5.1.x. Exercise questions

1. Analyze each of the following sentences in as much detail as possible.
    a. *If it was raining, the roads were slippery.*
    b. *He was home if the light was on.*
    c. *Ann and Bill helped if Carol was away*
    d. *Sam will help—and Tom will, too, if we ask him.*
    e. *If it was warm, they ate outside provided it didn't rain.*
    f. *If the new project was approved, Carol started work on it and so did Dave if he was finished with the last one.*
    g. *If he found the instructions, Tom set up the new machine; otherwise, he packed up the old one.*

2. Restate each of the following forms, putting English notation into symbols and vice versa and indicating the scope of connectives in the result by underlining:
    a. A ∧ (B → C)
    c. `if A then both B and if C then D`
    b. (A ∧ B) → C
    d. `both if A then B and if not A then not B`

3. Synthesize idiomatic English sentences that express the propositions that are associated with the logical forms below by the intensional interpretations that follow them.
    a. ¬ S → ¬ B
        S: *I'll see it*; B: *I'll believe it*
    b. S → ¬ (R ∨ N)
        S: *it was sunny*; R: *it rained*; N: *it snowed*
    c. ¬ W ← ¬ (P ∧ ¬ B)
        W: *the set works*; P: *the set is plugged in*; B: *the set is broken*
    d. ¬ (A ∨ B) → (G ← ¬ (C ∨ D))
        A: *Adams will back out*; B: *Brown will back out*; G: *the deal will go through*; C: *Collins will have trouble with financing*; D: *Davis will have trouble with financing*

4. Calculate truth values for all components of the forms below on each possible extensional interpretation. Since the first two each have two unanalyzed components, there will be 4 interpretations and your table will have 4 rows of values; with three components, as in the third and fourth, there will be 8 interpretations giving 8 rows of values.
    a. (A → B) ∧ (B → A)

b.   ¬ (A ∧ B) → (¬ B ∨ A)

c.   (A → C) ∧ (B → ¬ C)

d.   ¬ (A → C) ∧ (¬ B → C)