Recent Improvements in Tk 9

by

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Contents

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1. Abstract

This talk is about the progress achieved in the last few months regarding Tk 9:

- The improved look of several Ttk widgets in the built-in themes **`default`**, **`alt`**, **`clam`**, and **`classic`**;
- Focus ring support for the widgets ttk::entry, ttk::spinbox, and ttk::combobox;
- Support for non-default ttk::notebook tab positions;
- Support for the new **`<TouchpadScroll>`** event on Windows and macOS Aqua.

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2. Improved Look of Several Ttk Widgets

Improvements related to the arrows in Ttk widgets of the themes `default`, `alt`, `clam`, and `classic`:

- **`default`** and **`alt`** themes: The arrow boxes of the ttk::combobox and ttk::spinbox widgets now have a *visible* left border; the arrow within the ttk::combobox widget is now vertically centered; the arrow boxes of the ttk::scrollbar widget are now square-shaped.
- **`clam`** theme: The arrow boxes of the ttk::spinbox widget now have optimal dimensions, due to which the widget is no longer higher than needed and its arrows are no longer tiny; the arrrows of the ttk::scrollbar widget are now horizontally centered.

- **`classic`** theme: Replaced the ugly arrow boxes of the ttk::combobox and ttk::spinbox widgets with new ones, which are imported from the **`default`** theme (thanks to **Emiliano Gavilan**):

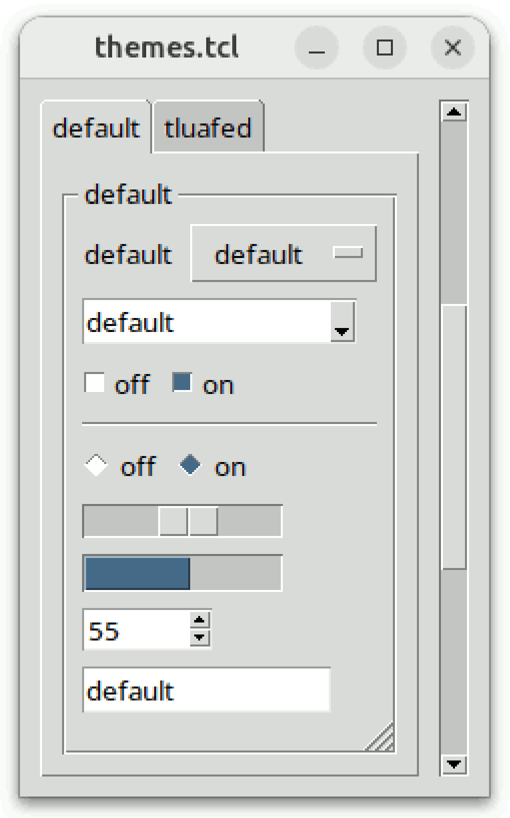
```
ttk::style element create Combobox.downarrow from default

ttk::style element create Spinbox.uparrow    from default
ttk::style element create Spinbox.downarrow  from default
```

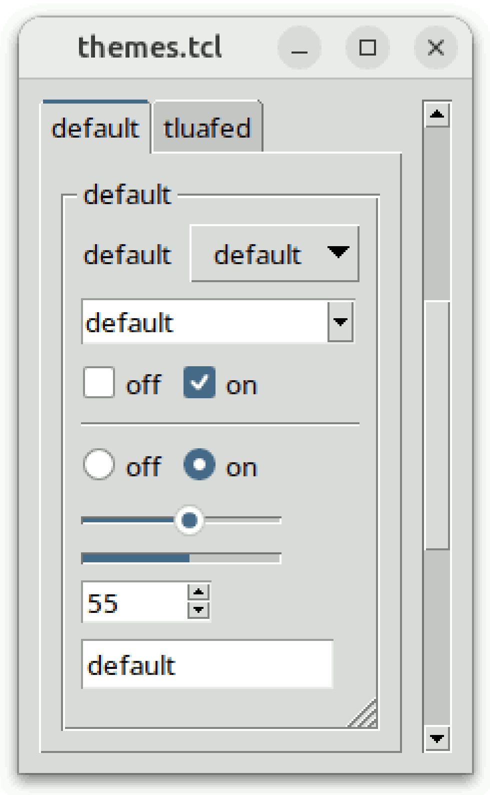
Further improvements:

