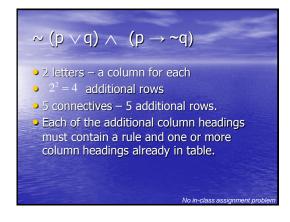
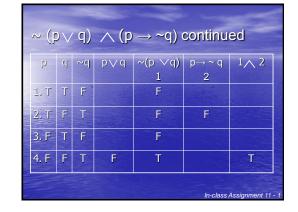


Columns for Component Simple Propositions • Fill in the first several (depends on the number of letters) columns in the table as indicated below. 1. Write the letter headings of these columns, p, q, etc. 2. In the first column enter "T"s for the top half of the rows and "F"s on the bottom half. 3. In the next column cut the number of "T"s and "F"s in half 4. In the next column repeat step 3 until all of the letter columns are filled.





To determine the conditions where a given proposition is true from its truth table look for T in the final column and read over to see the truth values of the components. In our example the only T is the last column is in condition 4 where both p and q are false. Any 2 simple propositions that are false when put in the format of our example is true.

Tautology

- A tautology is a compound proposition that is true regardless of the truth values of the component propositions.
- In a truth table the last column on the right must have all true entries.

n class Assignment 11

Contradiction

- A contradiction is a compound proposition that is always false regardless of the truth value of its component propositions.
- A contradiction is the negation of a tautology.
- De Morgan's Laws are tautologies.

In-class Assignment 11 -

Determining the Truth Value by Rules

- To determine the truth value of a given proposition when the truth values of the components are known
 - Translate the proposition into its symbolic logic form
 - Use the rules of logic to determine if the proposition is true or false working within parentheses first.

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Example

- If 4 > 5 and 10 is not even, then 6 < 2 or $7 \times 6 = 42$.
 - Implication
- -p: 4 > 5; q: 10 is not even; r: 6 < 2 and s: 7 x 6 = 42
- $(p \land q) \rightarrow (r \lor s)$
- FFF
- If F then T . Therefore the proposition is True.

In-class Assignment 11 – 4, 5, 6