The \texttt{l3str-format} package: formatting strings of characters

The \LaTeX3 Project*

Released 2020-09-11

1 Format specifications

In this module, we introduce the notion of a string \texttt{(format)}. The syntax follows that of Python’s \texttt{format} built-in function. A \texttt{(format specification)} is a string of the form

\begin{equation*}
\langle\text{format specification}\rangle = [[\langle\text{fill}\rangle][\langle\text{alignment}\rangle][\langle\text{sign}\rangle][\langle\text{width}\rangle][.\langle\text{precision}\rangle][\langle\text{style}\rangle]$
\end{equation*}

where each \texttt{[...]\texttt{]} denotes an independent optional part.

- \texttt{(fill)} can be any character: it is assumed to be present whenever the second character of the \texttt{(format specification)} is a valid \texttt{(alignment)} character.

- \texttt{(alignment)} can be \texttt{< (left alignment)}, \texttt{> (right alignment)}, \texttt{^ (centering)}, or \texttt{=} (for numeric types only).

- \texttt{(sign)} is allowed for numeric types; it can be \texttt{+ (show a sign for positive and negative numbers), - (only put a sign for negative numbers), or a space (show a space or a -).}

- \texttt{(width)} is the minimum number of characters of the result: if the result is naturally shorter than this \texttt{(width)}, then it is padded with copies of the character \texttt{(fill)}, with a position depending on the choice of \texttt{(alignment)}. If the result is naturally longer, it is not truncated.

- \texttt{(precision)}, whose presence is indicated by a period, can have different meanings depending on the type.

- \texttt{(style)} is one character, which controls how the given data should be formatted. The list of allowed \texttt{(styles)} depends on the type.

The choice of \texttt{(alignment)} = \texttt{=} 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 \text{token list} \rangle \{\langle \text{format specification} \rangle\}

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

\seq_format:Nn \seq_format:nn \langle \text{sequence} \rangle \{\langle \text{format specification} \rangle\}

Converts each item in the \langle \text{sequence} \rangle to a string according to the \langle \text{format specification} \rangle, and concatenates the results.

\int_format:nn \int_format:cn \langle \text{intexpr} \rangle \{\langle \text{format specification} \rangle\}

Evaluates the \langle \text{integer expression} \rangle and converts the result to a string according to the \langle \text{format specification} \rangle. The \langle \text{precision} \rangle argument is not allowed. The \langle \text{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:cn \langle \text{fpexpr} \rangle \{\langle \text{format specification} \rangle\}

Evaluates the \langle \text{floating point expression} \rangle and converts the result to a string according to the \langle \text{format specification} \rangle. The \langle \text{style} \rangle can be

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

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

3 Possibilities, and things to do

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

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