#### f (Formula)

Formula for the cell. The [formula](formula.docx) expression is contained in the character node of this element.

[Example:

<f>SUM(C4:E4)</f>

end example]

The possible values for the [t](t.docx) attribute have type [ST\_CellFormulaType](ST_CellFormulaType.docx), and are as follows:

* array (Array Entered)
* dataTable (Table Formula, see below)
* normal (Normal)
* shared (Shared Formula)

A data [table](table.docx) is a range of cells that shows how changing certain values in one or more formulas affects the results of those formulas. A data [table](table.docx) provides a shortcut for calculating multiple versions in one operation, and a way to view and compare the results of all of the different variations together on a worksheet.

Both one- and two-input variable data [tables](tables.docx) can be created (see attribute dt2D). [Example: A one-input variable data [table](table.docx) might be used to see how different interest rates affect a monthly mortgage payment, while a two-input variable data [table](table.docx) might be used to show how different interest rates and loan terms will affect the mortgage payment. end example]

Data [tables](tables.docx) shall be recalculated whenever a [worksheet](worksheet.docx) is recalculated.

In a one-input variable data [table](table.docx), values are listed either down a column (column-oriented) or across a [row](row.docx) (row-oriented) (see attribute dtr).

[Formulas](Formulas.docx) that are used in a one-input variable data [table](table.docx) shall refer to an input [cell](cell.docx) (see attribute r1), the [cell](cell.docx) in which each input value from a data [table](table.docx) is substituted. Any [cell](cell.docx) on a [worksheet](worksheet.docx) can be the input cell. Although the input [cell](cell.docx) does not need to be part of the data [table](table.docx), the formulas in data [tables](tables.docx) shall refer to that input cell.

Two-input variable data [tables](tables.docx) use only one [formula](formula.docx) with two lists of input values. The [formula](formula.docx) shall refer to two input cells (see attributes r1 and r2).

The top-left [cell](cell.docx) in the data [table](table.docx) is called the master [cell](cell.docx).

|  |
| --- |
| Parent Elements |
| [c](c.docx) (§); [nc](nc.docx) (§); [oc](oc.docx) (§) |

