

beamer named overlay specification with beanoves

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Abstract

This package allows the management of multiple slide lists in **beamer** documents. Slide lists are very handy both during edition and to manage complex and variable **beamer** overlay specifications.

Contents

1	Minimal example	1
2	Named slide lists	2
2.1	Presentation	2
2.2	Defining named slide lists	2
3	Named overlay specifications	3
3.1	Named slide ranges	3
3.2	Named slide lists	4
4	?(...) query expressions	4
5	Implementation	5
5.1	Package declarations	5
5.2	Local variables	5
5.3	Overlay specification	6
5.3.1	In slide range definitions	6
5.3.2	Regular expressions	8
5.3.3	Defining named slide ranges	11
5.3.4	Scanning named overlay specifications	14
5.3.5	Evaluation bricks	18
5.3.6	Evaluation	30
5.3.7	Reseting slide ranges	41

1 Minimal example

The document below is a contrived example to show how the **beamer** overlay specifications have been extended.

```
1 \documentclass {beamer}
2 \RequirePackage {beanoves}
3 \begin{document}
4 \Beanoves {
5     A = 1:2,
6     B = A.next:3,
7     C = B.next,
8 }
9 \begin{frame}
10 {\Large Frame \insertframenumber}
11 {\Large Slide \insertslidenumber}
12 \visible<?(A.1)> {Only on slide 1}\\
13 \visible<?(B.1)-?(B.last)> {Only on slide 3 to 5}\\
14 \visible<?(C.1)> {Only on slide 6}\\
15 \visible<?(A.2)> {Only on slide 2}\\
16 \visible<?(B.2::B.last)> {Only on slide 4 to 5}\\
17 \visible<?(C.2)> {Only on slide 7}\\
18 \visible<?(A.3)-> {From slide 3}\\
19 \visible<?(B.3::B.last)> {Only on slide 5}\\
20 \visible<?(C.3)> {Only on slide 8}\\
21 \end{frame}
22 \end{document}
```

On line 4, we use the `\Beanoves` command to declare named slide ranges. On line 5, we declare a slide range named ‘A’, starting at slide 1 and with length 2. On line 12, the extended *named overlay specification* `?(A.1)` stands for 1, on line 15, `?(A.2)` stands for 2 whereas on line 18, `?(A.3)` stands for 3. On line 6, we declare a second slide range named ‘B’, starting after the 2 slides of ‘A’ namely 3. Its length is 3 meaning that its last slide number is 5, thus each `?(B.last)` is replaced by 5. The next slide number after slide range ‘B’ is 6 which is also the start of the third slide range due to line 7.

2 Named slide lists

2.1 Presentation

Within a **beamer** frame, there are different slides that appear in turn. The main slide list is a range on integers covering all the slide numbers, from one to the total amount of slides. In general, a slide list is a range of positive integers identified by a unique name. The main practical interest is that such lists may be defined relative to one another, we can even have lists of slide ranges. Finally, we can use these lists to organize **beamer** overlay specifications logically.

2.2 Defining named slide lists

In order to define named slide lists, we can either use the `\Beanoves` command below before a **beamer** frame environment, or use the `beanoves` option of this environment. The

value of the `beanoves` option is similar to the argument of the `\Beanoves` commands, but the latter takes precedence on the former. This behaviour may be useful to input the very same source code into different frames and have different combinations of slides.

```

beanoves = {
  <name1>=<spec1>,
  <name2>=<spec2>,
  ...,
  <namen>=<specn>,
}

```

```

\Beanoves{
  <name1>=<spec1>,
  <name2>=<spec2>,
  ...,
  <namen>=<specn>,
}

```

The keys $\langle name_i \rangle$ are the slide lists names, they are case sensitive and must contain no spaces nor ‘/’ character. In order to avoid name conflicts with floating point functions, it is suggested to let them contain an uppercase letter or an underscore. When the same key is used multiple times, only the last one is taken into account. Possible values for $\langle spec_i \rangle$ are the *slide range specifiers* $\langle first \rangle$, $\langle first \rangle:\langle length \rangle$, $\langle first \rangle::\langle last \rangle$, $:\langle length \rangle::\langle last \rangle$ where $\langle first \rangle$, $\langle length \rangle$ and $\langle last \rangle$ are algebraic expression involving any integer valued named overlay specifications defined below.

Also possible values are *slide list specifiers* which are comma separated list of *slide range specifiers* and *slide list specifier* between square brackets. The definition

$$\langle name \rangle = [\langle spec_1 \rangle, \langle spec_2 \rangle, \dots, \langle spec_n \rangle],$$

is a convenient shortcut for

$$\begin{aligned} \langle name \rangle.1 &= \langle spec_1 \rangle, \\ \langle name \rangle.2 &= \langle spec_2 \rangle, \\ &\dots, \\ \langle name \rangle.n &= \langle spec_n \rangle. \end{aligned}$$

The rules above can apply individually to each

$$\langle name \rangle.i = \langle spec_i \rangle.$$

Moreover we can go deeper: the definition

$$\langle name \rangle = [[\langle spec_{1.1} \rangle, \langle spec_{1.2} \rangle], [[\langle spec_{2.1} \rangle, \langle spec_{2.2} \rangle]]$$

is a convenient shortcut for

$$\begin{aligned} \langle name \rangle.1.1 &= \langle spec_{1.1} \rangle, \\ \langle name \rangle.1.2 &= \langle spec_{1.2} \rangle, \\ \langle name \rangle.2.1 &= \langle spec_{2.1} \rangle, \\ \langle name \rangle.2.2 &= \langle spec_{2.2} \rangle \end{aligned}$$

and so on.

3 Named overlay specifications

3.1 Named slide ranges

When *slide range specifications* are used, the named overlay specifications are detailed in the tables below together with their replacement meaning value as `beamer` standard

overlay specification.

$\langle name \rangle == [i, i + 1, i + 2, \dots]$	
syntax	meaning
$\langle name \rangle.1$	i
$\langle name \rangle.2$	$i + 1$
$\langle name \rangle.\langle integer \rangle$	$i + \langle integer \rangle - 1$

In the frame example below, we use the `\BeanovesEval` command for the demonstration. It is mainly used for debugging and testing purposes.

```

1 \Beanoves {
2   A = 3:6,
3 }
4 \begin{frame} {Frame \insertframenum} {Slide \insertslidenumber}
5 \ttfamily
6 \BeanovesEval(A.1) ==3,
7 \BeanovesEval(A.2) ==4,
8 \BeanovesEval(A.-1)==1,
9 \end{frame}

```

When the slide range has been given a length or an end, like in the frame example below, we also have

$\langle name \rangle == [i, i + 1, \dots, j]$			
syntax	meaning	example	output
$\langle name \rangle.length$	$j - i + 1$	A.length	6
$\langle name \rangle.last$	j	A.last	8
$\langle name \rangle.next$	$j + 1$	A.next	9
$\langle name \rangle.range$	$i \text{ '-' } j$	A.range	3-8

```

1 \Beanoves {
2   A = 3:6,
3 }
4 \begin{frame} {Frame \insertframenum} {Slide \insertslidenumber}
5 \ttfamily
6 \BeanovesEval(A.length) == 6,
7 \BeanovesEval(A.1)      == 3,
8 \BeanovesEval(A.2)      == 4,
9 \BeanovesEval(A.-1)     == 1,
10 \end{frame}

```

Using these specification on unfinite named slide ranges is unsupported. Finally each named slide range has a dedicated counter $\langle name \rangle.n$ which is some kind of variable that can be used and incremented¹.

$\langle name \rangle.n$: use the position of the counter

$\langle name \rangle.n+=\langle integer \rangle$: advance the counter by $\langle integer \rangle$ and use the new position

$++\langle name \rangle.n$: advance the counter by 1 and use the new position

Notice that “.n” can generally be omitted.

¹This is actually an experimental feature.

3.2 Named slide lists

After the definition

$$\langle name \rangle = [\langle spec_1 \rangle, \langle spec_2 \rangle, \dots, \langle spec_n \rangle]$$

the rules of the previous section apply recursively to each individual declaration

$$\langle name \rangle . i = \langle spec_i \rangle.$$

4 ?(...) query expressions

This is the key feature of the `beanoves` package, extending `beamer overlay specifications` included between pointed brackets. Before the *overlay specifications* are processed by the `beamer` class, the `beanoves` package scans them for any occurrence of ‘ $\langle ?(\langle queries \rangle) \rangle$ ’. Each one is then evaluated and replaced by its static counterpart. The overall result is finally forwarded to the `beamer` class.

The $\langle queries \rangle$ argument is a comma separated list of individual $\langle query \rangle$ ’s of next table. Sometimes, using $\langle name \rangle . range$ is not allowed as it would lead to an algebraic difference instead of a range.

query	static value	limitation
:	–	
::	–	
$\langle first\ expr \rangle$	$\langle first \rangle$	
$\langle first\ expr \rangle :$	$\langle first \rangle -$	no $\langle name \rangle . range$
$\langle first\ expr \rangle ::$	$\langle first \rangle -$	no $\langle name \rangle . range$
$\langle first\ expr \rangle : \langle length\ expr \rangle$	$\langle first \rangle - \langle last \rangle$	no $\langle name \rangle . range$
$\langle first\ expr \rangle :: \langle end\ expr \rangle$	$\langle first \rangle - \langle last \rangle$	no $\langle name \rangle . range$

Here $\langle first\ expr \rangle$, $\langle length\ expr \rangle$ and $\langle end\ expr \rangle$ both denote algebraic expressions possibly involving named overlay specifications and counters. As integers, they respectively evaluate to $\langle first \rangle$, $\langle length \rangle$ and $\langle last \rangle$.

For example both $\langle ?(A.next) \rangle$, $\langle ?(A.last+1) \rangle$, $\langle ?(A.1+A.length) \rangle$ give the same result as soon as the slide range named ‘A’ has been properly defined with a length.

Notice that nesting $\langle ?(\dots) \rangle$ expressions is not supported.

```
1 \*package
```

5 Implementation

Identify the internal prefix (L^AT_EX3 DocStrip convention).

```
2 @@=beanoves
```

5.1 Package declarations

```
3 \NeedsTeXFormat{LaTeX2e}[2020/01/01]
4 \ProvidesExplPackage
5   {beanoves}
6   {2022/10/28}
7   {1.0}
8   {Named overlay specifications for beamer}
9 \cs_new:Npn \__beanoves_DEBUG_on: {
10  \cs_set:Npn \__beanoves_DEBUG:n ##1 {
```

```

11 \msg_term:nnn { beanoves } { :n } { ##1 }
12 }
13 }
14 \cs_new:Npn \__beanoves_DEBUG_off: {
15 \cs_set_eq:NN \__beanoves_DEBUG:n \use_none:n
16 }
17 \__beanoves_DEBUG_off:
18 \cs_generate_variant:Nn \__beanoves_DEBUG:n { x, V }
19 \int_zero_new:N \l__beanoves_group_int
20 \cs_set:Npn \__beanoves_group_begin: {
21 \group_begin:
22 \int_incr:N \l__beanoves_group_int
23 \__beanoves_DEBUG:x {GROUP~DOWN:~\int_use:N \l__beanoves_group_int}
24 }
25 \cs_set:Npn \__beanoves_group_end: {
26 \group_end:
27 \__beanoves_DEBUG:x {GROUP~UP:~\int_use:N \l__beanoves_group_int}
28 }

```

5.2 Local variables

We make heavy use of local variables and function scopes. Many functions are executed within a \TeX group, which ensures no name collision with the caller stack. In that case, variables need not follow exactly the \LaTeX 3 naming convention: we do not specialize with the module name. On execution, next initialization instructions declare the variables as side effect.

```

29 \int_zero_new:N \l__beanoves_split_int
30 \int_zero_new:N \l__beanoves_depth_int
31 \int_zero_new:N \g__beanoves_append_int
32 \bool_new:N \l__beanoves_no_counter_bool
33 \bool_new:N \l__beanoves_no_range_bool
34 \bool_new:N \l__beanoves_continue_bool

```

5.3 Overlay specification

5.3.1 In slide range definitions

$\backslash\text{g_beanoves_prop}$ $\langle\text{key}\rangle\text{--}\langle\text{value}\rangle$ property list to store the named slide lists. The basic keys are, assuming $\langle\text{name}\rangle$ is a slide list identifier,

