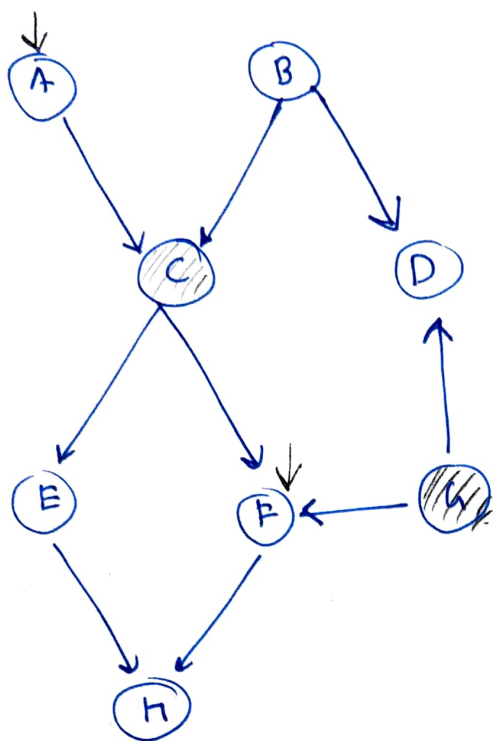


Bayes net Independence

(a) Is $A \perp\!\!\!\perp F \mid \{C, G\}$



Answer: True

Path $A \rightarrow C \rightarrow F$ is blocked at C

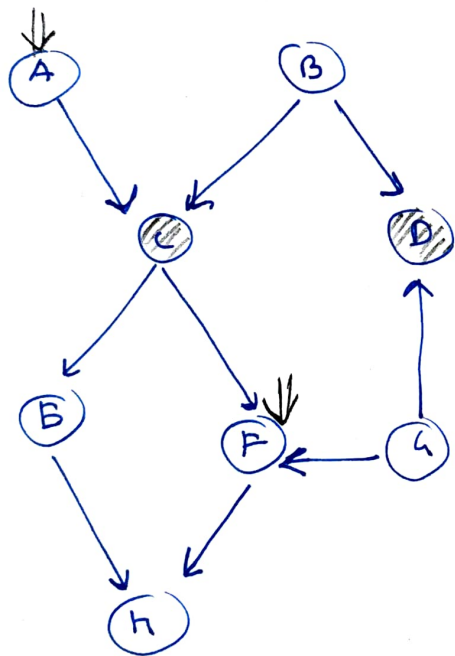
Path $A \rightarrow C \leftarrow B \rightarrow D \leftarrow G \rightarrow F$
 active active inactive

is blocked at D (C)

is also blocked at G. (C)

Path $A \rightarrow C \rightarrow E \rightarrow H \leftarrow F$
 is blocked at C.

(b) Is $A \perp\!\!\!\perp F \mid \{C, D\}$



Answer: False

Path: $A \rightarrow C \rightarrow F$ is blocked at C

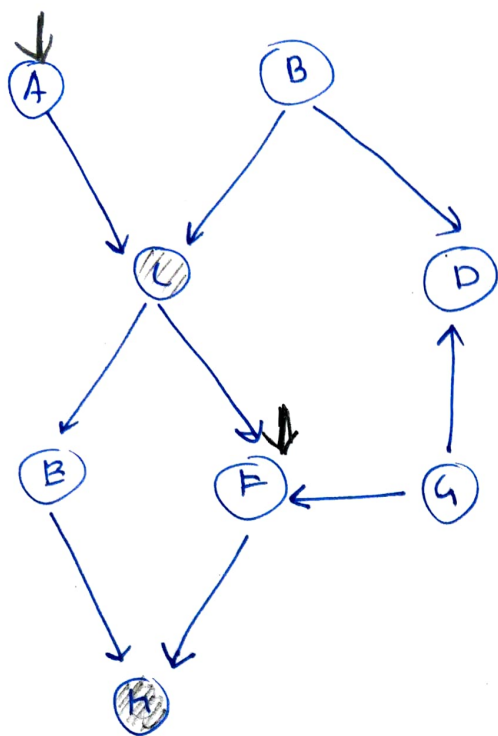
Path: $A \rightarrow C \leftarrow B \rightarrow D \leftarrow G \rightarrow F$
 active active active active

is active b/w A & F

Path: $A \rightarrow C \rightarrow E \rightarrow H \leftarrow F$ is
 blocked at C.

(c) $A \perp\!\!\!\perp F \mid C \text{ and } H$?

Answer: True



Path: $A \rightarrow C \rightarrow F$ is blocked at C

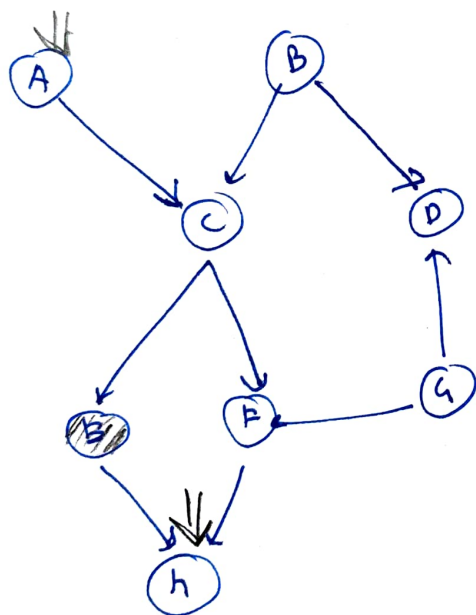
Path: $A \rightarrow C \leftarrow B \rightarrow D \leftarrow G \rightarrow F$
 $\xrightarrow{\text{active}} \xrightarrow{\text{inactive (LE)}} \xrightarrow{\text{Active}}$

is inactivated at D.

Path: $A \rightarrow C \rightarrow E \rightarrow H \leftarrow F$
 is blocked at C.

(d) $A \perp\!\!\!\perp H \mid E$

Answer: False



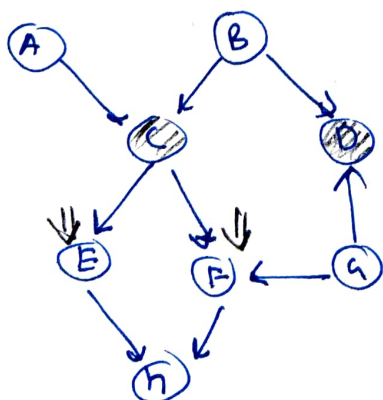
Path: $A \rightarrow C \rightarrow E \rightarrow H$ is blocked at E.

Path: $A \rightarrow C \rightarrow F \rightarrow H$ is active

Path: $A \rightarrow C \leftarrow B \rightarrow D \leftarrow G \rightarrow F \rightarrow H$
 $\xrightarrow{\text{inactive}} \xrightarrow{\text{inactive}} \xrightarrow{\text{active}} \xrightarrow{\text{active}} \xrightarrow{\text{active}}$
 is blocked at C & D.

(e) $E \perp\!\!\!\perp F \mid \{C, D\}$

Answer: ~~False~~ True



Path: $E \leftarrow C \rightarrow F$ is blocked at C

Path: $E \leftarrow C \leftarrow B \rightarrow D \leftarrow G \rightarrow F$
 $\xrightarrow{\text{inactive}} \xrightarrow{\text{active}} \xrightarrow{\text{active}}$
 is ~~active~~ inactive

Path: $E \rightarrow H \leftarrow F$ is ~~active~~ inactive at H.