Recitation.

□ Probabilities (REVIEW)
- Independence.
- Chain Rule & Bayes Rule

□ BAYES NET
D-seperation.
Explain Away.

□ APPLICATION.
- None Bayes.
- Model.

□ Probabilities.

Independence.

① marginal indep. $A \perp B$.
$P(A|B) = P(A)$
$P(AB) = P(A)\, P(B)$.

② conditional indep. $A \perp B \mid C$
$P(A|BC) = P(A|C)$.
$P(AB|C) = P(A|C) \cdot P(B|C)$

Chain Rule,

① joint prob. $P(ABCD) = P(A|BCD) \cdot P(B|CD) \cdot P(C|D) \cdot P(D)$

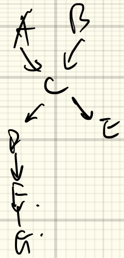
② condi prob. $P(ABC|D) = \dfrac{P(ABCD)}{P(D)}$
$= P(A|BCD)\, P(B|CD) \cdot P(C|D)$

③ Bayes Rule.
$P(AB) = P(A|B) \cdot P(B)$
$P(BA) = P(B|A) \cdot P(A)$ ⇒
$P(A|B) = \dfrac{P(B|A) \cdot P(A)}{P(B)}$

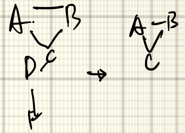
□ Bayes Net.

assumption a var is condi indep. of its non-desc given parent

D-separation.

Ex. 

① $A \perp B \mid DF$?



② $A \perp B$?
A B. indep.
$A \perp B \mid C$?

A—B. structurally dependent.

Explaining Away..
two vars that were marginally indep.
becomes conditionally dep given child
- Berkson's Fallacy / Paradox.
(counterintuitive).
: when prob. for each is low.