

Lecture 2 - 1348

Website

Suggested Problems

Article on $K \& K$

Books on reserve

Last time - Truth Tables

Propositions

It is raining and I don't have an umbrella
 X Y

$X \wedge Y$

Observations

1) Truth of $X \wedge Y$, depends on truth of X and truth of Y .

2) Key word is "and", denoted \wedge .

(2)

X	Y	$X \wedge Y$
T	T	T
T	F	F
F	T	F
F	F	F

Mention other connectives, $\vee, \Rightarrow, \Leftrightarrow, \neg$

Exclusive or, no English word
"one or other, but not both"

Write TT

Discuss Implication again

"If it is raining, then game is cancelled"

X	Y	$X \Rightarrow Y$
T	T	T
T	F	F
F	T	T
F	F	T

} $F \Rightarrow$ anything
is true!!

K&K problem

3

A says "If B is a knight, then I am a knave"

What are they?

Can A be a knave? NO

If A is a knave $X \Rightarrow Y$ is false. Hence,
second row of TT.

So X is true & Y is false. But

Y says "A is a knave", contradiction.

So A is a knight.

See p 6 & 7 of Rosen.

You Must understand this!!

Other Connective

"biconditional"

X if and only if Y

Fred passed the test if and only if he studied

$$X \Leftrightarrow Y$$

Meaning:

- (and)
- ① If F studied, he passed
 - ② If F passed, he studied.

TT:

X	Y	$X \Leftrightarrow Y$
T	T	T
T	F	F
F	T	F
F	F	T

Formulas of PL

Built up from

$\wedge, \vee, \neg, \Rightarrow$

and atoms } p, q, r, s, etc
variables }

Also need parentheses

Careful

$(p \wedge q) \vee r$ is different than

$p \wedge (q \vee r)$

Different TT's.

Do one in class.

Good Exam Question!

Translating English into PL.

We know

"And"

"or"

If, ..., then"

"not"

Others:

I was early for work, but Fred
was not.

Some say "and"

"I passed the course only if I studied"

X

Y

$$X \Rightarrow Y$$

Discuss this.

"I was home for dinner only if I caught the bus"

6