

Midterm

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1 Directions

2 Entailment and Truth

I. Which of the following pairs of sentences have the same truth conditions?
For pairs which differ in truth conditions give circumstances in which one is true and the other is not.

- (1) No. Someone else might be governor. a is false and b is true then.
- (2) Same TCs
- (3) Different TCs. If John ate a peanut bagel (a) is true and (b) is not.
- (4) Same TCs

II. Definition of entailment:

Sentence A entails B if and only if whenever Sentence A is true, Sentence B is true.
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Which of the pairs of sentences in (1)-(4) are such that one member of the pair entails the other? State which direction the entailment goes. If the entailment goes in both directions, say so.

- (5) Sentence (a) entails sentence (b) but not vice versa. Any sentence that is necessarily true is entailed by all sentences.
- (6) The two sentences entail each other. Any two sentences with the same TCs are mutually entailing.
- (7) Sentence (b) entails sentence (a). If John ate a raisin bagel then he ate a bagel.
- (8) The two sentences entail each other. Any two sentences with the same TCs are mutually entailing.

III. Consider the following claim:

Two sentences with the same truth conditions have the same meaning.

Evaluate this claim with respect to the following data.

- (9) Hard to say that a question even has truth-conditions. When is it true? yet is clearly has a meaning. Yes-no questions are problematic for the claim.
- (10) These sentences have the same truth conditions yet differ subtly in meaning. (b) includes a request for confirmation. This seems problematic for the claim,
- (11) These sentences have the same truth conditions yet differ subtly in meaning. (b) includes an evaluative judgement of the guitar. Hard to say what such evaluative judgements add to the truth conditions. [although maybe we could say they have a literal meaning] This may be problematic for the claim,
- (12) If a triangle had 4 sides, sentence (a) would be false. If a square had 3, sentence (b) would be false. The sentences have different truth conditions but there do not seem to be any possible worlds that distinguish those truth conditions. Thus these sentences appear to

be a problem for a theory of meaning that attempts to reduce truth conditions to truth in possible worlds, but not necessarily for a theory that attempts to reduce meaning to truth conditions.

IV. Can you give an example of two sentences that entail each other but do not have the same truth-conditions? If not, explain why not.

(13) There are no sentences that entail each other but have different truth-conditions. If p entails q the set of situations in which p is true is a superset of the set of situations in which q . If p and q entail each other, they are true in all the same situations. Therefore their truth conditions are the same.

3 Statement Logic

V. Translate the following into statement logic.

(14) a. John won't wake up unless we make him coffee.

Prop	Symbol
John wakes up	<i>wake-up</i>
we make him coffee	<i>make-coffee</i>

c.

yes	$\sim \text{make-coffee} \rightarrow \sim \text{wake-up}$
yes	$\text{wake-up} \rightarrow \text{make-coffee}$
no	$\sim \text{wake-up} \rightarrow \sim \text{make-coffee}$
no	$\text{make-coffee} \rightarrow \text{wake-up}$

d. p unless q means p , if not q ($\sim q \rightarrow p$)

(15) a. John will leave unless we make him a great offer.

b.

yes	$\sim \text{make-offer} \rightarrow \text{leave}$
yes	$\sim \text{leave} \rightarrow \text{make-offer}$
no	$\text{leave} \rightarrow \sim \text{make-offer}$
no	$\text{make-offer} \rightarrow \sim \text{leave}$

(16) a. You do that again and I'll smack you.

b.

yes	$\text{do-that} \rightarrow \text{smack-you}$
no	$\text{do-that} \wedge \text{smack-you}$

VI. Classify the following sentences of statement logic as to whether they are tautologies, contradictions, or contingent. Show truth tables to support your wild claims.

a $(p \rightarrow (q \rightarrow p))$ Tautology

p	q	$q \rightarrow p$	$p \rightarrow (q \rightarrow p)$
T	T	T	T
T	F	T	T
F	T	F	T
F	F	T	T

b $((p \rightarrow q) \rightarrow p)$ Contingent

p	q	$p \rightarrow q$	$((p \rightarrow q) \rightarrow p)$
T	T	T	T
T	F	F	T
F	T	T	F
F	F	T	F

c $\sim p \vee \sim q \vee p$ Tautology

p	q	$\sim p$	$\sim q$	$p \vee \sim q \vee \sim p$
T	T	F	F	T
T	F	F	T	T
F	T	T	F	T
F	F	T	T	T

d $\sim (p \vee \sim q) \vee p$ Contingent

p	q	$\sim q$	$p \vee \sim q$	$\sim (p \vee \sim q)$	$\sim (p \vee \sim q) \vee p$
T	T	F	T	F	T
T	F	T	T	F	T
F	T	F	F	T	T
F	F	T	T	F	F

