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CS 135

Professor Engling

1 February 2015

Homework Assignment 1

CS 135 Discrete Structures Spring 2015 Homework Assignment #1 Section 1.1 #1 (all) #3 (all) #8 a-e (inclusive) #14 (all) #20 (all) #28 a #31 a,c,e Section 1.3 #10 b

1.1

1:

1. Proposition: True
2. Proposition: False
3. Proposition: True
4. Proposition: False
5. Not a Proposition
6. Not a proposition.

3:

1. Mei does not have an MP3 player.
2. There is pollution in New Jersey.
3. 2 + 1 != 3
4. The summer in Maine is not hot or not sunny.

8:

1. I did not buy a lottery ticket this week.
2. I bought a lottery ticket this week, or I won the million dollar jackpot.
3. If I bought a lottery ticket this week, I won the million dollar jackpot.
4. I bought a lottery ticket this week and I won the million dollar jackpot.
5. I bought a lottery ticket this week, if and only if I won the million dollar jackpot.

14:

1. R ^ !Q
2. P ^ Q ^ R
3. P 🡪 R
4. P ^ !Q ^ R
5. (P ^ Q) 🡪 R
6. R 🡨🡪 (P or R)

20:

1. Inclusive or; experience with one or the other is required, but having experience with both doesn’t disqualify you.
2. Exclusive or; they aren’t going to give you both, so you have to choose one or the other, exclusively.
3. Inclusove or; either one is enough, but both wouldn’t hurt.
4. Exclusive or; the statement implies you have to publish, or else you will perish. You can’t do both at once.

28:

1. If it snows tonight, then I will stay at home.

Converse: If I stay at home, it’s snowing tonight.

Contrapositive: If I don’t stay at home, it’s not snowing tonight.

Inverse: If it is not snowing tonight, then I don’t stay at home.

31:

A:

|  |  |
| --- | --- |
| P | P ^ !P |
| T | F |
| F | F |

C:

|  |  |  |  |
| --- | --- | --- | --- |
| P | Q | (P or not Q) | (P or not Q) 🡪 Q |
| T | T | T | T |
| T | F | T | F |
| F | T | F | F |
| F | F | T | F |

E:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| P | Q | Not P | Not Q | P 🡪Q | Not Q🡪Not P | (P 🡪Q) 🡨🡪 (Not Q 🡪 Not P) |
| T | T | F | F | T | T | T |
| T | F | F | T | F | F | T |
| F | T | T | F | T | T | T |
| F | F | T | T | T | T | T |

1.3

10:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| P | Q | R | P 🡪Q | Q 🡪 R | P 🡪R | (P 🡪Q)^ (Q 🡪 R) | [(P🡪Q) ^ (Q 🡪R)] 🡪(P 🡪 R) |
| T | T | T | T | T | T | T | T |
| T | T | F | T | F | F | F | T |
| T | F | T | F | T | T | F | T |
| T | F | F | F | T | F | F | T |
| F | T | T | T | T | T | T | T |
| F | T | F | T | F | T | F | T |
| F | F | T | T | T | T | T | T |
| F | F | F | T | T | T | T | T |