Parentheses, and Translation

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1 Nuts and Bolts

- Trouble enrolling in carnap.io? trouble completing or submitting problems?

2 Conventions for Parentheses

Add the missing parentheses, or explain why the sentence is not well-formed.

1. $P \wedge Q$
2. $\neg\neg P$
3. $P \vee Q \vee R \vee S$
4. $P \wedge Q \wedge R \wedge S$
5. $P \vee Q \wedge R \vee S$
6. $P \rightarrow Q \rightarrow R \rightarrow S$
7. $P \leftrightarrow Q \leftrightarrow R \leftrightarrow S$
8. $P \wedge Q \rightarrow R$
9. $P \rightarrow Q \wedge R$
10. $P \vee Q \rightarrow R \wedge S$
11. $P \rightarrow Q \vee R \rightarrow S$
12. $\neg P \rightarrow Q$
13. $\neg\neg P \rightarrow Q$

Remove unnecessary parentheses where possible.

1. $(P \rightarrow Q)$
2. $\neg(P \rightarrow Q)$
3. $(P \wedge (Q \wedge (R \wedge (S \wedge T))))$
4. $(P \vee (Q \wedge (R \vee (S \wedge T))))$
5. $(((P \vee Q) \vee R) \vee S)$
6. $((P \vee Q) \leftrightarrow (R \vee (S \vee T)))$

3 Translating Between English and Symbols

P: You should have put a ring on it. Q: You liked it. R: You could afford a ring.

Translate into unambiguous English sentences, following the procedure described in the textbook:

1. $\neg\neg R$
2. $Q \rightarrow P$
3. $Q \wedge R \rightarrow P$
4. $Q \rightarrow R \wedge P$
5. $\neg(Q \rightarrow P)$
6. $\neg R \rightarrow \neg(Q \rightarrow P)$
7. $(Q \wedge P) \vee \neg R$
8. $Q \wedge (P \vee \neg R)$

Translate from English into Symbols:

1. You could afford a ring if you liked it.
2. If you couldn't afford a ring, you couldn't afford a ring.
3. You liked it and you should have put a ring on it. @.. It is not the case that you liked it and it is not the case that you should have put a ring on it.

4. It is not the case that both you liked it and you should have put a ring on it.
5. It is not the case that if you could afford a ring, you could afford a ring.
6. You could afford a ring, and if you could afford a ring then you should have put a ring on it.
7. Either you liked it and you should have put a ring on it, or you didn't like it and you shouldn't have put a ring on it. @.. It is not the case that if you liked it then you should have put a ring on it, if you couldn't afford a ring.

4 Thinking about Arguments and Validity

You learn that your ex just got married. You are thinking back on the relationship, and you come to two conclusions:

1. If you liked it then you should have put a ring on it.
2. It is not the case that you should have put a ring on it.

What follows from (1) and (2)?

Next week, you learn that someone you used to hookup with just got married. You think back, and realize:

1. If you liked it then you should have put a ring on it.
2. You liked it.

What follows from (1) and (2)?

Another week passes, and you learn that a kid you went to school with but never liked much has come into a large fortune. You reflect on this, and you weigh in your heart how much you value love and how much you value money. You conclude:

1. If you liked it then you should have put a ring on it.
2. You didn't like it.
3. You should have put a ring on it.

Are (1), (2) and (3) consistent? What does this tell you about what *doesn't* follow from (1) and (2)? What does this tell you about what *doesn't* follow from (1) and (3)?

Here are four possible patterns of argument that involve conditionals and negations. Two of them are valid and the other two are not:

Affirming the Antecedent $\phi \to \psi, \phi \vdash \psi$[1]
Affirming the Consequent $\phi \to \psi, \psi \vdash \phi$
Denying the Antecedent $\phi \to \psi, \neg\phi \vdash \neg\psi$
Denying the Consequent $\phi \to \psi, \neg\psi \vdash \neg\phi$

Go back and symbolize each of the arguments about your past romantic opportunities. Which of the arguments fit which of the patterns? Which of the patterns are valid, and which are not?

[1] The $\vdash$ symbol is called a "turnstyle", and means "therefore".