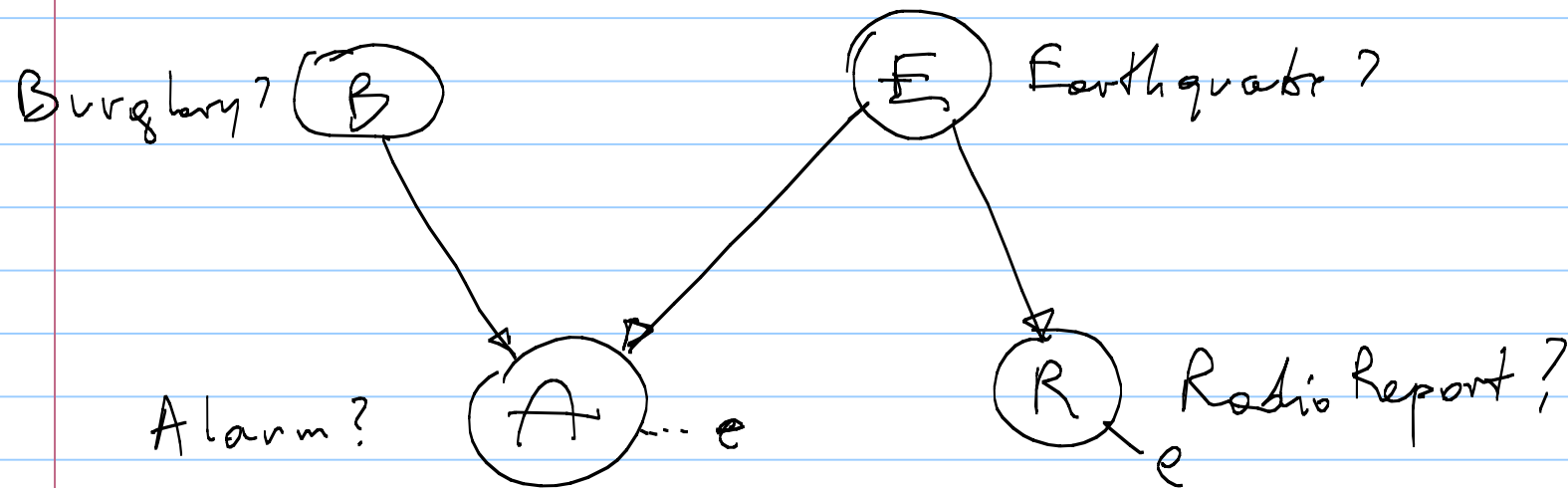




serial connection
 = is open when there is no evidence on B
 and closed when there is evidence on B



diverging connection
 = same



converging connection
 - closed when there is no evidence on B
 open when there is evidence on B

D-separation (D stands for directional - Defn 2.1 (J07))

Two distinct variables A and B in a causal network (an acyclic directed graph) are d-separated if

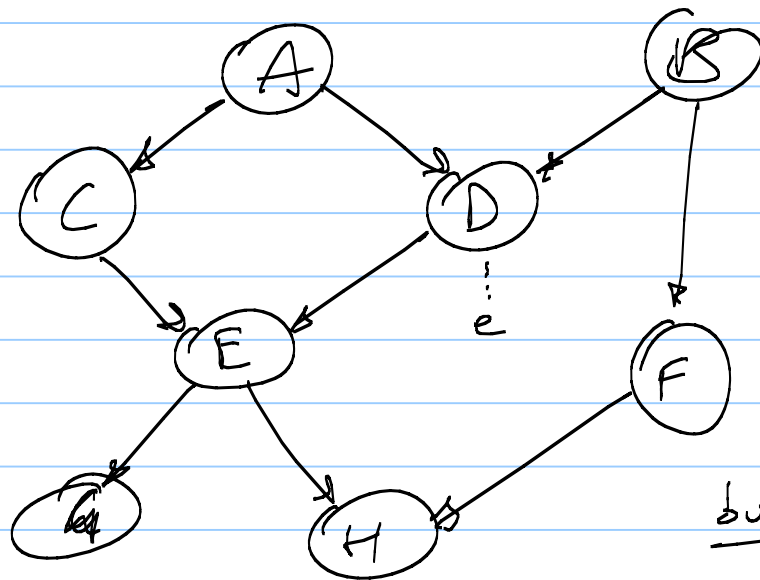
for all paths (chains) between A and B there is an

intermediate variable V distinct from A and B s.t. ^{either}

- or
- (1) the connection is either serial or diverging and V is instantiated
 - (2) the connection is converging and neither V nor V's

descendants have received evidence.

If A and B are not d-separated, they are d-connected.



$B \rightarrow D \rightarrow E \rightarrow G$ is an open path

Are E and F d-separated?

$E \rightarrow H \leftarrow F$ is blocked

but $E \leftarrow D \rightarrow B \rightarrow F$ is not blocked

No, in the absence of evidence

Now, add evidence on D ("instantiate D") $E \leftarrow D \rightarrow B$ is blocked,
 $E \rightarrow H \leftarrow F$ is blocked, but $E \leftarrow C \rightarrow A \rightarrow D \leftarrow B \rightarrow F$ is not!

By adding evidence on B alone, E is d -separated from F .