

Chapter Three Semantic Problems

R2.13.08

A. For each of the following symbolic arguments, use **truth tables** or **truth trees** to decide whether or not the argument is valid.

1. We won't have both a tax cut and increased spending on Logic research.
We won't have increased spending on logic research unless we have a tax cut.

Therefore, we won't have increased spending on Logic research, but we will have a tax cut.

2. Neko won't eat fish unless Suki does.

Suki won't eat fish unless Neko does.

Either Neko won't eat fish, or Suki won't.

Therefore, either Neko nor Suki will eat fish.

3. Either Ace and Zeke will both pass the logic exam, or neither of them will.

Therefore, Zeke won't pass the logic exam unless Ace does.

4. We'll either have ice cream or cake, but not both.

Unless we have ice cream, we won't have cake.

Therefore, we'll have ice cream without having cake.

5. Either Ace and Zeke will both attend the meeting, or neither of them will.

Either Ace or Zeke will fail to attend the meeting.

Therefore, either Ace will attend the meeting or Zeke will, but not both.

6. Either we'll have a quiz on Monday, or we'll have a quiz on Tuesday.

Either we'll have a quiz on Tuesday, or we'll have a quiz on Wednesday.

Therefore, either we'll have a quiz on Monday, or we'll have a quiz on Wednesday.

B. For each of the following symbolic arguments, use **truth trees** to decide whether or not the argument is valid.

1. The senate will pass the bill without holding a special hearing.
The governor will sign the bill unless the senate holds a special hearing.
Therefore, the senate will pass the bill, and the governor will sign it.

2. *Shao Lin Logic* was shot in either Hong Kong or Beijing.
Shao Lin Logic featured fight scenes, but didn't use stunt men.
Therefore, unless *Shao Lin Logic* used stunt men, it was filmed in Hong Kong.

3. Either Timbuktu Tech will win the game without going into overtime, or Bleak Prairies University will win the game without making a last-second shot.
Timbuktu Tech will neither go into overtime nor win the game.
Therefore, Bleak Prairies University will not make a last-second shot.

4. Kangaroos are indigenous to either Europe or Australia.
Kangaroos are indigenous to either Australia or South America.
Kangaroos are not indigenous to Europe.
Therefore, kangaroos are indigenous to South America.

5. Unless Descartes is thinking, he cannot doubt that he is thinking
Either Descartes can doubt that he is thinking, or he is thinking.
Descartes isn't thinking unless he exists.
Therefore, Descartes exists. (from KMM p. 35, #34)

C. Build a truth table for each of the following sentences, to show that the sentence is a **tautology**.

1. $\sim(P \wedge \sim P)$

2. $(P \vee \sim P)$

3. $(\sim Q \vee (\sim P \vee Q))$

4. $(P \vee (\sim P \vee Q))$

5. $(P \vee \sim(P \wedge Q))$

6. $((P \vee \sim(P \wedge P))$

7. $((P \vee Q) \vee \sim(P \wedge Q))$

8. $((P \vee Q) \vee (\sim P \wedge \sim Q))$

9. $((P \vee Q) \wedge (\sim P \vee Q)) \vee \sim Q$

10. $((P \wedge Q) \vee (\sim P \wedge Q)) \vee \sim Q$