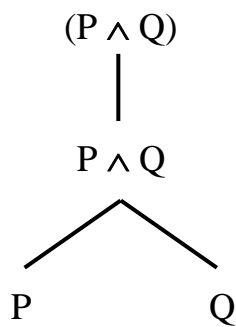


2.8.1. Construction and Translation Problems

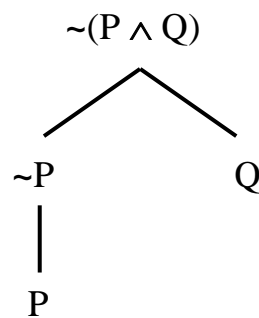
A. For each of the following **bad construction trees**, explain what **mistake** has been made in building that tree; then **build the correct tree** for that sentence.

☠ Bad Tree 1 ☠



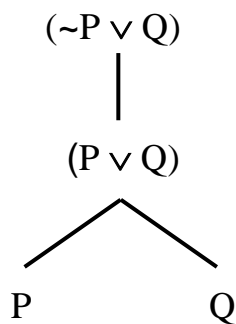
Mistake:

☠ Bad Tree 2 ☠



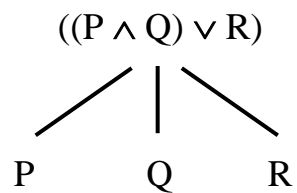
Mistake:

☠ 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. $(P \wedge Q)$ | 6. $(\sim(\sim Q) \vee T)$ |
| 2. $(P \sim Q)$ | 7. $((P \wedge P) \vee P) \wedge \sim P)$ |
| 3. $(\sim(S \wedge T) \vee U)$ | 8. $((P \wedge Q) R)$ |
| 4. $(Q \wedge R \vee S)$ | 9. $(\vee Q \vee R)$ |
| 5. $(S \sim \wedge T)$ | |

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 is not the case that neither Suki nor Neko ate dinner.
4. Suki passed Logic, and she did so without studying.
5. Neither Rex nor Jake failed to attend the dart league semi-finals.
6. Trixie passed the 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 perform a magic show.

D. A Procedure for Finding the Main Sign. Our discussion of the reverse construction tree for “ $((P \wedge Q) \vee \sim R)$ ” began by noting that the vel is the **main sign**, and that the outermost parentheses thus came with the vel (via Construction Rule 4). While it may be easy to see that the vel (and not the wedge) is the main sign here, it is possible to build a technical procedure for detecting the main sign automatically (so that, e.g., a computer which can’t simply “look and see” could still pick out the main sign).

As a first step to such a procedure, assign each symbol in the sentence a **parenthesis count**. Reading from left to right, and starting with parenthesis count 0, each symbol is assigned the count value at that step – following these two rules.

- If the symbol is a left parenthesis, increase the parenthesis count by 1, and assign that left parenthesis the new (increased) count value.
- If the symbol is a right parenthesis, subtract 1 from the parenthesis count, and assign that right parenthesis the new (decreased) count value.

For instance, each symbol in “ $((P \wedge Q) \vee \sim R)$ ” is assigned a parenthesis count value (reading from the left) as follows.

$$\begin{array}{cccccccccccc} 0 & 1 & 2 & 2 & 2 & 1 & 1 & 1 & 1 & 0 & & \\ & (& (& P & \wedge & Q &) & \vee & \sim & R &) & \end{array}$$

Use the parenthesis count, combined with the left-most symbol, to **state a general procedure for finding the main sign** in a formal sentence.