$\langle\text{name}\rangle/\text{A}$ for the first index

$\langle\text{name}\rangle/\text{L}$ for the length when provided

$\langle\text{name}\rangle/\text{Z}$ for the last index when provided

$\langle\text{name}\rangle/\text{C}$ for the counter value, when used

$\langle\text{name}\rangle/\text{C0}$ for initial value of the counter (when reset)

Other keys are eventually used to cache results when some attributes are defined from other slide ranges. They are characterized by a $\text{'//'}.$

$\langle\text{name}\rangle//\text{A}$ for the cached static value of the first index

$\langle\text{name}\rangle//\text{Z}$ for the cached static value of the last index

$\langle name \rangle // L$ for the cached static value of the length

$\langle name \rangle // N$ for the cached static value of the next index

The implementation is private, in particular, keys may change in future versions.

```
35 \prop_new:N \g__beanoves_prop
```

(End definition for $\backslash g_beanoves_prop$.)

```
\__beanoves_gput:nn
\__beanoves_gput:nV
\__beanoves_gprovide:nn
\__beanoves_gprovide:nV
\__beanoves_item:n
\__beanoves_get:nN
\__beanoves_gremove:n
\__beanoves_gclear:n
\__beanoves_gclear_cache:n
\__beanoves_gclear:
```

```
\__beanoves_gput:nn {\langle key \rangle} {\langle value \rangle}
\__beanoves_gprovide:nn {\langle key \rangle} {\langle value \rangle}
\__beanoves_item:n {\langle key \rangle}
\__beanoves_get:n {\langle key \rangle} \langle tl variable \rangle
\__beanoves_gremove:n {\langle key \rangle}
\__beanoves_gclear:n {\langle key \rangle}
\__beanoves_gclear:
```

Convenient shortcuts to manage the storage, it makes the code more concise and readable. This is a wrapper over L^AT_EX3 eponym functions, except $\backslash _beanoves_gprovide:nn$ which meaning is straightforward.

```
36 \cs_new:Npn \__beanoves_gput:nn {
37   \prop_gput:Nnn \g__beanoves_prop
38 }
39 \cs_new:Npn \__beanoves_gprovide:nn #1 #2 {
40   \prop_if_in:NnF \g__beanoves_prop { #1 } {
41     \prop_gput:Nnn \g__beanoves_prop { #1 } { #2 }
42   }
43 }
44 \cs_new:Npn \__beanoves_item:n {
45   \prop_item:Nn \g__beanoves_prop
46 }
47 \cs_new:Npn \__beanoves_get:nN {
48   \prop_get:NnN \g__beanoves_prop
49 }
50 \cs_new:Npn \__beanoves_gremove:n {
51   \prop_gremove:Nn \g__beanoves_prop
52 }
53 \cs_new:Npn \__beanoves_gclear:n #1 {
54   \clist_map_inline:nn { A, L, Z, C, CO, /, /A, /L, /Z, /N } {
55     \__beanoves_gremove:n { #1 / ##1 }
56   }
57 }
58 \cs_new:Npn \__beanoves_gclear_cache:n #1 {
59   \clist_map_inline:nn { /A, /L, /Z, /N } {
60     \__beanoves_gremove:n { #1 / ##1 }
61   }
62 }
63 \cs_new:Npn \__beanoves_gclear: {
64   \prop_gclear:N \g__beanoves_prop
65 }
66 \cs_generate_variant:Nn \__beanoves_gput:nn { nV }
67 \cs_generate_variant:Nn \__beanoves_gprovide:nn { nV }
```

<code>__beanoves_if_in_p:n *</code> <code>__beanoves_if_in_p:V *</code> <code>__beanoves_if_in:nTF *</code> <code>__beanoves_if_in:VTF *</code>	<code>__beanoves_if_in_p:n {<key>}</code> <code>__beanoves_if_in:nTF {<key>} {<true code>} {<false code>}</code> <p>Convenient shortcuts to test for the existence of some key, it makes the code more concise and readable.</p>
--	--

```

68 \prg_new_conditional:Npnn \__beanoves_if_in:n #1 { p, T, F, TF } {
69   \prop_if_in:NnTF \g__beanoves_prop { #1 } {
70     \prg_return_true:
71   } {
72     \prg_return_false:
73   }
74 }
75 \prg_generate_conditional_variant:Nnn \__beanoves_if_in:n {V} { p, T, F, TF }

```

<code>__beanoves_get:nNTF</code>	<code>__beanoves_get:nNTF {<key>} {<tl variable>} {<true code>} {<false code>}</code>
-----------------------------------	--

Convenient shortcuts to retrieve the value with branching, it makes the code more concise and readable. Execute *<true code>* when the item is found, *<false code>* otherwise. In the latter case, the content of the *<tl variable>* is undefined. NB: the predicate won't work because `\prop_get:NnNTF` is not expandable.

```

76 \prg_new_conditional:Npnn \__beanoves_get:nN #1 #2 { T, F, TF } {
77   \prop_get:NnNTF \g__beanoves_prop { #1 } #2 {
78     \prg_return_true:
79   } {
80     \prg_return_false:
81   }
82 }

```

Utility message.

```

83 \msg_new:nnn { beanoves } { :n } { #1 }

```

5.3.2 Regular expressions

<code>\c__beanoves_name_regex</code>	<p>The name of a slide range consists of a non void list of alphanumerical characters and underscore, but with no leading digit.</p>
--------------------------------------	--

```

84 \regex_const:Nn \c__beanoves_name_regex {
85   [[:alpha:]]_ [[:alnum:]]_*
86 }

```

(End definition for `\c__beanoves_name_regex`.)

<code>\c__beanoves_path_regex</code>	<p>A sequence of <i><positive integer></i> items representing a path.</p>
--------------------------------------	---

```

87 \regex_const:Nn \c__beanoves_path_regex {
88   (?: \. \d+ ) *
89 }

```

(End definition for `\c__beanoves_path_regex`.)

<code>\c__beanoves_key_regex</code> <code>\c__beanoves_A_key_Z_regex</code>	<p>A key is the name of a slide range possibly followed by positive integer attributes using a dot syntax. The 'A_key_Z' variant matches the whole string.</p>
--	--

```

90 \regex_const:Nn \c__beanoves_key_regex {
91   \ur{c__beanoves_name_regex} \ur{c__beanoves_path_regex}
92 }

```



```

93 \regex_const:Nn \c__beanoves_A_key_Z_regex {
94   \A \ur{c__beanoves_key_regex} \Z
95 }

```

(End definition for `\c__beanoves_key_regex` and `\c__beanoves_A_key_Z_regex`.)

`\c__beanoves_dotted_regex` A specifier is the name of a slide range possibly followed by attributes using a dot syntax. This is a poor man version to save computations, a dedicated parser would help in error management.

```

96 \regex_const:Nn \c__beanoves_dotted_regex {
97   \A \ur{c__beanoves_name_regex} (?: \. [\^.] + ) * \Z
98 }

```

(End definition for `\c__beanoves_dotted_regex`.)

`\c__beanoves_colons_regex` For ranges defined by a colon syntax.

```

99 \regex_const:Nn \c__beanoves_colons_regex { : ( : + ) ? }

```

(End definition for `\c__beanoves_colons_regex`.)

`\c__beanoves_int_regex` A decimal integer with an eventual leading sign next to the first digit.

```

100 \regex_const:Nn \c__beanoves_int_regex {
101   (?: [-+]) ? \d +
102 }

```

(End definition for `\c__beanoves_int_regex`.)

`\c__beanoves_list_regex` A comma separated list between square brackets.

```

103 \regex_const:Nn \c__beanoves_list_regex {
104   \A \[ \s *

```

Capture groups:

- 2: the content between the brackets, outer spaces trimmed out

```

105   ( [^\] % [---
106   ] * ? )
107   \s * \] \Z
108 }

```

(End definition for `\c__beanoves_list_regex`.)

`\c__beanoves_split_regex` Used to parse slide list overlay specifications in queries. Next are the 10 capture groups. Group numbers are 1 based because the regex is used in splitting contexts where only capture groups are considered and not the whole match.

```

109 \regex_const:Nn \c__beanoves_split_regex {
110   \s * ( ? :

```

We start with ‘++’ instrussions ².

- 1: $\langle name \rangle$ of a slide range

```

111   \+ \+ ( \ur{c__beanoves_name_regex} )

```

²At the same time an instruction and an expression... this is a synonym of expression

- 2: optionally followed by an integer path

112 (\ur{c__beanoves_path_regex}) (?: \. n)?

We continue with other expressions

- 3: $\langle name \rangle$ of a slide range

113 | (\ur{c__beanoves_name_regex})

- 4: optionally followed by an integer path

114 (\ur{c__beanoves_path_regex})

Next comes another branching

115 (?:

- 5: the $\langle length \rangle$ attribute

116 \. 1(e)ngth

- 6: the $\langle last \rangle$ attribute

117 | \. 1(a)st

- 7: the $\langle next \rangle$ attribute

118 | \. ne(x)t

- 8: the $\langle range \rangle$ attribute

119 | \. (r)ange

- 9: the $\langle n \rangle$ attribute

120 | \. (n)

• 10: the poor man integer expression after ‘+=’. When it contains no parenthesis, it is an algebraic expression involving integers and $\langle key \rangle$ ’s. Otherwise it starts with a parenthesis and ends with the first parenthesis followed by a white space or the end of the text. This tricky definition allows quite any algebraic expression involving parenthesis. The problems may arise when dealing with nested expressions.

121 (?: \s* \+= \s*
122 ((?: \ur{c__beanoves_int_regex} | \ur{c__beanoves_key_regex})
123 (?: [+\\-*/] (?: \d+ | \ur{c__beanoves_key_regex})) *
124 | \ (.*? \) (?: \Z | \s+)
125)
126)?

127 | \. (- \ur{c__beanoves_int_regex})

A.1.2.-1A.1.2.-1,,A,.1.2,,,,,-1Test ‘-’ 1

128)?

129) \s*

130 }

(End definition for \c__beanoves_split_regex.)

5.3.3 Defining named slide ranges

`__beanoves_parse:Nnn` `__beanoves_parse:nn` $\langle command \rangle$ $\{\langle key \rangle\}$ $\{\langle definition \rangle\}$

Auxiliary function called within a group. $\langle key \rangle$ is the slide key, including eventually a dotted integer path, $\langle definition \rangle$ is the corresponding definition. $\langle command \rangle$ is `__beanoves_range:nVVV` at runtime.

`\l_match_seq` Local storage for the match result.

(End definition for `\l_match_seq`. This variable is documented on page ??.)

