Assignment 2 (for Lecture 2) Solutions

April 7, 2017

A1.

(a) $0 < \pi < 10$

(b) $7 \leq p < 12$

(c) $5 < x < 7$

(d) $x < 4$

(e) $-3 < y < 3$

(f) $x = 0$

A2.

(a) Pi is strictly between 0 and 10.

(b) p is greater than or equal to 7 and less than 12.

(c) x is strictly between 5 and 7.

(d) x is strictly less than 4.

(e) y is strictly between -3 and 3.

(f) x is equal to 0.

A3. Check that ϕ_i is true $\forall i \in \{1, 2, \ldots, n\}$ in the statement.

A4. Try to find one such ϕ_i that is false in the statement.

A5.

(a) $\pi > 3$

(b) $x \neq 0$

(c) $x \geq 0$

(d) $x \geq 0$

(e) $x < -3$ or $x > 3$

A6.

(a) Pi is greater than 3.

(b) x is not equal to 0.

(c) x is greater than or equal to 0.

(d) x is greater than or equal to 0.

(e) x is less than -3 or x is greater than 3.

A7. Try to find one such ϕ_i that is true in the statement.

A8. Check that ϕ_i is false $\forall i \in \{1, 2, \ldots, n\}$ in the statement.

A9.

(a) $\pi \leq 3.2$

(b) $x \geq 0$

(c) $x = 0$

(d) $x \neq 1$

(e) ψ

A10.

(a) Pi is less than or equal to 3.2.

(b) x is greater than or equal to 0.

(c) x is equal to 0.

(d) x is not equal to 1.

(e) ψ

A11.

(a) D AND Y

(b) D AND $\neg Y$ AND T

(c) D AND $\neg Y$ OR $\neg D$ AND Y

(d) $\neg D$ AND $\neg Y$ AND T

(e) D AND Y AND $\neg T$

TWO TO THINK ABOUT AND DISCUSS WITH OTHER STUDENTS

A1. In general, it is thought that "not guilty" should mean "innocent", and "not innocent" should mean "guilty". However, this is not true in this situation because "not guilty" doesn't not mean that the entity on trial is "innocent" – it simply means that the entity cannot be proven to be guilty. Thus, if we change the question to: Does "not proven guility" the same as "¬proven guilty"? Then the answer is yes.

A2.