|  |  |
| --- | --- |
| Attributes | Description |
| aca (Always Calculate Array) | true indicates that this [formula](formula.docx) is an array [formula](formula.docx) and the entire array shall be calculated in full. If false the individual cells of the array shall be calculated as needed.  [Note: The primary case where an array [formula](formula.docx) shall be calcuated in part instead of in full is when some cells in the array depend on other cells that are semi-calculated, e.g., contains the function =RAND(). end note]  The possible values for this attribute are defined by the XML [Schema](Schema.docx) boolean datatype. |
| bx (Assigns Value to Name) | Specifies that this [formula](formula.docx) assigns a value to a name.  The possible values for this attribute are defined by the XML [Schema](Schema.docx) boolean datatype. |
| ca (Calculate Cell) | Indicates that this [formula](formula.docx) needs to be recalculated the next time calculation is performed. For example, this is always set on volatile functions, like =RAND(), and circular references.  The possible values for this attribute are defined by the XML [Schema](Schema.docx) boolean datatype. |
| del1 (Input 1 Deleted) | Whether the first input [cell](cell.docx) for data [table](table.docx) has been deleted. Applies to data [table](table.docx) [formula](formula.docx) only. Written on master [cell](cell.docx) of data [table](table.docx) [formula](formula.docx) only.  The possible values for this attribute are defined by the XML [Schema](Schema.docx) boolean datatype. |
| del2 (Input 2 Deleted) | Whether the second input [cell](cell.docx) for data [table](table.docx) has been deleted. Applies to data [table](table.docx) [formula](formula.docx) only. Written on master [cell](cell.docx) of data [table](table.docx) [formula](formula.docx) only.  The possible values for this attribute are defined by the XML [Schema](Schema.docx) boolean datatype. |
| dt2D (Data Table 2-D) | Data [table](table.docx) is two-dimentional. Only applies to the data [tables](tables.docx) function. Written on master [cell](cell.docx) of data [table](table.docx) [formula](formula.docx) only.  The possible values for this attribute are defined by the XML [Schema](Schema.docx) boolean datatype. |
| dtr (Data Table Row) | true if one-dimentional data [table](table.docx) is a [row](row.docx), otherwise it's a column. Only applies to the data [tables](tables.docx) function. Written on master [cell](cell.docx) of data [table](table.docx) [formula](formula.docx) only.  The possible values for this attribute are defined by the XML [Schema](Schema.docx) boolean datatype. |
| r1 (Data Table Cell 1) | First input [cell](cell.docx) for data table. Only applies to the data [tables](tables.docx) array function "TABLE()". Written on master [cell](cell.docx) of data [table](table.docx) [formula](formula.docx) only.  The possible values for this attribute are defined by the [ST\_CellRef](ST_CellRef.docx) simple type (§). |
| r2 (Input Cell 2) | Second input [cell](cell.docx) for data [table](table.docx) when dt2D is '1'. Only applies to the data [tables](tables.docx) array function "TABLE()".Written on master [cell](cell.docx) of data [table](table.docx) [formula](formula.docx) only.  The possible values for this attribute are defined by the [ST\_CellRef](ST_CellRef.docx) simple type (§). |
| ref (Range of Cells) | Range of cells which the [formula](formula.docx) applies to. Only required for shared [formula](formula.docx), array [formula](formula.docx) or data table. Only written on the master [formula](formula.docx), not subsequent formula's belonging to the same shared [group](group.docx), array, or data table.  The possible values for this attribute are defined by the [ST\_Ref](ST_Ref.docx) simple type (§). |
| [si](si.docx) (Shared Group Index) | Optional attribute to optimize load performance by sharing formulas.  When a [formula](formula.docx) is a shared [formula](formula.docx) ([t](t.docx) value is shared) then this value indicates the [group](group.docx) to which this particular cell's [formula](formula.docx) belongs. The first [formula](formula.docx) in a [group](group.docx) of shared formulas is saved in the f element. This is considered the 'master' [formula](formula.docx) cell. Subsequent cells sharing this [formula](formula.docx) need not have the [formula](formula.docx) written in their f element. Instead, the attribute [si](si.docx) value for a particular [cell](cell.docx) is used to figure what the [formula](formula.docx) expression should be based on the cell's relative [location](location.docx) to the master [formula](formula.docx) cell.  A [cell](cell.docx) is shared only when [si](si.docx) is used and [t](t.docx) is shared. The [formula](formula.docx) expression for a [cell](cell.docx) that is specified to be part of a shared [formula](formula.docx) (and is not the master) shall be ignored, and the master [formula](formula.docx) shall override.  If a master [cell](cell.docx) of a shared [formula](formula.docx) range specifies that a particular [cell](cell.docx) is part of the shared [formula](formula.docx) range, and that particular [cell](cell.docx) does not use the [si](si.docx) and [t](t.docx) attributes to indicate that it is shared, then the particular cell's [formula](formula.docx) shall override the shared master formula. If this [cell](cell.docx) occurs in the middle of a range of shared [formula](formula.docx) cells, the earlier and later formulas shall continue sharing the master [formula](formula.docx), and the [cell](cell.docx) in question shall not share the [formula](formula.docx) of the master [cell](cell.docx) formula.  Loading and handling of a [cell](cell.docx) and [formula](formula.docx) using an [si](si.docx) attribute and whose [t](t.docx) value is shared, located outside the range specified in the master [cell](cell.docx) associated with the [si](si.docx) [group](group.docx), is implementation defined.  Master [cell](cell.docx) [references](references.docx) on the same [sheet](sheet.docx) shall not overlap with each other.  The possible values for this attribute are defined by the XML [Schema](Schema.docx) unsignedInt datatype. |
| [t](t.docx) (Formula Type) | Type of formula.  The possible values for this attribute are defined by the [ST\_CellFormulaType](ST_CellFormulaType.docx) simple type (§). |

The following XML [Schema](Schema.docx) fragment defines the contents of this element:

<complexType [name](name.docx)="CT\_CellFormula">

<simpleContent>

<extension base="[ST\_Formula](ST_Formula.docx)">

<attribute name="[t](t.docx)" type="[ST\_CellFormulaType](ST_CellFormulaType.docx)" use="optional" default="normal"/>

<attribute name="aca" type="xsd:boolean" use="optional" default="false"/>

<attribute [name](name.docx)="ref" type="[ST\_Ref](ST_Ref.docx)" use="optional"/>

<attribute name="dt2D" type="xsd:boolean" use="optional" default="false"/>

<attribute name="dtr" type="xsd:boolean" use="optional" default="false"/>

<attribute name="del1" type="xsd:boolean" use="optional" default="false"/>

<attribute name="del2" type="xsd:boolean" use="optional" default="false"/>

<attribute [name](name.docx)="r1" type="[ST\_CellRef](ST_CellRef.docx)" use="optional"/>

<attribute [name](name.docx)="r2" type="[ST\_CellRef](ST_CellRef.docx)" use="optional"/>

<attribute name="ca" type="xsd:boolean" use="optional" default="false"/>

<attribute [name](name.docx)="[si](si.docx)" type="xsd:unsignedInt" use="optional"/>

<attribute name="bx" type="xsd:boolean" use="optional" default="false"/>

</extension>

</simpleContent>

</complexType>