Assignment 4 (due Thursday, February 28 in class)

0. Introduction (to be read before completing Parts I and II)

For our recent exam, you investigated the relationship between inclusive disjunction ∨ and exclusive disjunction ⊕ in propositional logic. As you discovered, the basic semantic difference between inclusive ∨ and exclusive ⊕ is that the former is compatible with the truth of both disjuncts, while the latter is incompatible with the truth of both disjuncts.

A	*B*	***A* ∨ *B***	***A* ⊕ *B***
T	T	**T**	**F**
F	T	**T**	**T**
T	F	**T**	**T**
F	F	**F**	**F**

You also demonstrated that for any formulas *A* and *B*, (*A* ⊕ *B*) is logically equivalent to (*A* ∨ *B*) & ~(*A* & *B*). (If you are unsure of this fact, then construct a truth table for the latter formula.)

In our class discussion, we saw that this distinction between ∨ and ⊕ appears to be mirrored by the so-called "inclusive" vs. "exclusive" uses of English *or*.

(1) If <u>you have small children, **or** you need special assistance</u>, then you may board the flight early.

The inclusive use of *or* is illustrated in (1), which grants early-boarding privileges to any passenger who is truthfully described by the underlined antecedent (an *or*-sentence). Such passengers include (i) those who have small children, but don't need special assistance, (ii) those who need special assistance, but don't have small children, and (iii) those who <u>both</u> have small children <u>and</u> need special assistance. In other words, *or* in (1) leaves open the possibility that both disjuncts are true, just like inclusive ∨ in propositional logic.

(2) Tonight, we will have hamburgers **or** pizza for dinner.

The exclusive use of *or* is illustrated in (2). Supposing that (2) is uttered by a mother to her children, her children will conclude that their dinner options are (i) hamburgers, but not pizza, or (ii) pizza, but not hamburgers. Crucially, the children will also conclude that having <u>both</u> hamburgers <u>and</u> pizza is not an option. In other words, *or* in (2) appears not to allow for the truth of both disjuncts, just like exclusive ⊕ in propositional logic.

I. Exploring semantic ambiguity with propositional logic

In class, we briefly entertained the **ambiguity hypothesis**, which states that *or* is semantically ambiguous between inclusive and exclusive meanings. On the one hand, we have *or*$_{\text{INCL}}$, which appears in (1). The meaning of o*r*$_{\text{INCL}}$ corresponds to the meaning of inclusive disjunction $\vee$ in propositional logic. On the other hand, we have *or*$_{\text{EXCL}}$, which appears in (2). The meaning of o*r*$_{\text{EXCL}}$ corresponds to the meaning of exclusive disjunction $\oplus$ in propositional logic.

A. If the ambiguity hypothesis were correct, then we would expect the English sentence (3a) to be semantically ambiguous, depending on which version of *or* it contains (compare (3b) to (3c)):

(3) a. I didn't go to Phonetics **or** Syntax 1 today.
b. I didn't go to Phonetics **or**$_{\text{INCL}}$ Syntax 1 today.
c. I didn't go to Phonetics **or**$_{\text{EXCL}}$ Syntax 1 today.

Provide propositional logic formulas that correspond to each of the expected meanings for (3a). Then, construct a truth table for each formula. (Assume the following basic translations of English sentences into propositional variables: p = *I went to Phonetics today* and q = *I went to Syntax 1 today*.)

B. The truth tables that you constructed in Part A should reveal a problem for the ambiguity hypothesis. State this problem as precisely as you can, noting any incorrect predictions that the hypothesis makes concerning the actual truth-conditional meaning(s) for (3a).

II. The conversational implicatures of *or*-sentences

In class, we also discussed the **inclusive-only hypothesis**, which states that *or* is not semantically ambiguous. Rather, there is only *or*$_{\text{INCL}}$, and its meaning always corresponds to the meaning of inclusive disjunction $\vee$ in propositional logic. In other words, even though an utterance of (4) conveys that having both hamburgers and pizza is not an option, the literal meaning for (4) is in fact compatible with having both for dinner.

(4) We will have hamburgers **or**$_{\text{INCL}}$ pizza for dinner. $(r \vee s)$

The exclusive understanding for an *or*-sentence arises because an utterance of (4) will, under normal circumstances, conversationally implicate (5).

(5) We will **not** have both hamburgers **and** pizza for dinner. $\sim(r \,\&\, s)$

The "not both" implicature in (5), when paired with the literal meaning of (4), yields an exclusive understanding for (4) (recall the logical equivalence stated in the Introduction to this assignment).

II. The conversational implicatures of *or*-sentences (continued)

The hearer's reasoning that leads an utterance of (4) to implicate (5) runs as follows: if the speaker has obeyed the conversational maxims, then she has made the most informative contribution that she can (Quantity), while still saying only that which she believes to be true (Quality). The speaker chose to utter (4), when she could have uttered (6):

(6) We will have both hamburgers **and** pizza for dinner. (r & s)

And in fact, an utterance of (6) would have been more informative than her actual utterance of (4), since (6) asymmetrically entails (4). (Use the truth tables for (r & s) and (r ∨ s) to convince yourself of this fact.) Thus, she must believe that the more informative (6) is false; otherwise, her utterance of the less informative (4) violates Quantity. Since the speaker expects us to assume that she is obeying the maxims, she has implicated the denial of (6), which is (5).

A. A potential problem for the inclusive-only hypothesis is that not every *or*-sentence comes with a "not both" implicature. For instance, an utterance of (1) (repeated below) does not implicate the denial of (7)—if it did, then upon hearing (1), a passenger who both has small children and needs special assistance could <u>not</u> conclude that he can board the flight early.

(1) If you have small children, **or** you need special assistance, then you may board the flight early.

(7) If you have small children, **and** you need special assistance, then you may board the flight early.

Provide propositional logic formulas that correspond to (1) and (7). Then, construct a truth table for each formula. (Assume the following basic translations: p = *You have small children* and q = *You need special assistance* and r = *You may board the flight early*.)

B. Use the truth tables from Part A to determine whether any informativity relationship exists between (1) and (7).

C. Your answer from Part B should reveal that (1) is not a problem for the inclusive-only hypothesis after all. Why don't we expect an utterance of (1) to implicate the denial of (7)?

(When answering this question, pay close attention to the way that informativity figures into the reasoning for those cases where the "not both" implicature <u>does</u> arise, such as (4) above.)

III. Presuppositions vs. Entailments

For each of the following, determine

(i) whether the (a)-sentence entails the (b)-sentence,
(ii) whether the (a)-sentence entails the (c)-sentence,
(iii) whether the (a)-sentence presupposes the (b)-sentence, **and**
(iv) whether the (a)-sentence presupposes the (c)-sentence.

Provide the necessary justification to support your answers to (i)–(iv).

(8) a. The woman who murdered Arturo was arrested.
b. A woman was arrested.
c. A woman murdered Arturo.

(9) a. The woman who was arrested murdered Arturo.
b. A woman was arrested.
c. A woman murdered Arturo.

(10) a. John is bald, and John's children are bald too.
b. John has children.
c. A member of John's family is bald.

(11) a. John has children, and John's children are bald.
b. John has children.
c. A member of John's family is bald.

(Tip: when checking for presupposition in (10)–(11), the easiest way to construct the negative versions of (10a) and (11a) is to use the phrase *It's not true that*...)