Albert & Loewer on Quantum Chances

*This exercise is **optional** but highly recommended if you've missed an exercise or Blackboard discussion in previous weeks. Hand in your answers anonymously on Blackboard by **Monday the 27th at 8pm**.*

1. Explain the following terms in your own words (no need to go into any mathematical detail). Use examples where helpful:
   a. **Wave Function** (ψ_S)
   b. **Schrödinger Equation** ($\psi_S(t) \mapsto \psi_S(t + x)$)
   c. **Eigenstates** ($O_1, O_2 \ldots$)
   d. **Superposition** ($c_1 \cdot O_1 + c_2 \cdot O_2$)
   e. **Entanglement** ($c_1 \cdot O_1 \otimes Q_1 + c_2 \cdot O_2 \otimes Q_2$)
   f. **Wave Collapse** ($c_1 \cdot O_1 + c_2 \cdot O_2 \mapsto O_2$)
   g. **The Born Rule**

2. Suppose you use the "Universe Splitter" app discussed in the third part of the lecture to decide your major. You fill in "take a philosophy major" in one field and "take a physics major" in the other, resolving to do whatever the app tells you to. To determine a choice, the app sends a signal to a lab in Switzerland where a 50/50 quantum experiment is performed — say a fair quantum coin is flipped. Depending on the outcome of the experiment, the app recommends one course of action or the other.
   a. Assuming Albert and Loewer's Many Minds version of quantum mechanics is true, describe what will happen to your phone, and to your body, if you do this.
   b. What will happen to your mind?
   c. Explain why this story requires that you have more than one mind.
   d. Explain why it requires that everyone else in the world has multiple minds as well.
   e. Do you think Albert and Loewer are right that positing a separate layer of minds is required to make sense on the many worlds interpretation? Give a reason.