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Lecture 2 summary.
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LOGIC GATES

AND Gate- it takes two inputs

TRUTH table

Input	Input	Output
0	0	0
1	0	0
0	1	0
1	1	1

OR GATE - takes two inputs
Truth Table

Input	Input	Output
0	0	0
0	1	1
1	0	1
1	1	1

NOT gate takes only a single input.

Quantifiers
-it contains a formula which indicates the statement whose true value depends on the value of some variable.
-It is used to quantify the variables of predicates.

Two types of quantifiers:-

Existential quantifiers-

- The existential quantifier are a type of element that contains some properties and denoted by ∃.
- '∃' this symbol is referred with a phrase 'there exists'.

Universal quantifier-

If the properties are true for all the given variable values of a given domain than it is known as domain of discourse.
It is denoted with a symbol '∀' and is referred with a phrase 'for all'.

Operator related notions

1. Commutative property

It is indicated with the arithmetic operation of addition and multiplication.
Changing the order or position of two numbers does not change the final result.

∀ x,y | X o Y=Y o X
For e.g.
3+5=5+3=8
Non commutative
Negation of a quantifier statement

- ∃ x,y | X o Y != Y o X

Division,Subtraction and concatenation are non-commutative.
For e.g.
4-8=-4
8-4=4

2 . Associative property

The way in which numbers are bracketed, does not affect their final result.
Addition and multiplication are mainly denoted as associative.
Matrix multiplication is one of the example.
For e.g.(1+7)+3=1+(7+3)=11

Non associative

Division and subtraction are non associative. For e.g.
101-34-36=31 and 101-(34-36)=103

3 . Distributive property
It indicates the operation that includes dividing and distributing the elements
Addition cannot be distributed over multiplication whereas multiplication is distributed over addition.

For e.g.
4(8+3) =(4*8)+(4*3)

Non distributive e.g.
4(8+3)!=4+(8*3)

Short Circuit evaluation :-

AND Gate- as soon as AND gate encounters 0 as input it stops there for evaluation and output is given as 0.
OR Gate - when OR gate encounters 1 as input it stops evaluation there and output is given as 1.

AND is indicated for multiplication

OR is indicated for addition

Proper bracketing should be taken into consideration while using AND and OR together.

(p^q v r) —> Ambiguity
(p ^ q ^ r) —> Correct operation
(P v q v r) —> Correct operation