`__beanoves_range:nnnn` `__beanoves_range:nnnn` $\{\langle key \rangle\}$ $\{\langle first \rangle\}$ $\{\langle length \rangle\}$ $\{\langle last \rangle\}$
`__beanoves_range:nVVV` `__beanoves_range_alt:nnnn` $\{\langle key \rangle\}$ $\{\langle first \rangle\}$ $\{\langle length \rangle\}$ $\{\langle last \rangle\}$
`__beanoves_range_alt:nnnn` Auxiliary function called within a group. Setup the model to define a range. The alt
`__beanoves_range_alt:nVVV` variant does not override an already existing value.

```

131 \cs_new:Npn \__beanoves_range:Nnnnn #1 #2 #3 #4 #5 {
132   \tl_if_empty:nTF { #3 } {
133     \tl_if_empty:nTF { #4 } {
134       \tl_if_empty:nTF { #5 } {
135         \msg_error:nnn { beanoves } { :n } { Not~a~range::~~#2 }
136       } {
137         #1 { #2/Z } { #5 }
138       }
139     } {
140       #1 { #2/L } { #4 }
141       \tl_if_empty:nF { #5 } {
142         #1 { #2/Z } { #5 }
143         #1 { #2/A } { #2.last - (#2.length) + 1 }
144       }
145     }
146   } {
147     #1 { #2/A } { #3 }
148     \tl_if_empty:nTF { #4 } {
149       \tl_if_empty:nF { #5 } {
150         #1 { #2/Z } { #5 }
151         #1 { #2/L } { #2.last - (#2.1) + 1 }
152       }
153     } {
154       #1 { #2/L } { #4 }
155       #1 { #2/Z } { #2.1 + #2.length - 1 }
156     }
157   }
158 }
159 \cs_new:Npn \__beanoves_range:nnnn #1 {
160   \__beanoves_gclear:n { #1 }
161   \__beanoves_range:Nnnnn \__beanoves_gput:nn { #1 }
162 }
163 \cs_generate_variant:Nn \__beanoves_range:nnnn { nVVV }
164 \cs_new:Npn \__beanoves_range_alt:nnnn #1 {
165   \__beanoves_gclear_cache:n { #1 }
166   \__beanoves_range:Nnnnn \__beanoves_gprovide:nn { #1 }
167 }
168 \cs_generate_variant:Nn \__beanoves_range_alt:nnnn { nVVV }

```

`_beanoves_parse:Nn`

`_beanoves_parse:nn <command> {<key>}`

Define a hidden range, for which slides are never shown. This is useful to conditionally show or hide a sequence of slides.

```
169 \cs_new:Npn \_beanoves_parse:Nn #1 #2 {
170   \_beanoves_gput:nn { #1/ } { }
171 }
```

```
172 \cs_generate_variant:Nn \tl_if_empty:NTF { xTF }
173 \cs_new:Npn \_beanoves_do_parse:Nnn #1 #2 #3 {
```

The first argument has signature nVVV. This is not a list.

```
174   \tl_clear:N \l_a_tl
175   \tl_clear:N \l_b_tl
176   \tl_clear:N \l_c_tl
177   \regex_split:NnN \c__beanoves_colons_regex { #3 } \l_split_seq
178   \seq_pop_left:NNT \l_split_seq \l_a_tl {
```

`\l_a_tl` may contain the *<start>*.

```
179     \seq_pop_left:NNT \l_split_seq \l_b_tl {
180       \tl_if_empty:NTF \l_b_tl {
```

This is a one colon range.

```
181         \seq_pop_left:NN \l_split_seq \l_b_tl
```

`\l_b_tl` may contain the *<length>*.

```
182         \seq_pop_left:NNT \l_split_seq \l_c_tl {
183           \tl_if_empty:NTF \l_c_tl {
```

A :: was expected:

```
184 \msg_error:nnn { beanoves } { :n } { Invalid~range~expression(1):~#3 }
185   } {
186     \int_compare:nNnT { \tl_count:N \l_c_tl } > { 1 } {
187 \msg_error:nnn { beanoves } { :n } { Invalid~range~expression(2):~#3 }
188   }
189     \seq_pop_left:NN \l_split_seq \l_c_tl
```

`\l_c_tl` may contain the *<end>*.

```
190       \seq_if_empty:NF \l_split_seq {
191 \msg_error:nnn { beanoves } { :n } { Invalid~range~expression(3):~#3 }
192     }
193   }
194 }
195 }
```

This is a two colon range.

```
196   \int_compare:nNnT { \tl_count:N \l_b_tl } > { 1 } {
197 \msg_error:nnn { beanoves } { :n } { Invalid~range~expression(4):~#3 }
198   }
199   \seq_pop_left:NN \l_split_seq \l_c_tl
```

`\l_c_tl` contains the *<end>*.

```
200     \seq_pop_left:NNTF \l_split_seq \l_b_tl {
201       \tl_if_empty:NTF \l_b_tl {
202         \seq_pop_left:NN \l_split_seq \l_b_tl
```

`\l_b_tl` may contain the $\langle length \rangle$.

```

203         \seq_if_empty:NF \l_split_seq {
204 \msg_error:nnn { beanoves } { :n } { Invalid~range~expression(5):~#3 }
205     }
206     } {
207 \msg_error:nnn { beanoves } { :n } { Invalid~range~expression(6):~#3 }
208     }
209     } {
210         \tl_clear:N \l_b_tl
211     }
212     }
213 }
214 }

```

Providing both the $\langle start \rangle$, $\langle length \rangle$ and $\langle end \rangle$ of a range is not allowed, even if they happen to be consistent.

```

215 \bool_if:nF {
216     \tl_if_empty_p:N \l_a_tl
217     || \tl_if_empty_p:N \l_b_tl
218     || \tl_if_empty_p:N \l_c_tl
219 } {
220 \msg_error:nnn { beanoves } { :n } { Invalid~range~expression(7):~#3 }
221 }
222 #1 { #2 } \l_a_tl \l_b_tl \l_c_tl
223 }

224 \cs_new:Npn \__beanoves_parse:Nnn #1 #2 #3 {
225     \__beanoves_group_begin:
226     \regex_match:NnTF \c__beanoves_A_key_Z_regex { #2 } {

```

We got a valid key.

```

227     \regex_extract_once:NnNTF \c__beanoves_list_regex { #3 } \l_match_seq {

```

This is a comma separated list, extract each item and go recursive.

```

228         \exp_args:NNx
229         \seq_set_from_clist:Nn \l_match_seq {
230             \seq_item:Nn \l_match_seq { 2 }
231         }
232         \seq_map_indexed_inline:Nn \l_match_seq {
233             \__beanoves_do_parse:Nnn #1 { #2.##1 } { ##2 }
234         }
235     } {
236         \__beanoves_do_parse:Nnn #1 { #2 } { #3 }
237     }
238 } {
239     \msg_error:nnn { beanoves } { :n } { Invalid~key:~#1 }
240 }
241 \__beanoves_group_end:
242 }

```

\Beanoves

\Beanoves {*<key--value list>*}

The keys are the slide range specifiers. When no value is provided, it defaults to 1. On the contrary, *<key-value>* items are parsed by `__beanoves_parse:Nnn`.

```
243 \NewDocumentCommand \Beanoves { sm } {
244   \tl_if_eq:NnT \@currenvir { document } {
245     \__beanoves_gclear:
246   }
247   \IfBooleanTF {#1} {
248     \keyval_parse:nnn {
249       \__beanoves_parse:Nn \__beanoves_range_alt:nVVV
250     } {
251       \__beanoves_parse:Nnn \__beanoves_range_alt:nVVV
252     }
253   } {
254     \keyval_parse:nnn {
255       \__beanoves_parse:Nn \__beanoves_range:nVVV
256     } {
257       \__beanoves_parse:Nnn \__beanoves_range:nVVV
258     }
259   }
260   { #2 }
261   \ignorespaces
262 }
```

If we use the frame `beanoves` option, we can provide default values to the various name ranges.

```
263 \define@key{beamerframe}{beanoves}{\Beanoves*{#1}}
```

5.3.4 Scanning named overlay specifications

Patch some beamer commands to support `?(...)` instructions in overlay specifications.

\beamer@frame

\beamer@frame {*<overlay specification>*}

\beamer@masterdecode

\beamer@masterdecode {*<overlay specification>*}

Preprocess *<overlay specification>* before `beamer` uses it.

\l_ans_tl

Storage for the translated overlay specification, where `?(...)` instructions are replaced by their static counterparts.

(End definition for `\l_ans_tl`. This variable is documented on page ??.)

Save the original macro `\beamer@masterdecode` and then override it to properly preprocess the argument.

```
264 \cs_set_eq:NN \__beanoves_beamer@frame \beamer@frame
265 \cs_set:Npn \beamer@frame < #1 > {
266   \__beanoves_group_begin:
267   \tl_clear:N \l_ans_tl
268   \__beanoves_scan:nNN { #1 } \__beanoves_eval:nN \l_ans_tl
269   \exp_args:NNNV
270   \__beanoves_group_end:
271   \__beanoves_beamer@frame < \l_ans_tl >
272 }
273 \cs_set_eq:NN \__beanoves_beamer@masterdecode \beamer@masterdecode
```

```

274 \cs_set:Npn \beamer@masterdecode #1 {
275   \__beanoves_group_begin:
276   \tl_clear:N \l_ans_tl
277   \__beanoves_scan:nNN { #1 } \__beanoves_eval:nN \l_ans_tl
278   \exp_args:NNV
279   \__beanoves_group_end:
280   \__beanoves_beamer@masterdecode \l_ans_tl
281 }

```

__beanoves_scan:nNN __beanoves_scan:nNN {*<named overlay expression>*} *<eval>* *<tl variable>*

Scan the *<named overlay expression>* argument and feed the *<tl variable>* replacing ?(...) instructions by their static counterpart with help from the *<eval>* function, which is __beanoves_eval:nN. A group is created to use local variables:

\l_ans_tl: is the token list that will be appended to *<tl variable>* on return.

\l__beanoves_depth_int Store the depth level in parenthesis grouping used when finding the proper closing parenthesis balancing the opening parenthesis that follows immediately a question mark in a ?(...) instruction.

(End definition for \l__beanoves_depth_int.)

g__beanoves_append_int Decrement each time __beanoves_append:nN is called. To avoid catch circular definitions.

(End definition for g__beanoves_append_int.)

\l_query_tl Storage for the overlay query expression to be evaluated.

(End definition for \l_query_tl. This variable is documented on page ??.)

\l_token_seq The *<overlay expression>* is split into the sequence of its tokens.

(End definition for \l_token_seq. This variable is documented on page ??.)

\l_ask_bool Whether a loop may continue. Controls the continuation of the main loop that scans the tokens of the *<named overlay expression>* looking for a question mark.

(End definition for \l_ask_bool. This variable is documented on page ??.)

\l_query_bool Whether a loop may continue. Controls the continuation of the secondary loop that scans the tokens of the *<named overlay expression>* looking for an opening parenthesis follow the question mark. It then controls the loop looking for the balanced closing parenthesis.

(End definition for \l_query_bool. This variable is documented on page ??.)

\l_token_tl Storage for just one token.

(End definition for \l_token_tl. This variable is documented on page ??.)

```

282 \cs_new:Npn \__beanoves_scan:nNN #1 #2 #3 {
283   \__beanoves_group_begin:
284   \tl_clear:N \l_ans_tl
285   \int_zero:N \l__beanoves_depth_int
286   \seq_clear:N \l_token_seq

```

Explode the *<named overlay expression>* into a list of tokens:

```
287 \regex_split:nnN {} { #1 } \l_token_seq
```

Run the top level loop to scan for a ‘?’:

```
288 \bool_set_true:N \l_ask_bool
289 \bool_while_do:Nn \l_ask_bool {
290   \seq_pop_left:NN \l_token_seq \l_token_tl
291   \quark_if_no_value:NTF \l_token_tl {
```

We reached the end of the sequence (and the token list), we end the loop here.

```
292   \bool_set_false:N \l_ask_bool
293 } {
```

`\l_token_tl` contains a ‘normal’ token.

```
294   \tl_if_eq:NnTF \l_token_tl { ? } {
```

We found a ‘?’, we first gobble tokens until the next ‘(’, whatever they may be. In general, no tokens should be silently ignored.

```
295   \bool_set_true:N \l_query_bool
296   \bool_while_do:Nn \l_query_bool {
```

Get next token.

```
297   \seq_pop_left:NN \l_token_seq \l_token_tl
298   \quark_if_no_value:NTF \l_token_tl {
```

No opening parenthesis found, raise.

```
299   \msg_fatal:nmx { beanoves } { :n } {Missing~'('%---)
300   ~after~a~?:~#1}
301 } {
302   \tl_if_eq:NnTF \l_token_tl { ( %}
303 } {
```

We found the ‘(’ after the ‘?’. Increment the parenthesis depth to 1 (on first passage).

```
304   \int_incr:N \l__beanoves_depth_int
```

Record the forthcoming content in the `\l_query_tl` variable, up to the next balancing ‘)’:

```
305   \tl_clear:N \l_query_tl
306   \bool_while_do:Nn \l_query_bool {
```

Get next token.

```
307   \seq_pop_left:NN \l_token_seq \l_token_tl
308   \quark_if_no_value:NTF \l_token_tl {
```

We reached the end of the sequence and the token list with no closing ‘)’. We raise and end both bool while loops. As recovery we feed `\l_query_tl` with the missing ‘)’. `\l__depth_int` is 0 whenever `\l_query_bool` is false.

```
309   \msg_error:nmx { beanoves } { :n } {Missing~%((---
310   ~)':~#1 }
311   \int_do_while:nNnn \l__beanoves_depth_int > 1 {
312     \int_decr:N \l__beanoves_depth_int
313     \tl_put_right:Nn \l_query_tl {%(---
314   }}
315 }
316 \int_zero:N \l__beanoves_depth_int
317 \bool_set_false:N \l_query_bool
318 \bool_set_false:N \l_ask_bool
```



```

319         } {
320         \tl_if_eq:NnTF \l_token_tl { ( %---)
321         } {

```

We found a ‘(’, increment the depth and append the token to \l_query_tl.

```

322         \int_incr:N \l__beanoves_depth_int
323         \tl_put_right:NV \l_query_tl \l_token_tl
324     } {

```

This is not a ‘(’.

```

325         \tl_if_eq:NnTF \l_token_tl { %(
326         )
327     } {

```

We found a ‘)’, decrement the depth.

```

328         \int_decr:N \l__beanoves_depth_int
329         \int_compare:nNnTF \l__beanoves_depth_int = 0 {

```

The depth level has reached 0: we found our balancing parenthesis of the ?(...) instruction. We can append the evaluated slide ranges token list to \l_ans_tl and stop the inner loop.

```

330     \exp_args:NV #2 \l_query_tl \l_ans_tl
331     \bool_set_false:N \l_query_bool
332 } {

```

The depth has not yet reached level 0. We append the ‘)’ to \l_query_tl because it is not the end of sequence marker.

```

333         \tl_put_right:NV \l_query_tl \l_token_tl
334     }

```

Above ends the code for a positive depth.

```

335     } {

```

The scanned token is not a ‘(’ nor a ‘)’, we append it as is to \l_query_tl.

```

336         \tl_put_right:NV \l_query_tl \l_token_tl
337     }
338 }
339 }

```

Above ends the code for Not a ‘(’

```

340     }
341 }

```

Above ends the code for: Found the ‘(’ after the ‘?’

```

342     }

```

Above ends the code for not a no value quark.

```

343 }

```

Above ends the code for the bool while loop to find the ‘(’ after the ‘?’.

