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Lecture Section: CMPT 260

Assignment 1

1. Use a truth table to show that (p→q) ←→(p ^ ~q) is a contradiction. Include a column for each distinct substatement form. State in a sentence why the use of the truth table allows you to say that the expression is contradiction.

p	q	~q	(p→q)	(p ^ ~q)
T	T	F	T	F
T	F	T	F	T
F	T	F	T	F
F	F	T	T	F

According to the truth table, (p→q) and (p ^ ~q) are always opposite, so it shows that (p→q) ←→ (p ^~q) is a contradiction

2. Given a formal proof that one can conclude b given the premise (a→b) ^ (~d v a) ^d). Use the rules of equivalence from Thm 2.1.1 of the text, or the rules of inference in table 2.3.1 of the text. At each step state the law used and the previous lines referred to.

1	(a→b) ^ (~d v a) ^d)	Premise
2	(a→b)	Specialization 1

3	(~d v a) ^ d	Specialization 1
4	~d v a	Specialization 3
5	d	Specialization 3
6	d is true	4
7	~d is false	6
8	a	Elimination 4 7
9	b	Modus Ponens 2 8

According the table, because a→b is true, b must be true.

3. Give a formal proof that one can conclude d, given the three premises ~a, b, and b→ (a v d) Use the rules of equivalence from Thm 2.1.1 of the text, or the rules of inference in table 2.3.1 of the text. For each step of the proof, give the reason for the step and the numbers of any previous steps referred to.

1	~a	Premise
2	b	Premise
3	b→(a v d)	Premise
4	a v d	Modus Ponens 2 3
5	d	Elimination 1 4