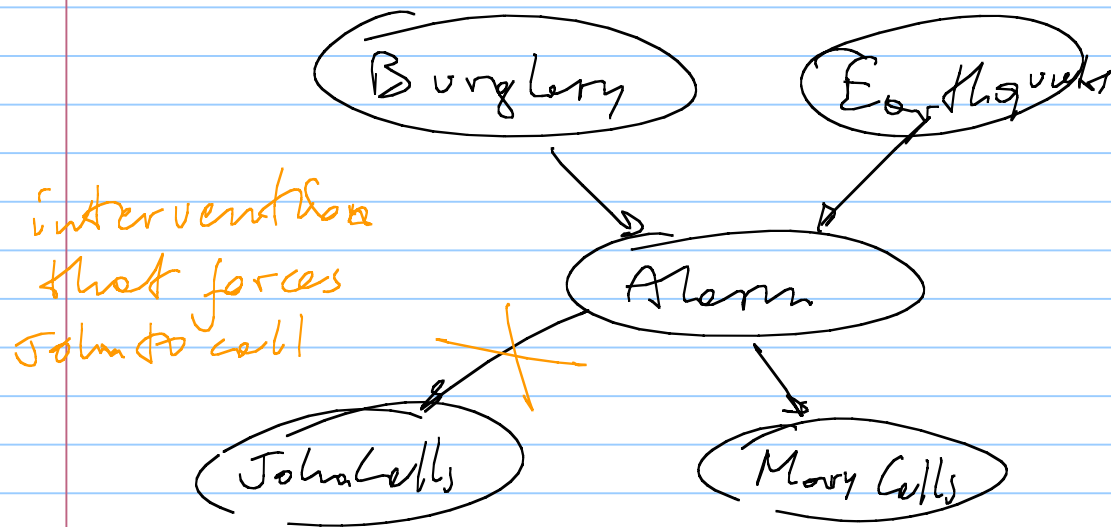
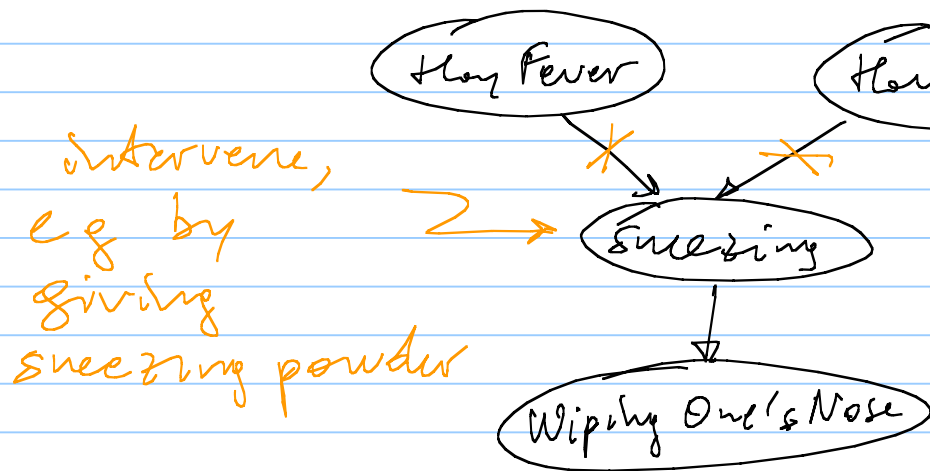


Example of modeling interventions (causal inference), from Korb & Nicholson - see course web site for full reference.



In order to model an intervention on a variable, "cut" (remove) the edges incoming into that variable, and set the variable to the desired value.



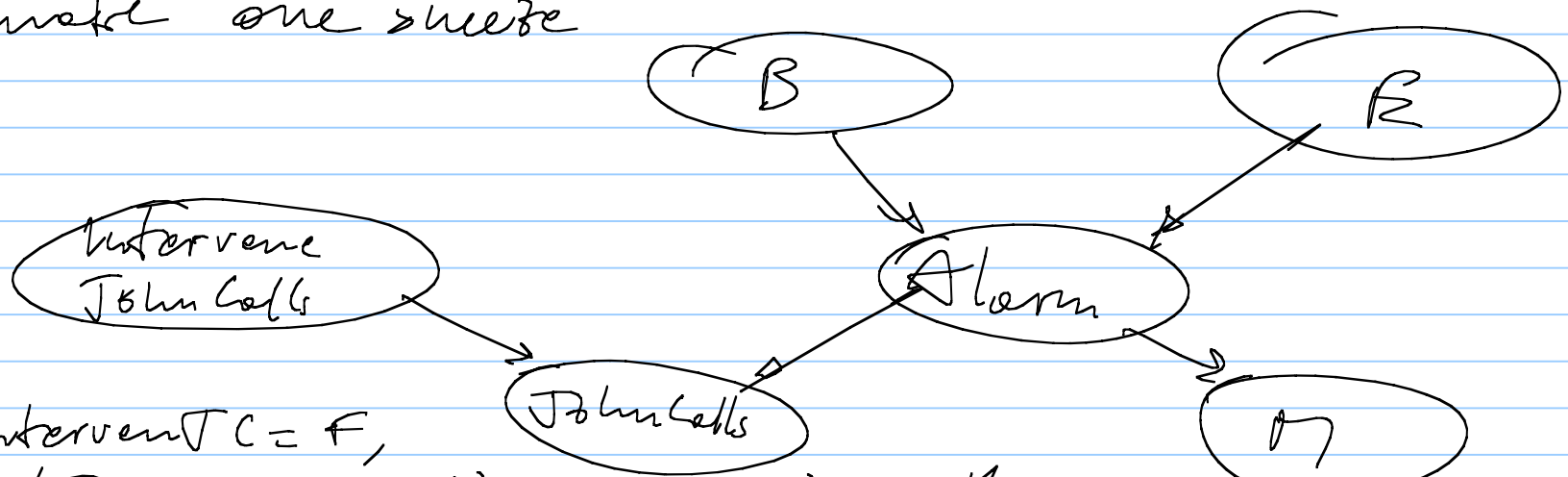
This intervention makes the causal mechanisms from disease to symptom irrelevant. This is

mirrored by the cutting of the edges.

However, it is still legitimate to maintain the causal links between Sneezing and Wiping One's Nose

- ① Do not treat intervention as if it were observation!
- ② The excision ("cutting") semantics only works when the Bayesian network is causal.
(In this course, we don't formally define this!)

Modeling interventions that are not fully potent.
 Ex.: giving a sneezing powder that sometimes fails to make one sneeze



If $\text{Intervene } IC = F$,
 then $P(\text{John Calls} | I, A) = P(J | A)$ (in the original network)
 If $\text{Intervene } IC = T$, then

I	A	P
T	F	1
T	T	1

: i.e., $P(\text{John Calls})$ is "cut off" from ~~Alarm~~.

Noisy functional dependencies beyond NoisyOR, etc.

Sum! (Sect. 3.3.4 [J07])

Object-oriented Bayesian networks

(supported by Hugin) (3.3.6 [J07])

They allow BNs to be developed in a top-down fashion and achieve some reuse.

Dynamic BNs (3.3.7 [J07])