

# Inteligencia Artificial

## Tarea 6

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## Tablas de verdad

$$[(P \rightarrow Q) \wedge Q] \rightarrow Q$$

P	Q	$P \rightarrow Q$	$(P \rightarrow Q) \wedge Q$	$[(P \rightarrow Q) \wedge Q] \rightarrow Q$
V	V	V	V	V
V	F	F	F	V
F	V	V	F	V
F	F	V	F	V

**Tautología**

$$(P \rightarrow Q) \vee (P \leftrightarrow Q)$$

P	Q	$P \rightarrow Q$	$P \leftrightarrow Q$	$(P \rightarrow Q) \vee (P \leftrightarrow Q)$
V	V	V	V	V
V	F	F	F	F
F	V	V	F	V
F	F	V	V	V

**Resultados combinados**

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

P	Q	$\neg Q$	$P \rightarrow Q$	$P \wedge \neg Q$	$(P \rightarrow Q) \wedge (P \wedge \neg Q)$
V	V	F	V	F	F
V	F	V	F	V	F
F	V	F	V	F	F
F	F	V	V	F	F

**Contradicción**

$$(P \wedge Q) \rightarrow P$$

P	Q	$P \wedge Q$	$(P \wedge \neg Q) \rightarrow P$
V	V	V	V
V	F	F	V
F	V	F	V
F	F	F	V

**Tautología**

$$P \vee (Q \rightarrow R)$$

P	Q	R	$Q \rightarrow R$	$P \vee (Q \rightarrow R)$
V	V	V	V	V
V	V	F	F	V
V	F	V	V	V
V	F	V	V	V
F	V	V	V	V
F	V	F	F	F
F	F	V	V	V
F	F	V	V	V

**Resultados combinados**

$$(P \rightarrow Q) \wedge (Q \rightarrow P)$$

P	Q	$P \rightarrow Q$	$Q \rightarrow P$	$(P \rightarrow Q) \wedge (Q \rightarrow P)$
V	V	V	V	V
V	F	F	V	F
F	V	V	F	F
F	F	V	V	V

**Resultados combinados**

$$[(P \rightarrow Q) \wedge (Q \rightarrow R)] \rightarrow (P \rightarrow R)$$

P	Q	R	$P \rightarrow Q$	$Q \rightarrow R$	$[(P \rightarrow Q) \wedge (Q \rightarrow R)]$	$(P \rightarrow R)$	$[(P \rightarrow Q) \wedge (Q \rightarrow R)] \rightarrow (P \rightarrow R)$
V	V	V	V	V	V	V	V
V	V	F	V	F	F	F	V
V	F	V	F	V	F	V	V
V	F	F	F	V	F	V	V
F	V	V	V	V	V	V	V
F	V	F	V	F	F	V	V
F	F	V	V	V	V	V	V
F	F	F	V	V	V	V	V

**Tautología**

$$\rightarrow \neg Q) \quad (P \rightarrow Q) \wedge (\neg P \rightarrow \neg Q)$$

P	Q	$\neg P$	$\neg Q$	$P \rightarrow Q$	$\neg P \rightarrow \neg Q$	$(P \rightarrow Q) \wedge (\neg P \rightarrow \neg Q)$
V	V	F	F	V	V	V
V	F	F	V	F	V	F
F	V	V	F	V	F	F
F	F	V	V	V	V	V

**Resultados combinados**

$$P \rightarrow (Q \rightarrow R)$$

P	Q	R	$Q \rightarrow R$	$P \rightarrow (Q \rightarrow R)$
V	V	V	V	V
V	V	F	F	F
V	F	V	V	V
V	F	V	V	V
F	V	V	V	V
F	V	F	F	V
F	F	V	V	V
F	F	V	V	V

**Resultados combinados**

$$\neg(P \vee Q) \leftrightarrow (\neg P \wedge \neg Q)$$

P	Q	$\neg P$	$\neg Q$	$P \vee Q$	$\neg(P \vee Q)$	$\neg P \wedge \neg Q$	$\neg(P \vee Q) \leftrightarrow (\neg P \wedge \neg Q)$
V	V	F	F	V	F	F	V
V	F	F	V	V	F	F	V
F	V	V	F	V	F	F	V
F	F	V	V	F	V	V	V

**Tautología**

$$\neg(P \wedge Q) \leftrightarrow (\neg P \vee \neg Q)$$

P	Q	$\neg P$	$\neg Q$	$P \wedge Q$	$\neg(P \wedge Q)$	$\neg P \vee \neg Q$	$\neg(P \wedge Q) \leftrightarrow (\neg P \vee \neg Q)$
V	V	F	F	V	F	F	V
V	F	F	V	F	V	V	V
F	V	V	F	F	V	V	V
F	F	V	V	F	V	V	V

**Tautología**

# Lógica de primer orden.

## Axiomas y predicantes

- **Grandchild**

The grandchild is the son of grandma's daughter

$$\forall x \text{ grandchild}(x) \leftrightarrow \text{son}(\text{daughter}, \text{granparent})$$

- **Greatgrandparent**

Greatgrandfather is the father of grandparent

$$\forall x \text{ greatgrandfather}(x) \leftrightarrow \text{father}(x, \text{grandparent})$$

- **Brother**

My brother respects his father

$$\forall x \text{ brother} \rightarrow \text{respect}(x, \text{father})$$

- **Sister**

My sister respects his mother

$$\forall x \text{ sister} \rightarrow \text{respect}(x, \text{mother})$$

- **Daughter**

Axel's daughter is a woman

$$\forall x \text{ daughter}(x) \rightarrow \text{woman}(x)$$

- **Son**

Joshua's son is very respectful

$$\forall x \text{ son}(x) \rightarrow \text{respect}(x)$$

- **BrotherInLaw**

The brotherinlaw is the husband's brother or wife's brother

$$\forall x \text{ brotherinlaw}(x) \rightarrow \text{brother}(x, \text{husband}) \vee \text{brother}(x, \text{wife})$$

- **SisterInLaw**

The Sisterinlaw is the husband's sister or wife's sister

$$\forall x \text{ sisterinlaw}(x) \rightarrow \text{sister}(x, \text{husband}) \vee \text{sister}(x, \text{wife})$$



- **Aunt**

The aunt is a daughter of grandma.

$\forall x \text{ aunt}(x) \rightarrow \text{daughter}(x, \text{grandparent})$

- **Uncle**

My uncle works for the day.

$\forall x \text{ uncle}(x) \rightarrow \text{work}(x, \text{day})$