**Ein- und zweistellige Junktoren**

Sie kennen bereits die Junktoren Negation (*nicht*), Konjunktion (*und*), Disjunktion (*oder*), Implikation (*wenn … dann*) und Äquivalenz (*genau dann … wenn*). Die Negation ist ein einstelliger Junktor, er kann auf eine Aussage A angewendet werden: ¬A. Die anderen sind zweistellige Junktoren, mit ihnen lassen sich jeweils zwei Aussagen verknüpfen: A ∧ B, A ∨ B, A → B, A ↔ B.

Man kann noch mehr ein- und zweistellige Junktoren mithilfe von Wahrheitswerttafeln definieren.

**Einstellige Junktoren**

Es gibt vier einstellige Junktoren. Diese können mit den Bezeichnungen *das Wahre, das Falsche, Bestätigung* und *Negation* bezeichnet werden.

Vervollständige die Wahrheitswerttafeln zu diesen Junktoren.

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| |  |  | | --- | --- | | A | das Wahre | | w |  | | f |  | | |  |  | | --- | --- | | A | das Falsche | | w |  | | f |  | | |  |  | | --- | --- | | A | Bestätigung | | w |  | | f |  | | |  |  | | --- | --- | | A | Negation | | w |  | | f |  | |

**Zweistellige Junktoren**

Es gibt \_\_\_\_\_\_ zweistellige Junktoren. Vervollständigen Sie die Wahrheitswerttafeln.

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| |  |  |  | | --- | --- | --- | | A | B |  | | w | w |  | | w | f |  | | f | w |  | | f | f |  | | |  |  |  | | --- | --- | --- | | A | B |  | | w | w |  | | w | f |  | | f | w |  | | f | f |  | | |  |  |  | | --- | --- | --- | | A | B |  | | w | w |  | | w | f |  | | f | w |  | | f | f |  | | |  |  |  | | --- | --- | --- | | A | B |  | | w | w |  | | w | f |  | | f | w |  | | f | f |  | |

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| |  |  |  | | --- | --- | --- | | A | B |  | | w | w |  | | w | f |  | | f | w |  | | f | f |  | | |  |  |  | | --- | --- | --- | | A | B |  | | w | w |  | | w | f |  | | f | w |  | | f | f |  | | |  |  |  | | --- | --- | --- | | A | B |  | | w | w |  | | w | f |  | | f | w |  | | f | f |  | | |  |  |  | | --- | --- | --- | | A | B |  | | w | w |  | | w | f |  | | f | w |  | | f | f |  | |

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| |  |  |  | | --- | --- | --- | | A | B |  | | w | w |  | | w | f |  | | f | w |  | | f | f |  | | |  |  |  | | --- | --- | --- | | A | B |  | | w | w |  | | w | f |  | | f | w |  | | f | f |  | | |  |  |  | | --- | --- | --- | | A | B |  | | w | w |  | | w | f |  | | f | w |  | | f | f |  | | |  |  |  | | --- | --- | --- | | A | B |  | | w | w |  | | w | f |  | | f | w |  | | f | f |  | |

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| |  |  |  | | --- | --- | --- | | A | B |  | | w | w |  | | w | f |  | | f | w |  | | f | f |  | | |  |  |  | | --- | --- | --- | | A | B |  | | w | w |  | | w | f |  | | f | w |  | | f | f |  | | |  |  |  | | --- | --- | --- | | A | B |  | | w | w |  | | w | f |  | | f | w |  | | f | f |  | | |  |  |  | | --- | --- | --- | | A | B |  | | w | w |  | | w | f |  | | f | w |  | | f | f |  | |

Ordnen Sie die folgenden Bezeichnungen für die zweistelligen Junktoren den Wahrheitswerttafeln zu.

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| (1) das Wahre | (2) das Falsche | (3) A und B | (4) A oder B |
| (5) entweder A oder B | (6) wenn A dann B | (7) A falls B | (8) A statt B |
| (9) von A und B  jedenfalls A | (10) von A und B  jedenfalls B | (11) nicht A, sondern B | (12) A genau dann, wenn B |
| (13) weder A noch B | (14) von A und B keinesfalls A | (15) von A und B keinesfalls B | (16) von A und B höchstens eines der beiden |

1. Bilden Sie in der Alltagssprache Sätze mit den Junktoren (7), (8), (9), (11) und (13).
2. Es gibt in der Mathematik die Formulierungen  
   „A ist eine hinreichende Bedingung für B“ und  
   „A ist eine notwendige Bedingung für B“.  
   Welche der obigen Junktoren drücken dies aus?
3. Erstellen Sie die Wahrheitswerttafeln für die folgenden dreistelligen Junktoren:  
   „wenn A und B, dann C“, „entweder A oder B oder C“,  
   „weder A, noch B, noch C“, „von A, B und C jedenfalls B“.
4. Es ist „von A und B keinesfalls A“ logisch äquivalent zu „¬A“.   
   Drücken Sie auch alle anderen Junktoren mithilfe von ¬, ∧, ∨, →, ↔ aus.
5. Stellen Sie die Wahrheitswerttafeln für die folgenden Aussagen auf.
6. (A ∧ B) ∨ ((¬A) ∧ (¬B))
7. ¬ (A ∨ (B ∧ ¬ A))
8. (A ∨ (¬B)) ∧ ((¬A) ∨ B)
9. Begründen Sie, dass folgende Aussagen logisch äquivalent sind.  
   (i) (¬A) ∧ (¬B) und ¬ (A ∨ B) (ii) (¬A) ∨ (¬B) und ¬ (A ∧ B)