4 Quantifiers, Scope, and Translation

- (17) a. Every man I know speaks Quechua.
 b. $\forall x[(\text{man}(x) \wedge \text{know}(\text{I}, x)) \rightarrow \text{speak}(x, \text{Quechua})]$
- (18) a. I know every man who speaks Quechua.
 b. $\forall x[(\text{man}(x) \wedge \text{speak}(x, \text{Quechua})) \rightarrow \text{know}(\text{I}, x)]$
- (19) a. John read few books about baseball.

- b. $[\text{Few } x \text{ book}(x) \wedge \text{about}(x, \text{baseball})] \text{read}(j, x)$
- (20) a. The yellow gorilla ate the green bandana. [Note: sentences like these are used to test aphasics]
 b. $[\text{The } xyellow(x) \wedge gorilla(x)][\text{The } ygreen(y) \wedge banana(y)]eat(x, y)$
- (21) a. Most girls like most boys.
 b. $\text{Most } x[\text{girl}(x)] \text{Most } y[\text{boy}(y)] \text{like}(x, y)$
- (22) a. Suppose the the girls are Alice, Betty, and Carol, and the boys are Al, Bob, and Clark. Suppose people with the same first letter in their name always like each other and that everyone likes Bob. Is (21a) true?
 b. Yes. Most of the girls (Alice and Carol) like at least two boys.
- (23) a. Is the following true in the situation described in (22a)?

$$\text{Most } y[\text{boy}(y)] \text{Most } x[\text{girl}(x)] \text{like}(x, y)$$

 b. No. Although Bob is loved by most of the girls, neither Al nor Clark are.
 c. Is (a) Is this a reading of (21a)? Yes. It requires just what (22a) does not, that a majority of the boys be such that they are loved by a majority of the girls.
 d. Is it the only reading? No. A more natural reading is given in (21b). The readings in (21b) are truth-conditionally distinct because one is true in the situation described in (22a) and the other is not.

5 Modality

- VII. Determine for each of the following sentences whether it uses logical, epistemic, or deontic modality (or whether it is ambiguous). Use D for the perfectly obedient worlds, E for the set of worlds consistent with our knowledge and W for the set of all worlds.

- (24) a. John might have eaten my bagel.

$\exists w \in E$ [John eats my apple in w]

- b. There could have been a tsunami.

$\exists w \in E$ [There is a tsunami in w]

- c. A good songwriter should never repeat the same line with the same chords.

$\forall w \in D$ [\sim A songwriter repeats the same line with the same chords in w]

D is the really the set of aesthetically perfect worlds, at least as far as songwriting goes Notice I have left the word “good” in the description of what happens in w . This is not required in the correct answer, but it seems reasonable. In those worlds, every songwriter is a good songwriter.

6 Aspect Classification of Verbs

VIII. Classify the following ...

- (25) a. This box contains 3 pounds of chocolate. [state]
b. * This box is containing 3 pounds of chocolate.
- (26) a. Warren baked the cake [activity and accomplishment]
b. Warren baked the cake for 3 hours.
c. Warren baked the cake in 3 hours.
- (27) a. John remembered the party on Tuesday. [achievement]
b. ? John remembered the party for 3 hours.
c. You will remember the party in 3 hours. [onset reading only]

IX. The following are all inchoatives..

- (28) a. An inchoative is an intransitive verb related to an adjective whose meaning can be paraphrased *become adjective*
b. The beer cooled for an hour.

- c. The beer cooled in three hours.
- d. The tub filled for an hour.
- e. The tub filled in an hour.
- f. The San Andreas Fault opened for millennia.
- g. The San Andreas Fault opened in a mere 50,000 years.

7 Tense and Aspect

- X. Give the Reichenbachian analysis of the following sentences. Use a time line and include in your diagram E, S, and R. Explicitly show the intervals connected with temporal frame adverbials and make sure I can tell whether E, S, and R fall into that frame.
- XI. What is Reichenbach's explanation for why the frame adverbial *yesterday* does not work in the following sentence:

- (29) a. John had written the letter before Mary arrived.
 E1 = writes, E2 = arrives. $E1 < E2 [=R] < S$
- b. John will have left by Tuesday.
 E = leaves; $R \in [\text{by Tuesday}]$; $S < E < R$
- c. John remembered the party on Tuesday.
 E = remembers; $R \in [\text{by Tuesday}]$; $E, R < S$