Examples of standard description of operators for the Reference Manual

Unary minus

*Symbol*  **-**

*Category Numeric*

*Semantics*

The Operator change the sign of the Operand

*Operands*

Number: 1

Artefacts: Data Set having 1..N Measures, Data Structure Component, Scalar value

Data type: Numeric

*Result*

Artefacts: Data Set having 1..N Measures, Data Structure Component, Scalar value

Data type: Numeric

*Syntax*

*- op\_1*

*Parameters*

*op\_1*  unique operand

*Parameters type formal description*

*op\_1*: [ **dataset** {identifier <IDENT> as scalar-type}+

{measure <IDENT> as number}+

{attribute <IDENT> as scalar-type}\*

| **component**

| **number** ]

*Constraints*

* The operand must be numeric (a Data Set is numeric if all its Measures are numeric)

*Operations on Data Sets*

The operator is applied on a Data Set and returns a Data Set.

As for the data structure, the result Data Set (ds\_r) has the Identifiers and the Measures of the operand Data Set (ds\_1), and has the Attributes resulting from the application of the attribute propagation rules on the Attributes of the operand Data Set.

As for the data content, for each Data Point (dp\_1) of the operand Data Set, a result Data Point (dp\_r) is returned, having for the Identifiers the same values as dp\_1.

For each Data Point dp\_1 and for each Measure, the operator is applied on the measure value of dp\_1 so returning the corresponding measure value of dp\_r.

For each Data Point dp\_1, the values of the Attributes of dp\_r are calculated by applying the Attribute propagation rules on the values of the Attributes of dp\_1.

*Operations on Data Structure Components*

The operator is applied on a Components (dsc\_1) and returns a Component (dsc\_r). For each Data Point of the Data Set which the Component belong to, the operator is applied on the values of dsc\_1 so returning the value of dsc\_r.

*Operations Scalar values*

The operator is applied on a Scalar value and returns a Scalar value.

*Examples*

[*The examples should contain* ***only*** *the described operator, possibly avoiding the use of other operators*]

multiplication

*Symbol*  **\***

*Category Numeric*

*Semantics*

The Operator multiplies two Operands

*Operands*

Number: 2

Artefacts: Data Sets having 1..N Measures, Data Structure Components, Scalar values

Data type: Numeric

*Result*

Artefacts: Data Set having 1..N Measures, Data Structure Component, Scalar value

Data type: Numeric

*Syntax*

*op\_1* \* *op\_2*

*Parameters*

*op\_1*  multiplicand

*op\_2*  multiplier

*Parameters type formal description*

*op\_1*, *op\_2*: [ **dataset** {identifier <IDENT> as scalar-type}+

{measure <IDENT> as number}+

{attribute <IDENT> as scalar-type}\*

| **component**

| **number** ]

*Constraints*

* The operands must be all numeric (a Data Set is numeric if all its Measures are numeric)
* The composition of a Data Set and a Data Structure Component is not allowed (it makes no sense)
* The composition of multi-measure Data Sets is allowed
* The operand Data Sets must have exactly the same Measures
* The composition of Data Sets is allowed either if the operand Data Sets have the same Identifiers or if one of them has at least all the Identifiers of the other one (in other words, the Identifiers of one of the Data Sets must be a superset of the identifiers of the other one)
* The composition of Data Structure Components is allowed provided that they belong to the same Data Set

*Operation on Data Sets*

The operator is applied either on two Data Sets or on a Data Set and a Scalar value and returns a Data Set.

As for the data structure, the result Data Set (ds\_r) has all the Identifiers and the Measures of both the operand Data Sets, and has the Attributes resulting from the application of the attribute propagation rules on the Attributes of the operands.

As for the data content, the operand Data Sets (ds\_1, ds\_2) are joined to find the couples of Data Points (dp\_1, dp\_2), where dp\_1 is from the first operand (ds\_1) and dp\_2 from the second operand (ds\_2), which have the same values as for the common Identifiers. Data points that are not coupled are left out (inner join). An operand Scalar value is treated as a Data Point that couples with all the Data Points of the other operand. For each couple (dp\_1, dp\_2) a result Data Point (dp\_r) is returned, having for the Identifiers the same values as dp\_1 and dp\_2.

For each couple (dp\_1, dp\_2) and for each Measure, the measure values of dp\_1 and dp\_2 are composed through the operator so returning the measure value of dp\_r. An operand Scalar value is composed with all the Measures of the other operand.

For each couple (dp\_1, dp\_2), the values of the Attributes of dp\_r are calculated by applying the Attribute propagation rules on the values of the Attributes of dp\_1 and dp\_2.

