Logical operators /connectives

Logical operators Connectives Description

Truth table

And A.B ≡ p Λ q Conjunction

A B F

0 0 0

0 1 0

1 0 0

1 1 1

OrA+B ≡ p V q Disjunction

A B F

0 0 0

0 1 1

1 0 1

1 1 1

NotĀ ≡ ¬A Bar

A F

0 1

1 0

Exclusive-Or A⊕ B ≡ p⊕ q Exclusive-Or

A B F

0 0 0

0 1 1

1 0 1

1 1 0

Logical operators Connectives Description

Truth table

Implication → Conclusion

p q p → q

T T T

T F F

F T T

F F T

Reasoning:

If the propositions ‘p’ is true but ‘q’ is false then the outcome is false, else true.

Biconditional ↔ Biconditional

p q p ↔ q

T T T

T F F

F T F

F F T

Note:

This outcome/condition is the ‘Not’ of an exclusive-Or.

The outcome is ‘T’ true is both propositions ‘p’ and ‘q’ have matching truth values

Other operators/connectives

⟺ Equivalent to

Note: An alternative logical combination may have the identical logical outcome (Identity).

e.g. (p V q) Λ (¬p V ¬q) ⟺ (¬p Λ q) V (p Λ ¬q)

Exclusive-Or ⟺ Exclusive-Or

( ) Brackets

≡ Same as