Ttk Elements

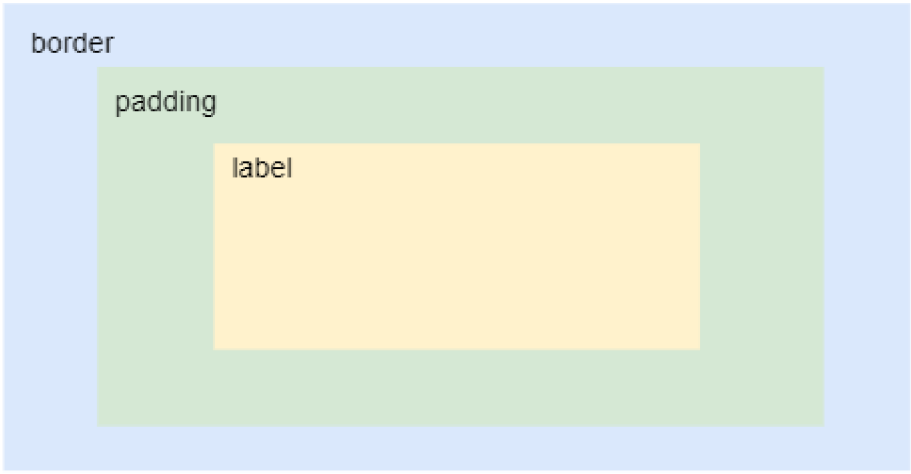
Summary: in this tutorial, you'll learn about the ttk elements and how they are assembled into styles of widgets.

Introduction to ttk elements

So far, you have learned that a theme (https://www.pythontutorial.net/tkinter/tkinter-theme/) is a collection of styles (https://www.pythontutorial.net/tkinter/ttk-style/) that defines the appearance of all ttk widgets (https://www.pythontutorial.net/tkinter/tkinter-ttk/) .

A style is a description of the appearance of a widget class. A style is composed of one or more elements.

For example, a `Label` consists of `border` , `padding` and `label` elements. And these elements are nested within each other like the following picture:



In general, most of the built-in ttk styles (https://www.pythontutorial.net/tkinter/ttk-style/) use the concept of a layout to organize the different element layers that build up a widget.

To get the layout of a widget class, you use the `layout()` method of the `Style` object like this:

```
style.layout(widget_class)
```

If a widget class doesn't have a layout, the `layout()` method will raise a `tk.TclError` exception.

The `layout()` method returns a list of tuples (`element_name` , `description`), where:

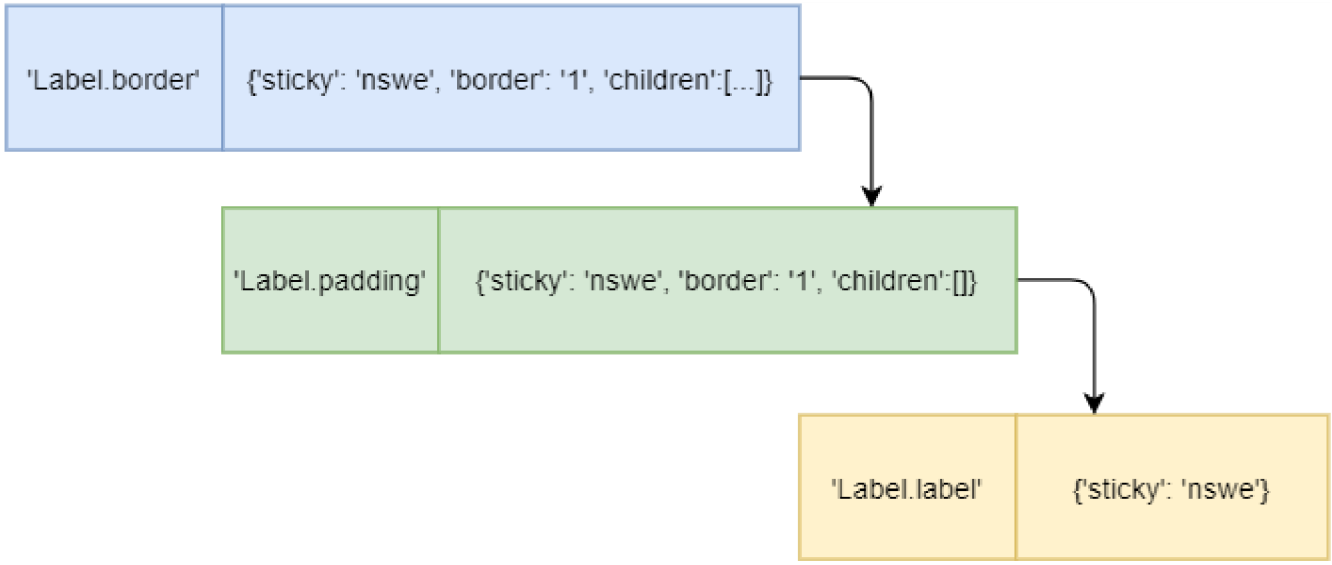
- `element_name` is the name of the element.
- `description` is a dictionary that describes the element.

