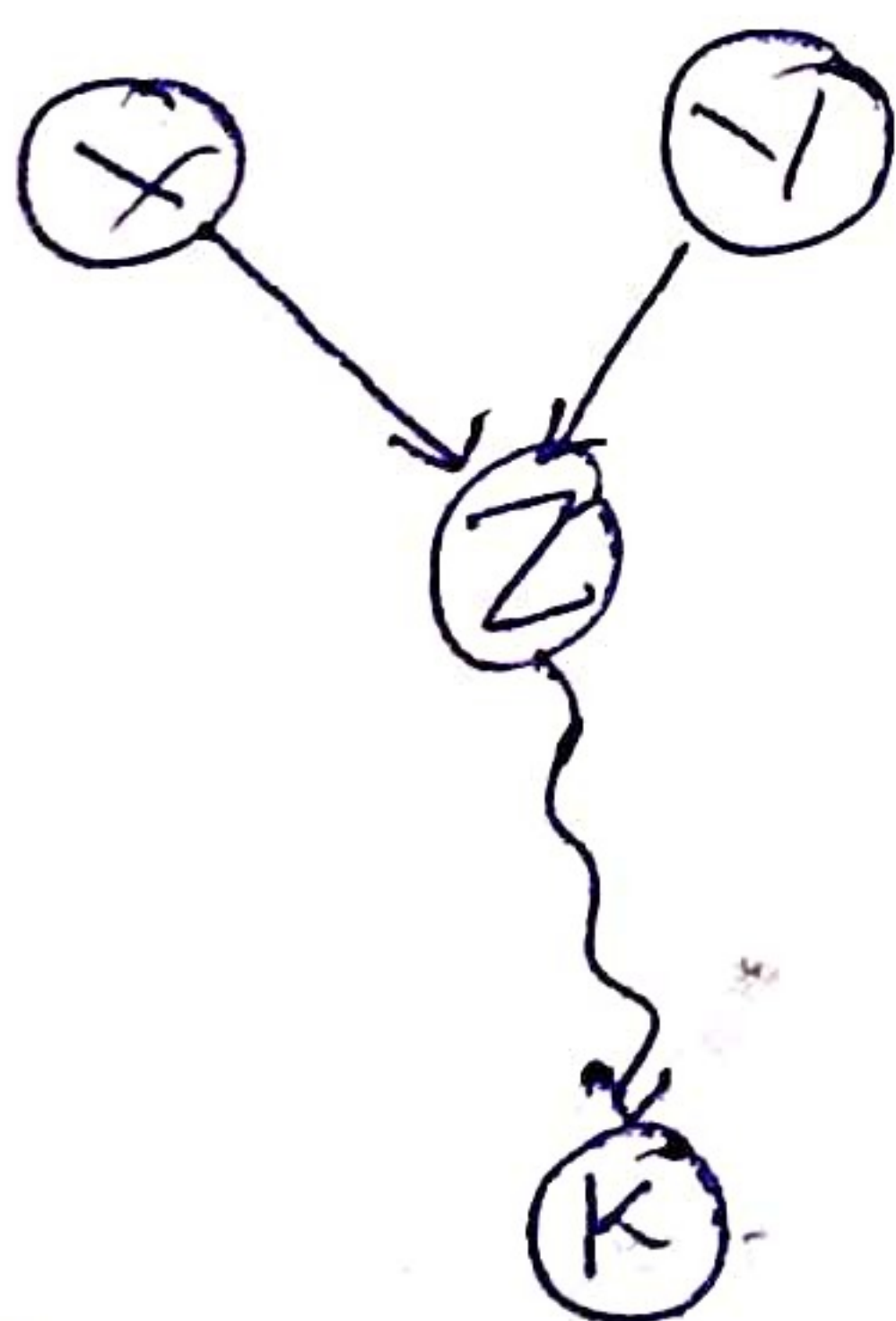
- Additional implied conditional independence assumptions

$$W \perp\!\!\!\perp X | Y$$

* D-separation



$\Rightarrow X \perp\!\!\!\perp Y$
 $\Rightarrow X \text{ \& } Y$ are not independent given Z



