

Prototype reimplementation of $\text{\LaTeX} 2_{\epsilon}$'s block environments using templates

\LaTeX Project*

v0.8d 2023/06/07

Abstract

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*Initial reimplementation of lists done by Bruno Le Floch, generalized second version with tagging support by Frank Mittelbach.

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1 Introduction

The list implementation in $\text{\LaTeX} 2_{\epsilon}$ serves a dual purpose: it implements real lists such as `itemize` or `enumerate`, but it is also used as the basis for vertical blocks, i.e., to specify the vertical spacing and paragraph handling after such block, e.g., in environments like `center`, `quote`, `verbatim`, or in the theorem environments. They are all implemented as “trivial” lists with a single (hidden) item.

While this was convenient to get a consistent layout using a single implementation it is not adequate if it comes to interpreting the structure of a document, because environments based on `trivlist` should not advertise themselves as being a “list” — after all, from a semantic point of view they aren’t lists.

The approach taking here is therefore to offer separate object types: *block* (horizontally or vertically oriented data that needs some handling at the start and the end), *para* (that deals with different paragraph layouts), *list* (that handles list related parameters, and *item* (for item layouts and handling), to address the independent aspects and also offer the object type *blockenv* that ties them together as necessary.

For example, a `quote` environment would make use of a (display) *block* and some *para* handling while an standard `enumerate` would make use of a display *block*, a *list*, and an *item* and *para* instance. An inline list (like `enumerate*` from the `enumitem` package) would be using the same *list* instance but a different (horizontally oriented) *block*.

2 Object types and templates for blocks and lists

2.1 Object types

2.1.1 The object type ‘block’

Arg: 1 key/value list to alter the default block parameters

Semantics:

Handle the layout aspects of a block of data. In case of a “display” block (i.e., vertically oriented) the spacing and page breaking as well as the handling if the block starts a paragraph or ends one, that is, if text is immediately following the block without being separated by an empty line, then this text is considered to be in the same paragraph as the block.

In case of a horizontally oriented block it covers any special handling at the start and end of the block, e.g., extra spacing, prohibiting or encouraging line breaks, and so forth.

2.1.2 The object type ‘para’

Arg: 1 key/value list to alter the default item parameters

Semantics:

Sets up paragraph-specific parameters for H&J, e.g., to implement justification variations, the behavior of `\` etc. The instances are used in higher-level templates, e.g., in a *block*.

2.1.3 The object type ‘list’

Arg: 1 key/value list to alter the default item parameters

Semantics:

Handle the aspects related to list design, e.g., the use and formatting of counters, etc.

Note that this does not cover block-related aspects, i.e., a list instance could be used both for a display list or for an inline line.

2.1.4 The object type ‘item’

Arg: 1 key/value list to alter the default item parameters

Semantics:

A sub-type used as part of *list* to easily cover alternative layout for list items.

2.1.5 The object type ‘blockenv’

Arg: 1 key/value list to alter the default item parameters

Semantics:

This object type is used to implement document-level environments. It defines a *block* instance to handle the layout at the “edge” of the environment data, possibly some paragraph setup through a *para* instance, potentially an “inner” instance for more complicated environments (such as lists), and possibly some additional setup code for certain environments.

It also defines how the *blockenv* behaves with respect to nesting, e.g., does it change when nested and if so how many levels of nesting are supported, etc.

Finally, the object type defines how it appears in a tagged PDF document, what tag names are used, how they are rolemapped and whether it adds additional attributes, etc.

2.2 Templates

2.2.1 The blockenv template ‘display’

Attributes:

env-name (*tokenlist*) Name of the environment used only in tracing

tag-name (*tokenlist*) Name of the tag in the PDF. If not explicitly given the name is defined by the **tagging-recipe**

tag-class (*tokenlist*) An explicit tag class attribute

tagging-recipe (*tokenlist*) Defines the way tagging is done. Currently the values **basic**, **standard**, and **list** are supported. Default: **standard**

level-increase (*boolean*) Does this *blockenv* increase the block level if it is nested in an outer block? Default: `true`

setup-code (*tokenlist*) Initial setup code. This is executed after legacy defaults (from `\@listi`, `\@listii`, etc.) are used but before the block instance is called

block-instance (*tokenlist*) Part of the name of the *block* instance that is called. The full name has a `-⟨level⟩` appended Default: `displayblock`

para-instance (*tokenlist*)

inner-level-counter (*tokenlist*) Name of an existing (!) counter that is incremented and used to determine final name of the *inner-instance* or empty if always the same inner instance should be used

max-inner-levels (*tokenlist*) Maximum number of nested environments of this kind. Only relevant if there is a *inner-level-counter* specified Default: 4

inner-instance-type (*tokenlist*) Object type of the inner instance Default: `list`

inner-instance (*tokenlist*) Name of the inner instance (if any).

para-flattened (*boolean*) *describe* Default: `false`

final-code (*tokenlist*) Final setup code Default: `\ignorespaces`

Semantics & Comments: This *blockenv* template supports the legacy list setting that are found in many document classes in the macros `\@listi`, `\@listii`, up to `\@listvi`. It also uses the counter `\@listdepth` to track nesting of block, again mainly to support legacy setups (internally it gives it a more appropriate name but it remains accessible through the L^AT_εX name).

It first checks that nothing is too deeply nested. If the level should increase then the increments the `\@listdepth` counter and calls the corresponding `\@list...` macro to update the legacy defaults. If *level-increase* is set to `false` this is bypassed.

It then sets up the tagging via the *tagging-recipe* setting and executes any code in *setup-code*.

Afterwards it calls the appropriate *block* instance based on *block-instance* and current level, e.g., `displayblock-1`. Then it sets up paragraph parameters if a *para-instance* was specified (otherwise they stay as they are).

If a *inner-instance* was specified this is called next, or more precisely: if no *inner-level-counter* was specified the instance *inner-instance* is called.

Otherwise, the *inner-level-counter* is incremented and the instance with the name *inner-instance-inner-level-counter* is called.

Finally, the *final-code* is executed (by default `\ignorespaces`).

The maximum number of *blockenvs* that can be nested into each other is restricted by the L^AT_εX counter `maxblocklevels` with a default value of 6. If this value is increased then it is necessary to provide additional instances, e.g., `displayblock-7`, etc. Decreasing is, of course, always possible, then some of the instances defined are not used and instead the user gets an error that there is too much nesting going on.

If the key *level-increase* is set to `false` then such an environment doesn't alter the nesting level and therefore you can nest those environments as often as you like (a typical example would be `flushleft` anywhere in the nesting hierarchy, that would have no effect on hitting the boundary).

2.2.2 The block template ‘display’

Attributes:

heading (*tokenlist*) *not really used yet*

beginsep (*skip*) Default: `\topsep`

begin-par-skip (*skip*) Default: `\partopsep`

par-skip (*skip*) Default: `\parsep`

end-skip (*skip*) Default: value from `beginsep`

end-par-skip (*skip*) Default: value from `begin-par-skip`

beginpenalty (*integer*) Default: `\@beginparpenalty`

endpenalty (*integer*) Default: `\@endparpenalty`

leftmargin (*length*) Default: `\leftmargin`

rightmargin (*length*) Default: `\rightmargin`

parindent (*length*) Default: `\listparindent`

Semantics & Comments: The idea of a `heading` key needs some further thoughts. Maybe instead the object type should accept a second argument and receive input for such a heading from the document level instead.

The names of the keys need further thoughts and some decision. Right now it is a mixture of those with hyphens and those that match legacy register names (the way `enumitem` did its keys).

Also `parindent` conflicts with `indent-width`!

2.2.3 The para template ‘std’

Attributes:

indent-width (*length*) Default: `\parindent`

start-skip (*skip*) Default: `0pt`

left-skip (*skip*) Default: `0pt`

right-skip (*skip*) Default: `0pt`

end-skip (*skip*) Default: `\@flushglue`

fixed-word-spaces (*boolean*) Default: `false`

final-hyphen-demerits (*integer*) Default: `5000`

cr-cmd (*tokenlist*) Default: `\@normalcr`

para-class (*tokenlist*) Default: `justify`

2.2.4 The list template ‘std’

Attributes:

counter (<i>tokenlist</i>)	Counter name to be used in a numbered list or empty, if the list is unnumbered	
item-label (<i>tokenlist</i>)	Label “string” for a fixed label or as generated from the current counter value	
start (<i>integer</i>)	Start value for the counter if the list is numbered, otherwise irrelevant	Default: 1
resume (<i>boolean</i>)	Should a numbered list be resumed from the last instance?	Default: false
item-instance (<i>instance</i>)	Instance of type item to be used to format the label string	Default: basic
item-skip (<i>skip</i>)	The space in front of an item in the list.	Default: \itemsep
item-indent (<i>length</i>)	Horizontal displacement of the item.	Default: Opt
item-penalty (<i>integer</i>)	Penalty for breaking before an item (except the first)	Default: \@itempenalty
label-width (<i>length</i>)	Width reserved for the formatted item label	Default: \labelwidth
label-sep (<i>length</i>)	Horizontal separation between label and following text	Default: \labelsep
legacy-support (<i>boolean</i>)	Is formatting the label via \makelabel supported?	Default: false

May need to be on a different template level

2.2.5 The item template ‘std’

Attributes:

counter-label (<i>function1</i>)	<i>unused</i>	Default: \arabic{#1}
counter-ref (<i>function1</i>)	<i>unused</i>	Default: value from counter-label
label-ref (<i>function1</i>)	<i>unused</i>	Default: #1
label-autoref (<i>function1</i>)	<i>unused</i>	Default: item #1
label-format (<i>function1</i>)	Formatting of the label, questionable the way it is used	Default: #1

<code>label-strut</code> (<i>boolean</i>)	Add a <code>\strut</code> to the label?	Default: <code>false</code>
<code>label-align</code> (<i>choice</i>)	Supported values <code>left</code> , <code>center</code> , <code>right</code> , and <code>parleft</code> . <i>Only partly implemented</i>	Default: <code>right</code>
<code>label-boxed</code> (<i>boolean</i>)	Should the label be boxed?	Default: <code>true</code>
<code>next-line</code> (<i>boolean</i>)		Default: <code>false</code>
<code>text-font</code> (<i>tokenlist</i>)	<i>unused</i>	
<code>compatibility</code> (<i>boolean</i>)		Default: <code>true</code>

Semantics & Comments: This template is only rudimentary implemented at the moment. It probably needs other keys and the existing ones need a proper implementation.

3 Tagging support

3.1 Paragraph tags

Paragraphs in L^AT_EX can be nested, e.g., you can have a paragraph containing a display quote, which in turn consists of more than one (sub)paragraph, followed by some more text which all belongs to the same outer paragraph.

In the PDF model and in the HTML model that is not supported — a limitation that conflicts with real live, given that such constructs are quite normal in spoken and written language.

The approach we take to resolve this is to model such “big” paragraphs with a structure named `<text-unit>` and use `<text>` (rollmapped to `<P>`) only for (portions of) the actual paragraph text in a way that the `<text>`s are not nested. As a result we have for a simple paragraph the structures

```
<text-unit>
  <text>
    The paragraph text ...
  </text>
</text-unit>
```

The `<text-unit>` structure is rollmapped to `<Part>` or possibly to `<Div>` so we get a valid PDF, but processors who care can identify the complete paragraphs by looking for `<text-unit>` tags.

In the case of an element, such as a display quote or a display list inside the paragraph, we then have

```
<text-unit>
  <text>
    The paragraph text before the display element ...
  </text>
  <display element structure>
    Content of the display structure possibly involving inner <text-unit> tags
  </display element structure>
  <text>
```



```

    ... continuing the outer paragraph text
  </text>
</text-unit>

```

In other words such a display block is always embedded in a `<text-unit>` structure, possibly preceded by a `<text>...</text>` block and possibly followed by one, though both such blocks are optional.

Thus an `itemize` environment that has some introductory text but no text immediately following the list would be tagged as follows:

```

<text-unit>
  <text>
    The intro text for the itemize environment ...
  </text>
  <itemize>
    <LI>
      <Lb1> label </Lb1>
      <LBody>
        The text of the first item involving <text-unit> as necessary ...
      </LBody>
    </LI>
    <LI>
      The second item ...
    </LI>
    ... further items ...
  </itemize>
</text-unit>

```

The `<itemize>` is rollmapped to `<L>`.

For some display blocks, such as centered text, we use a simpler strategy. Such blocks still ensure that they are inside a `<text-unit>` structure but their body uses simple `<text>` blocks and not `<text-unit><text>` inside, e.g., the input

```

This is a paragraph with some
\begin{center}
  centered lines

```

```

  with a paragraph break between them
\end{center}
followed by some more text.

```

will be tagged as follows:

```

<text-unit>
  <text>
    This is a paragraph with some
  </text>
  <text /0 /Layout /TextAlign/Center>
    centered lines
  </text>
  <text /0 /Layout /TextAlign/Center>
    with a paragraph break between them

```

```

    </text>
    <text>
        followed by some more text.
    </text-unit>

```

3.2 Tagging recipes

There are a number of different tagging recipes that implement different tagging approaches. They are selected through the `tagging-recipe` of the `blockenv` template. Currently the following values are implemented:

basic This recipe does the following:

- Ensure that the `blockenv` is inside a `<text-unit>` structure, if necessary, start one.
- If inside a `<text-unit><text>`, then close the `</text>` but leave the `<text-unit>` open.
- Text inside the body of the environment starts with `<text-unit><text>` if `para-flattened` is set to `false`, otherwise just with `<text>`.
- At the end of the environment close `</text>` and possibly an inner `</text-unit>` if open.
- Then look if the environment is followed by an empty line (`\par`). If so, close the outer `</text-unit>` and start any following text with `<text-unit><text>`. Otherwise, don't and following text restarts with a just a `<text>` (and no paragraph indentation)

standard This recipe is like the **basic** one as far as handling `<text-unit>` and `<text>` is concerned. In addition

- it starts an inner tagging structure (i.e., which is therefore a child of the outer `<text-unit>`).
- By default this structure is a `<Figure>` unless overwritten by the key `tag-name`. If that key is used, a suitable rollmap needs to be provided for the name given.
- At the end of the environment that inner structure is closed again so that we are back on the `<text-unit>` level from the outside.
- Then the lookahead for an empty line is done as described previously.

list This recipe is like the **standard** one except that

- the inner structure is a list (`<L>`).
- Furthermore everything is set up so that we have list items (``) with suitable substructures (`<Lb1>` for the item labels and `<LBody>` for the item bodies).
- If the key `tag-name` is specified, this is used as the tag name for the whole list instead of `<L>`. Of course, it should then have a suitable rollmap.
- If the key `tag-class` is specified then this is used as the class attribute. Again, this requires a suitable setup on the outside.
- At the end of the environment the `</LBody>`, ``, and `</L>` (or the tag name used) are closed.
- Then the lookahead for an empty line is done as described previously.

