Discrete Structures

* Lecture 8*

Chapter 2: Logic

The processor of computer contains ALU a arithmetic logical unit , and

, ALU is responsible for arithmetic and Logical operations.

- We will study Binary a mathematical, Logic a true or False,

* Propositional Statement: using a letter to represent specific sentence. « True or False »

Examples:

P: 2+3 >5
9: The Doctor Will Come T/F
r: The Sun is Shint Today. T/F

* Compound Statement: more than one propositional statement in one Sentence.

* Connectives *

1) Negletion "".

P: Student Succeeded T F

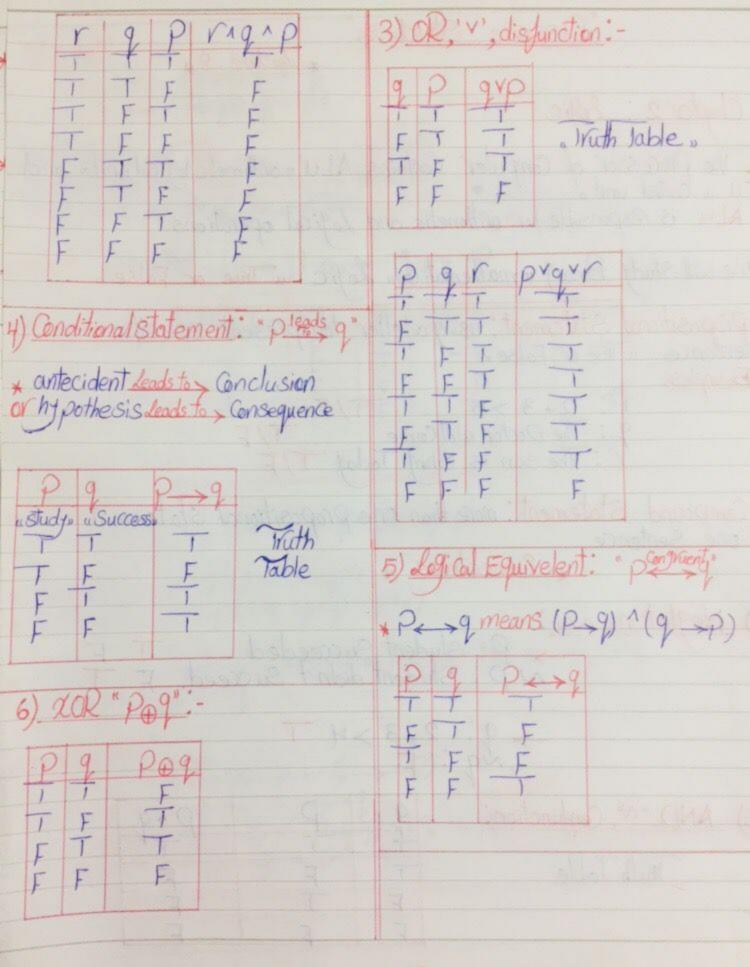
N P: Student didn't Succeed. F T

, Ng: F > H T

2) AND, "A", Conjunction:

With Table

9	P	PAG
十	7	17
T	F	F
F	T	F
F	F	F



* Notice that: > Pepe 9 = 9 Pege 9 = B * If all results are True Toutology, If all results are False Absurdity, If all results are mix of True and False Contingency Example: prove that: (p > q) < > ~q > ~p 1 > 2 * Notes:- $P^q = q^p$, $P^q = q^p$ * Associative: $P^{\gamma}(q^{\gamma}r) = (P^{\gamma}q)^{\gamma}r$ * Commutative: $P^{\gamma}(q^{\gamma}r) = (P^{\gamma}q)^{\gamma}(P^{\gamma}r)$ * PrP=P, PrP=P, N(NP)=P, N(Prq) = NP^Nq , N(prg) = Nprng * Properties: 1) $(P \rightarrow q) = (Nq \rightarrow NP)$ 2) $P \rightarrow q = NP \times q$ " important." 3) $(P \leftarrow q) = (P \rightarrow q) \land (q \rightarrow P)$

4) N(P->9) = PANG