

Relational Association Paradigm

Multilingual Fractionalization Example

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Association which demonstrates natural fraction arithmetical and relational function objectification.

Conformation	Natural
Alias	Language provided type

Language provided unsigned or signed integer type, in preferential order. If the language provides type aliasing support, the Natural identifier should be aliased to the language provided type, otherwise the identifier Natural found elsewhere in this document should be implemented with the underlying language provided identifier for the appropriate type.

Conformation	Fractional	
Member	Numerator	Natural
	Denominator	Natural

Basic representation of a natural fraction.

Abstraction Situation	ArithmeticFunctional
Return	Fractional
Parameters	Fractional
	Fractional

Fractional arithmetic function reference type.

Abstraction Situation	RelationFunctional
Return	Boolean
Parameters	Fractional
	Fractional

Fractional relation (comparison) function reference.

Classification	Arithmetical	
Member	Add	ArithmeticalFunction
	Subtract	ArithmeticalFunction
	Multiply	ArithmeticalFunction
	Divide	ArithmeticalFunction

Fractional arithmetic function reference table.

Classification	Relational	
Member	Lesser	RelationalFunction
	Greater	RelationalFunction
	Equal	RelationalFunction
	NotGreater	RelationalFunction
	NotLesser	RelationalFunction
	NotEqual	RelationalFunction

Fractional relation function reference table.

Classification	Operational	
Member	Arithmetic	Arithmetical
	Relation	Relational

Fractional operations table.

Function	GreatestCommonDivisor	
Return	Natural	
Parameters	A	Natural
	B	Natural

Calculates the greatest common divisor between it's two arguments using the Euclidean algorithm and returns the resulting divisor. The arguments do not need to follow any ordering.

Function	LeastCommonMultiple	
Return	Natural	
Parameters	A	Natural
	B	Natural

Calculates the least common multiple between it's two arguments and returns the resulting multiple. The arguments do not need to follow any ordering. This function's operations occur in such an order so as to keep the integer values to a minimum during calculations.

Function	Reduce	
Return	Fractional	
Parameters	Fraction	Fractional

Reduces the fraction argument and returns the result. If the numerator is 0 then the denominator is forced to 1. Otherwise the greatest common divisor between the numerator and denominator is calculated and both are divided by the divisor.

Function	FastAdd	
Abstraction	ArithmeticalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Adds two fractions by multiplying onto the product denominator and adding the resulting numerators.

Function	FastSubtract	
Abstraction	ArithmeticalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Adds two fractions by multiplying onto the product denominator and subtracting the resulting numerators.

Function	FastMultiply	
Abstraction	ArithmeticalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Multiplies two fractions trivially.

Function	FastDivide	
Abstraction	ArithmeticalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Cross-multiplies (divides) two fractions trivially.

Function	ReducingAdd	
Abstraction	ArithmeticalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Adds two fractions and reduces the result.

Function	ReducingSubtract	
Abstraction	ArithmeticalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Subtracts two fractions and reduces the result.

Function	ReducingMultiply	
Abstraction	ArithmeticalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Divides the multiplication factors by common divisors then multiplies to keep integers from overflowing while reducing inline.

Function	ReducingDivide	
Abstraction	ArithmeticalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Divides the cross-multiplication (division) factors by common divisors then multiplies to keep integers from overflowing while reducing inline.

Function	FastLesser	
Abstraction	RelationalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Compares two fractions by multiplying the numerators by each other's denominators and returning the boolean result of left less than right.

Function	FastGreater	
Abstraction	RelationalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Compares two fractions by multiplying the numerators by each other's denominators and returning the boolean result of left greater than right.

Function	FastEqual	
Abstraction	RelationalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Compares two fractions by multiplying the numerators by each other's denominators and returning the boolean result of left equal to right.

Function	FastNotGreater	
Abstraction	RelationalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Compares two fractions by multiplying the numerators by each other's denominators and returning the boolean result of left not greater than right.

Function	FastNotLesser	
Abstraction	RelationalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Compares two fractions by multiplying the numerators by each other's denominators and returning the boolean result of left not less than right.

Function	FastNotEqual	
Abstraction	RelationalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Compares two fractions by multiplying the numerators by each other's denominators and returning the boolean result of left not equal to right.

Function	ReducingLesser	
Abstraction	RelationalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Compares two fractions by using the least common multiple to keep integer values from overflowing returning the boolean result of left less than right.

Function	ReducingGreater	
Abstraction	RelationalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Compares two fractions by using the least common multiple to keep integer values from overflowing returning the boolean result of left greater than right.

Function	ReducingEqual	
Abstraction	RelationalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Compares two fractions by using the least common multiple to keep integer values from overflowing returning the boolean result of left equal to right.

Function	ReducingNotGreater	
Abstraction	RelationalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Compares two fractions by using the least common multiple to keep integer values from overflowing returning the boolean result of left not greater than right.

Function	ReducingNotLesser	
Abstraction	RelationalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Compares two fractions by using the least common multiple to keep integer values from overflowing returning the boolean result of left not less than right.

Function	ReducingNotEqual	
Abstraction	RelationalFunction	
Return	Fractional	
Parameters	Left	Fractional
	Right	Fractional

Compares two fractions by using the least common multiple to keep integer values from overflowing returning the boolean result of left not equal to right.

Objectification	FastArithmetic	
Classification	Arithmetical	
Initialization	FastAdd	
	FastSubtract	
	FastMultiply	
	FastDivide	

Fast fractional arithmetic function reference table.

Objectification	ReducingArithmetic
Classification	Arithmetical
Initialization	ReducingAdd
	ReducingSubtract
	ReducingMultiply
	ReducingDivide

Reducing fractional arithmetic function reference table.

Objectification	FastRelation
Classification	Relational
Initialization	FastLesser
	FastGreater
	FastEqual
	FastNotGreater
	FastNotLesser
	FastNotEqual

Fast fractional relation function reference table.

Objectification	ReducingRelation
Classification	Relational
Initialization	ReducingLesser
	ReducingGreater
	ReducingEqual
	ReducingNotGreater
	ReducingNotLesser
	ReducingNotEqual

Reducing fractional relation function reference table.

Objectification	FastOperation
Classification	Operational
Initialization	FastArithmetic
	FastRelation

Fast fractional operation function reference table.

Objectification	ReducingOperation
Classification	Operational
Initialization	ReducingArithmetic
	ReducingRelation

Reducing fractional operation function reference table.

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Example association which uses elements of the Fractionalization association by relation.

Function	DisplayFraction	
Return		
Parameters	Fraction	Fractional

Displays the numerator value to console output and if the denominator is greater than 1, it appends a forward slash as well as the denominator value.

Function	DisplayArithmetic	
Return		
Parameters	Left	Fractional
	Symbol	Language Text Character String
	Right	Fractional
	Equals	Fractional

Displays an arithmetical function to the console.

Function	DisplayRelation	
Return		
Parameters	Left	Fractional
	Symbol	Textual
	Right	Fractional
	Result	Boolean

Displays a relational function to the console.

Function	DisplayOperations	
Return		
Parameters	Operation	Operational

Displays operational functions to the console.

Function	Main (or other language application entry point)	
Return	Unused	
Parameters	Unused	Unused

Displays operational functions for fast and reducing fractional operations.