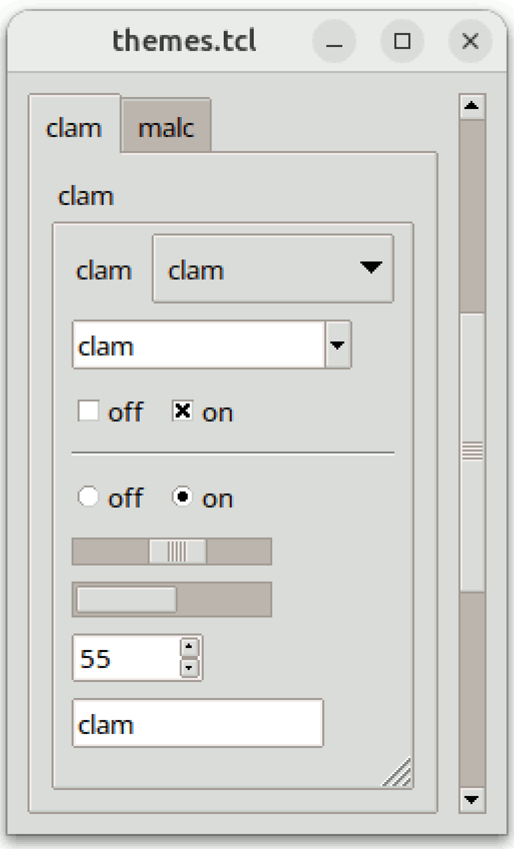
- **`default`** theme: Added a highlighting to the selected ttk::notebook tab; replaced the ttk::menubutton indicator with a more modern one, like in the **`alt`** and **`clam`** themes; the ttk::scale and ttk::progressbar widgets now have a nice modern look; changed the value of the **`-selectborderwidth`** style configuration option from `1` to `0`.

- **`classic`** theme: Changed the value of the **`-borderwidth`** and **`-troughborderwidth`** style configuration options from `2` to `1` and that of the **`-selectborderwidth`** option from `1` to `0`; changed the default width of the ttk::scrollbar widget from `11.25p` to `9p` (`15` px to `12` px on an unscaled screen); changed the value of the **`-troughcolor`** style configuration option from `"#c3c3c3"` to `"#b3b3b3"` (thanks to **Emiliano Gavilan**).

A few screenshots (Tk 8.6.14 vs Tk 9):



