

## TD2: Logique

### Exercice 2: FND.

$$\begin{aligned} 1. \neg(p \wedge (q \Rightarrow p)) &\equiv \neg(p \wedge (\neg q \vee p)) \\ &\equiv \neg p \vee \neg(\neg q \vee p) \\ &\equiv \neg p \vee (q \wedge \neg p) \\ &\equiv (\neg p \vee q) \wedge (\neg p \vee \neg p) \equiv \neg p \vee q. \end{aligned}$$

$$\begin{aligned} 2. ((p \vee q) \Rightarrow R) \vee ((p \Rightarrow R) \wedge (q \Rightarrow R)) \\ &\equiv (\neg(p \vee q) \vee R) \vee ((\neg p \vee R) \wedge (\neg q \vee R)) \\ &\equiv ((\neg p \wedge \neg q) \vee R) \vee ((\neg p \wedge \neg q) \vee (\neg p \wedge R) \vee (R \wedge \neg q) \\ &\quad \vee (R \wedge R)) \\ &\equiv (\neg p \wedge R) \vee (\neg q \wedge R) \end{aligned}$$

### Exercice 3

A: Alice went C, D, E ...

B: Bob went

$$\varphi_1: (A \Rightarrow B)$$

$$\varphi_2: \neg C \vee \neg \neg D$$

$$\varphi_3: E \Rightarrow C$$

$$\varphi_4: A \vee B \vee C \vee D \vee E$$

$$(\neg A \vee B) \wedge (\neg C \vee \neg D) \wedge (\neg E \vee C) \wedge \varphi_4$$

$$1: E, D$$

Exercice 5:

$$1. \left. \begin{array}{l} L_{1,t_1}, L_{2,t_2}, L_{3,t_3}, L_{4,t_4} \\ C_{1,t_1}, C_{2,t_2}, C_{3,t_2}, C_{4,t_4} \end{array} \right\} \text{Vrai}$$

le reste à faux

$$T: \{t_i \mid i \in \mathbb{N}\} \text{ (pas nécessaire)}$$

$$L: \{i \mid 1 \leq i \leq n\} \quad C: \{i \mid 1 \leq i \leq n\}$$

les variables sont:

$$L_{l,x}, C_{c,x}$$

$$\varphi_1: \bigwedge_{l \in L} \bigvee_{x \in T} L_{l,x} \quad \varphi_2: \bigwedge_{l \in L} \bigwedge_{(x_1, x_2) \in L^2} \neg L_{l,x_1} \vee \neg L_{l,x_2}$$

$$\varphi_3: \bigwedge_{c \in C} \bigvee_{x \in T} C_{c,x} \quad \varphi_4: \bigwedge_{c \in C} \bigwedge_{(x_1, x_2) \in L^2} \neg C_{c,x_1} \vee \neg C_{c,x_2}$$