If we reached the end of the token list, then end both the current loop and its containing loop.

```

344     \quark_if_no_value:NT \l_token_tl {
345         \bool_set_false:N \l_query_bool
346         \bool_set_false:N \l_ask_bool
347     }
348 } {

```

This is not a ‘?’, append the token to right of \l_ans_tl and continue.

```

349     \tl_put_right:NV \l_ans_tl \l_token_tl
350   }

```

Above ends the code for the bool while loop to find a ‘(’ after the ‘?’

```

351   }
352 }

```

Above ends the outer bool while loop to find ‘?’ characters. We can append our result to $\langle tl\ variable \rangle$

```

353   \exp_args:NNNV
354   \__beanoves_group_end:
355   \tl_put_right:Nn #3 \l_ans_tl
356 }

```

5.3.5 Evaluation bricks

$__\text{beanoves_fp_round:nN}$ $__\text{beanoves_fp_round:N}$	$__\text{beanoves_fp_round:nN} \{ \langle expression \rangle \} \langle tl\ variable \rangle$ $__\text{beanoves_fp_round:N} \langle tl\ variable \rangle$
---	--

Shortcut for $\backslash\text{fp_eval:n}\{\text{round}(\langle expression \rangle)\}$ appended to $\langle tl\ variable \rangle$. The second variant replaces the variable content with its rounded floating point evaluation.

```

357 \cs_new:Npn \__beanoves_fp_round:nN #1 #2 {
358   \__beanoves_DEBUG:x { ROUND:\tl_to_str:n{#1}/\string#2=\tl_to_str:V #2}
359   \tl_if_empty:nTF { #1 } {
360     \__beanoves_DEBUG:x { ROUND1:~EMPTY }
361   } {
362     \__beanoves_DEBUG:x { ROUND1:~\tl_to_str:n{#1} }
363     \tl_put_right:Nx #2 {
364       \fp_eval:n { round(#1) }
365     }
366   }
367 }
368 \cs_generate_variant:Nn \__beanoves_fp_round:nN { VN, xN }
369 \cs_new:Npn \__beanoves_fp_round:N #1 {
370   \__beanoves_DEBUG:x { ROUND:\string#1=\tl_to_str:V #1}
371   \tl_if_empty:VTF #1 {
372     \__beanoves_DEBUG:x { ROUND2:~EMPTY }
373   } {
374     \__beanoves_DEBUG:x { ROUND2:~\exp_args:Nx\tl_to_str:n{#1} }
375     \tl_set:Nx #1 {
376       \fp_eval:n { round(#1) }
377     }
378   }
379 }

```

$__\text{beanoves_raw_first:nNTF}$ $__\text{beanoves_raw_first:}(xN VN)\text{TF}$	$__\text{beanoves_raw_first:nNTF} \{ \langle name \rangle \} \langle tl\ variable \rangle \{ \langle true\ code \rangle \} \{ \langle false\ code \rangle \}$
--	---

Append the first index of the $\langle name \rangle$ slide range to the $\langle tl\ variable \rangle$. Cache the result. Execute $\langle true\ code \rangle$ when there is a $\langle first \rangle$, $\langle false\ code \rangle$ otherwise.

```

380 \cs_set:Npn \__beanoves_return_true:nnN #1 #2 #3 {

```

```

381 \tl_if_empty:NTF \l_ans_tl {
382   \__beanoves_group_end:
383 \__beanoves_DEBUG:n { RETURN_FALSE/key=#1/type=#2/EMPTY }
384   \__beanoves_gremove:n { #1//#2 }
385   \prg_return_false:
386 } {
387   \__beanoves_fp_round:N \l_ans_tl
388   \__beanoves_gput:nV { #1//#2 } \l_ans_tl
389   \exp_args:NNNV
390   \__beanoves_group_end:
391   \tl_put_right:Nn #3 \l_ans_tl
392 \__beanoves_DEBUG:x { RETURN_TRUE/key=#1/type=#2/ans=\l_ans_tl/ }
393   \prg_return_true:
394 }
395 }
396 \cs_set:Npn \__beanoves_return_false:nn #1 #2 {
397 \__beanoves_DEBUG:n { RETURN_FALSE/key=#1/type=#2/ }
398   \__beanoves_group_end:
399   \__beanoves_gremove:n { #1//#2 }
400   \prg_return_false:
401 }
402 \prg_new_conditional:Npnn \__beanoves_raw_first:nN #1 #2 { T, F, TF } {
403 \__beanoves_DEBUG:x { RAW_FIRST/
404   key=\tl_to_str:n{#1}/\string #2=\tl_to_str:V #2/}
405   \__beanoves_if_in:nTF { #1//A } {
406 \__beanoves_DEBUG:n { RAW_FIRST/#1/CACHED }
407   \tl_put_right:Nx #2 { \__beanoves_item:n { #1//A } }
408   \prg_return_true:
409 } {
410 \__beanoves_DEBUG:n { RAW_FIRST/key=#1/NOT_CACHED }
411   \__beanoves_group_begin:
412   \tl_clear:N \l_ans_tl
413   \__beanoves_get:nNTF { #1/A } \l_a_tl {
414 \__beanoves_DEBUG:x { RAW_FIRST/key=#1/A=\l_a_tl }
415     \__beanoves_if_append:VNTF \l_a_tl \l_ans_tl {
416       \__beanoves_return_true:nnN { #1 } A #2
417     } {
418       \__beanoves_return_false:nn { #1 } A
419     }
420   } {
421 \__beanoves_DEBUG:n { RAW_FIRST/key=#1/A/F }
422     \__beanoves_get:nNTF { #1/L } \l_a_tl {
423 \__beanoves_DEBUG:n { RAW_FIRST/key=#1/L=\l_a_tl }
424       \__beanoves_get:nNTF { #1/Z } \l_b_tl {
425 \__beanoves_DEBUG:n { RAW_FIRST/key=#1/Z=\l_b_tl }
426         \__beanoves_if_append:xNTF {
427           \l_b_tl - ( \l_a_tl ) + 1
428         } \l_ans_tl {
429           \__beanoves_return_true:nnN { #1 } A #2
430         } {
431           \__beanoves_return_false:nn { #1 } A
432         }
433       } {
434 \__beanoves_DEBUG:n { RAW_FIRST/key=#1/Z/F/ }

```

```

435         \__beanoves_return_false:nn { #1 } A
436     }
437 } {
438 \__beanoves_DEBUG:n { RAW_FIRST/key=#1/L/F/ }
439     \__beanoves_return_false:nn { #1 } A
440 }
441 }
442 }
443 }
444 \prg_generate_conditional_variant:Nnn
445     \__beanoves_raw_first:nN { VN, xN } { T, F, TF }

```

__beanoves_if_first:nNTF __beanoves_if_first:nNTF {<name>} <tl variable> {<true code>} {<false code>}

Append the first index of the <name> slide range to the <tl variable>. If no first index was explicitly given, use the counter when available and 1 hen not. Cache the result. Execute <true code> when there is a <first>, <false code> otherwise.

```

446 \prg_new_conditional:Npnn \__beanoves_if_first:nN #1 #2 { T, F, TF } {
447 \__beanoves_DEBUG:x { IF_FIRST/\tl_to_str:n{#1}/\string #2=\tl_to_str:V #2}
448 \__beanoves_raw_first:nNTF { #1 } #2 {
449     \prg_return_true:
450 } {
451     \__beanoves_get:nNTF { #1/C } \l_a_tl {
452 \__beanoves_DEBUG:n { IF_FIRST/#1/C/T/\l_a_tl }
453     \bool_set_true:N \l_no_counter_bool
454     \__beanoves_if_append:xNTF \l_a_tl \l_ans_tl {
455         \__beanoves_return_true:nnN { #1 } A #2
456     } {
457         \__beanoves_return_false:nn { #1 } A
458     }
459 } {
460     \regex_match:NnTF \c__beanoves_A_key_Z_regex { #1 } {
461         \__beanoves_gput:nn { #1/A } { 1 }
462         \tl_set:Nn #2 { 1 }
463 \__beanoves_DEBUG:x{IF_FIRST_MATCH:
464     key=\tl_to_str:n{#1}/\string #2=\tl_to_str:V #2 /}
465     \__beanoves_return_true:nnN { #1 } A #2
466 } {
467 \__beanoves_DEBUG:x{IF_FIRST_NO_MATCH:
468     key=\tl_to_str:n{#1}/\string #2=\tl_to_str:V #2 /}
469     \__beanoves_return_false:nn { #1 } A
470 }
471 }
472 }
473 }

```

__beanoves_first:nN __beanoves_first:nN {<name>} <tl variable>

__beanoves_first:VN Append the start of the <name> slide range to the <tl variable>. Cache the result.

```

474 \cs_new:Npn \__beanoves_first:nN #1 #2 {
475     \__beanoves_if_first:nNF { #1 } #2 {
476         \msg_error:nnn { beanoves } { :n } { Range-with-no~first:~#1 }
477     }

```

```

478 }
479 \cs_generate_variant:Nn \__beanoves_first:nN { VN }

```

```

\__beanoves_raw_length:nNTF \__beanoves_raw_length:nNTF {<name>} <tl variable> {<true code>} {<false
code>}

```

Append the length of the $\langle name \rangle$ slide range to $\langle tl variable \rangle$ Execute $\langle true code \rangle$ when there is a $\langle length \rangle$, $\langle false code \rangle$ otherwise.

```

480 \prg_new_conditional:Npnn \__beanoves_raw_length:nN #1 #2 { T, F, TF } {
481 \__beanoves_DEBUG:n { RAW_LENGTH/#1 }
482 \__beanoves_if_in:nTF { #1//L } {
483 \tl_put_right:Nx #2 { \__beanoves_item:n { #1//L } }
484 \__beanoves_DEBUG:x { RAW_LENGTH/CACHED/#1/\__beanoves_item:n { #1//L } }
485 \prg_return_true:
486 } {
487 \__beanoves_DEBUG:x { RAW_LENGTH/NOT_CACHED/key=#1/ }
488 \__beanoves_gput:nn { #1//L } { 0 }
489 \__beanoves_group_begin:
490 \tl_clear:N \l_ans_tl
491 \__beanoves_if_in:nTF { #1/L } {
492 \__beanoves_if_append:xNTF {
493 \__beanoves_item:n { #1/L }
494 } \l_ans_tl {
495 \__beanoves_return_true:nnN { #1 } L #2
496 } {
497 \__beanoves_return_false:nn { #1 } L
498 }
499 } {
500 \__beanoves_get:nNTF { #1/A } \l_a_tl {
501 \__beanoves_get:nNTF { #1/Z } \l_b_tl {
502 \__beanoves_if_append:xNTF {
503 \l_b_tl - (\l_a_tl) + 1
504 } \l_ans_tl {
505 \__beanoves_return_true:nnN { #1 } L #2
506 } {
507 \__beanoves_return_false:nn { #1 } L
508 }
509 } {
510 \__beanoves_return_false:nn { #1 } L
511 }
512 } {
513 \__beanoves_return_false:nn { #1 } L
514 }
515 }
516 }
517 }
518 \prg_generate_conditional_variant:Nnn
519 \__beanoves_raw_length:nN { VN } { T, F, TF }