4 The Implementation

```
1 <*package>
2 <@@=block>
3 \ProvidesPackage {latex-lab-testphase-block-tagging}
4                 [\lblocksdate\space \lblocksversion\space
5                 blockenv implementation]
```

We make use of templates:

```
6 \RequirePackage{xtemplate}
```

Generell kernel changes, also loaded by the sec and toc code.

```
7 \RequirePackage{latex-lab-kernel-changes}
```

```
8 \ExplSyntaxOn
```

```
9 \tl_new:N \l_block_item_align_tl
```

```
10 \tl_new:N \l_block_legacy_env_params_tl
```

UFI: this variable(s) must be declared:

4.1 Handling `\par` after the end of the list

An empty line (or a `\par`) after a list has semantic meaning as it defines whether then following text is logically within the same paragraph as the list (no empty line) or whether it starts a new paragraph and the paragraph containing the list ends at the end of the list (empty line after the list). This is handled by \LaTeX using a legacy flag called `@endpe` and set of commands inside the generic `\end` (calling `\@doendpe`) and as part of the list environments identifying themselves as “paragraph ending environments” (by setting this flag).

For the reimplementaion of the list environments including support of tagging we need to augment that mechanism slightly and add some kernel hook(s) to add the tagging code if needed.

`\@doendpe` The original \LaTeX 2_{ϵ} command is augmented to allow for tagging.

```
11 \def\@doendpe{\@endpetrue
12   \def\par
13     {
14       \@restorepar
15       \clubpenalty\@clubpenalty
```

At this point we add the tagging code that closes an open `<text-unit>`, `<text>` tag combination, if necessary:

```
16   \_kernel_displayblock_doendpe:
```

The standard `\par` command (`\par_end:`) acts on `@endpe` and attempts to close a still open `text-unit` and this would be wrong if it was already closed above. So we have to reset the switch to false first.

```
17     \@endpefalse
18     \everypar{}
19     \par
20   }
21 \everypar{\setbox\z@\lastbox}
22           \everypar{}
23           \@endpefalse
24 }
25 }
```

By default we don't do any tagging:

```
26 \cs_new_eq:NN \__kernel_displayblock_doendpe: \prg_do_nothing:
```

verify that this claim is actually correct!

The flag itself should be set globally not locally.

```
27 \def\@endpetrue {\global\let\if@endpe\iftrue}
28 \def\@endpefalse{\global\let\if@endpe\iffalse}
```

(End of definition for \@doendpe. This function is documented on page ??.)

4.2 Object and template interfaces

`blockenv` (*objecttype*) All object types expect a single key–value argument used to tweak template parameters
`block` (*objecttype*) specific to a given use in the document. This section is devoted to template interfaces,
`para` (*objecttype*) and the template code is covered later.

`list` (*objecttype*)

```
29 \DeclareObjectType{blockenv}{1}
```

`item` (*objecttype*)

```
30 \DeclareObjectType{block}{1}
```

```
31 \DeclareObjectType{para}{1}
```

```
32 \DeclareObjectType{list}{1}
```

```
33 \DeclareObjectType{item}{1}
```

`blockenv display` (*templ.*)

```
34 \DeclareTemplateInterface{blockenv}{display}{1}
```

```
35 {
```

```
36   env-name      : tokenlist ,
```

```
37   tag-name      : tokenlist ,
```

```
38   tag-class     : tokenlist ,
```

```
39   tagging-recipe : tokenlist = standard,
```

```
40   level-increase : boolean = true ,
```

```
41   setup-code    : tokenlist ,
```

```
42   block-instance : tokenlist = displayblock ,
```

```
43   para-instance : tokenlist ,
```

```
44   inner-level-counter : tokenlist,
```

```
45   max-inner-levels   : tokenlist = 4,
```

```
46   inner-instance-type : tokenlist = list ,
```

```
47   inner-instance     : tokenlist ,
```

```
48   para-flattened     : boolean = false ,
```

```
49   final-code        : tokenlist = \ignorespaces ,
```

```
50 }
```

`block display` (*templ.*)

```
51 \DeclareTemplateInterface{block}{display}{1}
```

```
52 {
```

```
53   heading      : tokenlist = ,
```

```
%??
```

```
54   beginsep     : skip = \topsep ,
```

```
55   begin-par-skip : skip = \partopsep ,
```

```
56   par-skip     : skip = \parsep ,
```

```
57   end-skip     : skip = \KeyValue{beginsep} ,
```

```
% conflict with name below
```

```
58   end-par-skip : skip = \KeyValue{begin-par-skip} ,
```

```
59   beginpenalty : integer = \UseName{@beginparpenalty} ,
```

```
60   endpenalty   : integer = \UseName{@endparpenalty} ,
```

```
61   leftmargin   : length = \leftmargin ,
```

```
62   rightmargin  : length = \rightmargin ,
```

```
63   parindent    : length = \listparindent ,
```

```
64 % font      : tokenlist
```

```
% maybe add? (or more general for fonts and color)
```

```
65 }
```

para std (*templ.*)

```
66 \DeclareTemplateInterface{para}{std}{1}
67 {
68   indent-width      : length = \parindent ,
69   start-skip        : skip = Opt ,
70   left-skip         : skip = Opt ,
71   right-skip        : skip = Opt ,
72   end-skip          : skip = \@flushglue ,
73   fixed-word-spaces : boolean = false ,
74   final-hyphen-demerits : integer = 5000 ,
75   cr-cmd            : tokenlist = \@normalcr ,
76   para-class        : tokenlist = justify ,
77 }
```

list std (*templ.*)

```
78 \DeclareTemplateInterface{list}{std}{1}      % optional
79 {
80   counter           : tokenlist = ,
81   item-label        : tokenlist = ,
82   start             : integer = 1 ,
83   resume           : boolean = false ,
84   item-instance     : instance{item} = basic ,
85   item-skip         : skip = \itemsep ,
86   item-penalty      : integer = \UseName{@itempenalty} ,
87   item-indent       : length = Opt ,          % was \itemindent
88   label-width       : length = \labelwidth ,
89   label-sep         : length = \labelsep ,
90   legacy-support    : boolean = false ,
91 }
```

item std (*templ.*)

```
92 \DeclareTemplateInterface{item}{std}{1}
93 {
94   counter-label : function{1} = \arabic{#1} ,
95   counter-ref   : function{1} = \KeyValue{counter-label} ,
96   label-ref     : function{1} = #1 ,
97   label-autoref : function{1} = item~#1 ,
98   label-format  : function{1} = #1 ,
99   label-strut   : boolean = false ,
100  label-align    : choice {left,center,right,parleft} = right ,
101  label-boxed    : boolean = true ,
102  next-line      : boolean = false ,
103  text-font      : tokenlist ,
104  compatibility  : boolean = true ,
105 }
```

4.3 Useful helper commands

This section collects expl3 commands that will be useful.

`_block_skip_set_to_last:N` Set a skip register to the value of an immediately preceding skip or zero if there was none

```

106 \cs_new_protected:Npn \_block_skip_set_to_last:N #1 {
107   \skip_set:Nn #1 { \tex_lastskip:D }
108 }

```

Remove a skip previous skip if it is directly in front (not allowed in unrestricted vertical mode).

```

109 \cs_new_eq:NN \_block_skip_remove_last: \tex_unskip:D

```

(End of definition for _block_skip_set_to_last:N and _block_skip_remove_last:.)

`\tl_if_novalue:nTF`

```

110 \cs_generate_variant:Nn \tl_if_novalue:nTF { o }

```

(End of definition for \tl_if_novalue:nTF. This function is documented on page ??.)

`\tag_if_active:T` If tagging support is not loaded then we shouldn't try to execute any tagging related commands. Eventually this can go once the basic support is available in the kernel.

```

111 \cs_if_exist:NF \tag_if_active:T
112   { \cs_new_eq:NN \tag_if_active:T \use_none:n }

```

(End of definition for \tag_if_active:T. This function is documented on page ??.)

4.3.1 Debugging

`\g_block_debug_bool`

```

113 \bool_new:N \g_block_debug_bool

```

(End of definition for \g_block_debug_bool.)

`_block_debug:n`

`_block_debug_typeout:n`

```

114 \cs_new_eq:NN \_block_debug:n \use_none:n
115 \cs_new_eq:NN \_block_debug_typeout:n \use_none:n

```

(End of definition for _block_debug:n and _block_debug_typeout:n.)

`\block_debug_on:`

`\block_debug_off:`

`_block_debug_gset:`

```

116 \cs_new_protected:Npn \block_debug_on:
117   {
118     \bool_gset_true:N \g_block_debug_bool
119     \_block_debug_gset:
120   }
121 \cs_new_protected:Npn \block_debug_off:
122   {
123     \bool_gset_false:N \g_block_debug_bool
124     \_block_debug_gset:
125   }
126 \cs_new_protected:Npn \_block_debug_gset:
127   {
128     \cs_gset_protected:Npx \_block_debug:n ##1
129     { \bool_if:NT \g_block_debug_bool {##1} }
130     \cs_gset_protected:Npx \_block_debug_typeout:n ##1
131     { \bool_if:NT \g_block_debug_bool { \typeout{==>~ ##1} } }
132   }

```

(End of definition for `\block_debug_on:`, `\block_debug_off:`, and `_block_debug_gset:`. These functions are documented on page ??.)

```

\DebugBlocksOn
\DebugBlocksOff 133 \cs_new_protected:Npn \DebugBlocksOn { \block_debug_on: }
                  134 \cs_new_protected:Npn \DebugBlocksOff { \block_debug_off: }
                  135 \DebugBlocksOff

```

(End of definition for `\DebugBlocksOn` and `\DebugBlocksOff`. These functions are documented on page ??.)

4.4 Implementation of the document-level block environments

Most such environments are pretty simple: they take an option argument and call a `blockenv` instance to do the work. At the end of environment we call `\endblockenv` to finish.

4.4.1 Displayblock environments

There are two basic block environment which are similar to $\text{\LaTeX} 2_{\epsilon}$'s `trivlist` except that there aren't degenerated lists and thus have no hidden `\item` inside.

```

displayblock (env.)
136 \NewDocumentEnvironment{displayblock}{!0{ } }
137 { \UseInstance{blockenv}{displayblock} {#1} }
138 { \endblockenv }

displayblockflattened (env.)
139 \NewDocumentEnvironment{displayblockflattened}{!0{ } }
140 { \UseInstance{blockenv}{displayblockflattened} {#1} }
141 { \endblockenv }

center (env.)
flushleft (env.)
flushright (env.) 142 \AddToHook{begindocument/before}{
143 \RenewDocumentEnvironment{center} {!0{ } }
144 { \UseInstance{blockenv}{center}{#1} }
145 { \endblockenv }

146 \RenewDocumentEnvironment{flushright} {!0{ } }
147 { \UseInstance{blockenv}{flushright}{#1} }
148 { \endblockenv }

149 \RenewDocumentEnvironment{flushleft} {!0{ } }
150 { \UseInstance{blockenv}{flushleft}{#1} }
151 { \endblockenv }
152 }

```

4.4.2 Display quote environments

```
quote (env.)
quotation (env.) 153 \AddToHook{begindocument/before}{
154   \RenewDocumentEnvironment{quote}{ !0{} }
155     { \UseInstance{blockenv}{quote} {#1} }
156     { \endblockenv }
157   \RenewDocumentEnvironment{quotation}{ !0{} }
158     { \UseInstance{blockenv}{quotation} {#1} }
159     { \endblockenv }
160 }
```

4.4.3 Verbatim environments

```
verbatim (env.)
verbatim* (env.) 161 \AddToHook{begindocument/before}{
162   \RenewDocumentEnvironment{verbatim}{ !0{} }
163     { \UseInstance{blockenv}{verbatim} {#1} }
```

This is the part of the code where `verbatim` and `verbatim*` differ.

```
164     \@setupverbinvisiblespace\frenchspacing\@vobeyspaces
165     \@xverbatim
166   }
167   { \endblockenv }
168   \RenewDocumentEnvironment{verbatim*}{ !0{} }
169     { \UseInstance{blockenv}{verbatim} {#1}
170       \@setupverbvisiblespace\frenchspacing\@vobeyspaces
171       \@sxverbatim
172     }
173     { \endblockenv }
174 }
```

Helper commands for verbatim

`\legacyverbatimsetup` This code resembles the L^AT_EX 2_ε `verbatim` implementation with a slight twist: in L^AT_EX 2_ε each code line was a paragraph using `\leftskip=\@totalleftmargin`. This was possible because the whole environment was implemented as a trivlist. As this is no longer the case setting `\leftskip` would alter the layout of a surrounding list. So instead we need to make sure that the paragraph end is executed in a group so that any parshape setup is preserved.

```
175 <@@=)
176 \def\legacyverbatimsetup{%
177   \language\l@nohyphenation
178   \@tempwafalse
179   \def\par{%
180     \if@tempswa
181       \leavevmode \null {\@@par}\penalty\interlinepenalty
182     \else
183       \@tempwatrue
184       \ifhmode{\@@par}\penalty\interlinepenalty\fi
185     \fi}%
186   \let\do\@makeother \dospecials
187   \obeylines \verbatim@font \@noligs
```



```

188 \everypar \expandafter{\the\everypar \unpenalty}%
189 \tl_set:Nn \l__tag_para_main_tag_tl {codeline}
190 \tagtool{paratag=Code}% oder faster: \tl_set:Nn\l__tag_para_tag_tl{Code}
191 }
192 <@@=block>

```

(End of definition for `\legacyverbatimsetup`. This function is documented on page ??.)

`\@setupverbinvisiblespace` In the pdf_TE_X engine we need to use `\pdffakespace` chars for the invisible spaces.

```

193 \newcommand\@setupverbinvisiblespace{}
194 \tag_if_active:T {
195 \bool_if:NF\g__tag_mode_lua_bool
196 {
197 \renewcommand\@setupverbinvisiblespace{\def\xobeysp{\nobreakspace\pdffakespace}}
198 }
199 }

```

(End of definition for `\@setupverbinvisiblespace`. This function is documented on page ??.)

