

The l3tl-build package: building token lists

The L^AT_EX3 Project*

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1 l3tl-build documentation

This module provides no user function: it is meant for kernel use only.

There are two main ways of building token lists from individual tokens. Either in one go within an `x`-expanding assignment, or by repeatedly using `\tl_put_right:Nn`. The first method takes a linear time, but only allows expandable operations. The second method takes a time quadratic in the length of the token list, but allows expandable and non-expandable operations.

The goal of this module is to provide functions to build a token list piece by piece in linear time, while allowing non-expandable operations. This is achieved by abusing `\toks`: adding some tokens to the token list is done by storing them in a free token register (time $O(1)$ for each such operation). Those token registers are only put together at the end, within an `x`-expanding assignment, which takes a linear time.¹ Of course, all this must be done in a group: we can't go and clobber the values of legitimate `\toks` used by L^AT_EX 2_ε.

Since none of the current applications need the ability to insert material on the left of the token list, I have not implemented that. This could be done for instance by using odd-numbered `\toks` for the left part, and even-numbered `\toks` for the right part.

1.1 Internal functions

<code>__tl_build:Nw</code>	<code>__tl_build:Nw <tl var> ...</code>
<code>__tl_gbuild:Nw</code>	<code>__tl_build_one:n {\tokens1} ...</code>
<code>__tl_build_x:Nw</code>	<code>__tl_build_one:n {\tokens2} ...</code>
<code>__tl_gbuild_x:Nw</code>	<code>...</code>

`__tl_build_end:`

Defines the `<tl var>` to contain the contents of `<tokens1>` followed by `<tokens2>`, etc. This is built in such a way to be more efficient than repeatedly using `\tl_put_right:Nn`. The code in “...” does not need to be expandable. The commands `__tl_build:Nw` and `__tl_build_end:` start and end a group. The assignment to the `<tl var>` occurs just after the end of that group, using `\tl_set:Nn`, `\tl_gset:Nn`, `\tl_set:Nx`, or `\tl_gset:Nx`.

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¹If we run out of token registers, then the currently filled-up `\toks` are put together in a temporary token list, and cleared, and we ultimately use `\tl_put_right:Nx` to put those chunks together. Hence the true asymptotic is quadratic, with a very small constant.

<u><code>__tl_build_one:n</code></u>	<code>__tl_build_one:n {⟨tokens⟩}</code>
<u><code>__tl_build_one:(o x)</code></u>	This function may only be used within the scope of a <code>__tl_build:Nw</code> function. It adds the <i>⟨tokens⟩</i> on the right of the current token list.
<u><code>__tl_build_end:</code></u>	Ends the scope started by <code>__tl_build:Nw</code> , and performs the relevant assignment.

Index

The italic numbers denote the pages where the corresponding entry is described, numbers underlined point to the definition, all others indicate the places where it is used.

T		tl internal commands:	
T _E X and L ^A T _E X 2 _ε commands:		<code>__tl_build:Nw</code>	<u>1</u> , <i>1</i> , <u>1</u> , <i>2</i> , <i>2</i>
<code>\toks</code>	<u>1</u> , <i>1</i> , <i>1</i> , <i>1</i> , <i>1</i>	<code>__tl_build_end:</code>	<u>1</u> , <i>1</i> , <i>2</i>
tl commands:		<code>__tl_build_one:n</code>	<u>1</u> , <i>1</i> , <i>2</i> , <i>2</i>
<code>\tl_gset:Nn</code>	<u>1</u> , <i>1</i>	<code>__tl_build_x:Nw</code>	<i>1</i>
<code>\tl_put_right:Nn</code>	<u>1</u> , <i>1</i> , <i>1</i>	<code>__tl_gbuild:Nw</code>	<i>1</i>
<code>\tl_set:Nn</code>	<u>1</u> , <i>1</i>	<code>__tl_gbuild_x:Nw</code>	<i>1</i>