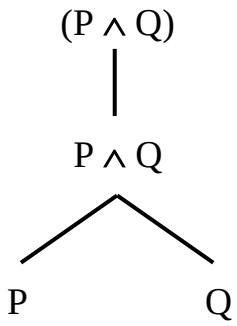
2.8.1. Construction and Translation Problems

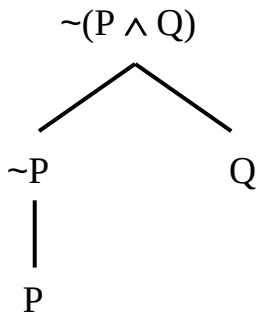
A. For each of the following **bad construction trees**, explain what **mistake** has been made in building that tree; then **build the correct tree** for that sentence.

☠ Bad Tree 1 ☠



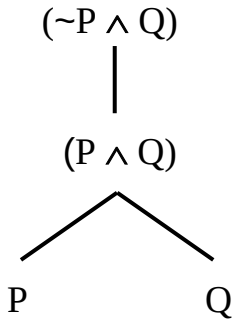
Mistake:

☠ Bad Tree 2 ☠



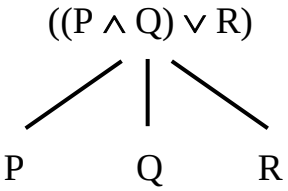
Mistake:

☠ Bad Tree 3 ☠



Mistake:

☠ Bad Tree 4 ☠



Mistake:

B. For each of the following (apparent) sentences, use reverse construction trees to **decide whether or not it’s a legal sentence** of the formal language.

1. (P ∧ Q))
2. (P ~ Q)
3. (~(S ∧ T) ∨ U)
4. (Q ∧ R ∨ S)
5. (S ~∧ T)
6. (~(~Q) ∨ T)
7. (((P ∧ P) ∨ P) ∧ ~P)
8. ((P ∧ Q) R)
9. (Q ∨∧ R)
10. ~T~

C. **Translate** each of the following into the formal language, then build a **construction tree** for that formal sentence.

1. Letitia’s not a goth, and she’s also not a goth.

2. Elvis neither went to the casino nor went to the casino.

3. It’s not the case that neither Suki nor Neko ate dinner.

4. Letitia passed the Psych exam, and she did so without studying.

5. Neither Rex nor Jake failed to attend the dart league semi-finals.

6. Trixie passed the Logic exam without studying for it, and so did Suki.

7. Trixie didn’t fail to pass the exam, even though she did so without studying.

8. Unless both Kitty and Jezebel are unavailable, Dr. Slim will demonstrate his exciting new product.

D. **'Book-Ending' and the Main Connective**. We said the main connective of a (molecular) sentence is the last connective added in the construction of that sentence. And though we noted that the left-most symbol is important to figuring out the main connective of a sentence, that's not always sufficient. For while a tilde on the left is definitely the work of the Negation-building rule (Rule 2), a left parenthesis could have been added by either the Conjunction or the Disjunction rule – as in the following sentence.

$$((\ U \wedge V\ ) \vee W\ )$$

In fact this sentence is a disjunction (with a conjunction as its left part). And to see why, define a connective's **book-end count** as the **number of parentheses book-ending that connective** (where a pair of parentheses **book-end** a connective if the left parenthesis is to the left of that connective, and the right parenthesis is to the right of that connective). So in that last formal sentence, the **wedge is book-ended by two pairs** of parentheses while the **vel is book-ended by one pair** of parentheses.[1]

$$\begin{array}{c} 2 \quad\ 1 \\ ((\ U \wedge V\ ) \vee W\ ) \end{array}$$

1. State a **mechanical set of steps** (that even a computer could follow) for **starting at the left** end of a sentence and **assigning a book-end count to each connective** in the sentence (moving from left to right).

2. For each of the following sentences (or pseudo-sentences), **give the book-end count** for each **connective**.

a. ~(~U ∧ (V ∨ W)) c. ((~R ∧ S) ∨ (~T ∧ S)))
b. ()P ∧ (Q ∨)R d. X ∧ Y ∨ Z

3. Using the book-end count as one ingredient, state a **general mechanical procedure** for **finding the main connective** of a (legal) formal sentence.

[1] Note that while "W" has two left parentheses to is left, it's not **book-ended** by two pairs of parentheses – because it doesn't have two right parentheses to its right.