4.4.4 Standard list environments

`itemize` (*env.*) For the standard lists everything is managed by the `blockenv` instance.

```

enumerate (env.) 200 \AddToHook{begindocument/before}{
description (env.) 201 \RenewDocumentEnvironment{itemize}{!0{}}
202 { \UseInstance{blockenv}{itemize} {#1} }
203 { \endblockenv }
204 \RenewDocumentEnvironment{enumerate}{!0{}}
205 { \UseInstance{blockenv}{enumerate} {#1} }
206 { \endblockenv }
207 \RenewDocumentEnvironment{description}{!0{}}
208 { \UseInstance{blockenv}{description} {#1} }
209 { \endblockenv }
210 }

```

`list` (*env.*) The legacy 2e list environment is more complicated as we have to get the extra arguments accounted for.

```

211 \AddToHook{begindocument/before}{
212 \RenewDocumentEnvironment{list}{0{ } m m }
213 {

```

We do this by storing them away and then call the list instance. Inside this instance the `setup-code` key contains `\legacylistsetupcode`, which makes use of the stored values.

```

214 \tl_set:Nn \@itemlabel {#2}
215 \tl_set:Nn \l__block_legacy_env_params_tl {#3}
216 \UseInstance{blockenv}{list} {#1}
217 }
218 { \endblockenv }
219 }

```

Again something that should probably elsewhere: the rolemapping.

```

220 \tag_if_active:T {
221 \tagpdfsetup{add-new-tag={tag=list,role=L}}
222 }

```

`\l_block_env_params_tl` Declare the variable for the parameter argument; `\@itemlabel` is already declared in L^AT_EX 2_ε.

```
223 \tl_new:N \l_block_env_params_tl
```

(End of definition for `\l_block_env_params_tl`.)

`\legacylistsetupcode` And here is the extra code for use in the list instance setup inside the key `setup-code`.

```
224 \cs_new:Npn \legacylistsetupcode {
```

Reset values to defaults:

```
225 \dim_zero:N \listparindent
```

```
226 \dim_zero:N \rightmargin
```

```
227 \dim_zero:N \itemindent
```

By default a list environment is not numbered:

```
228 \tl_set:Nn \@listctr {}
```

```
229 \legacy_if_set_false:n { @nbrlist } % needed if lists are nested
```

By default there is a simple definition for `\makelabel`. It can be overwritten in the second mandatory argument to the list environment (stored in `\l_block_legacy_env_params_tl`) and is used if the instance sets the compatibility key to true.

```
230 \let\makelabel\@mklab % TODO: customize
```

Now we use the argument with parameter settings to update some or all of the above defaults:

```
231 \l_block_legacy_env_params_tl
```

As we don't know much about this list we can only make a guess about the nature of the list and the setting of the tag name (default `list` rolemapped to `L`) and any tag attributes may have to be overwritten in the optional key/value argument. But we do have some hints to play with.

```
232 \legacy_if:nTF { @nbrlist }
```

```
233 { \tl_set:Nn \l_tag_L_attr_class_tl {enumerate} } % numbered list
```

```
234 { \tl_if_empty:NTF \@itemlabel
```

```
235 { \tl_set:Nn \l_tag_L_attr_class_tl {list} } % no label
```

```
236 { \tl_set:Nn \l_tag_L_attr_class_tl {itemize} } % unnumbered, unordered
```

```
237 }
```

```
238 }
```

(End of definition for `\legacylistsetupcode`. This function is documented on page ??.)

`trivlist (env.)`

```
239 \AddToHook{begindocument/before}{
```

```
240 \RenewDocumentEnvironment{trivlist}{ !O{} }
```

```
241 { \list[#1]{} 
```

```
242 { 
```

```
243 \dim_zero:N \leftmargin 
```

```
244 \dim_zero:N \labelwidth 
```

```
245 \cs_set_eq:NN \makelabel \use:n 
```

```
246 } 
```

```
247 }
```

```
248 { \endblockenv }
```

```
249 }
```

4.4.5 Theorem-like environments

Theorem-like environments are defined in L^AT_EX with the help of `\newtheorem` declarations. Internally they used a list with a single item. Using lists was convenient back then, but in a tagged document you end up with a strange structure. We therefore alter the mechanism.

`\newtheorem` This is a slightly streamlined version of `\newtheorem`, but it still uses a lot of the 2e code for now. Eventually this will change.

```

250 \RenewDocumentCommand \newtheorem { m O{#1} m o }
251 {
252   \expandafter\@ifdefinable\csname #1\endcsname
253   {
254     \str_if_eq:nnTF{#1}{#2}
255     {
256       \definecounter {#2}
257       \IfNoValueTF {#4}
258       { % @ynthm
259         \tl_gset:cx { the #2 }
260         {
261           \@thmcounter{#2}
262         }
263       }
264       { % @xnthm
265         \@newctr{#1}[#4]
266         \tl_gset:cx { the #2 }
267         {
268           \expandafter\noexpand\csname the#4\endcsname
269           \@thmcountersep
270           \@thmcounter{#2}
271         }
272       }
273     }
274     { % @othm
275       \ifundefined{c@#2}
276       { \@nocounterr{#2} }
277       {
278         \tl_gset:cn { the #1 }
279         { \UseName { the #2 } }
280       }
281     }
282     \global\@namedef{#1} { \@thm{#2}{#3} }
283     \global\@namedef{end#1}{ \@endtheorem }
284   }
285 }

```

(End of definition for `\newtheorem`. This function is documented on page ??.)

`\@begintheorem` The `\@thm` command expands to either `\@beginthorem` or `\@opargbegintheorem`. For
`\@opargbegintheorem` the moment we stick with this as it will help with the transition. But instead of using a `trivlist` we use a `blockenv` and some tagging for the title (as a `Caption`). We do not want potential tagging from `\textbf` here, so we use `\bfseries` to set the font.

```

286 \def\@begintheorem#1#2{
287   \UseInstance{blockenv}{theorem}{#1}

```

```

288 \tagpdfparaOff
289 \mode_leave_vertical:
290 \tag_struct_begin:n{tag=Caption}
291 \group_begin:
292 \bfseries
293 \tag_mc_begin:n {}
294 #1\
295 \tag_mc_end:
296 \tag_struct_begin:n{tag=Lbl}
297 \tag_mc_begin:n {}
298 #2
299 \tag_mc_end:
300 \tag_struct_end:
301 \group_end:
302 \tag_struct_end:
303 \tagpdfparaOn
304 \__block_start_para_structure_unconditionally:n { \PARALABEL }
305 \itshape
306 \hskip\labelsep
307 \ignorespaces
308 }
309 \def\@opargbegintheorem#1#2#3{
310 \UseInstance{blockenv}{theorem}{-}
311 \tagpdfparaOff
312 \mode_leave_vertical:
313 \tag_struct_begin:n{tag=Caption}
314 \group_begin:
315 \bfseries
316 \tag_mc_begin:n {}
317 #1\
318 \tag_mc_end:
319 \tag_struct_begin:n{tag=Lbl}
320 \tag_mc_begin:n {}
321 #2
322 \tag_mc_end:
323 \tag_struct_end:
324 \tag_mc_begin:n {}
325 \ (#3)
326 \tag_mc_end:
327 \group_end:
328 \tag_struct_end:
329 \tagpdfparaOn
330 \__block_start_para_structure_unconditionally:n { \PARALABEL }
331 \itshape
332 \hskip\labelsep
333 \ignorespaces
334 }
335 \def\@endtheorem{\endblockenv}

```

(End of definition for \@begintheorem and \@opargbegintheorem. These functions are documented on page ??.)

4.5 Implementation of templates

4.5.1 Implementation of blockenv templates ...

`\g_block_nesting_depth_int` L^AT_EX_{2 ϵ} already has a counter to record the nesting depth of blocks, but we want our own name because it isn't really tied to "lists" any more. However, `\@listdepth` is really part of the legacy interface (for example `minipage` alters it to point to a different counter) so that we are stuck with using at least indirectly for now and the following line makes this look like an L3 integer variable but internally expands to `\@listdepth`:

```
336 \cs_new:Npn \g_block_nesting_depth_int { \@listdepth } % a fake int
337                                         % for now
```

(End of definition for `\g_block_nesting_depth_int`. This function is documented on page ??.)

`blockenv display (templ.)`

```
338 \DeclareTemplateCode{blockenv}{display}{1}
339 {
340   env-name      = \l__block_env_name_tl ,
341   tag-name      = \l__block_tag_name_tl ,
342   tag-class     = \l__block_tag_class_tl ,
343   tagging-recipe = \l__block_tagging_recipe_tl ,
344   level-increase = \l__block_level_incr_bool ,
345   setup-code    = \l__block_setup_code_tl ,
346   block-instance = \l__block_block_instance_tl ,
347   para-instance = \l__block_para_instance_tl ,
348   inner-level-counter = \l__block_inner_level_counter_tl ,
349   max-inner-levels = \l__block_max_inner_levels_tl ,
350   inner-instance-type = \l__block_inner_instance_type_tl ,
351   inner-instance = \l__block_inner_instance_tl ,
352   para-flattened = \l__tag_para_flattened_bool ,
353   final-code    = \l__block_final_code_tl ,
354 }
355 {
356   \__block_debug_typeout:n{\l__block_env_name_tl -env-start}
357 %
358 \tl_if_empty:nF {#1} { \SetTemplateKeys{blockenv}{display}{#1} }
359 %
```

We need to know later if we have nested blockenvs inside a flattened environment. Whenever we start a new blockenv we increment `\l__block_flattened_level_int` if it is already different from zero. If it is zero we increment it if flattening is requested. Thus a value of 0 means no flattening requested so far and 1 means this is the first blockenv requesting flattening. In either case we have to make sure that the blockenv is surrounded by a `text-unit` tag, while for any value above 1 we have to omit the `text-unit`.

```
360 \int_compare:nNnTF \l__block_flattened_level_int > 0
361   {
362     \int_incr:N \l__block_flattened_level_int
363   }
364   {
365     \bool_if:NT \l__tag_para_flattened_bool
366       {
367         \int_incr:N \l__block_flattened_level_int
368       }
369   }
```

```

370 %
371 \tl_if_empty:NF \l__block_inner_level_counter_tl
372 {
373   \int_compare:nNnTF \l__block_inner_level_counter_tl >
374     { \l__block_max_inner_levels_tl - 1 }
375     { \@toodeep }
376     { \int_incr:N \l__block_inner_level_counter_tl } % not clean "o"?
377 }

```

Legacy defaults are only roped in if the list level changes. For display blocks that remain on the same level the current values are kept.

```

378 \bool_if:NT \l__block_level_incr_bool
379 {
380   \int_compare:nNnTF \g_block_nesting_depth_int >
381     { \c@maxblocklevels - 1 }
382     { \@toodeep }
383     {
384       \int_gincr:N \g_block_nesting_depth_int

```

If there are no legacy defaults for that level then the next line does nothing, i.e., the current values (from the last level become the defaults for the next.

```

385       \use:c { @list \int_to_roman:n { \g_block_nesting_depth_int } }
386     }
387 }

```

If we are doing tagging we load one of the available recipes for tagging, which alters various kernel hooks to add appropriate tagging structures.

```

388 \tag_if_active:T { \use:c { __block_recipe_ \l__block_tagging_recipe_tl : } }

```

Then run the setup code if any is given in the instance.

```

389 \l__block_setup_code_tl

```

Next call a block instance at the appropriate level passing it any key/value list provided in the optional argument (keys that are not recognized are ignored—currently with an error).

```

390 \__block_debug_typeout:n{use~ instance:~
391   \l__block_block_instance_tl - \int_use:N \g_block_nesting_depth_int }
392 \UseInstance{block}
393   { \l__block_block_instance_tl - \int_use:N
394     \g_block_nesting_depth_int }
395   {#1}

```

After the block instance call the para and then inner (list) instance if either or both are specified (which may not be the case).

```

396 \tl_if_empty:NF \l__block_para_instance_tl
397 {
398   \__block_debug_typeout:n{use~ para~ instance:~ \l__block_para_instance_tl }

```

For now we don't offer to alter instance parameters here so we pass an empty argument.

```

399   \UseInstance{para}{ \l__block_para_instance_tl } {}
400 }

```

In the inner instance may have its own levels or none depending on which the instance name differs. Again we pass it the optional key/value list.

```

401 \tl_if_empty:NF \l__block_inner_instance_tl
402 {

```

```

403     \l_block_debug_typeout:n{use~ instance:~ \l_block_inner_instance_tl
404         \tl_if_empty:NF \l_block_inner_level_counter_tl
405             { - \int_use:N \l_block_inner_level_counter_tl }}
406     \UseInstance{ \l_block_inner_instance_type_tl }
407         { \l_block_inner_instance_tl
408             \tl_if_empty:NF \l_block_inner_level_counter_tl
409                 { - \int_use:N \l_block_inner_level_counter_tl } % not clean
410                                                         % use "o"?
411         }
412     {#1}
413 }

```

We finish off with `\l_block_final_code_tl` which defaults to `\ignorespaces` so that spaces between `\begin{...}` and the start of the text are ignored.

```

414 \l_block_final_code_tl
415 }

```

`\l_block_flattened_level_int` Count the levels of nested blockenvs starting with the first that is “flattened”.

```

416 \int_new:N \l_block_flattened_level_int

```

(End of definition for `\l_block_flattened_level_int`.)

`\c@maxblocklevels` A counter to increase or decrease the number of supported level. If increased, one needs to supply additional level instances.

```

417 \newcounter{maxblocklevels}
418 \setcounter{maxblocklevels}{6}

```

(End of definition for `\c@maxblocklevels`. This function is documented on page ??.)

`\endblockenv` The code executed when a blockenv ends is 99% the same for all blockenvs (at least up to now). Small differences exist, though. They are accounted for first in the conditionals.

