

AICC 1

Proposition: fact (usually Q or P)
can be true/false

Operators:

- **NOT** ($\neg p$): "it is not the case that p "
- **AND** ($p \wedge q$): "p and q are true" (conjunction of p and q)
- **OR** ($p \vee q$): "p or q is true" (disjunction of p and q)
- **XOR** ($p \oplus q$): "p or q is true but not both" (exclusive or of p and q)

Conditional statement

"if p , then q "

implication

p	q	$p \rightarrow q$
\neg	\neg	\neg
\neg	\neg	\neg
\neg	\neg	\neg
\neg	\neg	\neg

P it rained
 q the ground is wet

$P \rightarrow q$: if it rained, then the ground is wet

Contrapositive

$$\neg q \rightarrow \neg p$$

Inverse

$$\neg p \rightarrow \neg q$$

Converse

$$q \rightarrow p$$

(certains ont la même
valeur de vérité)

Biconditional statements

"p if and only if q"

$$p \leftrightarrow q$$

Compound proposition

$$\text{ex: } (p \oplus q) \rightarrow (r \wedge \neg s)$$

Logical equivalence

- tautology \rightarrow always true $p \vee \neg p$
- contradict^o \rightarrow always false $p \wedge \neg p$
- contingency \rightarrow the rest

Morgan's laws:

$$\neg (p \wedge q) \equiv \neg p \vee \neg q$$

$$\neg (p \vee q) \equiv \neg p \wedge \neg q$$

\neg (There is a cow and there is a sheep)
 \equiv (There is no cow) OR (there is no sheep)