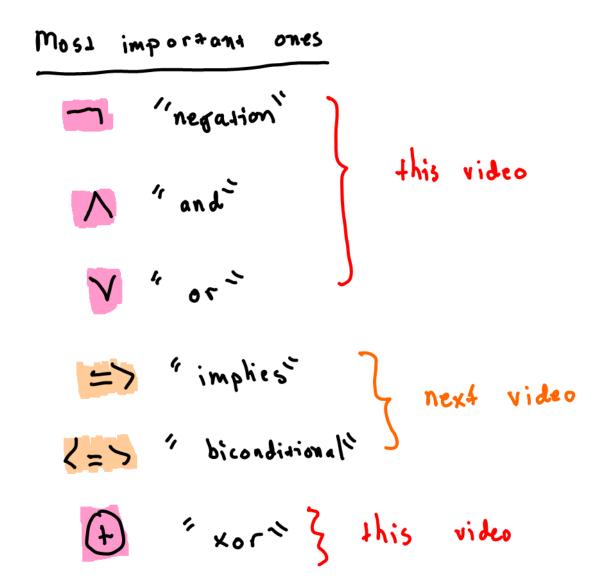
Discrete Mash

Lecture 2

Operations on Statements



"operation" —, a way of creating a new statement

ex) negating a statement creates a new one whop, truth value & opp, meaning

$$P: \quad \det \begin{bmatrix} 1 & 1 \\ 1 & 2 \end{bmatrix} = 0$$

$$\neg P: \quad \text{it is not true that } \det \begin{bmatrix} 1 & 1 \\ 1 & 2 \end{bmatrix} = 0$$

$$\det \begin{bmatrix} 1 & 1 \\ 1 & 2 \end{bmatrix} \neq 0$$

note: other books, courses notate "negation" w/ diff. Symbols

Example 2.2. Consider the statement Q: 35 is an odd number. Which of the following statements are correct ways of writing $\neg Q$?

- (1) 35 is an even number. ✓
- (2) It is not true that 35 is an odd number.
- (3) 35 is not odd.
- (4) 35 is a number.
- (5) There is no remainder when 35 is divided by 2.

(old fact; every whole number is eight)
even or odd.

(A) bah

P A Q is T when both are T is F otherwise

P	Q	$P \wedge Q$
T	T	T
T	F	F
\overline{F}	T	F
F	F	\overline{F}

ex P: It is sunny. Q: It is hot.

PAQ = 14 is sunny AND it is hat.

Example 2.4. Consider the statement $P: 5^2 < 10$. Can you come up with a statement Q so that $P \wedge Q$ is true? If you can, write one down. If not, explain why.

note: P is false
$$(5^{2} < 10 \text{ is false})$$

$$P_{\Lambda} Q = (5^{2} < 10)_{\Lambda} \frac{1+3=0}{\text{we pick}}$$

$$F_{\Lambda}T = F$$

$$F_{\Lambda}F = F$$

because P is false, PrQ is false no master what Q is!

OR (V)

allows for both
to be true

PVQ is T when either PorQ is T

is F otherwise

ex) no one attends UH or the USA is a country

so this entire statement is T.

ex Casey will buy a new Lego set or a new video game.

(spoiler alerf: both time, the statement is T)

ex (x-1)(x-2) = 0Solving this results in: x=1 or x=2

X=1 makes (x-1)(x-2)=0or X=2 makes (x-1)(x-2)=0

Truth Table for OR

P	Q	$P \lor Q$	D. T.
T	T	T	7 PisT, QisT,
T	F	T	(bosh are T
F	T	T)
F	F	F	-> neither is T

XOR (A)

P (not both)

vill be F otherwise

ex Casey will buy a new Lego set or a new video game.

(spoiler alers: both time, the statement is T)

Pi Casey buys Lego PrQ is T

Q: Cosey buys video games POQ is F