Recitation.

Probability.

- Vocab A = true. } event.
  variable value. (var w/ val. specified).

(bool) $P(A) = P(A = \text{true})$.

$P(\bar{A}) = P(\neg A) = P(A = \text{false})$.

TYPES. ① Marginal: incomplete set event

$P(A)$

② Joint prob: completely specified set of event.

$P(A, B)$ see all vari $= P(B, A)$

③ Conditional prob: prob of event given some info.

$P(A|B) = \frac{P(A, B)}{P(B)}$.

$P(A, B) = P(A|B) \cdot P(B)$.

Exhaustion. "span all values".

Sum of prob over hypothesis $= 1$.

bool. $P(A) + P(\bar{A}) = 1$.

discrete. $P(A = a_1) + \cdots + P(A = a_n) = 1$.

conditional. $P(A = a_1 | B) + \cdots + P(A = a_n | B) = 1$.

⚠ $P(A|B = b_1) + \cdots + P(A|B = b_n) \neq 1$

A	B	P(A|B)
T	T	p
T	F	q
F	T	1−p
F	F	1−q

Chain Rule.

Factor a prob → product of cond prob.

$P(A, B, C) = P(A|B, C) \cdot P(B|C) \cdot P(C)$

also $P(C, (B, A)) \cdot P(B, A)$

Bayes Rule.

$P(A, B) = P(A|B)P(B)$.

$= P(B, A) = P(B|A)P(A)$ ⊜

① $\frac{P(A|B)}{P(A)} = \frac{P(B|A)}{P(B)}$. ② $P(A|B) = \frac{P(B|A) \cdot P(A)}{P(B)}$.