**Homework on Reasoning about the Knowledge of Multiple Agents**

1. As no two events occur simultaneously, it is unlikely to attain common knowledge in a practical situations. Still, in practice, we seem to reach agreement regarding common knowledge. Briefly discuss two solutions to this apparent discrepancy.
2. Create an example of a Kripke structure with 4 agents and show it in a labeled graph where Ki s are not symmetric but transitive.
3. The partitioning of worlds to allow reasoning about probability can be done by collapsing worlds that contain some difference that agent 1 cannot detect. However, this can lead more statements to be essentially different. Give an example of a scenario where the probability of an event is at least 75% but the event collapses.
4. Say under the algorithmic model, with deterministic polynomial-bounded algorithms, agent A sends an encrypted message to agent B. Agent E sees the encrypted message. Assume that E has no knowledge about the plaintext before the ciphertext is sent, but could recognize the plaintext from decrypted gibberish (i.e. in polynomial time in the length of the ciphertext and of the key, and given the key, could decrypt the ciphertext, determine that the key was valid, and know the plaintext was the decrypted text). Does E have algorithmic knowledge of the key from only the ciphertext?