We make this a public command so that new block environments can be set up without the need to resort to L3 layer programming.

```

419 \cs_new:Npn \endblockenv {
420     \l_block_debug_typeout:n{blockenv~ common~ ending \on@line}

```

If this block was incrementing the level we have to decrement it now again:

```

421     \bool_if:NT \l_block_level_incr_bool
422         { \int_gdecr:N \g_block_nesting_depth_int }

```

If this block was a list and there are still `\item` labels to be placed we move to horizontal mode to get them typeset.

```

423     \legacy_if:nT { @inlabel }
424     {
425         \mode_leave_vertical:
426         \legacy_if_gset_false:n { @inlabel }
427     }

```

In a pure “displayblock” scenario `@newlist` will be always false and the code bypassed, but we may have an outer list followed immediately by a displayblock (with the `\item` missing)

```

428     \legacy_if:nT { @newlist }
429     {
430         \@noitemerr
431         \legacy_if_gset_false:n { @newlist }

```

name is bad

```

432     }
433     \mode_if_horizontal:TF
434       { \__block_skip_remove_last: \__block_skip_remove_last: \par }
435       { \@inmatherr{\end{\@currenenvir}} }

```

Once we are back in vertical mode we can add the appropriate closing tagging structure(s), if we are doing tagging.

```

436     \__kernel_displayblock_end:

```

What to do in terms of vertical spacing in different situations is still somewhat open to debate, right now this is more or less implementing what L^AT_EX 2_ε list environment have been doing.

some redesign/extensions here?

```

437 %     \__block_debug_typeout:n{@nolist =
438 %                                     \legacy_if:nTF { @nolist }{true}{false}}
439 \legacy_if:nF { @nolist }
440   {
441     \__block_skip_set_to_last:N \l_tmpa_skip
442     \dim_compare:nNnT \l_tmpa_skip > \c_zero_dim
443       {
444         \skip_vertical:n { - \l_tmpa_skip }
445         \skip_vertical:n { \l_tmpa_skip + \parskip - \@outerskip }
446       }
447     \addpenalty \@endparpenalty
448     \addvspace \l__block_topsepadd_skip

```

L^AT_EX 2_ε triggered the paragraph handling after a list at this point here, i.e., only if the list didn't start a paragraph. One can make a case for that, but it can be somewhat surprising to the user and there is a good argument that even such a list could be followed expository text that is part of the same paragraph and doesn't start a new one.

decide which logic we want to use! If the old logic is used we need to close the text-unit ourselves in the true branch

```

449 %     \legacy_if_gset_true:n { @endpe }
450   }

```

So this is for now always done. Probably `\l__block_topsepadd_skip` above should be added only if the paragraph ends here and not if it continues, so this need some further cleanup.

decide

```

451     \bool_if:NTF \l__block_standalone_bool

```

It is possible that `@endpe` is true because a displayblock has just ended before we end the standalone displayblock and in that case there is no outer `<text-unit>` so we have to explicitly set `@endpe` back to false to prevent it from closing a structure later that isn't there.

```

452     { \legacy_if_gset_false:n { @endpe } }
453     { \legacy_if_gset_true:n { @endpe } }
454   }

```

(End of definition for `\endblockenv`. This function is documented on page ??.)

`__kernel_displayblock_end:` The kernel hook for tagging at the end of the block.

```

455 \cs_new:Npn \__kernel_displayblock_end: {
456   \__block_debug_typeout:n{\detokenize{\__kernel_displayblock_end:}}
457 }

```

(End of definition for `__kernel_displayblock_end:`.)

`\l_block_standalone_bool`

```
458 \bool_new:N      \l_block_standalone_bool
459 \bool_set_false:N \l_block_standalone_bool
```

(End of definition for `\l_block_standalone_bool`.)

4.5.2 Implementation of para templates ...

`para std (templ.)`

```
460 \DeclareTemplateCode{para}{std}{1}
461 {
462   indent-width      = \parindent ,
463   start-skip        = \l__par_start_skip ,           % name??
464   left-skip         = \leftskip ,
465   right-skip        = \rightskip ,
466   end-skip          = \parfillskip ,
467   fixed-word-spaces = \l__par_fixed_word_spaces_bool , % name??
468   final-hyphen-demerits = \finalhyphendemerits ,
469   cr-cmd            = \\ ,
470   para-class        = \l_tag_para_attr_class_tl ,
471 }
472 {
473   \tl_if_empty:nF {#1} { \SetTemplateKeys{para}{std}{#1} }
474   \skip_set:Nn \@rightskip \rightskip
475 }
```

4.5.3 Implementation of block templates ...

`block display (templ.)`

```
476 \DeclareTemplateCode{block}{display}{1}
477 {
478   heading           = \l_block_heading_tl ,
479   beginsep          = \topsep ,
480   begin-par-skip    = \partopsep ,
481   par-skip          = \parsep ,
482   end-skip          = \l_block_botsep_skip ,
483   end-par-skip      = \l_block_parbotsep_skip ,
484   beginpenalty      = \@beginparpenalty ,
485   endpenalty        = \@endparpenalty ,
486   rightmargin       = \rightmargin ,
487   leftmargin        = \leftmargin ,
488   parindent         = \listparindent ,
489 }
490 {
491   \tl_if_empty:nF {#1} { \SetTemplateKeys{block}{display}{#1} }
492   \tl_if_blank:oF \l_block_heading_tl
493   { \mode_leave_vertical: \textbf{\l_block_heading_tl} } % TODO customize
```

generalize heading usage
(or drop?)

The code largely follows the logic of L^AT_EX 2_ε's `trivlist` implementation as far as it is applicable for the “display block” but coded using the L3 programming layer. However, we keep all the legacy variables (e.g., `@noskipsec`) if there is some chance that they are set in classes or packages.

```
494   \legacy_if:nT { @noskipsec } { \mode_leave_vertical: }
```

```

495 \skip_set:Nn \l__block_topsepadd_skip { \topsep }
496 \mode_if_vertical:TF
497 {
498 \skip_add:Nn \l__block_topsepadd_skip { \partopsep }

```

At this point it is safe to add tagging structure(s) so we have a kernel-owned hook here for tagging. This is used to possibly start a paragraph structure (to surround the block, for example, in case of lists) and possibly do some other preparation for tagging the block.

```

499 \__kernel_displayblock_beginpar_vmode:
500 }
501 {

```

If we are in horizontal mode then the displayblock has to return to vertical mode now (after removing any immediately preceding skip or kern. But before we actually issue the `\par` we execute a kernel hook in which we can add tagging code. This hook is “weird” because by default it does nothing, but if tagging is wanted it takes an argument and grabs the following `\par` in order to put tagging code before and after the `\par`.

```

502 \__block_skip_remove_last: \__block_skip_remove_last:
503 \__kernel_displayblock_beginpar_hmode:w \par
504 }

```

Now we are back to legacy list implementation ...

```

505 \legacy_if:nTF { @inlabel }
506 {
507 \legacy_if_set_true:n { @noparitem }
508 \legacy_if_set_true:n { @noparlist }
509 }
510 {
511 \legacy_if:nT { @newlist } { \@noitemerr }
512 \legacy_if_set_false:n { @noparlist }
513 \skip_set_eq:NN \l__block_effective_top_skip \l__block_topsepadd_skip
514 }
515 \skip_add:Nn \l__block_effective_top_skip { \parskip }

```

Next lines set some paragraph defaults, this may get overwritten if there is a `para`-instance specified on the `blockenv`.

```

516 \skip_zero:N \leftskip
517 \skip_set_eq:NN \rightskip \@rightskip
518 \skip_set_eq:NN \parfillskip \@flushglue

```

The next lines establish a parshape which is retained across paragraphs by executing `\para_end:` within a group and thus reestablishing the parshape for the next paragraph again. In case a list got started `\par` is ignored until we have seen an `\item` (or we have executed `\par` one thousand times.

```

519 \int_zero:N \par@deathcycles
520 \@setpar
521 {
522 \legacy_if:nTF { @newlist }
523 {
524 \int_incr:N \par@deathcycles
525 \int_compare:nNnTF \par@deathcycles > { 1000 }
526 { \@noitemerr
527 { \para_end: }
528 }
529 }

```

```

530     {
531       { \para_end: }
532     }
533   }
534   \skip_set_eq:NN \@outerparskip \parskip
535   \skip_set_eq:NN \parskip \parsep
536   \dim_set_eq:NN \parindent \listparindent
537   \dim_add:Nn \linewidth { - \rightmargin - \leftmargin }
538   \dim_add:Nn \@totalleftmargin { \leftmargin }
539   \tex_parshape:D 1 ~ \@totalleftmargin \linewidth

```

This is the point where we are ready to add the tagging structure for the block, e.g., an <L>, a <Figure> or some other structure.

```

540   \__kernel_displayblock_begin:

```

Finally, we have to output the vertical separation and penalty at the start of the block and make corrections for a change in `\parskip` and some other housekeeping, unless this block is inside a list and the list `\item` has not yet placed. In that case the vertical space and penalty us suppressed. This is controled through the legacy switches `@noparitem`, `minipage`, and `@nobreak`.

```

541   \legacy_if:nTF { @noparitem }
542   {
543     \legacy_if_set_false:n { @noparitem }
544     \hbox_gset:Nn \g__block_labels_box
545     {
546       \skip_horizontal:n { - \leftmargin }
547       \hbox_unpack_drop:N \g__block_labels_box
548       \skip_horizontal:n { \leftmargin }
549     }
550
551     \legacy_if:nF { @minipage } % Why this chunk of code?
552     {
553       \__block_skip_set_to_last:N \l_block_tmpa_skip
554       \skip_vertical:n { - \l_block_tmpa_skip }
555       \skip_vertical:n { \l_block_tmpa_skip + \@outerparskip - \parskip }
556     }
557   }
558   {
559     \legacy_if:nTF { @nobreak }
560     { \addvspace{\skip_eval:n{\@outerparskip-\parskip}} }
561     {
562       \addpenalty \@beginparpenalty
563       \addvspace \l_block_effective_top_skip
564       \addvspace{-\parskip}
565     }
566   }

```

Extra keys to support enumitem conventions:

```

567 \keys_define:nn { template/block/display }
568 {
569   ,topsep      .skip_set:N = \topsep
570   ,partopsep  .skip_set:N = \partopsep
571   ,listparindent .skip_set:N = \listparindent
572 }

```

document 2e logic used here

```

\__kernel_displayblock_begin: The internal kernel hooks for tagging.
\__kernel_displayblock_beginpar_hmode:w 573 \cs_new:Npn \__kernel_displayblock_begin: {
\__kernel_displayblock_beginpar_vmode: 574 \__block_debug_typeout:n{\detokenize{\__kernel_displayblock_begin:}}
575 }
576 \cs_new:Npn \__kernel_displayblock_beginpar_hmode:w {
577 \__block_debug_typeout:n{\detokenize{\__kernel_displayblock_beginpar_hmode:w}}
578 }
579 \cs_new:Npn \__kernel_displayblock_beginpar_vmode: {
580 \__block_debug_typeout:n{\detokenize{\__kernel_displayblock_beginpar_vmode:}}
581 }
(End of definition for \__kernel_displayblock_begin:, \__kernel_displayblock_beginpar_hmode:w,
and \__kernel_displayblock_beginpar_vmode:.)

```

4.5.4 Implementation of list templates ...

`\@itemlabel` Both `\@itemlabel` and `\@listctr` from the L^AT_EX 2_ε list implementation are used (or set) by various packages. We therefore use them too, so that these packages have a fighting chance to work with the new tagging-aware implementation for `list`.

```

582 \tl_new:N \@itemlabel % should have a top-level definition
583 \tl_new:N \@listctr % should have a top-level definition

```

(End of definition for `\@itemlabel` and `\@listctr`. These functions are documented on page ??.)

`list std (templ.)` This template implements numbered and unnumbered lists and can be combined with display blocks or with inline blocks.

```

584 \DeclareTemplateCode{list}{std}{1}
585 {
586 counter = \l__block_counter_tl,
587 item-label = \l__block_item_label_tl,
588 start = \l__block_counter_start_int ,
589 resume = \l__block_resume_bool ,
590 item-instance = \__block_item_instance:n ,
591 item-skip = \itemsep ,
592 % item-par-skip = \parsep ,
593 item-penalty = \@itempenalty ,
594 item-indent = \itemindent ,
595 label-width = \labelwidth ,
596 label-sep = \labelsep ,
597 legacy-support = \l__block_legacy_support_bool , % FMI questionable
598 }
599 {
600 \__block_debug_typeout:n{template:list:std}
601 %
602 \tl_if_empty:nF {#1} { \SetTemplateKeys{list}{std}{#1} }

```

Has this list a counter name defined in the instance?

```

603 \tl_if_empty:NTF \l__block_counter_tl
604 {

```

If not we check if `\@listctr` has a non-empty value to be used for the list counter.

We better test for blank not empty in case somebody had defined `\@listctr` using `\renewcommand` or `\cs_set:Npn`.

```

605 \tl_if_blank:oF \@listctr
606 {

```

In that case `@nbrlist` should have been set too, for example, through `\usecounter`, so we do not set it explicitly. However, we check if we should resume a previous list.

```

607     \bool_if:NF \l__block_resume_bool
608     {
609         \int_gset:cn{ c@ \@listctr }
610         { \l__block_counter_start_int - 1 }
611     }
612 }

```

If `\@listctr` is not set then we have definitely an unnumbered list.

```

613     { \@nbrlistfalse }
614 }

```

If a counter is set in the list instance we use that one. This should be the name of a L^AT_EX counter that is already allocated externally—no runtime check is made for this: if it is not declared one will get “no such counter” error when the list is used.

```

615     {
616         \@nbrlisttrue
617         \tl_set_eq:NN \@listctr \l__block_counter_tl
618         \bool_if:NF \l__block_resume_bool
619         {
620             \int_gset:cn{ c@ \@listctr }
621             { \l__block_counter_start_int - 1 }
622         }
623     }

```

Does the current instance has an item label representation? This would be possible whether or not we have a numbered list. If yes, then we use this for `\@itemlabel`, otherwise we expect that `\@itemlabel` is provided from the outside, e.g., as part of the `list` environment argument.

```

624     \tl_if_empty:NF \l__block_item_label_tl
625     {
626         \tl_set_eq:NN \@itemlabel \l__block_item_label_tl
627     }

```

finally, we signal that we are at the start of a new list (which effects how the first `\item` is handled and how `\par` commands are interpreted).

```

628     \legacy_if_gset_true:n { @newlist }
629     \__block_debug_typeout:n{template:list:std~end}
630 }

```

Extra keys to support enumitem conventions:

```

631 \keys_define:nn { template/list/std }
632 {
633     ,nosep .code:n =
634         \dim_zero:N \itemsep
635         \dim_zero:N \parsep
636         \dim_zero:N \topsep
637         \dim_zero:N \l__block_botsep_skip
638         \dim_zero:N \l__block_parbotsep_skip
639     ,midsep .skip_set:N = \topsep
640 }

```

4.5.5 Implementation of \item template(s)

`item std (templ.)` The item template has one hidden key `label` which is not available on the template for setting because it is only used to receive any optional data passed to the `\item` command. We therefore declare it with `\keys_define:nn` and ensure that the optional argument data to `\item` (if it is not a key/value list already) is passed to this `label` key.

```

641 \keys_define:nn { template/item/std }
642         { label .tl_set:N = \l__block_label_given_tl }
643 \DeclareTemplateCode{item}{std}{1}
644 {
645     counter-label = \__block_counter_label:n ,
646     counter-ref   = \__block_counter_ref:n ,
647
648     label-ref     = \__block_label_ref:n ,
649     label-autoref = \__block_label_autoref:n ,
650     label-format  = \__block_label_format:n ,
651     label-strut   = \l__block_label_strut_bool ,
652     label-boxed   = \l__block_label_boxed_bool ,
653     next-line     = \l__block_next_line_bool ,
654     text-font     = \l__block_text_font_tl ,
655     compatibility = \l__block_item_compatibility_bool ,