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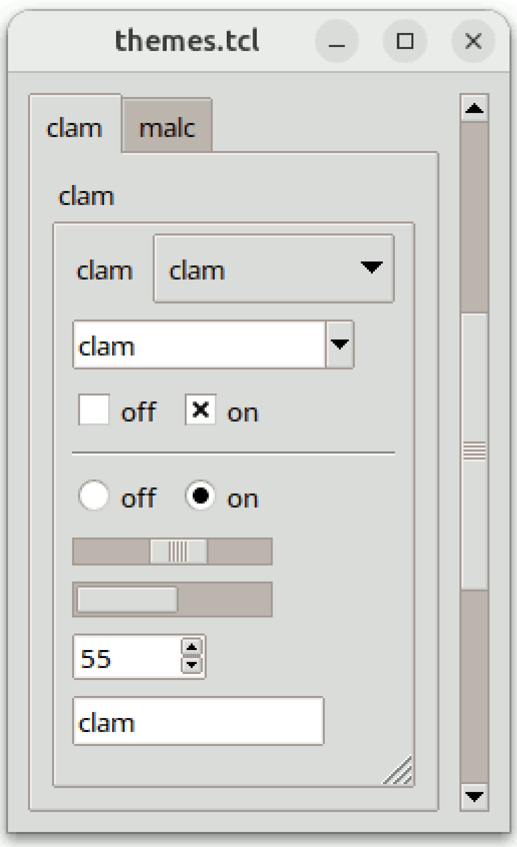
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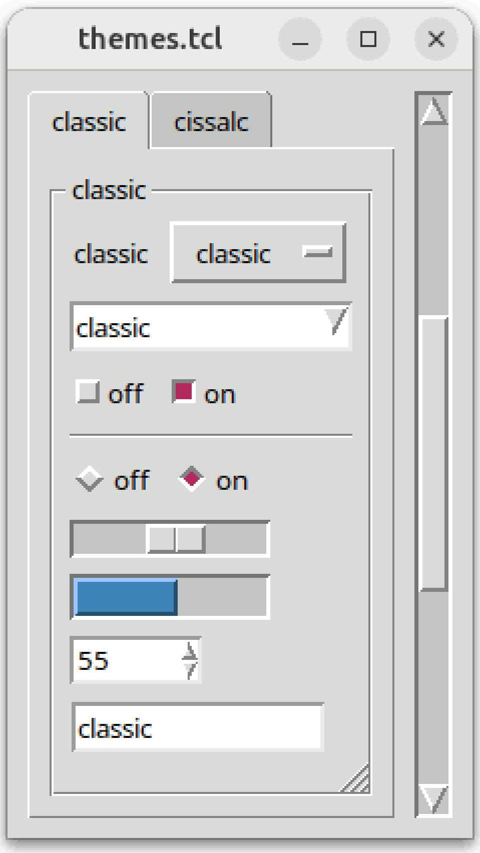
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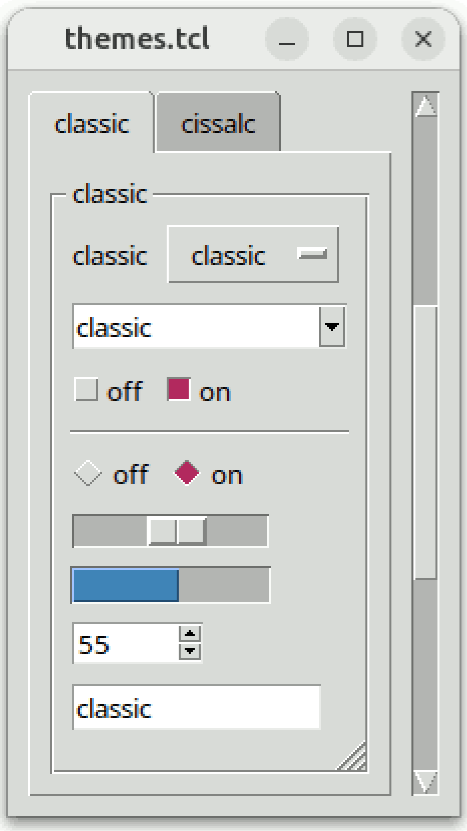
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3. Focus Ring Support for Ttk Widgets

The implementation of the focus ring around some Ttk widgets is theme-specific:

- **`default`** and **`alt`** themes: Extended the implementation of the **`field`** element to support the new **`-focuswidth`** and **`-focuscolor`** options, whose values for the ttk::entry, ttk::combobox, and ttk::spinbox widgets are set at script level as follows:

```
ttk::style configure TEntry    -focuswidth 2 -focuscolor $colors(-selectbg)
ttk::style configure TCombobox -focuswidth 1 -focuscolor $colors(-selectbg)
ttk::style configure TSpinbox  -focuswidth 1 -focuscolor $colors(-selectbg)
```

- **`clam`** theme: The focus ring around the ttk::entry, ttk::combobox, and ttk::spinbox widgets is drawn by using different values for the already existing **`field`** element options **`-bordercolor`** and **`-lightcolor`**. The last two lines below were aded in Tk 9:

```
ttk::style map TEntry    -bordercolor [list focus $colors(-selectbg)] \
    -lightcolor [list focus #6f9dc6]
ttk::style map TCombobox -bordercolor [list focus $colors(-selectbg)]
ttk::style map TSpinbox  -bordercolor [list focus $colors(-selectbg)]
```

- **`classic`** theme: The focus ring is actually the **`highlight`** element, which has always been the outermost element of the themes **`TButton`**, **`TCheckbutton`**, **`TRadiobutton`**, **`TMenubutton`**, and **`TEntry`**. In Tk 9 it was added as outermost element to the following further layouts: **`TCombobox`**, **`TSpinbox`**, **`Horizontal.TScale`**, **`Vertical.TScale`**, and **`Treeview`** (thanks to **Emiliano Gavilan**).

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4. Non-default ttk::notebook Tab Positions

Extended the C code to *properly* support not only the default value **`nw`** of the **`TNotebook`** style configuration option **`-tabposition`**, but also other values, like **`sw`**, **`wn`**, and **`en`**.

