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

The \LaTeX\ Project\textsuperscript{*}

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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}
\texttt{(format specification)} = \texttt{[[(fill)](alignment)][(sign)][(width)][(precision)][(style)]}
\end{equation}

where each [...] 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), \texttt{-} (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)} = 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

\texttt{\backslash tl\_format:Nn} \star \texttt{\backslash tl\_format:nn} \texttt{\{token list\}} \texttt{\{format specification\}}

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

\texttt{\backslash seq\_format:Nn} \star \texttt{\backslash seq\_format:cn} \star \texttt{\backslash seq\_format:nn} \star \texttt{\backslash int\_format:nn} \star \texttt{\backslash fp\_format:nn}

\texttt{\backslash seq\_format:Nn} \texttt{\{sequence\}} \texttt{\{format specification\}}

Converts each item in the \texttt{(sequence)} to a string according to the \texttt{(format specification)}, and concatenates the results.

\texttt{\backslash int\_format:nn} \star \texttt{\backslash fp\_format:nn}

\texttt{\backslash int\_format:nn} \texttt{\{intexpr\}} \texttt{\{format specification\}}

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

\texttt{\backslash fp\_format:nn} \star \texttt{\backslash fp\_format:cn} \star \texttt{\backslash fp\_format:nn}

\texttt{\backslash fp\_format:nn} \texttt{\{fpexpr\}} \texttt{\{format specification\}}

Evaluates the \texttt{(floating point expression)} and converts the result to a string according to the \texttt{(format specification)}. The \texttt{(style)} can be

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

When there is no \texttt{(style)} specifier nor \texttt{(precision)} the number is displayed without rounding. Otherwise the \texttt{(precision)} defaults to 6.

3 Possibilities, and things to do

- Provide a token list formatting \texttt{(style)} which keeps the last \texttt{(precision)} characters rather than the first \texttt{(precision)}.

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tl commands:
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