```

alignment is mostly wrong
(test short medium and
multiline labels)

next set of key not yet
used

complete

This probably needs a different implementation (and needs completing)

```

655     label-align   = {
656         left      = \tl_set:Nn \l__block_item_align_tl { \relax \hss } ,
657         center    = \tl_set:Nn \l__block_item_align_tl { \hss \hss } ,
658         right     = \tl_set:Nn \l__block_item_align_tl { \hss \relax } ,
659         parleft   = \NOT_IMPLEMENTED ,
660     } ,
661 }

```

Then typeset the label at its natural width by applying `__block_make_label_box:n` to the label given or to a label constructed from the counter. If it is boxed and reasonably short, add padding to make it at least of size `\labelwidth`, then add another layer of box. This way, when we unpack it in `\g__block_labels_box` it correctly remains boxed in those cases. Afterwards, in the `nextline` case add `\newline` if the label did not fit in the allotted space.

```

662 {
663     \__block_debug_typeout:n{template:item:std}

```

First deal with the key-value input, which in particular may provide a value for the label (the usual optional argument of `\item`). For this we set `\l__block_label_given_tl` to `\c_novalue_tl` so that we can identify if an optional argument was given.

```

664     \tl_set_eq:NN \l__block_label_given_tl \c_novalue_tl
665     \tl_if_empty:nF{#1}{ \SetTemplateKeys{item}{std}{#1} }

```

If no optional argument was given then `\l__block_label_given_tl` is still equal to `\c_novalue_tl` and so we can distinguish that from `\item[]`.

```

666     \tl_if_novalue:oTF \l__block_label_given_tl
667     {

```

The rest of the code for this template needs work and is both incomplete and partly wrong.

fix

```

668     \tl_if_blank:oF \@listctr { \@kernel@refstepcounter \@listctr }
669     \bool_if:NTF \l__block_item_compatibility_bool % not sure that conditional
670                                     % makes sense
671     { \__block_make_label_box:n { \MakeLinkTarget[\@listctr]{\@itemlabel } } % TODO ?
672     { \__block_make_label_box:n { \MakeLinkTarget[\@listctr]{\__block_counter_label:n
673     }
674     {
675     \__block_debug_typeout:n{item~ with~ optional}
676     \__block_make_label_box:n { \l__block_label_given_tl } }
677 \bool_if:nT
678     {
679     \l__block_label_boxed_bool
680     && \dim_compare_p:n { \box_wd:N \l__block_one_label_box <= \linewidth } % TODO: is \
681     }
682     {
683     \dim_compare:nNnT
684     { \box_wd:N \l__block_one_label_box } < \linewidth
685     {
686     \hbox_set_to_wd:Nnn \l__block_one_label_box { \linewidth }
687     {
688     \exp_after:wN \use_i:nn \l__block_item_align_tl
689 %
690     \hbox_unpack_drop:N \l__block_one_label_box %TODO: customize?
691     \box_use_drop:N \l__block_one_label_box
692     \exp_after:wN \use_ii:nn \l__block_item_align_tl
693     }
694     }
695     \hbox_set:Nn \l__block_one_label_box
696     { \box_use_drop:N \l__block_one_label_box }
697     }
698 \dim_compare:nNnTF { \box_wd:N \l__block_one_label_box } > \linewidth
699 { \bool_set_true:N \l__block_long_label_bool }
700 { \bool_set_false:N \l__block_long_label_bool }
701 \hbox_gset:Nn \g__block_labels_box
702 {
703 \hbox_unpack_drop:N \g__block_labels_box
704 \skip_horizontal:n { \itemindent - \labelsep - \linewidth }
705 \hbox_unpack_drop:N \l__block_one_label_box
706 \skip_horizontal:n { \labelsep }
707 \bool_if:NT \l__block_next_line_bool
708 { \bool_if:NT \l__block_long_label_bool { \nobreak \hfil \break } }
709 % version of \newline inside an hbox that will be unpacked
710 }
711 % \skip_set_eq:NN \parsep \l__block_item_parsep_skip TODO??? FMi
712 % what's that?
713 \dim_set_eq:NN \parindent \listparindent

```

FMi: $\text{\LaTeX} 2_{\epsilon}$ keeps the label boxed inside (not unboxed). This means that the content stays rigid and does not vary based on glue setting in the line with the label. There are cases where we do want the unboxed version (I think `enumitem` offers that in some cases too) but it should probably not be the default.

Placing the list label(s) is done when the paragraph for the `\item` is started, which executes `__block_item_everypar:` inside `para/begin`. By default this command does nothing, now we change it to attach the pending label or labels.

```
713     \cs_set_eq:NN \__block_item_everypar: \__block_item_everypar_std:
714   }
```

`\l_block_one_label_box` Each label is typeset in `\l_block_one_label_box` to be measured. Once this is ready, it is put (boxed or unboxed) in `\g_block_labels_box`, together with any pending labels (for the case where a list begins just after `\item`). This is an analogue of L^AT_EX 2_ε's `\@labels`, but it is always unboxed before use, to support both boxed and unboxed labels.

```
715 \box_new:N \l_block_one_label_box
716 \box_new:N \g_block_labels_box
```

(End of definition for `\l_block_one_label_box` and `\g_block_labels_box`.)

`\l_block_long_label_bool` Track whether the `\l_block_one_label_box` is larger than `\labelwidth`.

```
717 \bool_new:N \l_block_long_label_bool
```

(End of definition for `\l_block_long_label_bool`.)

`__block_make_label_box:n` Make one label, wrapped in `__block_label_format:n`, with an appropriate `\strut` and possibly `\makeLabel` in compatibility mode (used for the list environment).

```
718 \cs_new_protected:Npn \__block_make_label_box:n #1
719   {
720     \hbox_set:Nn \l_block_one_label_box
721       {
```

If we do tagging then the contents of this box may need to be wrapped into a structure, e.g., `<Lbl>`.

```
722     \__kernel_list_label_begin:
723     \__block_label_format:n
724     {
725       \bool_if:NT \l_block_label_strut_bool { \strut }
726       \bool_if:NTF \l_block_legacy_support_bool
727         \makeLabel
728         \use:n
729         {#1}
730     }
```

And what gets opened also needs closing:

```
731     \__kernel_list_label_end:
732   }
733 }
```

(End of definition for `__block_make_label_box:n` and `__block_label_format:x`.)

`__kernel_list_label_begin:` If we aren't doing tagging the kernel hooks do nothing.

```
\__kernel_list_label_end:
734 \cs_new_eq:NN \__kernel_list_label_begin: \prg_do_nothing:
735 \cs_new_eq:NN \__kernel_list_label_end:   \prg_do_nothing:
```

(End of definition for `__kernel_list_label_begin:` and `__kernel_list_label_end:.`)

`_block_item_everypar:` The `_block_item_everypar:` command is executed as part of `para/begin` but most of the time does nothing, i.e., it has the following default definition.

```
736 \cs_new_eq:NN \_block\_item\_everypar: \prg\_do\_nothing:
737 \AddToHook{para/begin}[lists]{\_block\_item\_everypar:}
```

Note that we have to make sure that the above code is executed after the hook chunk from `tagpdf` because the latter uses `@inlabel` to make a decision.

By the end of the day both should probably move into the kernel hook instead!

```
738 \DeclareHookRule{para/begin}[lists]{after}{tagpdf}
```

What follows is the version that resets various legacy booleans and puts the label box in the right place and finally resets itself to do nothing next time. `_block_item_everypar:` is set to this by the item template so that the next paragraph start runs the code below.

```
739 \cs_new_protected:Npn \_block\_item\_everypar\_std: {
740   \_block\_debug\_typeout:n{item~ everypar \on@line }
741   \legacy\_if\_set\_false:n { @minipage }
742   \legacy\_if\_gset\_false:n { @newlist }
743   \legacy\_if:nT { @inlabel }
744   {
745     \legacy\_if\_gset\_false:n { @inlabel }
746     \box\_if\_empty:NT \g\_para\_indent\_box { \kern - \itemindent }
747     \para\_omit\_indent:
748     \box\_use\_drop:N \g\_block\_labels\_box
```

After the labels are placed we start a paragraph structure (if appropriate). This is handled in the following kernel hook:

```
749   \_kernel\_list\_label\_after:
750   \penalty \c\_zero\_int
751   }
752   \legacy\_if:nTF { @nobreak }
753   {
754     \legacy\_if\_gset\_false:n { @nobreak }
755     \int\_set:Nn \clubpenalty { 10000 }
756   }
757   {
758     \int\_set\_eq:NN \clubpenalty \@clubpenalty
```

Once the label(s) are typeset and we are past any special `@nobreak` handling we reset `_block_item_everypar:` to do nothing.

```
759   \cs\_set\_eq:NN \_block\_item\_everypar: \prg\_do\_nothing:
760   }
761 }
```

(End of definition for `_block_item_everypar:` and `_block_item_everypar_std:.`)

`_kernel_list_label_after:`

```
762 \cs\_new\_eq:NN \_kernel\_list\_label\_after: \prg\_do\_nothing:
```

(End of definition for `_kernel_list_label_after:.`)

`\l_block_tmpa_skip`

```
763 \skip\_new:N \l\_block\_tmpa\_skip
```

(End of definition for `\l_block_tpa_skip`.)

`\l_block_topsepadd_skip` `\l_block_effective_top_skip` Variables equivalent to L^AT_EX 2_ε's `\@topsepadd` and `\@topsep`. Roughly equal to a mixture of `topsep`, `partopsep`, and various `parskip` at different nesting levels in lists. The code is really elaborate when `@inlabel` is true.

```
764 \skip_new:N \l_block_topsepadd_skip
765 \skip_new:N \l_block_effective_top_skip
```

(End of definition for `\l_block_topsepadd_skip` and `\l_block_effective_top_skip`.)

`\item` Here we already have all the building blocks. Complain in math mode. Distinguish between first item (do necessary tagging) and later items `_block_inter_item:` to cleanly close what's before, then call `_block_item_instance:n` (which calls `\UseInstance{item}{(instance)}`) to prepare the upcoming item: it will be actually inserted only once some later material triggers `\everypar`.

```
766 \AddToHook{begindocument/before}{
767   \RenewDocumentCommand{\item}{={label}o }
768   {
769     \@inmatherr \item
```

TODO: Test for being outside of a list needs updating!

```
770     \tl_if_empty:oTF \_block_item_instance:n %%FMi?
771     { \msg_error:nnn { _block } { item-in-nonlist } { \item[#{1}] } }
772     {
773       \legacy_if:nTF { @newlist }
774       { \_kernel_list_item_begin: }
775       { \_block_inter_item: }

```

To avoid unnecessary key/val processing we make a quick check if there was an optional argument.

```
776     \tl_if_novalue:nTF {#{1}} % avoids reparsing label={ }
777     { \_block_item_instance:n { } }
778     { \_block_item_instance:n {#{1}} }
```

Set the legacy switch that signals that we have a pending item label:

```
779     \legacy_if_gset_true:n { @inlabel }
780     \ignorespaces
781   }
782 }
783 }
```

(End of definition for `\item`. This function is documented on page ??.)

`_block_inter_item:` Between items. If the previous item had no content then we need to trigger `\everypar`. Otherwise we simply close the previous item with `\par` after removing some horizontal space. Between items, there is a penalty and some space.

```
784 \cs_new_protected:Npn \_block_inter_item: {
785   \legacy_if:nT { @inlabel }
786   { \indent \par } % case of \item\item
```

`\par` may have a strange definition and may not get us back to vertical mode in one go, so we better do not treat the next line as an else case to the above conditional (for now).

```
787   \mode_if_horizontal:T { \_block_skip_remove_last:
788     \_block_skip_remove_last: \par }
```

End any LI-tag, then start the next LI-tag (if doing tagging):

```

789 \_kernel_list_item_end:
790 \_kernel_list_item_begin:
791 \addpenalty \@itempenalty
792 \addvspace \itemsep
793 }

```

(End of definition for _block_inter_item:.)

```

\_kernel_list_item_begin:
\_kernel_list_item_end:
794 \cs_new_eq:NN \_kernel_list_item_begin: \prg_do_nothing:
795 \cs_new_eq:NN \_kernel_list_item_end: \prg_do_nothing:

```

(End of definition for _kernel_list_item_begin: and _kernel_list_item_end:.)

4.6 Tagging recipes

`_block_recipe_basic:` The **basic** recipe simply ensures that the block is inside a `text-unit` structure and if necessary starts one. When the block ends and is followed by a blank line the `text-unit` structure is closed too, otherwise it remains open and further text starts with just a `<text>` structure.

There is otherwise no inner structure so `_kernel_displayblock_begin:` and `_kernel_displayblock_end:` do nothing—`blockenvs` with inner structure use the `standard` or `list` recipe instead.

```

796 \cs_new:Npn \_block_recipe_basic: {
797   \cs_set_eq:NN \_kernel_displayblock_beginpar_hmode:w
798                                     \_block_beginpar_hmode:N
799   \cs_set_eq:NN \_kernel_displayblock_beginpar_vmode:
800                                     \_block_beginpar_vmode:
801   \let \_kernel_displayblock_begin: \prg_do_nothing:
802   \let \_kernel_displayblock_end: \prg_do_nothing:
803 }

```

(End of definition for _block_recipe_basic:.)

`_block_recipe_standalone:` The **standalone** recipe produces a block that ensures that a previous `text-unit` ends and that after the block a new `text-unit` starts.

```

804 \cs_new:Npn \_block_recipe_standalone: {
805   \cs_set_eq:NN \_kernel_displayblock_beginpar_hmode:w
806                                     \prg_do_nothing:
807   \cs_set_eq:NN \_kernel_displayblock_beginpar_vmode:
808                                     \prg_do_nothing:
809   \cs_set_eq:NN \_kernel_displayblock_begin: \_block_inner_begin:
810   \cs_set_eq:NN \_kernel_displayblock_end: \_block_inner_end:
811   \bool_set_true:N \l_block_standalone_bool
812   \tl_if_empty:NTF \l_block_tag_name_tl
813     { \tl_set:Nn \l_block_tag_inner_tag_tl {Sect} }
814     { \tl_set_eq:NN \l_block_tag_inner_tag_tl \l_block_tag_name_tl }
815 }

```

(End of definition for _block_recipe_standalone:.)

