Assignment #3
Due on Monday, 5 October, 2015.

Paradox Lost or Paradox Gained?

1. Supergame. A two-player game in which the players take turns making moves is considered to be *finite* if it cannot go on forever when played by the rules. For example, tic-tac-toe is finite. So is chess, thanks to some obscure rules about about the game being an automatic draw if no one captures a piece, moves a pawn, or delivers checkmate in a certain number of moves. (50 by each player in most situations, but there are a few exceptions to cover situations in which a checkmate can be forced, but it requires more than 50 moces to do so.) The two-player game supergame is played as follows: the first player chooses a finite two-player game, which the two players proceed to play out with the second player going first. Is supergame itself finite? Explain why or why not. *[5]*

   Hint: This is really a problem about definability in set theory . . .

2. The Unexpected Test.[†] In a certain mathematics class Professor B, who always tells the truth and is never mistaken, explains the marking scheme for the course to the students.

   "This course meets once each week. There will be only one test, which will be written in class in one of the twelve weeks of the next term. However you will not know which week it is until the class in which the test is given."

   Is there any way to determine in which week the test is given? Explain why or why not. If there is, in which week will the test be written? *[5]*

For fans of philosophy:

> Probable-Possible, my black hen,
> She lays eggs in the Relative When.
> She doesn't lay eggs in the Positive Now,
> Because she's unable to Postulate How.

From *The Space Child's Mother Goose* by Frederick Winsor.

[†] No one expects the mathematical inquisition!