```

```

\__beanoves_length:nN
\__beanoves_length:VN

```

$__beanoves_length:nN$ {<name>} <tl variable>
Append the length of the $\langle name \rangle$ slide range to $\langle tl variable \rangle$

```

520 \cs_new:Npn \__beanoves_length:nN #1 #2 {

```

```

521 \__beanoves_raw_length:nNF { #1 } #2 {
522   \msg_error:nnn { beanoves } { :n } { Range-with-no-length:~#1 }
523 }
524 }
525 \cs_generate_variant:Nn \__beanoves_length:nN { VN }

```

```

\__beanoves_raw_last:nNTF \__beanoves_raw_last:nNTF {<name>} <tl variable> {<true code>} {<false code>}

```

Put the last index of the $\langle name \rangle$ range to the right of the $\langle tl variable \rangle$, when possible.
Execute $\langle true code \rangle$ when a last index was given, $\langle false code \rangle$ otherwise.

```

526 \prg_new_conditional:Npnn \__beanoves_raw_last:nN #1 #2 { T, F, TF } {
527   \__beanoves_DEBUG:n { RAW_LAST/#1 }
528   \__beanoves_if_in:nTF { #1//Z } {
529     \tl_put_right:Nx #2 { \__beanoves_item:n { #1//Z } }
530     \prg_return_true:
531   } {
532     \__beanoves_gput:nn { #1//Z } { 0 }
533     \__beanoves_group_begin:
534     \tl_clear:N \l_ans_tl
535     \__beanoves_if_in:nTF { #1/Z } {
536       \__beanoves_DEBUG:x { NORMAL_RAW_LAST:~\__beanoves_item:n { #1/Z } }
537       \__beanoves_if_append:xNTF {
538         \__beanoves_item:n { #1/Z }
539       } \l_ans_tl {
540         \__beanoves_return_true:nnN { #1 } Z #2
541       } {
542         \__beanoves_return_false:nn { #1 } Z
543       }
544     } {
545       \__beanoves_get:nNTF { #1/A } \l_a_tl {
546         \__beanoves_get:nNTF { #1/L } \l_b_tl {
547           \__beanoves_if_append:xNTF {
548             \l_a_tl + (\l_b_tl) - 1
549           } \l_ans_tl {
550             \__beanoves_return_true:nnN { #1 } Z #2
551           } {
552             \__beanoves_return_false:nn { #1 } Z
553           }
554         } {
555           \__beanoves_return_false:nn { #1 } Z
556         }
557       } {
558         \__beanoves_return_false:nn { #1 } Z
559       }
560     }
561   }
562 }
563 \prg_generate_conditional_variant:Nnn
564 \__beanoves_raw_last:nN { VN } { T, F, TF }

```

```

\__beanoves_last:nN \__beanoves_last:nN {<name>} <tl variable>

```

```

\__beanoves_last:VN
Append the last index of the  $\langle name \rangle$  slide range to  $\langle tl variable \rangle$ 

```

```

565 \cs_new:Npn \__beanoves_last:nN #1 #2 {
566   \__beanoves_raw_last:nNF { #1 } #2 {
567     \msg_error:nnn { beanoves } { :n } { Range-with-no-last:~#1 }
568   }
569 }
570 \cs_generate_variant:Nn \__beanoves_last:nN { VN }

```

```

\__beanoves_if_next:nNTF \__beanoves_if_next:nNTF {<name>} <tl variable> {<true code>} {<false code>}

```

Append the index after the $\langle name \rangle$ slide range to the $\langle tl variable \rangle$. Execute $\langle true code \rangle$ when there is a $\langle next \rangle$ index, $\langle false code \rangle$ otherwise.

```

571 \prg_new_conditional:Npnn \__beanoves_if_next:nN #1 #2 { T, F, TF } {
572   \__beanoves_if_in:nTF { #1//N } {
573     \tl_put_right:Nx #2 { \__beanoves_item:n { #1//N } }
574     \prg_return_true:
575   } {
576     \__beanoves_group_begin:
577     \cs_set:Npn \__beanoves_return_true: {
578       \tl_if_empty:NTF \l_ans_tl {
579         \__beanoves_group_end:
580         \prg_return_false:
581       } {
582         \__beanoves_fp_round:N \l_ans_tl
583         \__beanoves_gput:nV { #1//N } \l_ans_tl
584         \exp_args:NNNV
585         \__beanoves_group_end:
586         \tl_put_right:Nn #2 \l_ans_tl
587         \prg_return_true:
588       }
589     }
590     \cs_set:Npn \__beanoves_return_false: {
591       \__beanoves_group_end:
592       \prg_return_false:
593     }
594     \tl_clear:N \l_a_tl
595     \__beanoves_raw_last:nNTF { #1 } \l_a_tl {
596       \__beanoves_if_append:xNTF {
597         \l_a_tl + 1
598       } \l_ans_tl {
599         \__beanoves_return_true:
600       } {
601         \__beanoves_return_false:
602       }
603     } {
604       \__beanoves_return_false:
605     }
606   }
607 }
608 \prg_generate_conditional_variant:Nnn
609   \__beanoves_if_next:nN { VN } { T, F, TF }

```

```

\__beanoves_next:nN \__beanoves_next:nN {<name>} <tl variable>

```

```

\__beanoves_next:VN

```

Append the index after the $\langle name \rangle$ slide range to the $\langle tl variable \rangle$.

```

610 \cs_new:Npn \__beanoves_next:nN #1 #2 {
611   \__beanoves_if_next:nNF { #1 } #2 {
612     \msg_error:nnn { beanoves } { :n } { Range-with-no-next:~#1 }
613   }
614 }
615 \cs_generate_variant:Nn \__beanoves_next:nN { VN }

```

```

\__beanoves_if_free_counter:nNTF \__beanoves_if_free_counter:nNTF <tl variable> {<name>} {<true code>}
\__beanoves_if_free_counter:nVTF {<false code>}

```

Set the *<tl variable>* to the value of the counter associated to the *{<name>}* slide range.

```

616 \prg_new_conditional:Nppn \__beanoves_if_free_counter:Nn #1 #2 { T, F, TF } {
617   \__beanoves_DEBUG:x { IF_FREE: \string #1/
618     key=\tl_to_str:n{#2}/value=\__beanoves_item:n {#2/C}/ }
619   \__beanoves_group_begin:
620   \tl_clear:N \l_ans_tl
621   \__beanoves_get:nNF { #2/C } \l_ans_tl {
622     \__beanoves_raw_first:nNF { #2 } \l_ans_tl {
623       \__beanoves_raw_last:nNF { #2 } \l_ans_tl { }
624     }
625   }
626   \__beanoves_DEBUG:x { IF_FREE_2:\string \l_ans_tl=\tl_to_str:V \l_ans_tl/}
627   \tl_if_empty:NTF \l_ans_tl {
628     \__beanoves_group_end:
629     \regex_match:NnTF \c__beanoves_A_key_Z_regex { #2 } {
630       \__beanoves_gput:nn { #2/C } { 1 }
631       \tl_set:Nn #1 { 1 }
632     }
633     \__beanoves_DEBUG:x { IF_FREE_MATCH_TRUE:\string #1=\tl_to_str:V #1 /
634       key=\tl_to_str:n{#2} }
635     \prg_return_true:
636   } {
637     \__beanoves_DEBUG:x { IF_FREE_NO_MATCH_FALSE: \string #1=\tl_to_str:V #1/
638       key=\tl_to_str:n{#2} }
639     \prg_return_false:
640   } {
641     \__beanoves_gput:nV { #2/C } \l_ans_tl
642     \exp_args:NNNV
643     \__beanoves_group_end:
644     \tl_set:Nn #1 \l_ans_tl
645     \__beanoves_DEBUG:x { IF_FREE_TRUE(2): \string #1=\tl_to_str:V #1 /
646       key=\tl_to_str:n{#2} }
647     \prg_return_true:
648   }
649 }
650 \prg_generate_conditional_variant:Nnn
651   \__beanoves_if_free_counter:Nn { NV } { T, F, TF }

```

```

\__beanoves_if_counter:nNTF \__beanoves_if_counter:nNTF {<name>} <tl variable> {<true code>} {<false
\__beanoves_if_counter:nVTF code>}

```

Append the value of the counter associated to the *{<name>}* slide range to the right of *<tl variable>*. The value always lays in between the range, whenever possible.


```

652 \prg_new_conditional:Npnn \__beanoves_if_counter:nN #1 #2 { T, F, TF } {
653 \__beanoves_DEBUG:x { IF_COUNTER:key=
654 \tl_to_str:n{#1}/\string #2=\tl_to_str:V #2 }
655 \__beanoves_group_begin:
656 \__beanoves_if_free_counter:NnTF \l_ans_tl { #1 } {

```

If there is a $\langle first \rangle$, use it to bound the result from below.

```

657 \tl_clear:N \l_a_tl
658 \__beanoves_raw_first:nNT { #1 } \l_a_tl {
659 \fp_compare:nNnT { \l_ans_tl } < { \l_a_tl } {
660 \tl_set:NV \l_ans_tl \l_a_tl
661 }
662 }

```

If there is a $\langle last \rangle$, use it to bound the result from above.

```

663 \tl_clear:N \l_a_tl
664 \__beanoves_raw_last:nNT { #1 } \l_a_tl {
665 \fp_compare:nNnT { \l_ans_tl } > { \l_a_tl } {
666 \tl_set:NV \l_ans_tl \l_a_tl
667 }
668 }
669 \exp_args:NNx
670 \__beanoves_group_end:
671 \__beanoves_fp_round:nN \l_ans_tl #2
672 \__beanoves_DEBUG:x {IF_COUNTER_TRUE:key=\tl_to_str:n{#1}/
673 \string #2=\tl_to_str:V #2 }
674 \prg_return_true:
675 } {
676 \__beanoves_DEBUG:x {IF_COUNTER_FALSE:key=\tl_to_str:n{#1}/
677 \string #2=\tl_to_str:V #2 }
678 \prg_return_false:
679 }
680 }
681 \prg_generate_conditional_variant:Nnn
682 \__beanoves_if_counter:nN { VN } { T, F, TF }

```

<u>__beanoves_if_index:nnNTF</u> <u>__beanoves_if_index:VVNTF</u> <u>__beanoves_if_index:nnnNTF</u>	<u>__beanoves_if_index:nnNTF {$\langle name \rangle$} {$\langle integer path \rangle$} $\langle tl variable \rangle$ {$\langle true code \rangle$} {$\langle false code \rangle$}</u> <u>__beanoves_if_index:nnnNTF {$\langle name \rangle$} {$\langle integer path \rangle$} {$\langle integer shift \rangle$} $\langle tl variable \rangle$ {$\langle true code \rangle$} {$\langle false code \rangle$}</u>
--	--

Append the index associated to the $\{ \langle name \rangle \}$ and $\{ \langle integer path \rangle \}$ slide range to the right of $\langle tl variable \rangle$. When $\langle integer shift \rangle$ is 1, this is the first index, when $\langle integer shift \rangle$ is 2, this is the second index, and so on. When $\langle integer shift \rangle$ is 0, this is the index, before the first one, and so on. If the computation is possible, $\langle true code \rangle$ is executed, otherwise $\langle false code \rangle$ is executed. The computation may fail when too many recursion calls are made.

```

683 \prg_new_conditional:Npnn \__beanoves_if_index:nnN #1 #2 #3 { T, F, TF } {
684 \__beanoves_DEBUG:x { IF_INDEX:key=#1/index=#2/\string#3/ }
685 \__beanoves_group_begin:
686 \tl_set:Nn \l_name_tl { #1 }
687 \regex_split:nnNTF { \. } { #2 } \l_split_seq {
688 \seq_pop_left:NN \l_split_seq \l_a_tl
689 \seq_pop_right:NN \l_split_seq \l_a_tl

