Chapter 3: Hints and Selected Solutions

Section 3.1 (page 70)

3.2 1. True

4. To see why this sentence is false, you may need to switch to the 2D view, since the label f is barely visible in the 3D view.

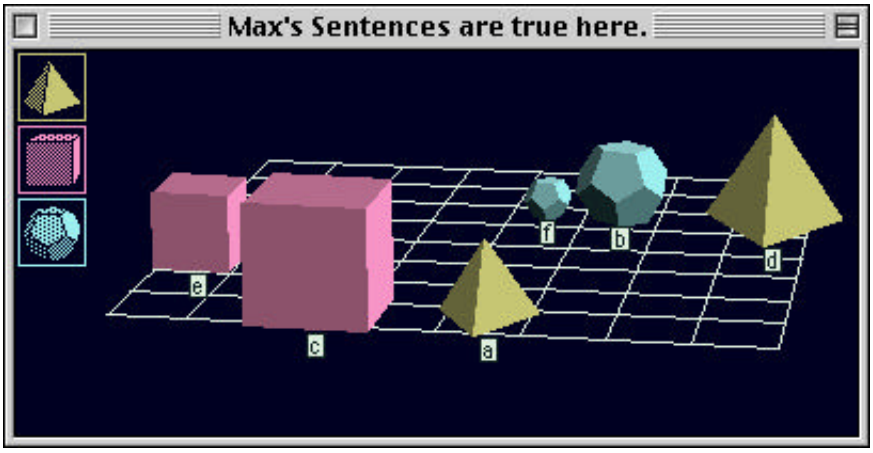
5. This is false since it claims that a and b are not in the same row, but they are in the same row in the given world.

8. $\neg\neg\mathsf{LeftOf}[\mathsf{a}, \mathsf{a}]$ is logically equivalent to $\mathsf{LeftOf}[\mathsf{a}, \mathsf{a}]$, which is false in any world that has a block named a, so it is false in Boole's World.

3.4 The procedure asked for in the second paragraph consists of stripping off two negations at a time until at most one is left. This gives the desired literal.

Section 3.2 (page 73)

3.7 There are many worlds where all of Max's sentences are true. One is shown in below. You should submit a different world.

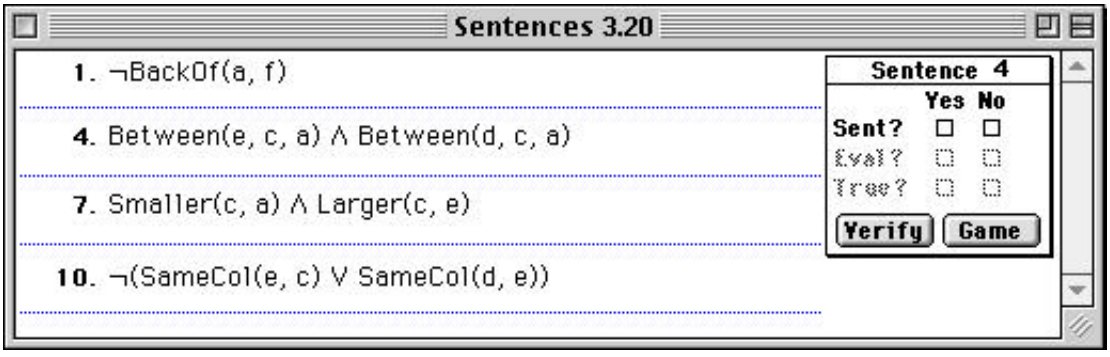


Section 3.5 (page 81)

3.14 To get a counterexample, you need a world in which the second sentence is true but the first is false. The first sentence says that it is not the case that either a or b is small, i.e. th at neither are small. The second sentence says that either a is not small or b is small. Thus one way to solve the problem is to build a world in which b is small.

Section 3.7 (page 86)

3.20 Some of the translations are shown below as they would appear in Tarski's World, though we have edited the picture to leave out the other sentences.



3.21 1. Small(a) ∨ (Large(c) ∧ Large(d))

4. $\mathsf{Cube}(\mathsf{d}) \wedge \mathsf{Cube}(\mathsf{c}) \wedge \neg(\mathsf{Small}(\mathsf{d}) | \mathsf{Small}(\mathsf{c}))$

7. $\neg\mathsf{Between}(\mathsf{c}, \mathsf{b}, \mathsf{a}) \wedge \neg\mathsf{FrontOf}(\mathsf{c}, \mathsf{a}) \wedge \neg\mathsf{BackOf}(\mathsf{b}, \mathsf{c})$

10. $\mathsf{Between}(\mathsf{c}, \mathsf{f}, \mathsf{d}) \vee (\mathsf{Smaller}(\mathsf{c}, \mathsf{d}) \wedge \mathsf{Larger}(\mathsf{f}, \mathsf{c}))$

3.24. 1. *Claire is a student but Max isn't.*

2. *Max did not feed both Pris and Folly at 2:00 p.m.*

Section 3.8 (page 91)

3.26 1. $\neg(\neg\mathsf{P} \wedge \neg\mathsf{Q})$

4. $\mathsf{P} \wedge (\neg\mathsf{Q} \vee (\mathsf{R} \wedge \mathsf{S}))$