Assignment #7: The measurement problem (due April 4). Answer the first question in a page or so, the second question in a paragraph, and the third question in three pages. (One page = 300 words.) Some general hints: There is a clearly right answer to the second question. The third question—especially the last part of it—is more controversial, and what will matter most to us is how thoughtfully you defend whatever answer you give. The first question has a pretty clearly right answer; you can if you wish try to defend the *other* answer, but you will have your work cut out for you (and will, at any rate, need to recognize the principal objections).

1. **(2 points)** Here is a response one often hears to the claim that there is a conflict between the deterministic character of Schrödinger's Equation and the probabilistic character of the measurement process: "There is no conflict between the determinism of Schrödinger's Equation and the chanciness of measurement outcomes. For Schrödinger's Equation says merely that the *probabilities* evolve deterministically." Does this response succeed? Why or why not? Your answer to this question should take into account what both Maudlin and Albert have to say about the measurement problem. (**Think carefully** about what, precisely, it could mean to say that only the probabilities evolve deterministically. You should ask, "Probabilities of what?")

2. **(1 point)** Here is another response one often hears: "Schrödinger's Equation only says that the quantum mechanical state of an *isolated* system evolves deterministically. But when a system is being measured, it is quite obviously interacting with a measuring device and so is *not* isolated. So Schrödinger's Equation doesn't apply, and there is consequently no conflict between the claim that it is deterministic and the claim that measurement outcomes are chancy." Explain what is wrong with this response, drawing where appropriate on Maudlin's discussion.

3. **(4 points)** Suppose someone takes the extreme instrumentalist view that the *only* proper role for a physical theory is to predict the results of experiments (or at least, to predict their probabilities). Which, if any, of the three claims that make up the problem of outcomes would (or could) such a person reject? Which, if any, of the three claims that make up the problem of statistics would (or could) such a person reject? Does this position succeed in avoiding the *third* of Maudlin's three measurement problems? Why or why not? Finally, how reasonable a view *is* this kind of extreme instrumentalism?