Discussion 8

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CSEN 5303 Foundations of Computer Science

October 24, 2022

Problem statement. Consider the statement:
"There is a person x who is a student in CSEN 5303 and has visited Mexico".
Explain why the answer cannot be $\exists x(S(x) \to M(x))$.

$S(x) : x$ is a student in CSEN 5303.
$M(x) : x$ has visited Mexico.
"There is a person x who is a student in CSEN 5303 and has visited Mexico": $\exists x(S(x) \wedge M(x))$

$S(x)$	$M(x)$	$S(x) \wedge M(x)$	$S(x) \to M(x)$
T	T	T	T
T	F	F	F
F	T	F	T
F	F	F	T

Since the truth table values are different, the two statements are not equivalent.

Note: $\exists x(S(x) \to M(x))$ is known as the Drinker's Paradox, and is true in two cases. Case one: there is a CSEN 5303 student who visited Mexico, which intuitively makes sense. Case two: there is a person who is not a CSEN 5303 student (regardless of whether this person visited Mexico or not). This second case is highly unintuitive gives the paradox its name.