`_block_recipe_standard:` The **standard** recipe does the following:

- surround the block with a `text-unit`-structure if not already in a `text-unit`. In the latter case end the MC and the `<text>` but leave the `text-unit` open.
If we are producing flattened paragraphs, just close any `<text>` but do not open a `text-unit`.
- Then open an new (inner) structure (by default `Figure` but typically the one specified on the instance).
- At the end of the block close the the inner structure (`Figure` or explicit one) but leave the `text-unit` open to be either continued or closed due to a following `\par`.

```

816 \cs_new:Npn \__block_recipe_standard:
817 {
818   \cs_set_eq:NN \__kernel_displayblock_beginpar_hmode:w
819                                     \__block_beginpar_hmode:N
820   \cs_set_eq:NN \__kernel_displayblock_beginpar_vmode:
821                                     \__block_beginpar_vmode:
822   \cs_set_eq:NN \__kernel_displayblock_begin: \__block_inner_begin:
823   \cs_set_eq:NN \__kernel_displayblock_end:  \__block_inner_end:
824   \tl_if_empty:NTF \l__block_tag_name_tl
825     { \tl_set:Nn \l__block_tag_inner_tag_tl {Figure}          }
826     { \tl_set_eq:NN \l__block_tag_inner_tag_tl \l__block_tag_name_tl }
827 }

```

(End of definition for `__block_recipe_standard:.`)

`\l__block_tag_inner_tag_tl`

```

828 \tl_new:N \l__block_tag_inner_tag_tl

```

(End of definition for `\l__block_tag_inner_tag_tl.`)

`__block_recipe_list:` The `list` recipe does the following.

- It opens a `<text-unit>`-structure or keeps the current one open (only closing the MC).
- It then starts a new structure rollmapped to L-structure and arranges for handling list items, e.g., `Li`, `Lbl` and `LBody` structures.
- At the end it closes open list structures as needed but keeps the `<text-unit>`-structure open to continue the paragraph after the list, if necessary.

```

829 \cs_new:Npn \__block_recipe_list:
830 {
831   \cs_set_eq:NN \__kernel_displayblock_beginpar_hmode:w
832                                     \__block_beginpar_hmode:N
833   \cs_set_eq:NN \__kernel_displayblock_beginpar_vmode:
834                                     \__block_beginpar_vmode:
835   \cs_set_eq:NN \__kernel_displayblock_begin: \__block_list_begin:
836   \cs_set_eq:NN \__kernel_displayblock_end:  \__block_list_end:

```

The next two lines could be done globally, because they are only called if we do have `\items`, i.e., if we are in a list. It is therefore also not necessary to reset them in other recipes (right now—this may change if we get more templates (like inline lists)).

```

837   \cs_set_eq:NN \__kernel_list_item_begin:  \__block_list_item_begin:
838   \cs_set_eq:NN \__kernel_list_item_end:    \__block_list_item_end:

```

Handle the tag name and attribute classes using the key values from the current list instance.

```

839 \tl_if_empty:NTF \l__block_tag_name_tl
840   { \tl_set:Nn \l__tag_L_tag_tl {L} }
841   { \tl_set_eq:NN \l__tag_L_tag_tl \l__block_tag_name_tl }
842 \tl_if_empty:NTF \l__block_tag_class_tl
843   { \tl_set:Nn \l__tag_L_attr_class_tl {} }
844   { \tl_set_eq:NN \l__tag_L_attr_class_tl \l__block_tag_class_tl }
845 }

```

(End of definition for `__block_recipe_list:.`)

4.7 Blockenv instances

4.7.1 Basic instances

`blockenv displayblock` (*inst.*)

```

846 \DeclareInstance{blockenv}{displayblock}{display}
847 {
848   env-name      = displayblock,
849   tag-name      = ,
850   tag-class     = ,
851   tagging-recipe = standard,
852   inner-level-counter = ,
853   level-increase = false,
854   setup-code    = ,
855   block-instance = displayblock ,
856   inner-instance = ,
857 }

```

`blockenv displayblockflattened` (*inst.*)

```

858 \DeclareInstance{blockenv}{displayblockflattened}{display}
859 {
860   env-name      = displayblockflattened,
861   tag-name      = ,
862   tag-class     = ,
863   tagging-recipe = basic,
864   inner-level-counter = ,
865   level-increase = false,
866   setup-code    = ,
867   block-instance = displayblock ,
868   para-flattened = true ,
869   inner-instance = ,
870 }

```

`blockenv center` (*inst.*)

```

871 \DeclareInstance{blockenv}{center}{display}
872 {
873   env-name      = center,
874   tag-name      = ,
875   tag-class     = ,
876   tagging-recipe = basic,
877   inner-level-counter = ,
878   level-increase = false,

```

```

879 setup-code      = ,
880 block-instance = displayblock ,
881 para-flattened = true ,
882 para-instance  = center ,
883 inner-instance = ,
884 }

```

`blockenv flushleft` (*inst.*)

```

885 \DeclareInstance{blockenv}{flushleft}{display}
886 {
887   env-name      = flushleft,
888   tag-name      = ,
889   tag-class     = ,
890   tagging-recipe = basic,
891   inner-level-counter = ,
892   level-increase = false,
893   setup-code    = ,
894   block-instance = displayblock ,
895   para-flattened = true ,
896   para-instance = raggedright ,
897   inner-instance = ,
898 }

```

`blockenv flushright` (*inst.*)

```

899 \DeclareInstance{blockenv}{flushright}{display}
900 {
901   env-name      = flushleft,
902   tag-name      = ,
903   tag-class     = ,
904   tagging-recipe = basic,
905   inner-level-counter = ,
906   level-increase = false,
907   setup-code    = ,
908   block-instance = displayblock ,
909   para-flattened = true ,
910   para-instance = raggedleft ,
911   inner-instance = ,
912 }

```

4.7.2 Blockquote instances

`blockenv quotation` (*inst.*)

```

913 \tag_if_active:T {
914   \tagpdfsetup{add-new-tag={tag=quote,role=BlockQuote}}
915   \tagpdfsetup{add-new-tag={tag=quotation,role=BlockQuote}}
916 }

917 \DeclareInstance{blockenv}{quotation}{display}
918 {
919   env-name      = quotation,
920   tag-name      = quotation,
921   tag-class     = ,
922   tagging-recipe = standard,
923   inner-level-counter = ,

```

```

924 level-increase = true,
925 setup-code     = ,
926 block-instance = quotationblock ,
927 inner-instance = ,
928 }

```

blockenv quote (*inst.*)

```

929 \DeclareInstance{blockenv}{quote}{display}
930 {
931   env-name      = quote,
932   tag-name      = quote,
933   tag-class     = ,
934   tagging-recipe = standard,
935   inner-level-counter = ,
936   level-increase = true,
937   setup-code    = ,
938   block-instance = quoteblock ,
939   inner-instance = ,
940 }

```

I guess the setup code is still executed too early, have to check.

An alternative setup for quotations, using the displayblock instance and just overwrite a bit in the setup code. This would be less flexible but would ensure visual consistency, because the displayblock settings are used throughout.

```

941 % \DeclareInstance{blockenv}{quotation}{display}
942 % {
943 %   env-name      = quotation,
944 %   tag-name      = ,
945 %   tag-class     = ,
946 %   tagging-recipe = blockquote,
947 %   inner-level-counter = ,
948 %   level-increase = true,
949 %   setup-code    = \setlength\rightmargin{\leftmargin}
950 %                 \setlength\parsep{1.5em} ,
951 %   block-instance = displayblock ,
952 %   inner-instance = ,
953 % }
954 % \DeclareInstance{blockenv}{quote}{display}
955 % {
956 %   env-name      = quote,
957 %   tag-name      = ,
958 %   tag-class     = ,
959 %   tagging-recipe = blockquote,
960 %   inner-level-counter = ,
961 %   level-increase = true,
962 %   setup-code    = \setlength\rightmargin{\leftmargin} ,
963 %   block-instance = displayblock ,
964 %   inner-instance = ,
965 % }
966 \DeclareInstance{blockenv}{theorem}{display}
967 {
968   env-name      = theorem-like,
969   tag-name      = theorem-like,
970   tag-class     = ,

```

```

971 tagging-recipe = standalone,
972 inner-level-counter = ,
973 level-increase = false,
974 setup-code = ,
975 block-instance = displayblock ,
976 % inner-instance-type = innerblock ,
977 % inner-instance = theorem,
978 }

```

We use `<theorem-like>` as the structure name and rollmap it to a `<Sect>` because that can hold a `<Caption>`.

```

979 \tag_if_active:T {
980   \tagpdfsetup{add-new-tag={tag=theorem-like,role=Sect}}
981 }

```

4.7.3 Verbatim instances

`blockenv verbatim` (*inst.*)

```

982 \tag_if_active:T {
983   \tagpdfsetup{add-new-tag={tag=verbatim,role=P}}
984   \tagpdfsetup{add-new-tag={tag=codeline,role=Sub}}

```

Possible alternative for PDF 1.7:

```

985 % \tagpdfsetup{add-new-tag={tag=verbatim,role=Div}}
986 % \tagpdfsetup{add-new-tag={tag=codeline,role=P}}
987 }

```

```

988 \DeclareInstance{blockenv}{verbatim}{display}
989 {
990   env-name      = verbatim,
991   tag-name      = verbatim,
992   tag-class     = ,
993   tagging-recipe = standard,
994   inner-level-counter = ,
995   level-increase = false,
996   setup-code    = ,
997   block-instance = verbatimblock ,
998   inner-instance = ,
999   final-code    = \legacyverbatimsetup ,
1000 }

```

4.7.4 Standard list instances

`blockenv itemize` (*inst.*)

```

1001 \DeclareInstance{blockenv}{itemize}{display}
1002 {
1003   env-name      = itemize,
1004   tag-name      = itemize,
1005   tag-class     = itemize,
1006   tagging-recipe = list,
1007   inner-level-counter = \@itemdepth,
1008   level-increase = true,
1009   max-inner-levels = 4,
1010   setup-code    = ,

```



```

1011 block-instance = list ,
1012 inner-instance = itemize ,
1013 }

```

`blockenv enumerate` (*inst.*)

```

1014 \DeclareInstance{blockenv}{enumerate}{display}
1015 {
1016   env-name           = enumerate,
1017   tag-name           = enumerate,
1018   tag-class          = enumerate,
1019   tagging-recipe     = list,
1020   level-increase    = true,
1021   setup-code         = ,
1022   block-instance     = list ,
1023   inner-level-counter = \@enumdepth,
1024   max-inner-levels  = 4,
1025   inner-instance     = enum ,
1026 }

```

`blockenv description` (*inst.*)

```

1027
1028 \DeclareInstance{blockenv}{description}{display}
1029 {
1030   env-name           = description,
1031   tag-name           = description,
1032   tag-class          = description,
1033   tagging-recipe     = list,
1034   inner-level-counter = ,
1035   level-increase    = true,
1036   setup-code         = ,
1037   block-instance     = list ,
1038   inner-instance     = description ,
1039 }

```

`blockenv list` (*inst.*) The general (legacy) list environment does some of its setup in the `setup-code` key.

```

1040 \DeclareInstance{blockenv}{list}{display}
1041 {
1042   env-name           = list,
1043   tag-name           = list,
1044   tag-class          = ,
1045   tagging-recipe     = list,
1046   level-increase    = true,
1047   setup-code         = \legacylistsetupcode ,
1048   block-instance     = list ,
1049   inner-level-counter = ,
1050   inner-instance     = legacy ,
1051 }

```

4.8 Block instances

4.8.1 Displayblock instances

We provide 6 nesting levels (as in L^AT_EX 2_ε). If you want to provide more you need to change the `maxblocklevels` counter, offer further `displayblock-xx` instances but also

define further (legacy) `\list<romannumeral>` commands for the defaults. If not, then the settings from the previous level are reused automatically—which may or may not be good enough).

```
1052 \setcounter{maxblocklevels}{6}
```

`block displayblock-0` (*inst.*) Here we need level zero as well in case a flattened displayblock (like the center env) it is used on top-level.

```
block displayblock-1 (inst.)
block displayblock-2 (inst.) 1053 \DeclareInstance{block}{displayblock-0}{display}
block displayblock-3 (inst.) 1054 {
block displayblock-4 (inst.) 1055     leftmargin      = Opt ,
block displayblock-5 (inst.) 1056     parindent      = Opt ,
block displayblock-6 (inst.) 1057 }

1058 \DeclareInstanceCopy{block}{displayblock-1}{displayblock-0}
1059 \DeclareInstanceCopy{block}{displayblock-2}{displayblock-0}
1060 \DeclareInstanceCopy{block}{displayblock-3}{displayblock-0}
1061 \DeclareInstanceCopy{block}{displayblock-4}{displayblock-0}
1062 \DeclareInstanceCopy{block}{displayblock-5}{displayblock-0}
1063 \DeclareInstanceCopy{block}{displayblock-6}{displayblock-0}
```

4.8.2 Verbatim instances

Verbatim instances have there own levels so that one can specify specific indentations or vertical separations between line.

```
block verbatimblock-0 (inst.)
block verbatimblock-1 (inst.) 1064 \DeclareInstance{block}{verbatimblock-0}{display}
block verbatimblock-2 (inst.) 1065 {
block verbatimblock-3 (inst.) 1066     leftmargin      = Opt ,
block verbatimblock-4 (inst.) 1067     parindent      = Opt ,
block verbatimblock-5 (inst.) 1068     par-skip       = Opt ,
block verbatimblock-6 (inst.) 1069 }

1070 \DeclareInstanceCopy{block}{verbatimblock-1}{verbatimblock-0}
1071 \DeclareInstanceCopy{block}{verbatimblock-2}{verbatimblock-0}
1072 \DeclareInstanceCopy{block}{verbatimblock-3}{verbatimblock-0}
1073 \DeclareInstanceCopy{block}{verbatimblock-4}{verbatimblock-0}
1074 \DeclareInstanceCopy{block}{verbatimblock-5}{verbatimblock-0}
1075 \DeclareInstanceCopy{block}{verbatimblock-6}{verbatimblock-0}
```

