



# Inteligencia Artificial

# Tarea 6

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# Tablas de verdad

 $[(P \to Q) \land Q] \to Q$ 

Р	Q	P→Q	(P → Q) Λ Q	$[(P \to Q) \land Q] \to Q$
V	V	٧	V	V
V	F	F	F	V
F	V	V	F	V
F	F	V	F	V

# Tautología

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

Р	Q	P→Q	P∰Q	$(P \to Q) \bigvee (P {\ensuremath{ \bigoplus}} Q)$
V	V	V	V	V
V	F	F	F	F
F	V	V	F	V
F	F	V	V	V

## Resultados combinados

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

Р	Q	¬Q	P→Q	P∧¬Q	$(P \rightarrow Q) \bigwedge (P \bigwedge \neg Q)$
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





 $(P \land Q) \rightarrow P$ 

Р	Q	P∧Q	(P <b>\</b> ¬Q) → P
V	V	V	V
V	F	F	V
F	V	F	V
F	F	F	V

# Tautología

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

Р	Q	R	Q→R	PV(Q→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





$$(P \to Q) \land (Q \to P)$$

Р	Q	P→Q	$Q \rightarrow P$	$(P \rightarrow Q) \bigwedge (Q \rightarrow P)$
V	V	V	V	V
V	F	F	V	F
F	V	V	F	F
F	F	V	V	V

# Resultados combinados

$$[(P \to Q) \land (Q \to R)] \to (P \to R)$$

Р	Q	R	$P \rightarrow Q$	Q→R	$[(P \rightarrow Q) \bigwedge (Q \rightarrow R)]$	(P → R)	$[(P \to Q) \bigwedge (Q \to R)] \to (P \to R)$
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	V	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	V	V	V	V	V	V

Tautología





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

 $\rightarrow \neg Q)$ 

Р	Q	¬P	¬Q	P→Q	¬P→¬Q	$(P \rightarrow Q) \bigwedge (\neg P \rightarrow \neg Q)$
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

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

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

### Resultados combinados





 $\neg (P \lor Q) \leftrightarrow (\neg P \land \neg Q)$ 

	Р	Q	¬P	¬Q	PVQ	¬(PVQ)	¬P∧¬Q	¬(PVQ) <mark>-&gt;</mark> (¬P∧¬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

 $\neg (P \land Q) \leftrightarrow (\neg P \lor \neg Q)$ 

Р	Q	¬P	¬Q	P∧Q	¬(P/\Q)	¬P∧¬Q	¬(P∧Q) <b>□</b> (¬PV¬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  $\forall x \ grandchild(x) \leftrightarrow son(daughter, granparent)$ 

### • Greatgrandparent

Greatgrandfather is the father of grandparent  $\forall x \ greatgrandfather(x) \leftrightarrow father(x, \ grandparent)$ 

#### • Brother

My brother respects his father  $\forall x \ brother \rightarrow respect(x, father)$ 

#### Sister

My sister respects his mother  $\forall x \ sister \rightarrow respect(x, mother)$ 

### • Daughter

Axel's daughter is a woman  $\forall x \ daughter(x) \rightarrow woman(x)$ 

#### • Son

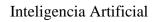
Joshua's son is very respectful  $\forall x son(x) \rightarrow respect(x)$ 

#### • BrotherInLaw

The brotherinlaw is the husband's brother or wife's brother  $\forall x \ brotherinlaw(x) \rightarrow brother(x, husband) \lor brother(x, wife)$ 

#### SisterInLaw

The Sisterinlaw is the husband's sister or wife's sister  $\forall x \ sisterinlaw(x) \rightarrow sister(x, husband) \lor sister(x, wife)$ 







### • Aunt

The aunt is a daughter of grandma.  $\forall x \ aunt(x) \rightarrow daughter(x, grandparent)$ 

## • Uncle

My uncle works for the day.  $\forall x \, uncle(x) \rightarrow work(x, day)$