Yousef Jarrar
0058458 36
Nicholas Chiodini
004603962

Homework Assignment #4

CSE 512
Winter 19'

Problem #1

I. Conversion to CNF

-> Prop Statement

$$\neg L5 \rightarrow (\neg(L7 \wedge L2)) - L5 \vee \neg L7 \vee \neg L2$$

- Setting the premises

$$\neg L2 \rightarrow L1 \equiv L2 \vee L1$$
$$L4 \rightarrow L3 \equiv \neg L4 \vee L3$$
$$L5 \rightarrow (L1 \wedge L4) \equiv (\neg L5 \vee L1) \wedge (\neg L5 \vee L4)$$
$$\neg L6 \rightarrow L2 \equiv L6 \vee \neg L2$$
$$L7 \rightarrow L6 \equiv \neg L7 \wedge \neg L6$$

Step 2 part A: Use the resolution, to disprove the contradiction of P.S.

1	$L2 \vee L1$	Given
2	$\neg L4 \vee L3$	Given
3	$(\neg L5 \vee L1) \wedge (\neg L5 \vee L4)$	Given
4	$L6 \vee \neg L2$	Given
5	$\neg L7 \wedge \neg L6$	Given
6	$\neg L5 \wedge L7 \wedge L2$	Negated Prop Sentence
7	$L6$	4 + 6
8	$\neg L7$	5 + 7
9	NULL	5 + 8, EOP

Step 2 part B: Same idea applies to disprove contradiction of propositional statement.

$\rightarrow \neg L3 \rightarrow (\neg L4 \wedge \neg L5) \equiv \neg L3 \wedge L4 \vee L5$

disprove $\neg L3 \wedge L4 \vee L5$

1	$L2 \vee L1$	Given
2	$\neg L4 \vee L3$	Given
3	$(\neg L5 \vee L1) \wedge (\neg L5 \vee L4)$	Given
4	$L6 \vee \neg L2$	Given
5	$\neg L7 \wedge \neg L6$	Given
6	$\neg L3 \wedge L4 \vee L5$	Negated P. Statement
7	$\neg L4$	6+2
8	$L5$	6+7
9	$L4$	8+3
10	NULL	7+9, EOP

Problem #2

Id	A	B	C	D	OK
1	1	0	1	1	0
2	1	1	0	1	1
3	1	1	0	0	0
4	1	1	0	1	1
5	1	0	0	0	0
6	0	1	1	1	1
7	0	1	0	1	1
8	0	1	0	0	0
9	0	1	0	1	1
10	0	0	0	0	0

→ Find Row with best Ratio.

A = 2/5 = 40%

B = 5/7 = 71.4%

C = 1/2 = 50%

D = 5/6 83.3% ← D is the best choice BUT it is not 100%, therefore add another row.

→ Best Ratio with D

$D \cap A = 2/3 = 66.7\%$

$D \cap B = 5/5 = 100\%$

$D \cap C = 1/2 = 50\%$

∴ $D \cap B$ has a 100% ratio, it then becomes a 1st Learning Rule.

Also our only Learning Rule, since we now have 0's in all rows for the 'OK' vector.