

TD1: propositional logic (LP_0)

Exercise 1: Some tables

Find formulas of A et B matching the following tables:

$[A]_\sigma$	$[B]_\sigma$	$[\varphi_1]_\sigma$	$[\varphi_2]_\sigma$	$[\varphi_3]_\sigma$	$[\varphi_4]_\sigma$	$[\varphi_5]_\sigma$	$[\varphi_6]_\sigma$
<i>ff</i>	<i>ff</i>	<i>ff</i>	<i>tt</i>	<i>ff</i>	<i>tt</i>	<i>tt</i>	<i>ff</i>
<i>ff</i>	<i>tt</i>	<i>ff</i>	<i>ff</i>	<i>tt</i>	<i>tt</i>	<i>tt</i>	<i>tt</i>
<i>tt</i>	<i>ff</i>	<i>ff</i>	<i>ff</i>	<i>tt</i>	<i>ff</i>	<i>tt</i>	<i>ff</i>
<i>tt</i>	<i>tt</i>	<i>tt</i>	<i>ff</i>	<i>ff</i>	<i>tt</i>	<i>tt</i>	<i>tt</i>

Exercise 2: Some formulas

Write the tables of

- (a) $(\neg A)$
- (b) $(\neg(A \wedge B))$
- (c) $((A \wedge B) \vee ((\neg A) \wedge (\neg B)))$

Exercise 3: Natural language

Are the following propositions true or not?

- (a) The fact that Napoléon is dead imply that he won the battle of Waterloo.
- (b) The fact that a mathematic professor of yours is the queen of England imply that one of your biology professors is the king of Spain.
- (c) The fact that I will win the lottery at least once in my whole life imply that water wets.

Exercise 4:

An inspector of public health services is inspecting a psychiatric hospital where some strange cases were reported. In this hospital, there are only patients and physicians, but both of them can be sound of mind or totally crazy. The inspector has to take out people that have nothing to do here, that is sane patients and crazy doctors (at the risk of reintegrate them later as patients). He assumes that sane persons tell only the truth, while insane persons say only false things. In a room, he interviews two persons (named A and B to preserve their anonymity). A says that B is insane and B says that A is a doctor.

After an long thinking, the inspector bring out one of the two of the hospital. Which one (and why?)

Is there anything to say about the other?