CY 1/27/20-1

XMIT BITS

P(ERROR) = .4 ON EACH BIT

P[NO ERROR FOR 2 BITS]

P = P[1ST BIT GOOD] P[2ND BIT GOOD]

= .6 × .6 = .36

MAYBE WE CARE ONLY ABOUT SET OF HOSPITALS WE VISIT.

2 PATIENTS 3 HOSPITALS

THIS IS A COMBINATION

$\binom{3}{2}$ "3 CHOOSE 2"

$\binom{n}{k} = \frac{n!}{k!\,(n-k)!}$

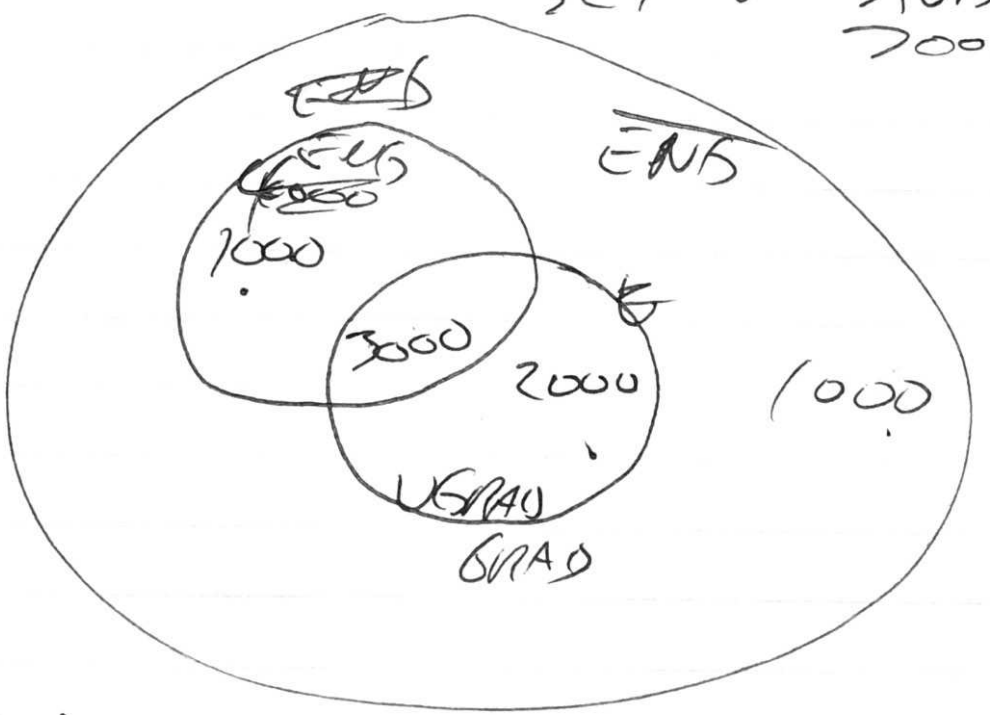
CONDITIONAL PROB

$$P[A|B] = \frac{P[A \cap B]}{P[B]} \quad \text{DEF}$$

CONDITIONED ON
GIVEN THAT

$P(A|B)$ = PROB A OCCURS (IF WE KNOW THAT B OCCURRED.

"$\cap$" = "AND"



$P[ENS] =$

$P(ENG) = 4/7$ $P[UGRAD] = 5/7$

$P[ENG \cap UGRAD] = \frac{3}{7}$

$\neq P(ENG]\,P(UGRAD]$

$\frac{4}{7} \quad \frac{5}{7} = \frac{20}{49} \neq \frac{3}{7}$

ENG, UGRAD ARE DEPENDENT

IF YOU KNOW JOE IS UNDERGRAD

IF YOU KNOW NOTHING ABOUT JOE

$P[\text{JOE IS ENG}] = \frac{4}{7}$

BUT IF YOU KNOW JOE IS UGRAD

NOW, $P[\text{JOE IS ENG} \mid \text{JOE IS UGRAD}]$

$$= \frac{P[\text{ENG} \wedge \text{UGRAD}]}{P[\text{UGRAD}]} = \frac{3/7}{5/7} = \frac{3}{5}$$

EX COMPRESS ENGLISH TEXT

$P[\text{"U"}]$ ——— $P[\text{"U"} \mid \text{"Q"}] = 1$

KNUJJUAQQ CRYPTO

CONDITIONAL

$P[A|B] \neq P[B|A]$

IMPORTANT

$$P[A|B] \triangleq \frac{P[A \cap B]}{P[B]}$$

$$P[B|A] \triangleq \frac{P(A \cap B)}{P[A]}$$

ENGIN APPLIC BAYES RULE

YOU HAVE $P[A|B]$ APP ~~XMTS CORRECTLY~~

YOU WANT $P[B|A]$ "0" GOES THRU OK.

APP NOISY CHANNEL

A: XMIT "0"

B: RCV "0"

~~A CBT~~ A|B

YOU SAW "0"

WAS "0" XMITTED?

BAYES