LOGIC - Lecture 2-2

Symbolization Basics -

1) Capital letters - specific sentences abbreviated by one letter, usually reminding you of the content:

"John is tall" - J

"The car is stalled" - C

"Beauty is in the eye of the beholder" - B

2) Lowercase letters - sentence variables:

"If p then q" - $p \supset q$

"q happened" - q

3) Formulas -

Consider the sentence "Ted hit a single and a home run". If we let S symbolize "Ted hit a single" and H symbolize "Ted hit a home run", the original sentence can be symbolized by $S \cdot H$.

Or we can symbolize Ted did not hit either a single or homerun as $\neg (S \vee H)$.

Or "if Ted hit a single, then he hit a home run" by $S \supset H$

4) Parentheses -

We can write the formula $A \cdot B \supset C$.

Does this mean $(A \cdot B) \supset C$ or

$A \cdot (B \supset C)$? We don't know unless

the parentheses are introduced.

So we agree to make all our formulas

unambiguous by adding suitable

parenthesizations. Nesting...

$(A \cdot (B \vee C))$ is perfectly OK.

5) Major Operators -

Any or all of the sentential operators

may appear in a formula. Consider

$(((A \cdot B) \vee ((C \supset D) \vee F)) \supset ((H \cdot E) \vee C))$

This formula has several sub-formulas linked together with operators. Is it a conjunction, disjunction, or conditional? To find out, we draw lines below all the paired parentheses:

$$(((A \cdot B) \vee ((C \supset D) \vee F)) \supset ((H \cdot E) \vee C))$$

The last operator covered, by the lowest line, is the "major operator". So the overall expression is, in fact, a conditional, or implicaton. Note that we always put parentheses around the entire formula.