Solution: Quiz 1

1. Determine whether the following argument form is valid or not by using the truth table.

   If I am lazy, then I don't come to class.

   I come to class.

   $\therefore$ I am not lazy.

Answer:

Let p be the statement "I am lazy" and q be the statement "I don't come to class. " Then

$$\begin{aligned} & p \to q \\ & \sim q \\ \therefore \quad & \sim p \end{aligned}$$

Truth table:

p	q	$p \to q$	$\sim q$	$\sim p$	
T	T	T	F		
T	F	F	T		
F	T	T	F		
F	F	T	T	T	← critical row

Notice that the columns 3 and 4 consist of the truth values of premises. Since every critical row (the fourth row is the only critical row here) has true premises with true conclusion, then this argument is **valid**.

REMARK: Alternatively, it is also possible to define q differently as shown below. The results is still the same in this case.

Let p be the statement "I am lazy" and q be the statement "I come to class. " Then

$$\begin{aligned} & p \to \sim q \\ & q \\ \therefore \quad & \sim p \end{aligned}$$

Truth table:

p	q	$\sim p$	$\sim q$	$p \to \sim q$	q	$\sim p$	
T	T	F	F	F	T		
T	F	F	T	T	F		
F	T	T	F	T	T	T	← critical row
F	F	T	T	T	F		

Notice that the columns 5 and 6 consist of the truth values of premises. Since every critical row (the third row is the only critical row here) has true premises with true conclusion, then this argument is **valid**.