4.8.3 Quote/quotationblock instances

Quote and quotation are not flattened, i.e., they change levels, thus they start with level 1 not 0.

```
block quoteblock-1 (inst.) Default layout is to indent equally from both side.
block quoteblock-2 (inst.) 1076 \DeclareInstance{block}{quoteblock-1}{display}
block quoteblock-3 (inst.) 1077 { rightmargin = \KeyValue{leftmargin} }
block quoteblock-4 (inst.) 1078 \DeclareInstanceCopy{block}{quoteblock-2}{quoteblock-1}
block quoteblock-5 (inst.) 1079 \DeclareInstanceCopy{block}{quoteblock-3}{quoteblock-1}
block quoteblock-6 (inst.) 1080 \DeclareInstanceCopy{block}{quoteblock-4}{quoteblock-1}
1081 \DeclareInstanceCopy{block}{quoteblock-5}{quoteblock-1}
1082 \DeclareInstanceCopy{block}{quoteblock-6}{quoteblock-1}
```

```

block quotationblock-1 (inst.) Quotation additionally changes the parindent.
block quotationblock-2 (inst.) 1083 \DeclareInstance{block}{quotationblock-1}{display}
block quotationblock-3 (inst.) 1084 { parindent = 1.5em , rightmargin = \KeyValue{leftmargin} }
block quotationblock-4 (inst.) 1085 \DeclareInstanceCopy{block}{quotationblock-2}{quotationblock-1}
block quotationblock-5 (inst.) 1086 \DeclareInstanceCopy{block}{quotationblock-3}{quotationblock-1}
block quotationblock-6 (inst.) 1087 \DeclareInstanceCopy{block}{quotationblock-4}{quotationblock-1}
1088 \DeclareInstanceCopy{block}{quotationblock-5}{quotationblock-1}
1089 \DeclareInstanceCopy{block}{quotationblock-6}{quotationblock-1}

```

4.8.4 Block instances for the standard lists

block list-1 (inst.) The block instances for the various list environments use the same underlying instance
 block list-2 (inst.) (well by default) and nothing needs to be set up specifically (because that is
 block list-3 (inst.) already done in the legacy `\list<romannumeral>` unless a different layout is wanted.

```

block list-4 (inst.) 1090 \DeclareInstance{block}{list-1}{display}{
block list-5 (inst.) 1091 % heading = ,
block list-6 (inst.) 1092 % beginsep = \topsep ,
1093 % begin-par-skip = \partopsep ,
1094 % par-skip = \parsep ,
1095 % end-skip = \KeyValue{beginsep} ,
1096 % end-par-skip = \KeyValue{begin-par-skip} ,
1097 % beginpenalty = \UseName{@beginparpenalty} ,
1098 % endpenalty = \UseName{@endparpenalty} ,
1099 % leftmargin = \leftmargin ,
1100 % rightmargin = \rightmargin ,
1101 % parindent = \listparindent ,
1102 }
1103 \DeclareInstance{block}{list-2}{display}{}
1104 \DeclareInstance{block}{list-3}{display}{}
1105 \DeclareInstance{block}{list-4}{display}{}
1106 \DeclareInstance{block}{list-5}{display}{}
1107 \DeclareInstance{block}{list-6}{display}{}

```

4.9 List instances for the standard lists

For all list instances we have to say what kind of label we want (`label-instance`) and how it should be formatted.

list itemize-1 (inst.) For `itemize` environments this is all we need to do and we refer back to the external
 list itemize-2 (inst.) definitions rather than defining the `item-label` code in the instance to ensure that old
 list itemize-3 (inst.) documents still work.

```

list itemize-4 (inst.) 1108 \DeclareInstance{list}{itemize-1}{std}{ item-label = \labelitemi }
1109 \DeclareInstance{list}{itemize-2}{std}{ item-label = \labelitemii }
1110 \DeclareInstance{list}{itemize-3}{std}{ item-label = \labelitemiii }
1111 \DeclareInstance{list}{itemize-4}{std}{ item-label = \labelitemiv }

```

list enumerate-1 (inst.) `enumerate` environments are similar, except that we also have to say which counter to
 list enumerate-2 (inst.) use on every level.

```

list enumerate-3 (inst.) 1112 \DeclareInstance{list}{enum-1}{std}
list enumerate-4 (inst.) 1113 { item-label = \labelenumi , counter = enumi }
1114 \DeclareInstance{list}{enum-2}{std}
1115 { item-label = \labelenumii , counter = enumii }

```

```

1116 \DeclareInstance{list}{enum-3}{std}
1117   { item-label = \labelenumiii , counter = enumiii }
1118 \DeclareInstance{list}{enum-4}{std}
1119   { item-label = \labelenumiv , counter = enumiv }

```

`list legacy` (*inst.*) For the legacy `list` environment there is only one instance which is reused on all levels. This is done this way one because the legacy `list` environment sets all its parameters through its arguments. So this instances shouldn't really be touched. It sets the `legacy-support` key to true, which means that the list code uses `\makeLabel` for formatting the label

```

1120 \DeclareInstance{list}{legacy}{std} {
1121   item-instance = basic ,
1122   legacy-support = true ,
1123 }

```

`list description` (*inst.*) The description lists also use only a single list instance with only one key not using the default:

```

1124 \DeclareInstance{list}{description}{std} { item-instance = description }

```

4.10 Item instances

`item basic` (*inst.*) There two item instances set up: `description` for use with the `description` environment and `basic` for use with all other lists (up to now).

```

1125 \DeclareInstance{item}{basic}{std}
1126   {
1127     label-align = right ,
1128   }
1129 \DeclareInstance{item}{description}{std}
1130   {
1131     label-format = \normalfont\bfseries #1 ,
1132   }

```

4.11 Para instances

```

1133 \tag_if_active:T
1134 {
1135   \tagpdfsetup
1136     {
1137       newattribute = {justify}    {/0 /Layout /TextAlign/Justify},
1138       newattribute = {center}    {/0 /Layout /TextAlign/Center},
1139       newattribute = {raggedright}{/0 /Layout /TextAlign/Start},
1140       newattribute = {raggedleft}{/0 /Layout /TextAlign/End},
1141     }
1142 }

```

`para center` (*inst.*)

```

1143 \DeclareInstance{para}{center}{std}
1144 {
1145   indent-width      = Opt ,
1146   start-skip        = Opt ,
1147   left-skip         = \@flushglue ,
1148   right-skip        = \@flushglue ,

```

```

1149 end-skip          = \z@skip ,
1150 final-hyphen-demerits = 0 ,
1151 cr-cmd            = \@centercr ,
1152 para-class       = center ,
1153 }

1154 \DeclareInstance{para}{raggedright}{std}
1155 {
1156   indent-width      = Opt ,
1157   start-skip        = Opt ,
1158   left-skip         = \z@skip ,
1159   right-skip        = \@flushglue ,
1160   end-skip          = \z@skip ,
1161   final-hyphen-demerits = 0 ,
1162   cr-cmd            = \@centercr ,
1163   para-class       = raggedright ,
1164 }

1165 \DeclareInstance{para}{raggedleft}{std}
1166 {
1167   indent-width      = Opt ,
1168   start-skip        = Opt ,
1169   left-skip         = \@flushglue ,
1170   right-skip        = \z@skip ,
1171   end-skip          = \z@skip ,
1172   final-hyphen-demerits = 0 ,
1173   cr-cmd            = \@centercr ,
1174   para-class       = raggedleft ,
1175 }

1176 \DeclareInstance{para}{justify}{std}
1177 {
1178   % indent-width      = Opt ,
1179   start-skip        = Opt ,
1180   left-skip         = \z@skip ,
1181   right-skip        = \z@skip ,
1182   end-skip          = \@flushglue ,
1183   final-hyphen-demerits = 5000 ,
1184   cr-cmd            = \@normalcr ,
1185   para-class       = justify ,
1186 }

1187 \DeclareRobustCommand\centering {\UseInstance{para}{center}{}}
1188 \DeclareRobustCommand\raggedleft {\UseInstance{para}{raggedleft}{}}
1189 \DeclareRobustCommand\raggedright{\UseInstance{para}{raggedright}{}}
1190 \DeclareRobustCommand\justifying {\UseInstance{para}{justify}{}}
1191
1192 \justifying

```

4.12 Tagging support

In this section we provide code to the various kernel hooks to support the tagging of the different displayblock environments.

All of the following definitions should only be made if tagging is active!

```

1193 \tag_if_active:T {

```

`_block_beginpar_vmode:` When a block starts out in vertical mode, i.e., is not yet part of a paragraph, we have to start a paragraph structure. However, this is not the case if we are already flattening paragraphs, thus in this case we do nothing. We also do nothing if `@endpe` is currently true, because that means we are right now just after the end of a `blockenv` and in the process of looking if we have to end the current `text-unit`, i.e., it is already open.

```

1194 \cs_set:Npn \_block\_beginpar\_vmode: {
1195     \_block\_debug\_typeout:n
1196     { @endpe = \legacy\_if:nTF { @endpe }{true}{false}
1197       \on@line }
1198   \legacy\_if:nTF { @endpe }
1199     {
1200     \legacy\_if\_gset\_false:n { @endpe }
1201     }

```

We test for `<2` because the first flattened environment has to surround itself with a `text-unit`. Only any inner ones then have to avoid adding another `text-unit`.

```

1202   {
1203     \int\_compare:nNnT \l\_block\_flattened\_level\_int < 2
1204     {
1205       \int\_gincr:N \g\_tag\_para\_main\_begin\_int
1206       \tagstructbegin{tag=\l\_tag\_para\_main\_tag\_tl}
1207     }
1208   }
1209 }

```

(End of definition for `_block_beginpar_vmode:.`)

`_block_beginpar_hmode:N` If the block is already part of a part of a paragraph, i.e., when it has some text directly in front, then the first thing to do is to return to vertical mode. However, that should be done without inserting a paragraph end tag, so before calling `\par` to do its normal work, we disable paragraph tagging and restarting afterwards again. The argument to this config point simply gobbles the `\par` following it in the code above (which is used when there is no tagging going on).

```

1210 \cs_set:Npn \_block\_beginpar\_hmode:N #1
1211   {
1212     \tag\_mc\_end:
1213     \int\_gincr:N \g\_tag\_para\_end\_int
1214     \_block\_debug\_typeout:n{increment~ /P \on@line }
1215     \bool\_if:NT \l\_tag\_para\_show\_bool
1216     { \tag\_mc\_begin:n{artifact}
1217       \rlap{\color\_select:n{red}\tiny\ \int\_use:N\g\_tag\_para\_end\_int}
1218       \tag\_mc\_end:
1219     }
1220     \tag\_struct\_end:
1221     \tagpdfparaOff \par \tagpdfparaOn
1222   }

```

(End of definition for `_block_beginpar_hmode:N.`)

`_kernel_displayblock_doendpe:` If a display block ends and is followed by a blank line we have to end the enclosing paragraph tagging structure.

```

1223 \cs_set:Npn \_kernel\_displayblock\_doendpe: {
1224   \bool\_if:NT \l\_tag\_para\_bool
1225   {

```

Given that restoring `\par` through the legacy L^AT_EX 2_ε method can take a few iterations (for example, in case of nested lists, e.g., `... \end{itemize} \item ... \par` it can happen that `__kernel_displayblock_doendpe:` is called while `@endpe` is already handled and then we should not attempt to close a `text-unit` structure. So we need to check for this.

```
1226     \legacy_if:nT { @endpe }
1227     {
```

If the display block currently ending was “flattened” (i.e., uses simplified paragraphs that are not tagged by a combination of `text-unit` followed by `<text>`, but simply with a `<text>`), then we don’t have to do anything, because the `<text>` is already closed.

```
1228         \__block_debug_typeout:n
1229         { flattened= \bool_if:NTF
1230                   \l__tag_para_flattened_bool {true}{false}
1231         \on@line }
1232     \bool_if:NF \l__tag_para_flattened_bool
1233     {
1234         \__block_debug_typeout:n{Structure-end~
1235         \l__tag_para_main_tag_tl\space after~ displayblock \on@line }
1236         \int_gincr:N \g__tag_para_main_end_int
1237         \tag_struct_end: %text-unit
1238     }
1239 }
1240 }
1241 }
```

(End of definition for `__kernel_displayblock_doendpe:.`)

para/begin Paragraph tagging is mainly done using the paragraph hooks (will get moved eventually). The default hook setting is not good enough when lists get supported: we need to delay starting the paragraph tagging if we still have to place the list label. We therefore remove the existing hook data and replace it with an augmented version (this will get combined eventually).

```
1242 \RemoveFromHook{para/begin}[tagpdf]
1243 \AddToHook{para/begin}[tagpdf]{
1244     \bool_if:NT \l__tag_para_bool {
```

if we are still waiting to typeset the list label we do nothing (the paragraph tagging then happens when the list is finally typeset).

```
1245         \legacy_if:nF { @inlabel }
1246         {
```

Otherwise, we start a `<text>` tag structure but only if we are not starting a paragraph immediately *after* a list, in which case we only start a new MC (because the `<text>` tag is still open from before the list — one of the reasons why lists are always put “inside” paragraphs).

We do this in a separate command, because it is needed elsewhere too.

```
1247         \__block_start_para_structure:n { \PARALABEL }
1248     }
1249 }
1250 }
```

```

1251 \cs_new_protected:Npn \__block_start_para_structure:n #1 {
1252   \__block_debug_typeout:n
1253   { @endpe = \legacy_if:nTF { @endpe }{true}{false}
1254     \on@line }
1255   \legacy_if:nF { @endpe }
1256   {
1257     \bool_if:NF \l__tag_para_flattened_bool
1258     {
1259       \int_gincr:N \g__tag_para_main_begin_int
1260       \tag_struct_begin:n{tag=\l__tag_para_main_tag_tl}
1261     }
1262   }
1263   \int_gincr:N \g__tag_para_begin_int
1264   \__block_debug_typeout:n{increment~ P \on@line }
1265   \tag_struct_begin:n
1266   {
1267     tag=\l__tag_para_tag_tl
1268     ,attribute-class=\l_tag_para_attr_class_tl
1269   }
1270   \__tag_check_para_begin_show:nn {green}{#1}
1271   \tag_mc_begin:n {}
1272 }

```

The same code, but without testing @endpe. This is not needed in the standalong e case and wrong inside lists.

```

1273 \cs_new_protected:Npn \__block_start_para_structure_unconditionally:n #1 {
1274   \bool_if:NF \l__tag_para_flattened_bool
1275   {
1276     \int_gincr:N \g__tag_para_main_begin_int
1277     \tag_struct_begin:n{tag=\l__tag_para_main_tag_tl}
1278   }
1279   \int_gincr:N \g__tag_para_begin_int
1280   \__block_debug_typeout:n{increment~ P \on@line }
1281   \tag_struct_begin:n
1282   {
1283     tag=\l__tag_para_tag_tl
1284     ,attribute-class=\l_tag_para_attr_class_tl
1285   }
1286   \__tag_check_para_begin_show:nn {green}{#1}
1287   \tag_mc_begin:n {}
1288 }

1289 \tag_if_active:T {
1290 % \tagpdfsetup{add-new-tag={tag=text-unit,role=Part}}
1291 }

1292 \RemoveFromHook{para/end}[tagpdf]
1293 \AddToHook{para/end}
1294 {
1295   \bool_if:NT \l__tag_para_bool
1296   {
1297     \int_gincr:N \g__tag_para_end_int
1298     \__block_debug_typeout:n{increment~ /P \on@line }
1299     \tag_mc_end:

```



```

1300     \_tag_check_para_end_show:nn {red}{}
1301     \tag_struct_end:
1302     \bool_if:NF \l__tag_para_flattened_bool
1303     {
1304         \int_gincr:N \g__tag_para_main_end_int
1305         \tag_struct_end:
1306     }
1307 }
1308 }
1309 \def\PARALABEL{NP-}

```

(End of definition for para/begin and _block_start_para_structure:n. This function is documented on page ??.)

