Exercise solutions for Intermediate Logic by David Bostock

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2 Truth-Functors

2.1 Truth-Functors

2.1.1. The truth-tables are the followings.

(a)

First argument	Second argument	Third argument	Value
T	T	T	F
T	T	F	F
T	F	T	F
T	F	F	T
F	T	T	F
F	T	F	T
F	F	T	T
F	F	F	F

(b)

First argument	Second argument	Third argument	Value
T	T	T	T
T	T	F	T
T	F	T	T
T	F	F	F
F	T	T	T
F	T	F	F
F	F	T	F
F	F	F	F

(c)

First argument	Second argument	Third argument	Value
T	T	T	F
T	T	F	F
T	F	T	F
T	F	F	F
F	T	T	T
F	T	F	T
F	F	T	T
F	F	F	T

2.1.2. The three-place function has the same value as the two-place function if the value of the first arguments are the same. Whether a two-place function can be the *same* as a three-place function depends on the definition of *same*, but with regards to the strictest definition, no, because a three-place function needs 3 arguments always.

2.1.3. The truth-tables for all two-place functions are below. An n-place function has 2^n lines, and there are 2^{2^n} n-place functions, so all in all $2^n \cdot 2^{2^n} = 2^{n+2^n}$ lines.

Assuming the time it takes for me to write down each function is proportial to the number of lines, it would take $2^{3+2^3}/2^{2+2^2} = 32$ times as much long.

(1)

First argument	Second argument	Value
T	T	T
T	F	T
F	T	T
F	F	T

(2)

First argument	Second argument	Value
T	T	T
T	F	T
F	T	T
F	F	F

(3)

First argument	Second argument	Value
T	T	T
T	F	T
F	T	F
F	F	T

(4)

First argument	Second argument	Value
T	T	T
T	F	T
F	T	F
F	F	F

(5)

First argument	Second argument	Value
T	T	T
T	F	F
F	T	T
F	F	T

(6)

First argument	Second argument	Value
T	T	T
T	F	F
F	T	T
F	F	F

(7)

First argument	Second argument	Value
T	T	T
T	F	F
F	T	F
F	F	T

(8)

First argument	Second argument	Value
T	T	T
T	F	F
F	T	F
F	F	F

(9)

First argument	Second argument	Value
T	T	F
T	F	T
F	T	T
F	F	T

(10)

First argument	Second argument	Value
T	T	F
T	F	T
F	T	T
F	F	F

(11)

First argument	Second argument	Value
T	T	F
T	F	T
F	T	F
F	F	T

(12)

First argument	Second argument	Value
T	T	F
T	F	T
F	T	F
F	F	F

(13)

First argument	Second argument	Value
T	T	F
T	F	F
F	T	T
F	F	T

(14)

First argument	Second argument	Value
T	T	F
T	F	F
F	T	T
F	F	F

(15)

First argument	Second argument	Value
T	T	F
T	F	F
F	T	F
F	F	T

(16)

First argument	Second argument	Value
T	T	F
T	F	F
F	T	F
F	F	F