The Ttk library files `altTheme.tcl`, `clamTheme.tcl`, `vistaTheme.tcl`, `xpTheme.tcl`, and `winTheme.tcl` contain the settings for the styles **`TNotebook`** and **`TNotebook.Tab`**, corresponding to the default tab position **`nw`**:

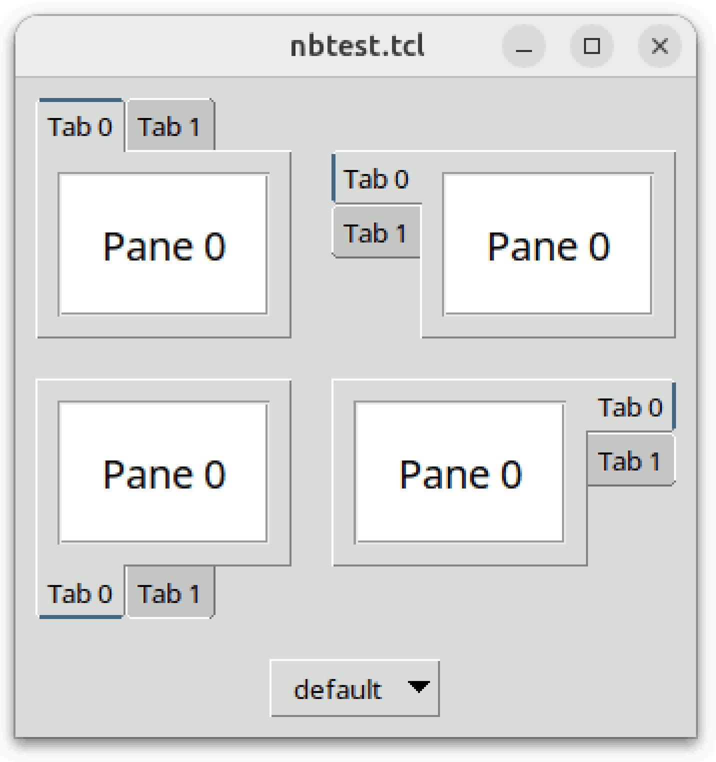
```
ttk::style theme setting alt {
    ttk::style configure TNotebook -tabmargins     {1.5p 1.5p 0.75p 0}
    ttk::style map TNotebook.Tab -expand {selected {1.5p 1.5p 0.75p 0}}
}
ttk::style theme setting clam {
    ttk::style configure TNotebook.Tab -padding     {4.5p 1.5p 4.5p 1.5p}
    ttk::style map TNotebook.Tab -padding {selected {4.5p 3p   4.5p 1.5p}}
}
ttk::style theme setting vista|xpnative {
    ttk::style configure TNotebook -tabmargins     {2 2 2 0}
    ttk::style map TNotebook.Tab -expand {selected {2 2 2 2}}
}
ttk::style theme setting winnative {
    ttk::style configure TNotebook -tabmargins     {2 2 2 0}
    ttk::style map TNotebook.Tab -expand {selected {2 2 2 0}}
}
```