`\para_end:` If we see a `\par` in vmode and a `text-unit` is still open we need to close that. For this we check if a request for `@endpe` was made (but the `\par` redefinition got lost due to (bad?) coding).

```

1310 \cs_set_protected:Npn \para_end: {
1311   \scan_stop:
1312   \mode_if_horizontal:TF {
1313     \mode_if_inner:F {
1314       \tex_unskip:D
1315       \hook_use:n{para/end}
1316       \@kernel@after@para@end
1317       \mode_if_horizontal:TF {
1318         \if_int_compare:w 11 = \tex_lastnodetype:D
1319           \tex_hskip:D \c_zero_dim
1320         \fi:
1321         \tex_par:D
1322         \hook_use:n{para/after}
1323         \@kernel@after@para@after
1324       }
1325       { \msg_error:nnnn { hooks }{ para-mode }{end}{horizontal} }
1326     }
1327   }
1328   {
1329     \_kernel_endpe_vmode:      % should do nothing if no tagging
1330     \tex_par:D
1331   }
1332 }
1333 \cs_set_eq:NN \par \para_end:
1334 \cs_set_eq:NN \_blockpar \para_end:
1335 \cs_set_eq:NN \endgraf \para_end:

```

(End of definition for `\para_end:`. This function is documented on page ??.)

`\begin` We need to do a little more than canceling `@endpe` now.

```

1336 \DeclareRobustCommand*\begin[1]{%
1337   \UseHook{env/#1/before}%
1338   \@ifundefined{#1}%
1339     {\def\reserved@a{\@latex@error{Environment #1 undefined}\@eha}}%
1340     {\def\reserved@a{\def\@currenvir{#1}%
1341       \edef\@currencline{\on@line}%
1342       \execute@begin@hook{#1}%

```

```

1343         \csname #1\endcsname}}%
1344     \@ignorefalse
1345     \begingroup
1346     \__kernel_endpe_vmode:
1347     \reserved@a}

```

(End of definition for \begin. This function is documented on page ??.)

`__kernel_endpe_vmode:` Close an open text-unit if @endpe is true and we are in vmode. Used in `\para_end:` and `\begin`.

```

1348 \cs_new:Npn \__kernel_endpe_vmode: {
1349     \if@endpe \ifvmode
1350     \bool_if:NT \l__tag_para_bool
1351     {
1352     \bool_if:NF \l__tag_para_flattened_bool
1353     {
1354     \int_gincr:N \g__tag_para_main_end_int
1355     \tag_struct_end:
1356     }
1357     \@endpefalse
1358     }
1359     \fi \fi
1360 }

```

(End of definition for __kernel_endpe_vmode:.)

`__kernel_list_label_after:` If starting the text-unit/text tags got delayed because of a pending label we have to do it after the label got typeset

```

1361 \cs_set:Npn \__kernel_list_label_after: {
1362     \bool_if:NT \l__tag_para_bool
1363     {
1364     \__block_start_para_structure_unconditionally:n { LI- }
1365     }
1366 }

```

(End of definition for __kernel_list_label_after:.)

`__block_inner_begin:` Start a block that has an inner structure if it isn't also a list.

```

1367 \cs_new:Npn \__block_inner_begin: {
1368     \tag_struct_begin{tag=\l__block_tag_inner_tag_tl}
1369 }

```

(End of definition for __block_inner_begin:.)

`__block_inner_end:` End a block (which isn't also a list).

```

1370 \cs_new:Npn \__block_inner_end: {
1371     \__block_debug_typeout:n{block-end \on@line}
1372     \legacy_if:nT { @endpe }
1373     {
1374     \int_gincr:N \g__tag_para_main_end_int
1375     \__block_debug_typeout:n{close~ /text-unit \on@line}
1376     \tag_struct_end
1377     }
1378     \tag_struct_end % end inner structure
1379 }

```

(End of definition for __block_inner_end:.)

4.12.1 List tags

```
1380 \tl_new:N \l__tag_L_tag_tl
1381 \tl_set:Nn \l__tag_L_tag_tl {L}
1382
1383 \tl_new:N \l__tag_L_attr_class_tl
1384 \tl_set:Nn \l__tag_L_attr_class_tl {list}
1385
1386 \tag_if_active:T
1387 {
1388   \tagpdfsetup
1389   {
1390     % default if unknown
1391     newattribute = {list}{/0 /List /ListNumbering/None},
1392     newattribute = {itemize}{/0 /List /ListNumbering/Unordered},
1393     newattribute = {enumerate}{/0 /List /ListNumbering/Ordered},
1394     newattribute = {description}{/0 /List /ListNumbering/Description},
1395   }
1396 }
1397
1398 \def\LItag{LI}
```

`__block_list_begin:` Start a list ...

```
1397 \cs_set:Npn \__block_list_begin: {
1398   \tagstructbegin
1399   {
1400     tag=\l__tag_L_tag_tl
1401     ,attribute-class=\l__tag_L_attr_class_tl
1402   }
1403 }
```

(End of definition for __block_list_begin:.)

`__block_list_item_begin:` Start tagging a list item.

```
1404 \cs_set:Npn \__block_list_item_begin: { \tagstructbegin{tag=\LItag} }
```

(End of definition for __block_list_item_begin:.)

`__kernel_list_label_begin:` A list label needs a Lbl structure tag and an MC.

```
1405 \cs_set:Npn \__kernel_list_label_begin: {
1406   %
1407   % FMI: this needs a different logic to decide when to make the label
1408   %   an artifact (after cleaning up the the \item code ), therefore
1409   %   disabled for now
1410   % \tl_if_empty:oTF \@itemlabel
1411   % {
1412   %   \tag_mc_begin:n {artifact}
1413   % }
1414   % {
1415   %   \tagstructbegin{tag=Lbl}
1416   %   \tagmcbegin{tag=Lbl}
1417   % }
1418 }
```

(End of definition for __kernel_list_label_begin:.)

`__kernel_list_label_end:` And when we are done with the label we have to close the MC and the Lbl structure. We then start the LBody. The material inside will be “paragraph” text and the tagging for that is handled by the normal para tagging.

```

1419 \cs_set:Npn \__kernel_list_label_end: {
1420   \tagmcentd                                     % end mc-Lbl or artifact
1421   % FMi: unconditionally for now
1422   % \tl_if_empty:oF \@itemlabel
1423   \tagstructend % end Lbl
1424   \tagstructbegin{tag=\LBody}
1425 }
1426 \def\LBody{\LBody}

```

(End of definition for __kernel_list_label_end:.)

`__block_list_item_end:` When a list item ends we have to close LBody and LI but also a <text> in the special case that the item material ends in a list (identifiable via @endpe).

```

1427 \cs_set:Npn \__block_list_item_end: {
1428   \legacy_if:nT { @endpe }
1429   {
1430     \int_gincr:N \g__tag_para_main_end_int
1431     \tagstructend % text-unit
1432     % \__block_debug_typeout:n{Structure-end~ P~ at~ item-end \on@line }
1433   }
1434   \tagstructend \tagstructend % end LBody, LI
1435 }

```

(End of definition for __block_list_item_end:.)

`__block_list_end:` Finally, at the list end we have to close the open LBody, LI, L, and possibly a <text> if the last item ends with a list.

```

1436 \cs_set:Npn \__block_list_end: {
1437   \legacy_if:nT { @endpe }
1438   {
1439     \int_gincr:N \g__tag_para_main_end_int
1440     \tagstructend % text-unit
1441     \__block_debug_typeout:n{Structure-end~ P~ at~ list-end \on@line }
1442   }
1443   \tagstructend\tagstructend % end LBody, LI
1444   \tagstructend % end L
1445 }

```

(End of definition for __block_list_end:.)

End of tagging related declarations.

```

1446 }
1447 </package>
1448 <*latex-lab>
1449 \ProvidesFile{block-tagging-latex-lab-testphase.ltx}
1450   [\ltxblocksdate\space \ltxblocksversion\space
1451     blockenv implementation]
1452 \RequirePackage{latex-lab-testphase-block-tagging}
1453 </latex-lab>

```

5 Documentation from first prototype implementations

5.1 Open questions

- Existing questions — moved to issues —

5.2 Code cleanup

- Actually implement what's announced.
- Encapsulate most uses of `\legacy_if...` into commands with `expl3` syntax: we cannot rename these booleans for compatibility reasons but we can make the code cleaner nevertheless. — made issue —
- The `\topsep` and `\partopsep` business is tricky to reproduce exactly (see `\@topsepadd` and `\@topsep`) because of how it accumulates when lists are nested immediately.

5.3 Tasks

- Change author to LaTeX Team once it's nice enough to deserve that label.
- Reproducing exactly the standard layouts and examples in the `enumitem` documentation.
- Hooks, but do not duplicate those that already exist as environment hooks. Hence, mostly around items.
- Customization and interaction with LDB:
 - Allow arbitrary nesting depth with automatically defined styles for labels, counters etc.
 - Adapt everything to font size! (e.g. footnotes).
 - How to model the inheritance from `trivlist` to `list` to `enumerate`?
- Add key-value settings mimicking `enumitem`'s ability to set any four of five horizontal parameters and deduce the fifth by `\leftmargin + \itemindent = \labelindent + \labelwidth + \labelsep`.
- Provide good ways to customize how overlong labels are dealt with.
- Use the `.aux` file.
 - Implement the `\ref` styles that `enumitem` provides.
 - Reverse enumerations, important in publication lists and the like. Somehow avoid needing 3 compilations for references to reverse enumerations to settle?
 - Ability to calculate `\labelwidth` from the label contents. Share calculated parameters between multiple environments (cf. `resume` option).
- Related to grabbing the whole list environment, and input syntax variations:

- Other layouts: `tabular` (see `listliketab` vs `typed-checklist`), `multicolumn` and `horizontally numbered` (see `tasks`), `inline lists`, `runin lists` in the easy case where there is no intervening `\par`.
 - Formatting the item text in a box or similar (requires grabbing the whole list).
 - Filtering which items to show: hide certain items according to criteria (useful together with `list reuse`), see `typed-checklist`.
 - Shorthands `\iitem` for automatic nested lists, or `\1`, `\2` etc from `outlines`.
 - Support markdown input like `asciilist`.
- Check interaction with `babel` options such as `french` or `accadian` (see `FrenchItemizeSpacing`)
 - RTL and vertical typesetting.

6 Plan of attack of first prototype

Typesetting list environments involves a rather large number of parameters. They can be affected by the context such as the total list nesting level, the nesting level of the given type of list, and the font size. An environment like `enumerate` has two main aspects.

- It has a certain layout in the page, with vertical and horizontal spacing around it. This type of layout is shared with environments such as `quote`, `flushright`, or `tabbing`. This common layout is implemented in $\text{\LaTeX} 2_{\epsilon}$ through `\trivlist` (or `\list`).
- It defines how each `\item` should be typeset: how to construct the label, in particular the `counter` name, and how to format the content of the item.

This suggests defining two object types, `block` and `item` covering these two aspects.¹ While the `item` type will perhaps have a single template, one could typeset a `block` object in several ways, for instance the standard $\text{\LaTeX} 2_{\epsilon}$ way or a fancy colored box.

The *general block* template should receive the following parameters. The *plain block* template is a restricted template that freezes all item-related parameters to dummy values (`counter`, `start`, `resume`, `label-width`, `label-sep` and all `item-*`). The *list block* template is a restricted template² that omits the `heading` parameter and whose default for `item-instance` is non-empty.

- Structural parameters: the `heading` to place before, `counter` name, `start` value, whether to `resume` a previous list, and the `item-instance` (an `item` instance) to use when typesetting items.
- Vertical spacing and penalties: `beginpenalty`, `beginsep`, `begin-par-skip`, `item-penalty`, `item-skip`, `item-par-skip`, `endpenalty`, `end-skip`, `end-par-skip`.
- Horizontal spacing: `rightmargin`, `leftmargin`, `parindent`, `item-indent`, `label-width`, `label-sep`.

A document class should edit these templates (or define restricted templates) to set

¹Possibly also `endblock` to deal with decorations at the end?

²A better approach could be to have a notion of inheritance for object types, so that we end up with two different *object types*. Then we can implement other template for the list object type: `table` for lists typeset as rows/columns of a table, `inline` for lists typeset in horizontal mode within a paragraph, and `runin` for run-in lists.

up default values that depend on `\g_block_nesting_depth_int`, namely how many lists are nested overall.³ The document class should then set up an instance of these templates for each environment, with appropriate settings such as a `heading`, a suitable `item-instance`, or making `margin-right` equal to `margin-left` in a `quote` environment.

The *inline-list block* template receives many fewer parameters. Note that `beginsep`, `item-skip`, `end-skip` are now *horizontal* skips.

- Structural parameters: `counter`, `start`, `resume`, `item-instance`.
- Spacing and penalties: `beginpenalty`, `beginsep`, `item-penalty`, `item-skip`, `endpenalty`, `end-skip`.
- Horizontal spacing: `label-width`, `label-sep`.

The *std item* template should receive the following parameters. They depend on the type of list and its nesting level among lists of such type, but typically not on the total nesting level.

- Counter name (`counter`), shared with the parent *list block* template, but needed for incrementing.
- Label construction: a function `counter-label` that produces the label from the counter name, used if `\item` is given without argument.
- References: a function `counter-ref` for how the label should be referred to when it is constructed from the counter, `label-ref` and `label-autoref` used when `\item` has an optional argument.
- Label formatting: `label-format` function, `label-strut` boolean.
- Label alignment (`label-align`, `label-boxed`, `next-line`).
- Content parameters: `text-font`.
- A `compatibility` boolean that controls for instance whether `\makeLabel` is used.

The document class should set up an instance such as *enumiii* for each environment and nesting level.⁴

A given environment will adjust some nesting levels, then call the *block* instance appropriate to the environment type, passing it the *item* instance appropriate to the environment and depth. Additional context-dependence could be provided by `l3ldb`, but the main context-dependence should not rely on it for simplicity reasons and incidentally because `l3ldb` is not yet available.

³Does `xtemplate` provide a way to specify default values that are only evaluated once an instance is used?

⁴This should be made easily extendible to deeper levels.

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