COSC 6111 Advanced Design and Analysis of Algorithms
Jeff Edmonds
Assignment: Distributed Systems: Mud on Forehead and Common Knowledge

First Person:
Family Name:
Given Name:
Student #:
Email:

Second Person:
Family Name:
Given Name:
Student #:
Email:

Problem Name	If Done Old Mark	Check if to be Marked	New Mark
1 Mud			

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1.

(a) Give a graph in order to demonstrate an example in which $K_A K_B F$ and $\neg K_B K_A F$. Here F is a fact that may or may not be true and A and B are players. The nodes of the graph are the possible universes. There are circles around sets of nodes that player A can't be distinguished and similarly for B.

(b) Given a graph with nodes giving the possible universes and edges giving which pairs of universes can't be distinguished by each player. Suppose all the players come together and share their knowledge. How does this change the graph? Let S_i be the set of universes that player i thinks are possible given what he can differentiate and the actually universe. What is the set S of universes that they think are possible once they share their information?