```

```

690 \seq_map_inline:Nn \l_split_seq {
691   \tl_set_eq:NN \l_b_tl \l_name_tl
692   \tl_put_right:Nn \l_b_tl { . ##1 }
693   \exp_args:Nx
694   \__beanoves_get:nN { \l_b_tl / A } \l_c_tl
695   \quark_if_no_value:NTF \l_c_tl {
696     \tl_set_eq:NN \l_name_tl \l_b_tl
697   } {
698     \tl_set_eq:NN \l_name_tl \l_c_tl
699   }
700 \__beanoves_DEBUG:x { IF_INDEX_SPLIT:##1/
701   \string\l_name_tl=\tl_to_str:N \l_name_tl}
702 }
703 \tl_clear:N \l_b_tl
704 \__beanoves_raw_first:xNTF { \l_name_tl.\l_a_tl } \l_b_tl {
705   \tl_set_eq:NN \l_ans_tl \l_b_tl
706 } {
707   \tl_clear:N \l_b_tl
708   \__beanoves_raw_first:VNTF \l_name_tl \l_b_tl {
709     \tl_set_eq:NN \l_ans_tl \l_b_tl
710   } {
711     \tl_set_eq:NN \l_ans_tl \l_name_tl
712   }
713   \tl_put_right:Nx \l_ans_tl { + (\l_a_tl) - 1}
714 }
715 \__beanoves_DEBUG:x { IF_INDEX_TRUE:key=#1/index=#2/
716   \string\l_ans_tl=\tl_to_str:N \l_ans_tl }
717   \exp_args:NNx
718   \__beanoves_group_end:
719   \__beanoves_fp_round:nN \l_ans_tl #3
720   \prg_return_true:
721 } {
722 \__beanoves_DEBUG:x { IF_INDEX_FALSE:key=#1/index=#2/ }
723   \prg_return_false:
724 }
725 }
726 \prg_generate_conditional_variant:Nnn
727 \__beanoves_if_index:nnN { VVN } { T, F, TF }

```

$\backslash_beanoves_if_index:nnnNTF$ $\backslash_beanoves_if_index:VVVNTF$	$\backslash_beanoves_if_index:nnnNTF \{ \langle name \rangle \} \{ \langle integer\ path \rangle \} \{ \langle integer\ index \rangle \} \langle tl$ $variable \rangle \{ \langle true\ code \rangle \} \{ \langle false\ code \rangle \}$
--	--

Append the value of the counter associated to the $\{ \langle name \rangle \}$ slide range to the right of $\langle tl\ variable \rangle$. The value always lays in between the range, whenever possible. If the computation is possible, $\langle true\ code \rangle$ is executed, otherwise $\langle false\ code \rangle$ is executed. The computation may fail when too many recursion calls are made.

```

728 \prg_new_conditional:Npnn \__beanoves_if_index_original:nnnN #1 #2 #3 #4 { T, F, TF } {
729   \__beanoves_DEBUG:x { IF_INDEX:key=#1/path=#2/index=#3/\string#4/ }
730   \__beanoves_group_begin:
731   \tl_set:Nn \l_a_tl { #1 }
732   \regex_split:nnNTF { \. } { #2 } \l_split_seq {
733     \cs_set:Npn \:n ##1 {
734       \tl_set_eq:NN \l_b_tl \l_a_tl

```

```

735     \tl_put_right:Nn \l_b_tl { . ##1 }
736     \exp_args:Nx
737     \__beanoves_get:nNTF { \l_b_tl / A } \l_c_tl {
738         \exp_args:NNx
739         \regex_match:NnTF \c__beanoves_A_key_Z_regex \l_c_tl {
740             \tl_set_eq:NN \l_a_tl \l_c_tl
741         } {
742             \cs_set:Npn \:n ####1 {
743                 \tl_set_eq:NN \l_b_tl \l_a_tl
744                 \tl_put_right:Nn \l_b_tl { . ####1 }
745                 \tl_set_eq:NN \l_a_tl \l_b_tl
746             }
747             \string\l_a_tl=\tl_to_str:N \l_a_tl
748         }
749     } {
750         \tl_set_eq:NN \l_a_tl \l_b_tl
751     }
752     \__beanoves_DEBUG:x { IF_INDEX_SPLIT:##1/
753         \string\l_a_tl=\tl_to_str:N \l_a_tl }
754     }
755     \seq_map_function:NN \l_split_seq \:n
756     \tl_clear:N \l_b_tl
757     \__beanoves_raw_first:VNTF \l_a_tl \l_b_tl {
758         \tl_set_eq:NN \l_ans_tl \l_b_tl
759     } {
760         \tl_set_eq:NN \l_ans_tl \l_a_tl
761     }
762     \tl_put_right:Nx \l_ans_tl { + (#3) - 1 }
763     \__beanoves_DEBUG:x { IF_INDEX_TRUE:key=#1/path=#2/index=#3/
764         \string\l_ans_tl=\tl_to_str:N \l_ans_tl }
765     \exp_args:NNx
766     \__beanoves_group_end:
767     \__beanoves_fp_round:nN \l_ans_tl #4
768     \prg_return_true:
769 } {
770     \tl_if_empty:nTF { #2 } {
771         \tl_clear:N \l_b_tl
772         \__beanoves_raw_first:VNTF \l_a_tl \l_b_tl {
773             \tl_set_eq:NN \l_ans_tl \l_b_tl
774         } {
775             \tl_set_eq:NN \l_ans_tl \l_a_tl
776         }
777         \tl_put_right:Nx \l_ans_tl { + (#3) - 1 }
778     }
779     \__beanoves_DEBUG:x { IF_INDEX_TRUE:key=#1/path=#2/index=#3/
780         \string\l_ans_tl=\tl_to_str:N \l_ans_tl }
781     \exp_args:NNx
782     \__beanoves_group_end:
783     \__beanoves_fp_round:nN \l_ans_tl #4
784     \prg_return_true:
785 } {
786     \__beanoves_DEBUG:x { IF_INDEX_FALSE:key=#1/path=#2/index=#3/ }
787     \prg_return_false:
788 }

```

```

789 }
790 }
791 \prg_new_conditional:Npnn \__beanoves_if_index:nnnN #1 #2 #3 #4 { T, F, TF } {
792 \__beanoves_DEBUG:x { IF_INDEX:key=#1/path=#2/index=#3/string#4/ }
793 \__beanoves_group_begin:
794 \tl_set:Nn \l_a_tl { #1 }
795 \seq_set_split:Nnn \l_split_seq { . } { #2 }
796 \seq_remove_all:Nn \l_split_seq {}
797 \__beanoves_DEBUG:x {SPLIT_SEQ:/\seq_use:Nn \l_split_seq / /}
798 \cs_set:Npn \:n ##1 {
799 \tl_set_eq:NN \l_b_tl \l_a_tl
800 \tl_put_right:Nn \l_b_tl { . ##1 }
801 \exp_args:Nx
802 \__beanoves_get:nNTF { \l_b_tl / A } \l_c_tl {
803 \exp_args:NNx
804 \regex_match:NnTF \c__beanoves_A_key_Z_regex \l_c_tl {
805 \tl_set_eq:NN \l_a_tl \l_c_tl
806 } {
807 \tl_set_eq:NN \l_a_tl \l_b_tl
808 }
809 } {
810 \tl_set_eq:NN \l_a_tl \l_b_tl
811 }
812 \__beanoves_DEBUG:x { IF_INDEX_SPLIT:##1/
813 \string\l_a_tl=\tl_to_str:N \l_a_tl}
814 }
815 \seq_map_function:NN \l_split_seq \:n
816 \tl_clear:N \l_b_tl
817 \__beanoves_raw_first:VNTF \l_a_tl \l_b_tl {
818 \tl_set_eq:NN \l_ans_tl \l_b_tl
819 \tl_put_right:Nx \l_ans_tl { + (#3) - 1}
820 \__beanoves_DEBUG:x { IF_INDEX_TRUE:key=#1/path=#2/index=#3/
821 \string\l_ans_tl=\tl_to_str:N \l_ans_tl }
822 \exp_args:NNx
823 \__beanoves_group_end:
824 \__beanoves_fp_round:nN \l_ans_tl #4
825 \prg_return_true:
826 } {
827 \__beanoves_DEBUG:x { IF_INDEX_FALSE:key=#1/path=#2/index=#3/ }
828 \prg_return_false:
829 }
830 }
831 \prg_generate_conditional_variant:Nnn
832 \__beanoves_if_index:nnnN { VVVN } { T, F, TF }

```

<u>__beanoves_if_incr:nnTF</u>	__beanoves_if_incr:nnTF {<name>} {<offset>} {<true code>} {<false
<u>__beanoves_if_incr:nnTF</u>	code>}
<u>__beanoves_if_incr:(VnN VVN)TF</u>	__beanoves_if_incr:nnNTF {<name>} {<offset>} {<tl variable>} {<true code>}
	{<false code>}

Increment the free counter position accordingly. When requested, put the result in the *<tl variable>*. The result will lay within the declared range.

```

833 \prg_new_conditional:Npnn \__beanoves_if_incr:nn #1 #2 { T, F, TF } {

```

```

834 \__beanoves_DEBUG:x { IF_INCR:\tl_to_str:n{#1}/\tl_to_str:n{#2} }
835 \__beanoves_group_begin:
836 \tl_clear:N \l_a_tl
837 \__beanoves_if_free_counter:NnTF \l_a_tl { #1 } {
838 \tl_clear:N \l_b_tl
839 \__beanoves_if_append:xNTF { \l_a_tl + (#2) } \l_b_tl {
840 \__beanoves_fp_round:N \l_b_tl
841 \__beanoves_gput:nV { #1/C } \l_b_tl
842 \__beanoves_group_end:
843 \__beanoves_DEBUG:x { IF_INCR_TRUE:#1/#2 }
844 \prg_return_true:
845 } {
846 \__beanoves_group_end:
847 \__beanoves_DEBUG:x { IF_INCR_FALSE(1):#1/#2 }
848 \prg_return_false:
849 }
850 } {
851 \__beanoves_group_end:
852 \__beanoves_DEBUG:x { IF_INCR_FALSE(2):#1/#2 }
853 \prg_return_false:
854 }
855 }
856 \prg_new_conditional:Npnn \__beanoves_if_incr:nnN #1 #2 #3 { T, F, TF } {
857 \__beanoves_if_incr:nnTF { #1 } { #2 } {
858 \__beanoves_if_counter:nNTF { #1 } #3 {
859 \prg_return_true:
860 } {
861 \prg_return_false:
862 }
863 } {
864 \prg_return_false:
865 }
866 }
867 \prg_generate_conditional_variant:Nnn
868 \__beanoves_if_incr:nnN { VnN, VVN } { T, F, TF }

```

__beanoves_if_range:nNTF __beanoves_if_range:nNTF {<name>} <tl variable> {<true code>} {<false code>}

Append the range of the <name> slide range to the <tl variable>. Execute <true code> when there is a <range>, <false code> otherwise.

```

869 \prg_new_conditional:Npnn \__beanoves_if_range:nN #1 #2 { T, F, TF } {
870 \__beanoves_DEBUG:x{ RANGE:key=#1/\string#2/}
871 \bool_if:NNTF \l__beanoves_no_range_bool {
872 \prg_return_false:
873 } {
874 \__beanoves_if_in:nTF { #1/ } {
875 \tl_put_right:Nn { 0-0 }
876 } {
877 \__beanoves_group_begin:
878 \tl_clear:N \l_a_tl
879 \tl_clear:N \l_b_tl
880 \tl_clear:N \l_ans_tl
881 \__beanoves_raw_first:nNTF { #1 } \l_a_tl {
882 \__beanoves_raw_last:nNTF { #1 } \l_b_tl {

