
Problem of the Week

Solution Nine

Recall that we now have three kinds of people. There are knights, who only make true statements and knaves, who only make false statements. There are also people in the transitional phase. They are called “Neutrals” and only make statements with the truth value N.

The agreed upon truth tables for conjunctions (and) and disjunctions (or) statements are:

\wedge	T	N	F	\vee	T	N	F
T	T	N	F	T	T	T	T
N	N	N	F	N	T	N	N
F	F	F	F	F	T	N	F

So here's the problem:

You meet three people, who make the following statements:

Doctor Daystrom : Frankenstein is a knight and Frankenstein is a knave.

Elmer Fudd : Frankenstein is a knave or Frankenstein is not a knave.

Frankenstein : Doctor Daystrom is a knight or Elmer Fudd is a knave or I am a neutral.

Please determine the types of all three people.

SOLUTION: Doctor Daystrom is a knave, Elmer Fudd is a knight and Frankenstein is a neutral.

Since Doctor Daystrom's statement is a classical contradiction, we know that he is either a knave or a neutral. Likewise, since Elmer Fudd's statement is a classical tautology we know he is either a knight or a neutral. It follows that neither of the first two parts of Frankenstein's statement are true. They are either false or neutral.

Frankenstein cannot be a knight, since then none of the three parts of his disjunction is true. That would imply the entire disjunction could not be true, which is a contradiction. Nor can Frankenstein be a neutral, since then the third part of his disjunction would be true. That would render the whole statement true, which is a contradiction since neutrals cannot make true statements. It follows that Frankenstein is a knave.

It now follows that neither Doctor Daystrom's statement nor Elmer Fudd's statement can be neutral, and therefore they have classical truth values. This is possible only if Doctor Daystrom's statement is false and Elmer Fudd's statement is true.