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

The \LaTeX3\ Project*

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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)} = \left[ \left[ \texttt{fill} \right] \texttt{alignment} \right] \left[ \texttt{sign} \right] \left[ \texttt{width} \right] \left[ \texttt{precision} \right] \left[ \texttt{style} \right]
\end{equation*}

where each \(\ldots\) 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{-}).
- \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{\textbackslash tl\_format:nn \{token\ list\}\ \{format\ specification\}}

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

\texttt{\textbackslash seq\_format:nn \{sequence\}\ \{format\ specification\}}

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

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

Evaluates the \emph{\{integer\ expression\}} and converts the result to a string according to the \emph{\{format\ specification\}}. The \emph{\{precision\}} argument is not allowed. The \emph{\{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{\textbackslash fp\_format:nn \{fpexpr\}\ \{format\ specification\}}

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

- \texttt{e} for scientific notation, with one digit before and \emph{\{precision\}} digits after the decimal separator, and an integer exponent, following \texttt{e};
- \texttt{f} for a fixed point notation, with \emph{\{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 \emph{\{style\}} specifier nor \emph{\{precision\}} the number is displayed without rounding. Otherwise the \emph{\{precision\}} defaults to 6.

3 Possibilities, and things to do

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

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