

Harvey Mudd College
Computer Science 80
Logic for Computer Science
Fall Semester 2002

Assignment #4 – Propositional Logic: Resolution Refutation and Matching
Due 11:00am, Monday November 11, 2002

1. Consider the set of numbered clauses:

$$a \vee \overset{1}{\neg b} \vee c \quad b \vee \overset{2}{c} \vee \neg d \quad b \vee \neg c \overset{3}{\vee} e \vee \neg f \quad c \vee \overset{4}{d} \vee g$$

For each pair of clauses show all possible resolvents of the pair.

2. Consider the set of assumptions:

- Every fungus is either a mushroom or a toadstool.
- Every boletus is a fungus.
- Toadstools are poisonous, as are peach pits.
- A boletus is not a mushroom.
- This thing is a boletus.

If we wish to know whether “this thing” is poisonous, we can model this with the set of formulas:

$$\Gamma = \{f \Rightarrow (m \vee t), b \Rightarrow f, (pp \vee t) \Rightarrow p, b \Rightarrow \neg m, b\}$$

and attempt to prove the consequence:

$$\Gamma \models p$$

Construct the corresponding implication, convert its negation to conjunctive normal form, and produce a resolution refutation tree showing that the consequence holds.

(over)

3. Consider the set of assumptions and the conclusion from problem 2.

Construct the corresponding implication, convert it (not its negation) to CNF, and use the “simple” validity tester to show that the original consequence holds.