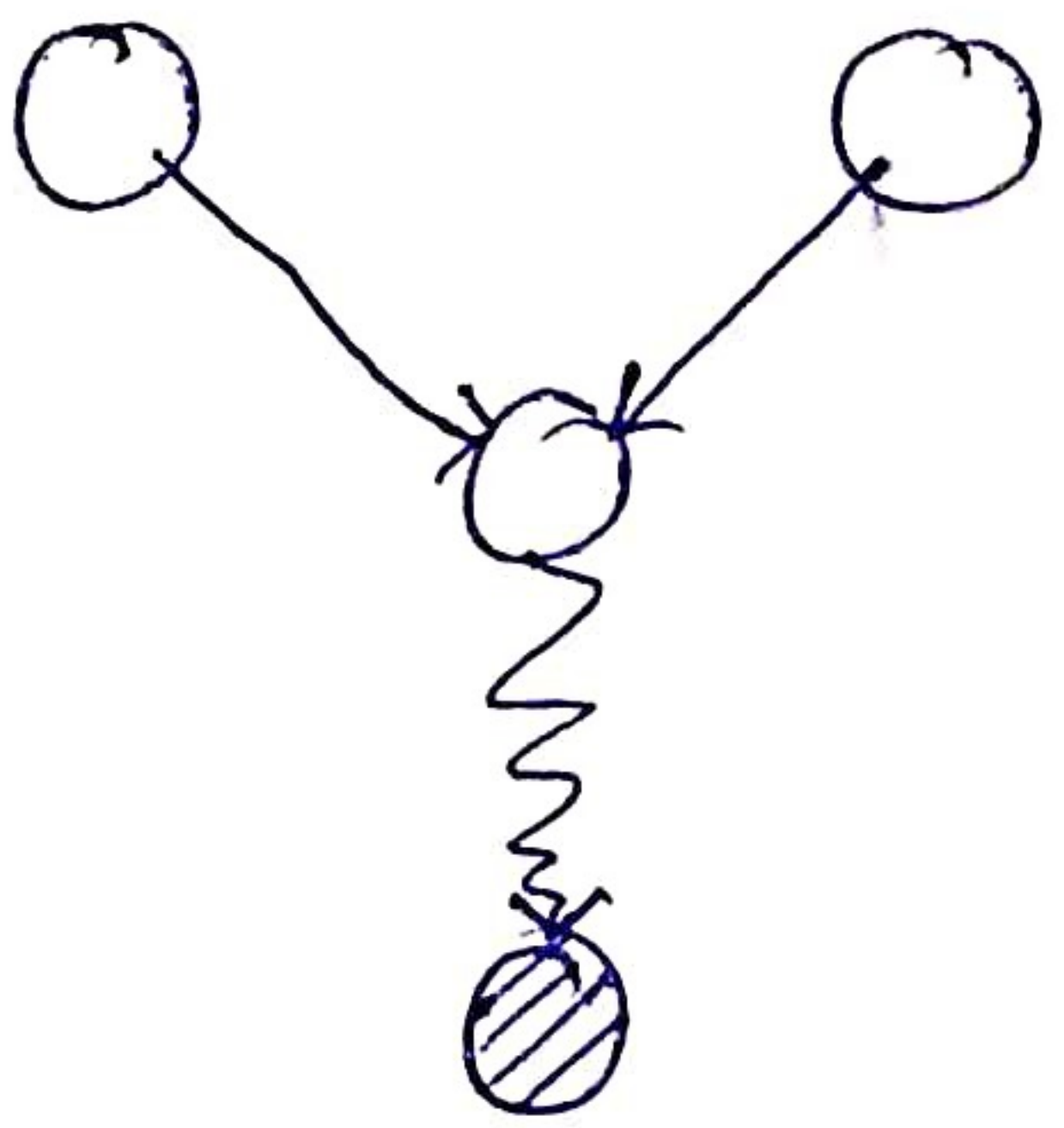
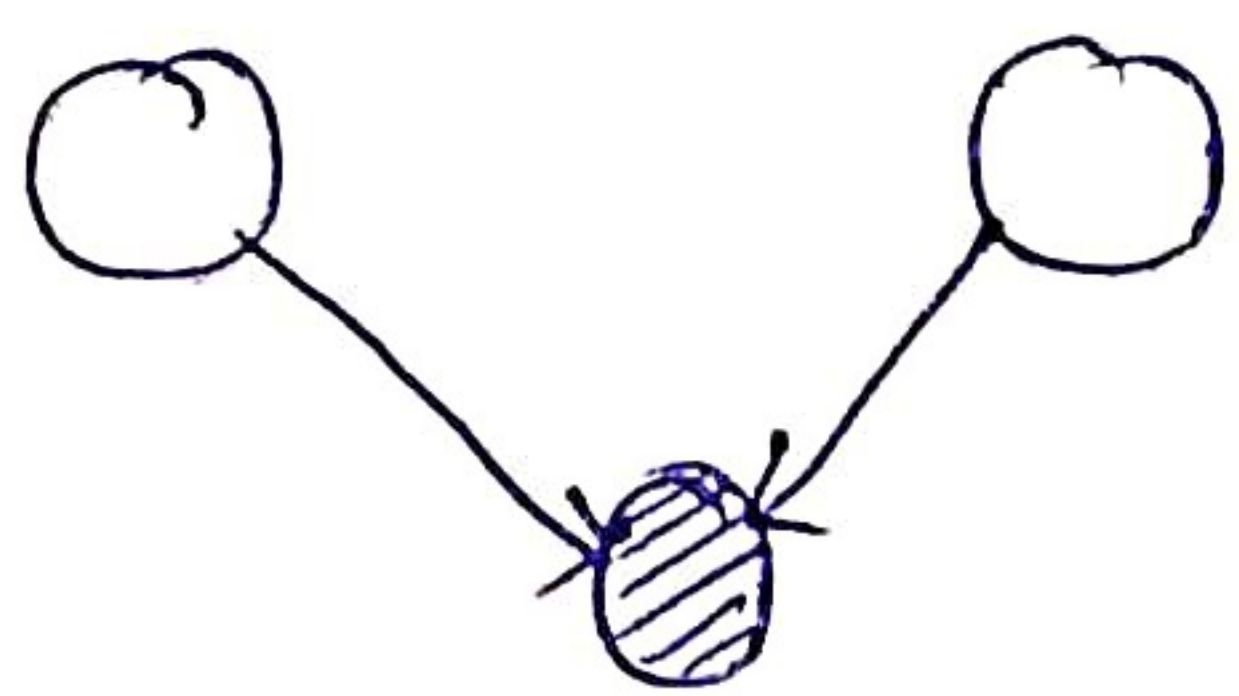
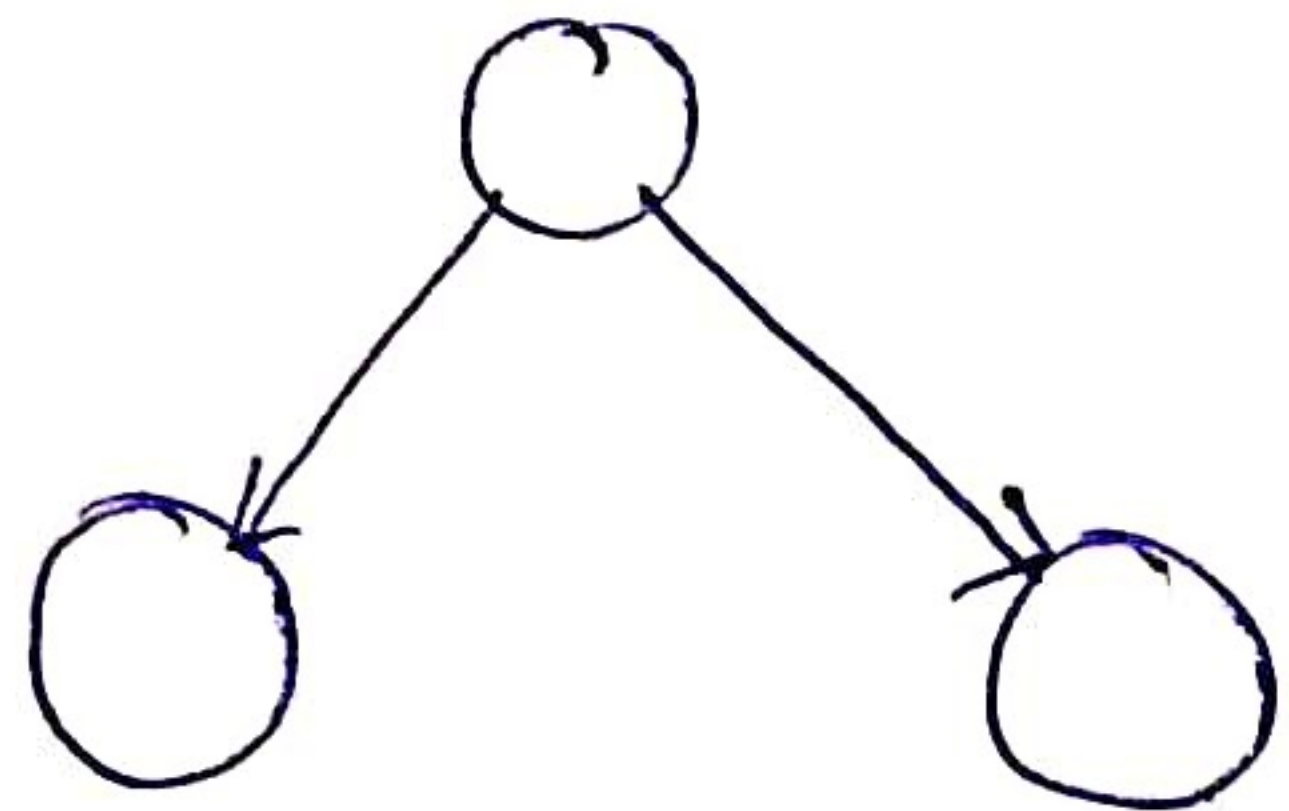
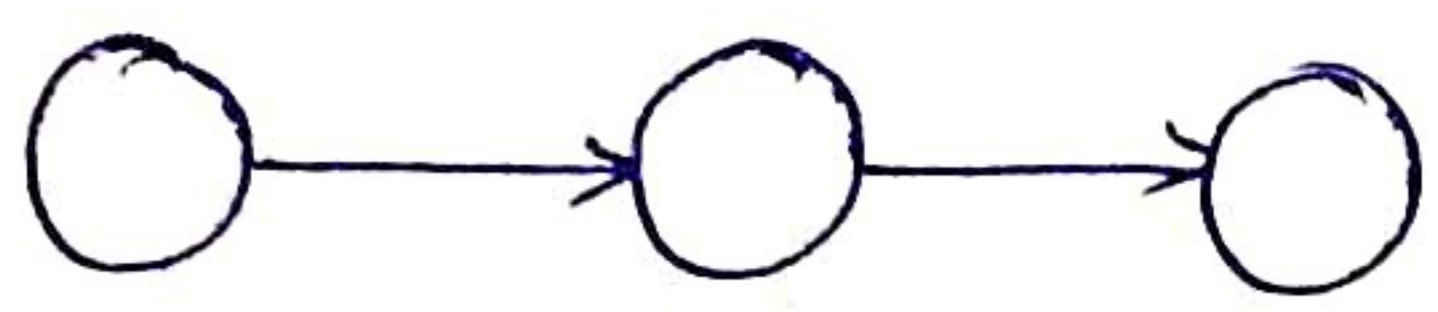
$\Rightarrow X \perp\!\!\!\perp Y$
 $\Rightarrow X \text{ \& } Y$ are not independent given K

- Query: $X_i \perp\!\!\!\perp X_j | \{X_k, \dots, X_m\}$

- Check all (undirected) paths between X_i & X_j

\rightarrow If one or more active, then independence not guaranteed.
 \rightarrow Otherwise then independence is guaranteed.

Active Triples



Inactive Triples