```

```

883         \exp_args:NNNx
884         \__beanoves_group_end:
885         \tl_put_right:Nn #2 { \l_a_tl - \l_b_tl }
886 \__beanoves_DEBUG:x{ RANGE_TRUE_A:key=#1/\string#2=#2/}
887         \prg_return_true:
888     } {
889         \exp_args:NNNx
890         \__beanoves_group_end:
891         \tl_put_right:Nn #2 { \l_a_tl - }
892 \__beanoves_DEBUG:x{ RANGE_TRUE_A:key=#1/\string#2=#2/}
893         \prg_return_true:
894     }
895 } {
896     \__beanoves_raw_last:nNTF { #1 } \l_b_tl {
897 \__beanoves_DEBUG:x{ RANGE_TRUE_Z:key=#1/\string#2=#2/}
898         \exp_args:NNNx
899         \__beanoves_group_end:
900         \tl_put_right:Nn #2 { - \l_b_tl }
901         \prg_return_true:
902     } {
903 \__beanoves_DEBUG:x{ RANGE_FALSE:key=#1/}
904         \__beanoves_group_end:
905         \prg_return_false:
906     }
907 }
908 }
909 }
910 }
911 \prg_generate_conditional_variant:Nnn
912 \__beanoves_if_range:nN { VN } { T, F, TF }

```

```

\__beanoves_range:nN
\__beanoves_range:VN

```

`__beanoves_range:nN {<name>} <tl variable>`

Append the range of the *<name>* slide range to the *<tl variable>*.

```

913 \cs_new:Npn \__beanoves_range:nN #1 #2 {
914     \__beanoves_if_range:nNF { #1 } #2 {
915         \msg_error:nnn { beanoves } { :n } { No-range-available:~#1 }
916     }
917 }
918 \cs_generate_variant:Nn \__beanoves_range:nN { VN }

```

5.3.6 Evaluation

```

\__beanoves_resolve:nnN
\__beanoves_resolve:VVN
\__beanoves_resolve:nnNN
\__beanoves_resolve:VVNN

```

`__beanoves_resolve:nnN {<name>} {<path>} <tl variable>`

`__beanoves_resolve:nnNN {<name>} {<path>} <tl name variable> <tl last variable>`

Resolve the *<name>* and *<path>* into a key that is put into the *<tl name variable>*. *<name₀>.<i₁>.<i₂>...<i_n>* is turned into *<name₁>.<i₂>...<i_n>* where *<name₀>.<i₁>* is *<name₁>*, then *<name₂>.<i₃>...<i_n>* where *<name₁>.<i₂>* is *<name₂>*... In the second version, the last path component is first removed from *{<path>}* and stored in *<tl last variable>*.

```

919 \cs_new:Npn \__beanoves_resolve:nnN #1 #2 #3 {
920     \__beanoves_group_begin:

```

```

921 \tl_set:Nn \l_a_tl { #1 }
922 \regex_split:nnNT { \. } { #2 } \l_split_seq {
923   \seq_pop_left:NN \l_split_seq \l_b_tl
924   \cs_set:Npn \:n ##1 {
925     \tl_set_eq:NN \l_b_tl \l_a_tl
926     \tl_put_right:Nn \l_b_tl { . ##1 }
927     \exp_args:Nx
928     \__beanoves_get:nNTF { \l_b_tl / A } \l_c_tl {
929       \exp_args:NNx
930       \regex_match:NnTF \c__beanoves_A_key_Z_regex \l_c_tl {
931         \tl_set_eq:NN \l_a_tl \l_c_tl
932       } {
933         \cs_set:Npn \:n ####1 {
934           \tl_set_eq:NN \l_b_tl \l_a_tl
935           \tl_put_right:Nn \l_b_tl { . ####1 }
936           \tl_set_eq:NN \l_a_tl \l_b_tl
937         }
938       }
939     } {
940       \tl_set_eq:NN \l_a_tl \l_b_tl
941     }
942   }
943   \seq_map_function:NN \l_split_seq \:n
944 }
945 \exp_args:NNNV
946 \__beanoves_group_end:
947 \tl_set:Nn #3 \l_a_tl
948 }
949 \cs_generate_variant:Nn \__beanoves_resolve:nnN { VVN }
950 \cs_new:Npn \__beanoves_tl_put_right_braced:Nn #1 #2 {
951   \tl_put_right:Nn #1 { { #2 } }
952 }
953 \cs_generate_variant:Nn \__beanoves_tl_put_right_braced:Nn { NV }
954 \cs_new:Npn \__beanoves_resolve:nnNN #1 #2 #3 #4 {
955   \__beanoves_group_begin:
956   \regex_extract_once:nnNT { (\.\d+)*? (\.\d+) \Z } { #2 } \l_match_seq {
957     \exp_args:Nnx
958     \__beanoves_resolve:nnN { #1 } { \seq_item:Nn \l_match_seq 2 } \l_name_tl
959     \tl_set:Nn \l_a_tl {
960       \tl_set:Nn #3
961     }
962     \exp_args:NNV
963     \__beanoves_tl_put_right_braced:Nn \l_a_tl \l_name_tl
964     \tl_put_right:Nn \l_a_tl {
965       \tl_set:Nn #4
966     }
967     \exp_args:NNx
968     \__beanoves_tl_put_right_braced:Nn \l_a_tl {
969       \seq_item:Nn \l_match_seq 3
970     }
971   }
972   \exp_last_unbraced:NV
973   \__beanoves_group_end:
974   \l_a_tl

```

```

975 }
976 \cs_generate_variant:Nn \__beanoves_resolve:nnNN { VVNN }

```

```

\__beanoves_if_append:nNTF \__beanoves_if_append:nNTF {<integer expression>} <tl variable> {<true
\__beanoves_if_append:(VN|xN)TF code>} {<false code>}

```

Evaluates the *<integer expression>*, replacing all the named specifications by their static counterpart then put the result to the right of the *<tl variable>*. Executed within a group. Heavily used by `__beanoves_eval_query:nN`, where *<integer expression>* was initially enclosed in ‘*?(...)*’. Local variables:

`\l_ans_tl` To feed *<tl variable>* with.

(End definition for `\l_ans_tl`. This variable is documented on page ??.)

`\l_split_seq` The sequence of caught query groups and non queries.

(End definition for `\l_split_seq`. This variable is documented on page ??.)

`\l__beanoves_split_int` Is the index of the non queries, before all the caught groups.

(End definition for `\l__beanoves_split_int`.)

`\l_name_tl` Storage for `\l_split_seq` items that represent names.

(End definition for `\l_name_tl`. This variable is documented on page ??.)

`\l_path_tl` Storage for `\l_split_seq` items that represent integer paths.

(End definition for `\l_path_tl`. This variable is documented on page ??.)

Catch circular definitions.

```

977 \prg_new_conditional:Npnn \__beanoves_if_append:nN #1 #2 { T, F, TF } {
978 \__beanoves_DEBUG:x { IF_APPEND:\tl_to_str:n { #1 } / \string #2}
979 \int_gdecr:N \g__beanoves_append_int
980 \int_compare:nNnTF \g__beanoves_append_int > 0 {
981 \__beanoves_DEBUG:x { IF_APPEND...}
982 \__beanoves_group_begin:

```

Local variables:

```

983 \int_zero:N \l__beanoves_split_int
984 \seq_clear:N \l_split_seq
985 \tl_clear:N \l_name_tl
986 \tl_clear:N \l_path_tl
987 \tl_clear:N \l_group_tl
988 \tl_clear:N \l_ans_tl
989 \tl_clear:N \l_a_tl

```

Implementation:

```

990 \regex_split:NnN \c__beanoves_split_regex { #1 } \l_split_seq
991 \__beanoves_DEBUG:x { IF_APPEND_SPLIT_SEQ: / \seq_use:Nn \l_split_seq / / }
992 \int_set:Nn \l__beanoves_split_int { 1 }
993 \tl_set:Nx \l_ans_tl {
994 \seq_item:Nn \l_split_seq { \l__beanoves_split_int }
995 }

```

```
\switch:nTF {<capture group number>} {<black code>} {<white code>}
```

Helper function to locally set the `\l_group_tl` variable to the captured group *<capture group number>* and branch.

```

996     \cs_set:Npn \switch:nTF ##1 ##2 ##3 ##4 {
997         \tl_set:Nx ##2 {
998             \seq_item:Nn \l_split_seq { \l__beanoves_split_int + ##1 }
999         }
1000     \__beanoves_DEBUG:x { IF_APPEND_SWITCH/##1/\string##2/\tl_to_str:N##2/}
1001         \tl_if_empty:NTF ##2 { %SWITCH~APPEND~WHITE/##1/\
1002             ##4 } { %SWITCH~APPEND~BLACK/##1/\
1003             ##3
1004         }
1005     }
```

`\prg_return_true:` and `\prg_return_false:` are wrapped locally to close the group and return the proper value.

```

1006     \cs_set:Npn \__beanoves_return_true: {
1007         \__beanoves_fp_round:
1008         \exp_args:NNNV
1009         \__beanoves_group_end:
1010         \tl_put_right:Nn #2 \l_ans_tl
1011     \__beanoves_DEBUG:x { IF_APPEND_TRUE:\tl_to_str:n { #1 } /
1012         \string #2=\tl_to_str:V #2 }
1013         \prg_return_true:
1014     }
1015     \cs_set:Npn \__beanoves_fp_round: {
1016         \__beanoves_fp_round:N \l_ans_tl
1017     }
1018     \cs_set:Npn \next: {
1019         \__beanoves_return_true:
1020     }
1021     \cs_set:Npn \__beanoves_return_false: {
1022         \__beanoves_group_end:
1023     \__beanoves_DEBUG:x { IF_APPEND_FALSE:\tl_to_str:n { #1 } /
1024         \string #2=\tl_to_str:V #2 }
1025         \prg_return_false:
1026     }
1027     \cs_set:Npn \break: {
1028         \bool_set_false:N \l__beanoves_continue_bool
1029         \cs_set:Npn \next: {
1030             \__beanoves_return_false:
1031         }
1032     }
```

Main loop.

```

1033     \bool_set_true:N \l__beanoves_continue_bool
1034     \bool_while_do:Nn \l__beanoves_continue_bool {
1035         \int_compare:nNnTF {
1036             \l__beanoves_split_int } < { \seq_count:N \l_split_seq
1037         } {
1038             \switch:nTF 1 \l_name_tl {
```

- Case ++*<name>**<integer path>*.n.

```

1039         \switch:nNTF 2 \l_path_tl {
1040             \__beanoves_resolve:VWN \l_name_tl \l_path_tl \l_name_tl
1041         } { }
1042         \__beanoves_if_incr:VnNF \l_name_tl 1 \l_ans_tl {
1043             \break:
1044         }
1045     } {
1046         \switch:nNTF 3 \l_name_tl {

• Cases  $\langle name \rangle \langle integer path \rangle \dots$ 

1047         \tl_set:Nn \l_b_tl {
1048             \switch:nNTF 4 \l_path_tl {
1049                 \__beanoves_resolve:VWN \l_name_tl \l_path_tl \l_name_tl
1050             } { }
1051         }
1052         \switch:nNTF 5 \l_a_tl {

• Case ...length.

1053         \l_b_tl
1054         \__beanoves_raw_length:VNF \l_name_tl \l_ans_tl {
1055             \break:
1056         }
1057     } {
1058         \switch:nNTF 6 \l_a_tl {

• Case ...last.

1059         \l_b_tl
1060         \__beanoves_raw_last:VNF \l_name_tl \l_ans_tl {
1061             \break:
1062         }
1063     } {
1064         \switch:nNTF 7 \l_a_tl {

• Case ...next.

1065         \l_b_tl
1066         \__beanoves_if_next:VNF \l_name_tl \l_ans_tl {
1067             \break:
1068         }
1069     } {
1070         \switch:nNTF 8 \l_a_tl {

• Case ...range.

1071         \l_b_tl
1072         \__beanoves_if_range:VNTF \l_name_tl \l_ans_tl {
1073             \cs_set_eq:NN \__beanoves_fp_round: \relax
1074         } {
1075             \break:
1076         }

1077     } {
1078         \switch:nNTF 9 \l_a_tl {

```

- Case ...n.

```

1079             \l_b_tl
1080             \switch:nNTF { 10 } \l_a_tl {

```

- Case ...+=*<integer>*.

```

1081 \__beanoves_if_incr:VVNF \l_name_tl \l_a_tl \l_ans_tl {
1082   \break:
1083 }
1084   } {
1085 \__beanoves_DEBUG:x {+++++++~NAME=\l_name_tl}
1086   \__beanoves_if_counter:VNF \l_name_tl \l_ans_tl {
1087     \break:
1088   }
1089   }

1090   } {

