Week Six Assignment

Modal Theorems and Conditionals

Due August 14, 5pm

The Logic KT

Which of these are theorems of KT?

1. $\Box A \rightarrow (A \wedge \Diamond A)$
2. $\Box(A \rightarrow B) \rightarrow (A \rightarrow B)$
3. $A \rightarrow \Box\Diamond A$
4. $A \rightarrow \Diamond\Box A$
5. $(\Box A \wedge \Diamond B) \rightarrow (A \wedge \Diamond\Diamond B)$

The Logic S4

Which of these are theorems of S4?

6. $\Box\Diamond A \rightarrow \Box\Box\Diamond A$
7. $\Box\Diamond A \rightarrow \Box\Diamond\Diamond A$
8. $\Diamond\Box A \rightarrow \Box\Diamond A$
9. $\Box\Diamond A \rightarrow \Diamond\Box A$
10. $\Diamond\Box A \vee \Box\Diamond\Diamond\neg A$

The Logic S5

Which of these are theorems of S5?

11. $\Diamond A \rightarrow \Box\Box\Diamond A$
12. $\Box A \vee \neg A$
13. $\Diamond\Box A \rightarrow \Box\Diamond A$
14. $\Box\Diamond A \rightarrow \Diamond\Box A$
15. $\neg\Diamond((A \wedge \neg\Box A) \wedge \Diamond\Box(A \wedge \neg\Box A))$

Assignment continues on next page

For each of the following arguments, I want you to find substitution instances for A, B and (if necessary) C to make the arguments intuitively have true premises and a false conclusion. In most cases there are examples of these in the textbook or the slides - you **must** use your own versions, not those. If you need to explain the background to the examples, you can do that as well in the text boxes provided.

Question 16

1. If it were the case that A, it would be the case that B.
2. So, if it were the case that $C \wedge A$, it would be the case that B.

Question 17

1. If it will be the case that A, it will be the case that B.
2. So, if it will the case that $C \wedge A$, it will be the case that B.

Question 18

1. If it was be the case that A, it was be the case that B.
2. So, if it was the case that $C \wedge A$, it was be the case that B.

Question 19

1. If it were the case that A, it would be the case that B.
2. If it were the case that B, it would be the case that C.
3. So, if it were the case that A, it would be the case that C.

Question 20

1. If it were the case that A, it would be the case that $B \vee C$.
2. So *either*, if it were the case that A, it would be the case that B, *or*, if it were the case that A, it would be the case that C.