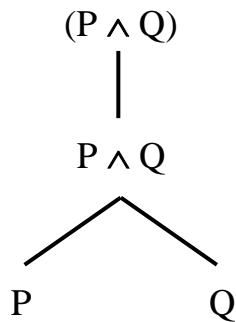


3.8.1. Construction Problems

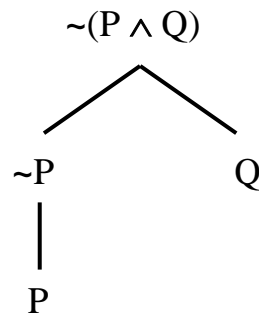
A. For each of the following **bad construction trees**, explain what **mistake** has been made in building that tree.

☠ Bad Tree 1 ☠



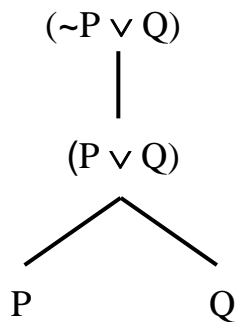
Mistake:

☠ Bad Tree 2 ☠



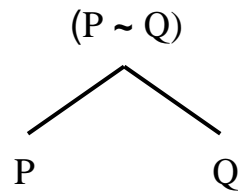
Mistake:

☠ 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 is a genuine sentence** of the formal language.

1. $(P \wedge Q)$
2. $(\sim(P \wedge Q) \vee R)$
3. $(P \wedge Q \vee R)$
4. $(\sim(\sim P) \vee Q)$
5. $((P \wedge P) \vee P) \wedge \sim P$

C. A Procedure for Finding the Main Connective. Note that our discussion of the reverse construction tree for “ $((P \wedge Q) \vee \sim R)$ ” began by noting that the vel is the main connective, 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 connective here, it is possible to build a technical procedure for detecting the main connective automatically (so that, e.g., a computer which can’t simply “look and see” could still pick out the main connective).

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 – with the following two stipulations.

- If the symbol is a left parenthesis, add 1 to the parenthesis count, and assign the left parenthesis the new (increased) count value.
- If the symbol is a right parenthesis, subtract 1 from the parenthesis count, and assign the 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.

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

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