```

- Case ...*<integer path>*.

```

1091             \switch:nNTF { 11 } \l_a_tl {
1092 \switch:nNTF 4 \l_path_tl { } {
1093   \tl_clear:N \l_path_tl
1094 }
1095 \__beanoves_if_index:VVNF \l_name_tl \l_path_tl \l_a_tl \l_ans_tl {
1096   \break:
1097 }
1098   } {
1099     \switch:nNTF 4 \l_path_tl {
1100 \__beanoves_if_index:VVNF \l_name_tl \l_path_tl \l_ans_tl {
1101   \break:
1102 }
1103   } {
1104 \exp_args:Nx
1105 \__beanoves_if_counter:nNF { \l_name_tl } \l_ans_tl {
1106   \break:
1107 }
1108   }
1109   }

1110   }
1111   }
1112   }
1113   }
1114   }
1115   } {

```

No name.

```

1116   }
1117 }
1118 \int_add:Nn \l__beanoves_split_int { 12 }
1119 \tl_put_right:Nx \l_ans_tl {
1120   \seq_item:Nn \l_split_seq { \l__beanoves_split_int }

```

```

1121     }
1122   } {
1123     \bool_set_false:N \l__beanoves_continue_bool
1124   }
1125 }
1126 \next:
1127 } {
1128   \msg_error:nnx
1129     { beanoves } { :n } { Too-many-calls:~\tl_to_str:n { #1 } }
1130   \__beanoves_return_false:
1131 }
1132 }
1133 \prg_generate_conditional_variant:Nnn
1134   \__beanoves_if_append:nN { VN, xN } { T, F, TF }

```

`__beanoves_if_eval_query:nNTF` `__beanoves_if_eval_query:nNTF {<overlay query> } <tl variable> {<true code>} {<false code>}`

Evaluates the single *<overlay query>*, which is expected to contain no comma. Extract a range specification from the argument, replaces all the *named overlay specifications* by their static counterparts, make the computation then append the result to the right of the *<seq variable>*. Ranges are supported with the colon syntax. This is executed within a local group. Below are local variables and constants.

`\l_a_tl` Storage for the first index of a range.

(End definition for `\l_a_tl`. This variable is documented on page ??.)

`\l_b_tl` Storage for the last index of a range, or its length.

(End definition for `\l_b_tl`. This variable is documented on page ??.)

`\c__beanoves_A_cln_Z_regex` Used to parse slide range overlay specifications. Next are the capture groups.

(End definition for `\c__beanoves_A_cln_Z_regex`.)

```

1135 \regex_const:Nn \c__beanoves_A_cln_Z_regex {
1136   \A \s* (?

```

- 2: *<first>*

```

1137     ( [^:]* ) \s* :

```

- 3: second optional colon

```

1138     (:)? \s*

```

- 4: *<length>*

```

1139     ( [^:]* )

```

- 5: standalone *<first>*

```

1140     | ( [^:]+ )
1141   ) \s* \Z
1142 }

```

```

1143 \prg_new_conditional:Npnn \__beanoves_if_eval_query:nN #1 #2 { T, F, TF } {
1144 \__beanoves_DEBUG:x { EVAL_QUERY:#1/
1145 \tl_to_str:n{#1}/\string#2=\tl_to_str:N #2}
1146 \int_gset:Nn \g__beanoves_append_int { 128 }
1147 \regex_extract_once:NnNTF \c__beanoves_A_cln_Z_regex {
1148 #1
1149 } \l_match_seq {
1150 \__beanoves_DEBUG:x { EVAL_QUERY:#1/
1151 \string\l_match_seq/\seq_use:Nn \l_match_seq //}
1152 \bool_set_false:N \l__beanoves_no_counter_bool
1153 \bool_set_false:N \l__beanoves_no_range_bool

```

\switch:nNTF $\langle \text{capture group number} \rangle$ $\langle \text{tl variable} \rangle$ $\langle \text{black code} \rangle$ $\langle \text{white code} \rangle$

Helper function to locally set the $\langle \text{tl variable} \rangle$ to the captured group $\langle \text{capture group number} \rangle$ and branch depending on the emptiness of this variable.

```

1154 \cs_set:Npn \switch:nNTF ##1 ##2 ##3 ##4 {
1155 \__beanoves_DEBUG:x { EQ_SWITCH:##1/ }
1156 \tl_set:Nx ##2 {
1157 \seq_item:Nn \l_match_seq { ##1 }
1158 }
1159 \__beanoves_DEBUG:x { \string ##2/ \tl_to_str:N ##2/}
1160 \tl_if_empty:NTF ##2 { ##4 } { ##3 }
1161 }
1162 \switch:nNTF 5 \l_a_tl {

```

Single expression

```

1163 \bool_set_false:N \l__beanoves_no_range_bool
1164 \__beanoves_if_append:VNTF \l_a_tl #2 {
1165 \prg_return_true:
1166 } {
1167 \prg_return_false:
1168 }
1169 } {
1170 \switch:nNTF 2 \l_a_tl {
1171 \switch:nNTF 4 \l_b_tl {
1172 \switch:nNTF 3 \l_c_tl {

```

$\langle \text{first} \rangle :: \langle \text{last} \rangle$ range

```

1173 \__beanoves_if_append:VNTF \l_a_tl #2 {
1174 \tl_put_right:Nn #2 { - }
1175 \__beanoves_if_append:VNTF \l_b_tl #2 {
1176 \prg_return_true:
1177 } {
1178 \prg_return_false:
1179 }
1180 } {
1181 \prg_return_false:
1182 }
1183 } {

```

$\langle \text{first} \rangle :: \langle \text{length} \rangle$ range

```

1184 \__beanoves_if_append:VNTF \l_a_tl #2 {
1185 \tl_put_right:Nx #2 { - }

```

```

1186         \tl_put_right:Nx \l_a_tl { + ( \l_b_tl ) - 1}
1187         \__beanoves_if_append:VNTF \l_a_tl #2 {
1188             \prg_return_true:
1189         } {
1190             \prg_return_false:
1191         }
1192     } {
1193         \prg_return_false:
1194     }
1195 }
1196 } {
1197     <first>: and <first>:: range
1198     \__beanoves_if_append:VNTF \l_a_tl #2 {
1199         \tl_put_right:Nn #2 { - }
1200         \prg_return_true:
1201     } {
1202         \prg_return_false:
1203     }
1204 } {
1205     \switch:nNTF 4 \l_b_tl {
1206         \switch:nNTF 3 \l_c_tl {
1207             <::<last> range
1208             \tl_put_right:Nn #2 { - }
1209             \__beanoves_if_append:VNTF \l_a_tl #2 {
1210                 \prg_return_true:
1211             } {
1212                 \prg_return_false:
1213             }
1214         } {
1215             \msg_error:nxx { beanoves } { :n } { Syntax-error(Missing-first):~#1 }
1216         }
1217     } {
1218         <: or :: range
1219         \seq_put_right:Nn #2 { - }
1220     }
1221 } {
1222     Error
1223     \msg_error:nnn { beanoves } { :n } { Syntax-error:~#1 }
1224 }

```

<u>_beanoves_eval:nN</u>	<p>_beanoves_eval:nN {\(overlay query list\)} (tl variable)</p> <p>This is called by the <i>named overlay specifications</i> scanner. Evaluates the comma separated list of <i>overlay query</i>'s, replacing all the named overlay specifications and integer expressions by their static counterparts by calling _beanoves_eval_query:nN, then append the result to the right of the <i>tl variable</i>. This is executed within a local group. Below are local variables and constants used throughout the body of this function.</p>
\l_query_seq	<p>Storage for a sequence of <i>query</i>'s obtained by splitting a comma separated list.</p> <p>(End definition for \l_query_seq. This variable is documented on page ??.)</p>
\l_ans_seq	<p>Storage of the evaluated result.</p> <p>(End definition for \l_ans_seq. This variable is documented on page ??.)</p>
\c__beanoves_comma_regex	<p>Used to parse slide range overlay specifications.</p> <pre> 1225 \regex_const:Nn \c__beanoves_comma_regex { \s* , \s* } </pre> <p>(End definition for \c__beanoves_comma_regex.)</p> <p>No other variable is used.</p> <pre> 1226 \cs_new:Npn _beanoves_eval:nN #1 #2 { 1227 _beanoves_DEBUG:x {EVAL:\tl_to_str:n{#1}/\string#2=\tl_to_str:V #2} 1228 _beanoves_group_begin: </pre> <p>Local variables declaration</p> <pre> 1229 \seq_clear:N \l_ans_seq </pre> <p>In this main evaluation step, we evaluate the integer expression and put the result in a variable which content will be copied after the group is closed. We authorize comma separated expressions and <i>first</i>::<i>last</i> range expressions as well. We first split the expression around commas, into \l_query_seq</p> <pre> 1230 \regex_split:NnN \c__beanoves_comma_regex { #1 } \l_query_seq </pre> <p>Then each component is evaluated and the result is stored in \l_ans_seq that we have clear before use.</p> <pre> 1231 \seq_map_inline:Nn \l_query_seq { 1232 \tl_clear:N \l_ans_tl 1233 _beanoves_if_eval_query:nNTF { ##1 } \l_ans_tl { 1234 \seq_put_right:NV \l_ans_seq \l_ans_tl 1235 } { 1236 \seq_map_break:n { 1237 \msg_fatal:nnn { beanoves } { :n } { Circular~dependency~in~#1} 1238 } 1239 } 1240 } </pre> <p>We have managed all the comma separated components, we collect them back and append them to <i>tl variable</i>.</p> <pre> 1241 \exp_args:NNNx 1242 _beanoves_group_end: 1243 \tl_put_right:Nn #2 { \seq_use:Nn \l_ans_seq , } 1244 } 1245 \cs_generate_variant:Nn _beanoves_eval:nN { VN, xN } </pre>

\BeanovesEval

\BeanovesEval [*<tl variable>*] {*<overlay queries>*}

<overlay queries> is the argument of ?(...) instructions. This is a comma separated list of single *<overlay query>*'s.

This function evaluates the *<overlay queries>* and store the result in the *<tl variable>* when provided or leave the result in the input stream. Forwards to `__beanoves_eval:nN` within a group. `\l_ans_tl` is used locally to store the result.

```
1246 \NewExpandableDocumentCommand \BeanovesEval { s o m } {  
1247   \__beanoves_group_begin:  
1248   \tl_clear:N \l_ans_tl  
1249   \IfBooleanTF { #1 } {  
1250     \bool_set_true:N \__beanoves_no_counter_bool  
1251   } {  
1252     \bool_set_false:N \__beanoves_no_counter_bool  
1253   }  
1254   \__beanoves_eval:nN { #3 } \l_ans_tl  
1255   \IfValueTF { #2 } {  
1256     \exp_args:NNNV  
1257     \__beanoves_group_end:  
1258     \tl_set:Nn #2 \l_ans_tl  
1259   } {  
1260     \exp_args:NV  
1261     \__beanoves_group_end: \l_ans_tl  
1262   }  
1263 }
```

5.3.7 Reseting slide ranges

\BeanovesReset

\beanovesReset [*<first value>*] {*<Slide list name>*}

```
1264 \NewDocumentCommand \BeanovesReset { O{1} m } {  
1265   \__beanoves_reset:nn { #1 } { #2 }  
1266   \ignorespaces  
1267 }
```

Forwards to `__beanoves_reset:nn`.

__beanoves_reset:nn

__beanoves_reset:nn {*<first value>*} {*<slide list name>*}

Reset the counter to the given *<first value>*. Clean the cached values also.

```
1268 \cs_new:Npn \__beanoves_reset:nn #1 #2 {  
1269   \bool_if:nTF {  
1270     \__beanoves_if_in_p:n { #2/A } || \__beanoves_if_in_p:n { #2/Z }  
1271   } {  
1272     \__beanoves_gremove:n { #2/C }  
1273     \__beanoves_gremove:n { #2//A }  
1274     \__beanoves_gremove:n { #2//L }  
1275     \__beanoves_gremove:n { #2//Z }  
1276     \__beanoves_gremove:n { #2//N }  
1277     \__beanoves_gput:nn { #2/C0 } { #1 }  
1278   } {  
1279     \msg_warning:nnn { beanoves } { :n } { Unknown~name:~#2 }  
1280   }  
1281 }
```



```
1282 \makeatother
1283 \ExplSyntaxOff
1284 \end{package}
```