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PHILOS 12A / DIS 102

GSI: Mathias Boehm

Problem Set #4

Exercise 4.3

1. *Suppose you are told that the atomic sentence A is in fact a logical truth (for example, a = a). Can you determine whether any additional sentences in the list (1)-(4) are logically necessary based on this information?*

Because it's assumed that A is a logical truth, then Sentences 1 and 4 would be logically necessary. It would be all True even if the rows where the A is False. It is a logical necessity. All tautologies are logical necessities.

Going through the sentences, Sentence 2 is similarly logically necessary because there would be True all throughout after some adjustment. It would be a tautology and logically necessary. Although, Sentence 3 wouldn't be the same. It would not be logically necessary since there would still be False. There is an instance where Sentence 3 is false.

2. *Suppose you are told that A is in fact a logically false sentence (for example, a≠ a). Can you determine whether any additional sentences in the list (1)-(4) are logical truths based on this information?*

Because it's assumed that A is a logically false statement, then Sentences 1 and 4 are again logically necessary. It would be all True even if the rows where the A is False It is a logical necessity because all tautologies are logical necessities.

Going through each of the sentences, Sentence 2 would not be logically necessary. There would still be some instances where Sentence 2 is false. As a result, Sentence 2 is not a logical necessity. Sentence 3 would be logically necessary since there would be all Trues left after removing the rows where A is False. It is a tautology and logically necessary.

Exercise 4.8
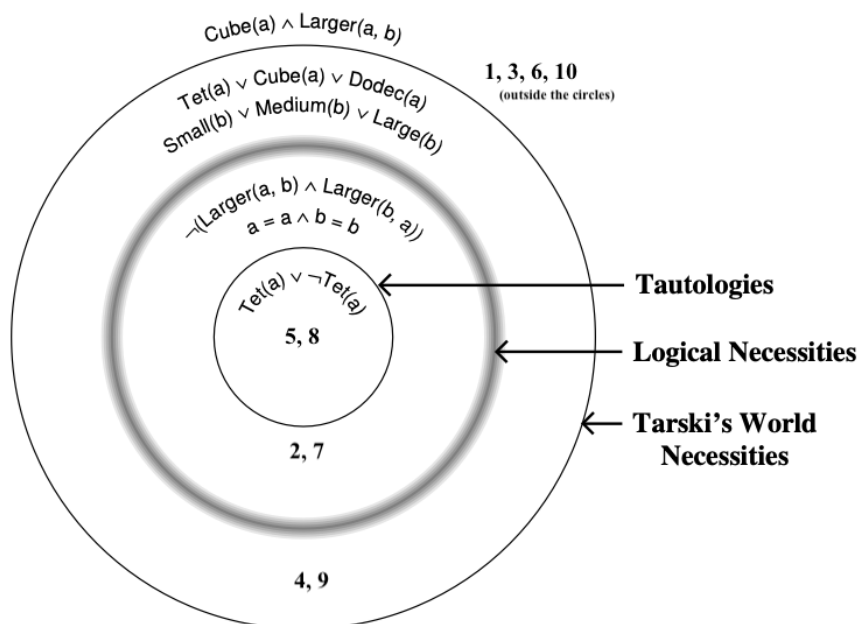
Exercise 4.19

1. *What is the relationship between tw-equivalence, tautological equivalence and logical equivalence?*

A Tarski's World (TW) equivalence is a logical equivalence. It follows that the all sentences that are TW-equivalent are logically equivalent but not vice versa. It's such that all sentences are logically equivalent, but they're not always TW-equivalent.

Meanwhile for tautological equivalence, it's different. TW-equivalent sentences that are tautologically equivalent can be TW-equivalent, but this does not imply that one equivalence is an existence of another.

2. *Give an example of a pair of sentences that are tw-equivalent but not logically equivalent.*

Sentence 1: SameRow(a, b) ∧ SameCol(a, b)

Sentence 2: c = d