

Problem Is the following argument valid?

If I don't get an "A" for the final exam I won't get an "A" for the course. I got an "A" for the course. Therefore I got an "A" on the final exam.

Let's translate the argument into logic.

P : I get an "A" on the final exam

Q : I get an "A" for the course.

$$((\neg P \Rightarrow \neg Q) \wedge Q) \Rightarrow P$$

P	Q	$\neg P$	$\neg Q$	$\neg P \Rightarrow \neg Q$	$(\neg P \Rightarrow \neg Q) \wedge Q$	$((\neg P \Rightarrow \neg Q) \wedge Q) \Rightarrow P$
T	T	F	F	T	T	T
T	F	F	T	T	F	T
F	T	T	F	F	F	T
F	F	T	T	T	F	T

The argument is logically valid
 Since this is a tautology.

Problem Is the following valid?

you must pass the final exam
or pass all the tests if you
pass the course. you failed the
final exam and the course.
therefore you must not have
passed all the tests.

P: you pass the final exam

Q: you pass the course

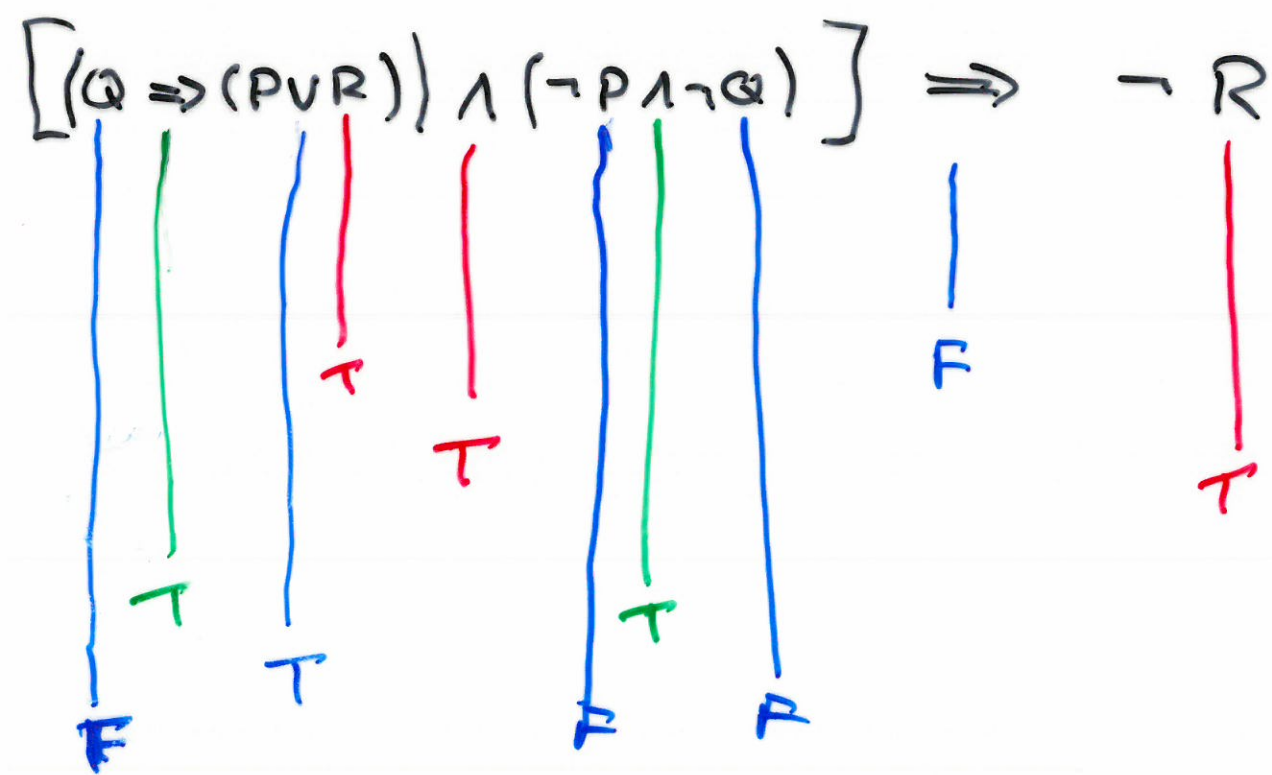
R: you pass all the tests

$$[(Q \Rightarrow (P \vee R)) \wedge (\neg P \wedge \neg Q)] \Rightarrow \neg R \quad (*)$$

P	Q	R	$Q \Rightarrow (P \vee R)$	$\neg P \wedge \neg Q$	$(Q \Rightarrow (P \vee R)) \wedge (\neg P \wedge \neg Q)$	(*)
T	T	T	T	F	F	T
T	T	F	T	F	F	T
T	F	T	T	F	F	T
F	T	T	T	F	F	T
T	F	F	T	F	F	T
F	T	F	F	F	F	T
F	F	T	F	T	F	F
F	F	F	T	T	F	T

This is not a valid argument
 since the corresponding truth
 formula is not a tautology.

Here is an alternative method
for seeing that (*) is not
a tautology.



So for $Q = F$ $P = F$ $R = T$ the
expression (*) has value F.

$$[(P \Rightarrow Q) \wedge (\neg Q \Rightarrow R) \wedge (R \wedge P) \Rightarrow \neg S] \Rightarrow Q$$

$\begin{array}{ccccccc}
\downarrow & & \downarrow & & \downarrow & & \downarrow \\
P & & \neg Q & & R & & \neg S \\
\downarrow & & \downarrow & & \downarrow & & \downarrow \\
T & & T & & T & & F
\end{array}$

~~we'll analyse this tomorrow.~~

\downarrow
F

So this formula is not a tautology, and so the formal argument of yesterday is not valid.