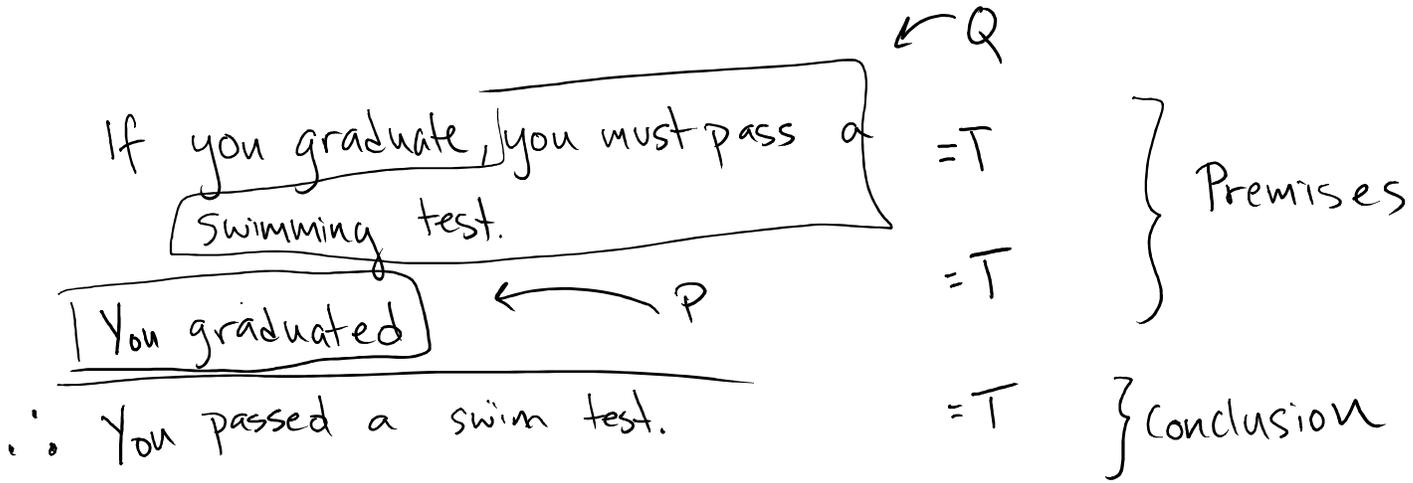


- Goals:
- Implement Deduction Strategies
 - Create sets using set builder notation

Quiz
Reminder

Deductions: Known true statements \rightarrow new true statements



$$\frac{P \rightarrow Q}{P} \therefore Q$$

If $P \rightarrow Q$ is true and P is true, Q must be true

2 Strategies

1. Truth table. Cross out false rows, see what is left

P	Q	$P \rightarrow Q$
T	T	T
T	F	F
F	T	T
F	F	T

2. Reason it out.

If P is true and $P \rightarrow Q$ is true then Q must be true because otherwise $T \rightarrow F = F$.

Q:

Andre has a black suit and a tweed suit. He always wears his tweed suit OR he wears sandals. If he wears his tweed suit and purple shirt, he does not wear a bow tie. He never wears his tweed suit unless he also wears a purple shirt OR sandals. If he wears sandals, he also wears a purple shirt. Yesterday, Andre wore a bow tie. What else did he wear?

OR = logical or

W = tweed suit
 P = purple shirt
 S = sandals
 B = bow tie

W = tweed suit
 P = purple shirt
 S = sandals
 B = bow tie

\Rightarrow

$W \vee S$
 $W \wedge P \rightarrow \neg B$
 $W \rightarrow (P \vee S)$
 $S \rightarrow P$
 B

$W \wedge P = F$

or

$W = F$
 $\downarrow + W \vee S$
 $S = T$
 $\downarrow + S \rightarrow P$
 $P = T$

$P = F$

$\downarrow + S \rightarrow P$

$S = F$

$\downarrow + W \vee S$

$W = T$

$\downarrow W \rightarrow (P \vee S) = F \quad X$

Solution

W V S
WAP $\rightarrow \neg B$
W $\rightarrow (P \vee S)$
S $\rightarrow P$
B

WAP is false

W	P	S	B
T	T	T	
T	T	F	
T	F	T	
T	F	F	
F	T	T	
F	T	F	
F	F	T	
F	F	F	

Sets

Set is a group of unordered objects (no repeats, order doesn't matter)

Metaphor: Folder ^{≅ set} on computer

- Contains files + other folders
 ↑ ↑
 objects sets
- Could be empty

Rosterlist elements of set
↓Notation:

$A = \{0, 2, 5\}$ means "A is the set containing the elements 0, 2, 5."

↑
for sets "element" = "object"

\in : $2 \in A$ means 2 is an element of A

\notin : Prof. Watson $\notin S$ means Prof. Watson is not an element of S.

Sets in Sets: $T = \{x, y, \{g, h\}, k\}$

↑
an element of a set can be another set

Q: Is $g \in T$? Is $\{g, h\} \in T$?

A) Yes. Yes. B) Yes. No. C) No. Yes. D) No. No.

elements of T are x, y, {g, h}, k
*Also $\{x, y\} \notin T$