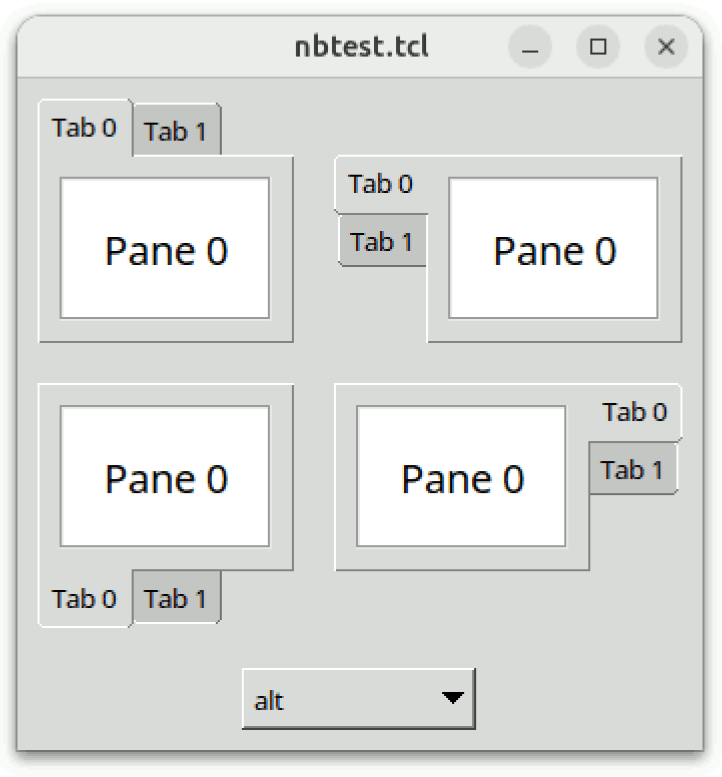
For a non-default tab position the extended C code assumes that accordingly modified settings are provided, like in the following example:

```
set themeList [ttk::style theme names]

#
# Tab position sw
#
set nbStyle SW.TNotebook
ttk::style configure $nbStyle -tabposition sw
ttk::style theme setting alt {
    ttk::style configure $nbStyle -tabmargins     {1.5p 0 0.75p 1.5p}
    ttk::style map $nbStyle.Tab -expand {selected {1.5p 0 0.75p 1.5p}}
}
ttk::style theme setting clam {
    ttk::style configure $nbStyle.Tab -padding     {4.5p 1.5p 4.5p 1.5p}
    ttk::style map $nbStyle.Tab -padding {selected {4.5p 1.5p 4.5p 3p  }}
}
foreach theme {vista xpnative} {
    if {$theme in $themeList} {
        ttk::style theme setting $theme {
            ttk::style configure $nbStyle -tabmargins     {2 0 2 2}
            ttk::style map $nbStyle.Tab -expand {selected {2 2 2 2}}
        }
    }
}
if {"winnative" in $themeList} {
    ttk::style theme setting winnative {
        ttk::style configure $nbStyle -tabmargins     {2 0 2 2}
        ttk::style map $nbStyle.Tab -expand {selected {2 0 2 2}}
    }
}
ttk::notebook .nbSW -style $nbStyle
...
```

A few screenshots:

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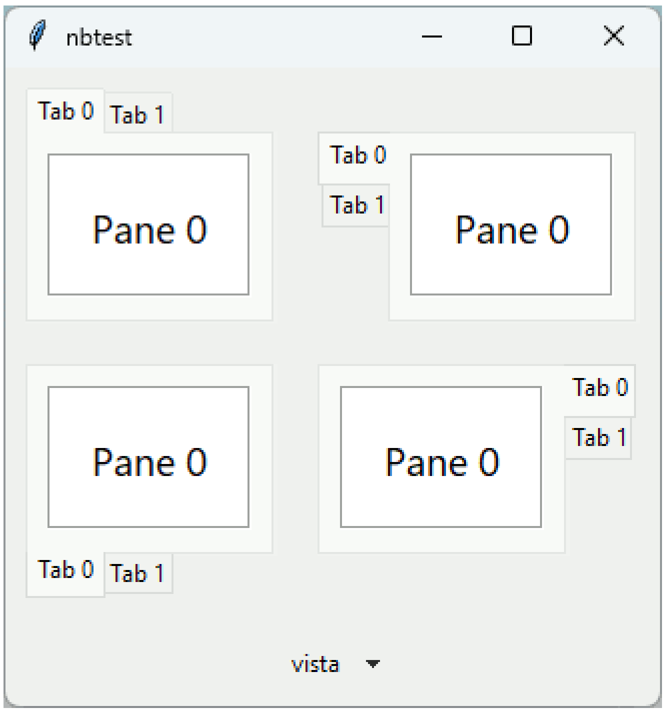
Tab 1
Pane 0
Tab 0
Tab 1
Pane 0
Pane 0
Tab 0
Tab 1
Pane 0
Tab 0
Tab 1
alt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Tab 1
Pane 0
Tab 0
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Pane 0
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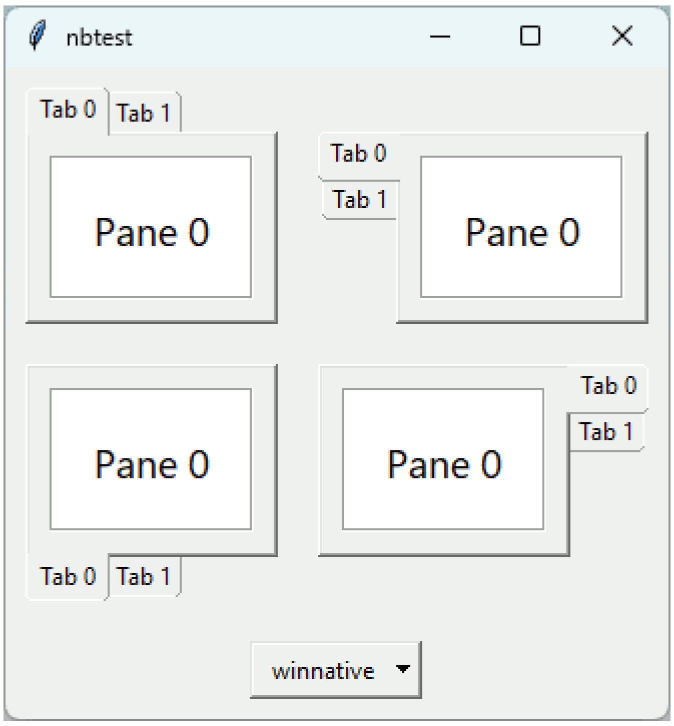
Tab 1
Pane 0
Tab 0
Tab 1
vista



