

CSE 4/563 Knowledge Representation
Professor Shapiro
Homework 2
Maximum Points: 18
Due: Wednesday, February 4, 2009
10:30 AM for submit, 11:00 AM for hardcopy

January 28, 2009

You must turn in the answers to Question 3 in a submitted file by 10:30 AM on the date shown above. You may turn in the answers to Questions 1 and 2 either as hard-copy at the start of lecture on the date shown above, or in the same submitted file as for Question 3 by 10:30 AM on the date shown above.

The submitted file must be named `hw2.ext`, for an appropriate value of `ext`. **Include your name at the top of the file.** Submit that file by executing the Unix command

```
submit_cse463 hw2.ext
```

or

```
submit_cse563 hw2.ext
```

whichever is appropriate for you. The file can be a text file, or produced by some word processing software, but it must be formatted so it is easy to read.

1. (a) (3) Show the truth table for the wfp $(P \Rightarrow Q) \vee (Q \Rightarrow P)$.
(b) (2) According to your truth table, is $(P \Rightarrow Q) \vee (Q \Rightarrow P)$ valid, unsatisfiable, or contingent?
2. (a) (3) Using the tableau-inspired model-finding method, draw a tree to identify the models that simultaneously satisfy the wfps: $(\neg M \Rightarrow (S \vee P)), ((S \Rightarrow H) \wedge (P \Rightarrow K)), \neg K$.
(b) (2) According to your tree, what models satisfy the wfps $(\neg M \Rightarrow (S \vee P)), ((S \Rightarrow H) \wedge (P \Rightarrow K)), \neg K$?
3. For this question, let S be the sentence,

Tom is the driver of the car does not imply that Betty drives Tom to work.

- (a) (3) Using the syntax of and semantics of CarPool World given in the file, `/projects/shapiro/CSE563/decreasoner/examples/ShapiroCSE563/cpwPropRules.e` formulate S .
- (b) (2) Make a copy of `/projects/shapiro/CSE563/decreasoner/examples/ShapiroCSE563/cpwPropRules.e`, and append your formalization of S to it. Place it here in your answer file:
- (c) (1) Run `ubdecreasonerP` on your extended file. Place the output here in your answer file:
- (d) (1) According to `ubdecreasonerP`, how many models satisfy your set of wfps?
- (e) (1) In each model that satisfies your set of wfps, who is the driver of the car?