

The l3str-format package: formatting strings of characters

The L^AT_EX Project*

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1 Format specifications

In this module, we introduce the notion of a string $\langle format \rangle$. The syntax follows that of Python's `format` built-in function. A $\langle format specification \rangle$ is a string of the form

$$\langle format specification \rangle = [[\langle fill \rangle]\langle alignment \rangle][\langle sign \rangle][\langle width \rangle][.\langle precision \rangle][\langle style \rangle]$$

where each [...] denotes an independent optional part.

- $\langle fill \rangle$ can be any character: it is assumed to be present whenever the second character of the $\langle format specification \rangle$ is a valid $\langle alignment \rangle$ character.
- $\langle alignment \rangle$ can be < (left alignment), > (right alignment), ^ (centering), or = (for numeric types only).
- $\langle sign \rangle$ is allowed for numeric types; it can be + (show a sign for positive and negative numbers), - (only put a sign for negative numbers), or a space (show a space or a -).
- $\langle width \rangle$ is the minimum number of characters of the result: if the result is naturally shorter than this $\langle width \rangle$, then it is padded with copies of the character $\langle fill \rangle$, with a position depending on the choice of $\langle alignment \rangle$. If the result is naturally longer, it is not truncated.
- $\langle precision \rangle$, whose presence is indicated by a period, can have different meanings depending on the type.
- $\langle style \rangle$ is one character, which controls how the given data should be formatted. The list of allowed $\langle styles \rangle$ depends on the type.

The choice of $\langle alignment \rangle =$ is only valid for numeric types: in this case the padding is inserted between the sign and the rest of the number.

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2 Formatting various data-types

`\tl_format:Nn` * `\tl_format:nn` $\langle\{token\ list\}\rangle$ $\langle\{format\ specification\}\rangle$
`\tl_format:cn` *
`\tl_format:nn` * Converts the $\langle\{token\ list\}\rangle$ to a string according to the $\langle\{format\ specification\}\rangle$. The $\langle\{style\}\rangle$, if present, must be **s**. If $\langle\{precision\}\rangle$ is given, all characters of the string representation of the $\langle\{token\ list\}\rangle$ beyond the first $\langle\{precision\}\rangle$ characters are discarded.

`\seq_format:Nn` * `\seq_format:Nn` $\langle\{sequence\}\rangle$ $\langle\{format\ specification\}\rangle$
`\seq_format:cn` * Converts each item in the $\langle\{sequence\}\rangle$ to a string according to the $\langle\{format\ specification\}\rangle$, and concatenates the results.

`\int_format:nn` * `\int_format:nn` $\langle\{intexpr\}\rangle$ $\langle\{format\ specification\}\rangle$
Evaluates the $\langle\{integer\ expression\}\rangle$ and converts the result to a string according to the $\langle\{format\ specification\}\rangle$. The $\langle\{precision\}\rangle$ argument is not allowed. The $\langle\{style\}\rangle$ can be **b** for binary output, **d** for decimal output (this is the default), **o** for octal output, **X** for hexadecimal output (using capital letters).

`\fp_format:nn` * `\fp_format:nn` $\langle\{fp\ expr\}\rangle$ $\langle\{format\ specification\}\rangle$
Evaluates the $\langle\{floating\ point\ expression\}\rangle$ and converts the result to a string according to the $\langle\{format\ specification\}\rangle$. The $\langle\{style\}\rangle$ can be

- **e** for scientific notation, with one digit before and $\langle\{precision\}\rangle$ digits after the decimal separator, and an integer exponent, following **e**;
- **f** for a fixed point notation, with $\langle\{precision\}\rangle$ digits after the decimal separator and no exponent;
- **g** for a general format, which uses style **f** for numbers in the range $[10^{-4}, 10^{\langle\{precision\}\rangle})$ and style **e** otherwise.

When there is no $\langle\{style\}\rangle$ specifier nor $\langle\{precision\}\rangle$ the number is displayed without rounding. Otherwise the $\langle\{precision\}\rangle$ defaults to 6.

3 Possibilities, and things to do

- Provide a token list formatting $\langle\{style\}\rangle$ which keeps the last $\langle\{precision\}\rangle$ characters rather than the first $\langle\{precision\}\rangle$.

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