5. Support for the New `<TouchpadScroll>` Event

Adding a new **`<TouchpadScroll>`** event to Tk was proposed and implemented in November 2023 by **Marc Culler** (see TIP 684).

Background: According to TIP 563 by **Harald Oehlmann** (back in 2020), when the mouse pointer is over a horizontal or vertical scrollbar, the mouse wheel scrolls the connected widget, regardless of whether the `Shift` key is down or not. That is, both the **`<MouseWheel>`** and **`<Shift-MouseWheel>`** events sent to a scrollbar would result in scrolling the connected widget in the direction given by the scrollbar's **`-orient`** option. Since two-finger touchpad scroll gestures almost always gave rise to *both* of these events, they resulted in annoying interferences, experienced especially during slow scrollings, as reported by **Nicolas Bats**.

To solve this problem, two-finger touchpad scroll gestures **on Windows and macOS Aqua** no longer generate **`<MouseWheel>`** and **`<Shift-MouseWheel>`** events, but they send **`<TouchpadScroll>`** events instead. These events store two 16 bit delta values in the integer provided by the **`%D`** substitution. These values can be unpacked by using the **`tk::PreciseScrollDeltas`** utility procedure, like in the following example:

```
lassign [tk::PreciseScrollDeltas %D] deltaX deltaY
```

The binding scripts for scrollbar widgets (see the Tk library file `scrlbar.tcl`) simply ignore the value of `deltaY` for a horizontal scrollbar and that of `deltaX` for a vertical one, thus eliminating any potential interferences.

The *`serial`* field of a **`<TouchpadScroll>`** event, accessible as the **`%#`** substitution, holds a counter which is incremented each time a **`<TouchpadScroll>`** event is generated (which happens about 60 times per second during a two-finger gesture). This allows a binding script to, for example, only respond to every 5th **`<TouchpadScroll>`** event by testing if the counter is divisible by 5.

On X11 there is currently no support for the **`<TouchpadScroll>`** event, two-finger touchpad scroll gestures continue to generate **`<MouseWheel>`** and **`<Shift-MouseWheel>`** events. To minimize the number of undesirable artifacts, the improved binding scripts for scrollbar widgets count both the **`<MouseWheel>`** and **`<Shift-MouseWheel>`** events and ignore the non-dominant ones.

Example of an extended event handling that supports both the mouse wheel and the two-finger gestures (see the Tk library file `listbox.tcl`):

```
bind Listbox <MouseWheel> {
    tk::MouseWheel %W y %D -40.0 units
}
bind Listbox <Option-MouseWheel> {
    tk::MouseWheel %W y %D -12.0 units
}
bind Listbox <Shift-MouseWheel> {
    tk::MouseWheel %W x %D -40.0 units
}
bind Listbox <Shift-Option-MouseWheel> {
    tk::MouseWheel %W x %D -12.0 units
}
bind Listbox <TouchpadScroll> {
    if {%# %% 5 != 0} {
        return
    }
    lassign [tk::PreciseScrollDeltas %D] deltaX deltaY
    if {$deltaX != 0} {
        %W xview scroll [expr {-$deltaX}] units
    }
    if {$deltaY != 0} {
        %W yview scroll [expr {-$deltaY}] units
    }
}
```

Libraries known to support the **`<TouchpadScroll>`** event: Mentry 4.0+, Scrollutil 2.0+, Tablelist 7.0+.