*Operation on Data Structure Components*

The operator is applied either on two Components (dsc\_1, dsc\_2) belonging to the same Data Set or on a Component and a Constant and returns a Component (dsc\_r). For each Data Point of the Data Set which the Components belong to, the values of dsc\_1 and dsc\_2 are composed through the operator so returning the value of dsc\_r.

*Operation on Scalar values*

The operator is applied on two Scalar values and returns a Scalar value.

*Examples*

[*The examples should contain* ***only*** *the described operator, possibly avoiding the use other operators*]

division

*Symbol*  /

*Category Numeric*

*Semantics*

The Operator divides the first Operand by the second Operand

*Operands*

Number: 2

Artefacts: Data Sets having 1..N Measures, Data Structure Components, Scalar values

Data type: Numeric

*Result*

Artefacts: Data Set having 1..N Measures, Data Structure Component, Scalar value

Data type: Numeric

*Syntax*

*op\_1* / *op\_2*

*Parameters*

*op\_1*  dividend

*op\_2*  divisor

*Parameters type formal description*

*op\_1*, *op\_2*: [ **dataset** {identifier <IDENT> as scalar-type}+

{measure <IDENT> as number}+

{attribute <IDENT> as scalar-type}\*

| **component**

| **number** ]

*Constraints*

* The operands must be all numeric (a Data Set is numeric if all its Measures are numeric)
* The composition of a Data Set and a Data Structure Component is not allowed (it makes no sense)
* The composition of multi-measure Data Sets is allowed
* The operand Data Sets must have exactly the same Measures
* The composition of Data Sets is allowed either if the operand Data Sets have the same Identifiers or if one of them has at least all the Identifiers of the other one (in other words, the Identifiers of one of the Data Sets must be a superset of the identifiers of the other one)
* The composition of Data Structure Components is allowed provided that they belong to the same Data Set
* The values of the Divisor cannot be zero

*Operation on Data Sets*

The operator is applied either on two Data Sets or on a Data Set and a Scalar value and returns a Data Set.

As for the data structure, the result Data Set (ds\_r) has all the Identifiers and the Measures of both the operand Data Sets, and has the Attributes resulting from the application of the attribute propagation rules on the Attributes of the operands.

As for the data content, the operand Data Sets (ds\_1, ds\_2) are joined to find the couples of Data Points (dp\_1, dp\_2), where dp\_1 is from the first operand (ds\_1) and dp\_2 from the second operand (ds\_2), which have the same values as for the common Identifiers. Data points that are not coupled are left out (inner join). An operand Scalar value is treated as a Data Point that couples with all the Data Points of the other operand. For each couple (dp\_1, dp\_2) a result Data Point (dp\_r) is returned, having for the Identifiers the same values as dp\_1 and dp\_2.

For each couple (dp\_1, dp\_2) and for each Measure, the measure values of dp\_1 and dp\_2 are composed through the operator so returning the measure value of dp\_r. An operand Scalar value is composed with all the Measures of the other operand.

For each couple (dp\_1, dp\_2), the values of the Attributes of dp\_r are calculated by applying the Attribute propagation rules on the values of the Attributes of dp\_1 and dp\_2.

*Operation on Data Structure Components*

The operator is applied either on two Components (dsc\_1, dsc\_2) belonging to the same Data Set or on a Component and a Constant and returns a Component (dsc\_r). For each Data Point of the Data Set which the Components belong to, the values of dsc\_1 and dsc\_2 are composed through the operator so returning the value of dsc\_r.

*Operation on Scalar values*

The operator is applied on two Scalar values and returns a Scalar value.

*Examples*

[*The examples should contain* ***only*** *the described operator, possibly avoiding the use other operators*]

**Generic structure for the description of an Operator**

* **Symbol:** the symbol or the reserved word to be used in the syntax to denote the operator
* **Category:** the category of the operator (as described in the excel spreadsheet)
* **Semantics**: a very short description of the operator (as in the excel spreadsheet)
* **Operands:** number of Operands, type of artefacts and data types (as in the excel spreadsheet)
* **Result:** type of artefacts and data type of the result (as in the excel spreadsheet)
* **Syntax**: specification of the syntax of the operator by means of a specific meta-syntax
* **Parameters**: the input parameters
* **Parameters formal description**: the formal description of the input parameters
* **Constraints**: semantic constraints under which the operation is possible and syntactical constraints that cannot be specified with the meta-syntax but need a textual explanation
* **Operations description**: extensive explanation of the behaviour of the operator in terms of the syntactical elements described in the sections Syntax, Parameters and Returns.
* **Examples**: a series of examples of the behaviour of the operator, possibly using only the operator to be explained