

# The l3str-format package: formatting strings of characters

The L<sup>A</sup>T<sub>E</sub>X 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

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`\tl_format:Nn` \* `\tl_format:nn`  $\{\langle token\ list\rangle\}$   $\{\langle format\ specification\rangle\}$   
`\tl_format:cn` \*  
`\tl_format:nn` \*  

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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.

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`\seq_format:Nn` \* `\seq_format:nn`  $\{\langle sequence\rangle\}$   $\{\langle format\ specification\rangle\}$   
`\seq_format:cn` \*  

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

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`\int_format:nn` \* `\int_format:nn`  $\{\langle intexpr\rangle\}$   $\{\langle format\ specification\rangle\}$   

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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).

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`\fp_format:nn` \* `\fp_format:nn`  $\{\langle fpexpr\rangle\}$   $\{\langle format\ specification\rangle\}$   

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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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