The following example uses the `layout()` method to get the layout of the `TLabel` widget class:

```
import tkinter as tk
from tkinter import ttk


class App(tk.Tk):
    def __init__(self):
        super().__init__()

        style = ttk.Style(self)

        layout = style.layout('TLabel')
        print(layout)
```

```
if __name__ == "__main__":
    app = App()
    app.mainloop()
```

The following output shows the style's layout of the `TLabel`:




```
[('Label.border',
    {'sticky': 'nswe',
     'border': '1',
     'children': [('Label.padding',
                   {'sticky': 'nswe',
                    'border': '1',
                    'children': [('Label.label',
                                  {'sticky': 'nswe'})]
                    })]
     }
)]
```

The `TLabel` has three elements nested within each other:

- The `Label.border` is the outermost element that has the `sticky`, `border`, and `children` keys.

- The `Label.padding` is nested inside the `Label.border`. It also has the `sticky`, `border`, and `children` keys.
- The `Label.label` is the innermost element that has only one `sticky` key.

For example, when an element has a `sticky` key with the value of `nswe`, it would be stretched to adhere to the north, south, west, and east of the parent element.

> Note that the style's layout of a widget's class depends on the current theme (https://www.pythontutorial.net/tkinter/tkinter-theme/). If you change the theme, the layout may be different.

Element options

Each element has a list of options that specify the appearance of the element. To get the list of option names, you use the `element_options()` method of `Style` object:

```
style.element_options(styleName)
```

The following program shows the element options of the `Label.border`, `Label.padding`, and `Label.label` elements:

```
import tkinter as tk
from tkinter import ttk


class App(tk.Tk):
    def __init__(self):
        super().__init__()

        style = ttk.Style(self)

        # layout
        layout = style.layout('TLabel')
        print(layout)
```

```
        # element options
        print(style.element_options('Label.border'))
        print(style.element_options('Label.padding'))
        print(style.element_options('Label.label'))


if __name__ == "__main__":
    app = App()
    app.mainloop()
```

Output:

```
('relief',)
('padding', 'relief', 'shiftrelief')
('compound', 'space', 'text', 'font', 'foreground', 'underline', 'width', 'anc
```

In this output:

- The `Label.border` element has one option: `'relief'` .
- The `Label.padding` element has three options: `'padding'` , `'relief'` , and `'shiftrelief'` .
- The `Label.label` element has many options including `'font'` , `'foreground'` , `'with'` , etc.

Attributes of element options

To get a list of attributes associated with an element option, you use the `lookup()` method of the `Style` object:

```
style.lookup(layout_name, option_name)
```

The following example shows the attributes of the `font` , `foreground` , and `background` options in the `TLabel.label` element:

```
import tkinter as tk
from tkinter import ttk
```

```
class App(tk.Tk):
    def __init__(self):
        super().__init__()

        style = ttk.Style(self)

        # attributes of the font, foreground, and background
        # of the Label.label element
        print(style.lookup('Label.label', 'font'))
        print(style.lookup('Label.label', 'foreground'))
        print(style.lookup('Label.label', 'background'))


if __name__ == "__main__":
    app = App()
    app.mainloop()
```

Output:

```
TkDefaultFont
SystemWindowText
SystemButtonFace
```

As you can see clearly from the output, the `font` is `TkDefaultFont`, the `foreground` is `SystemWindowText`, and the `background` is `SystemButtonFace`.

Put it all together

The following shows how to change the appearance of a `Label` widget:

```
import tkinter as tk
from tkinter import ttk
```

```
class App(tk.Tk):
    def __init__(self):
        super().__init__()

        self.geometry('500x100')

        message = 'This is an error message!'

        label = ttk.Label(self, text=message, style='Error.TLabel')
        label.pack(expand=True)

        style = ttk.Style(self)

        style.configure('Error.TLabel', foreground='white')
        style.configure('Error.TLabel', background='red')
        style.configure('Error.TLabel', font=('Helvetica', 12))
        style.configure('Error.TLabel', padding=(10, 10))


if __name__ == "__main__":
    app = App()
    app.mainloop()
```

Summary

- A ttk widget is made up of elements. The `layout` determines how elements assembled the widget.
- Use the `Style.layout()` method to retrieve the layout of a widget class.
- Use the `Style.element_options()` method to get the element options of an element.
- Use the `Style.lookup()` method to get the attributes of an element option.