Craft Your Own GUIs with Python and Tkinter

# Penn State MacAdmins 2016

2016
MACADMINS
CONFERENCE
AT PENN STATE

JAMF software

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Talking Tkinter

Grab the source code for all examples here:

https://github.com/brysontyrrell

“MacAdmins-2016-Craft-GUIs-with-Python-and-Tkinter”

Talking Tkinter

Run the examples using:

```
/usr/bin/python example.py
```

Talking Tkinter

We are gathered here to talk about...

- Python and Tkinter
- Adding another tool to your toolbox

We aren't here to talk about...

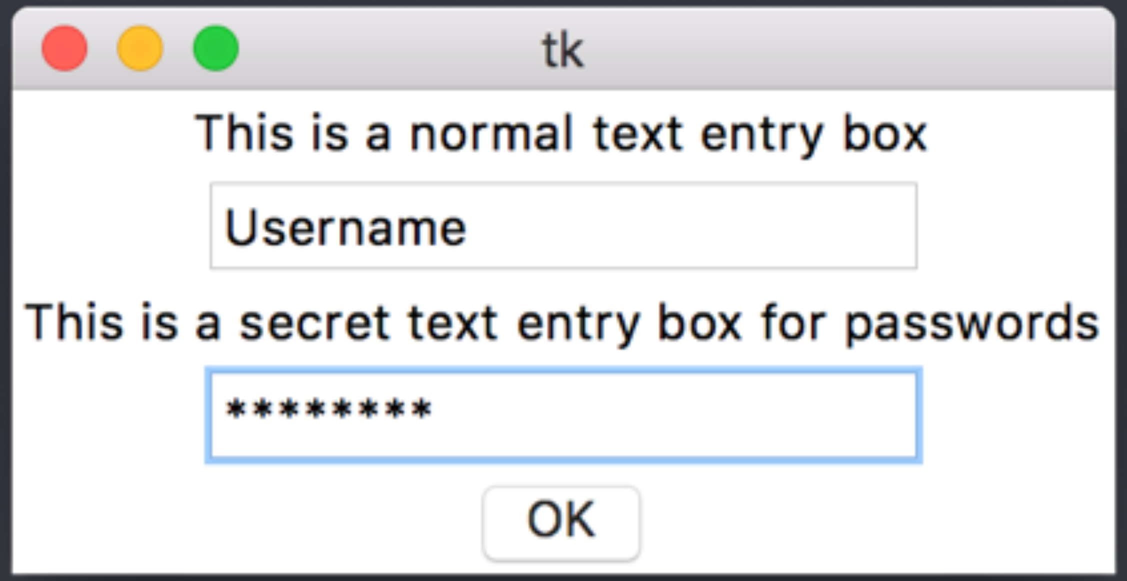
- Convincing you that Tkinter is the best option
- Not using other solutions

Talking Tkinter

What are some pros of using this toolkit?

- Python and Tkinter are standard on macOS
- All of your code can be in one file/script/program
- Your GUIs don't need to close to process actions

What comes with Tkinter?

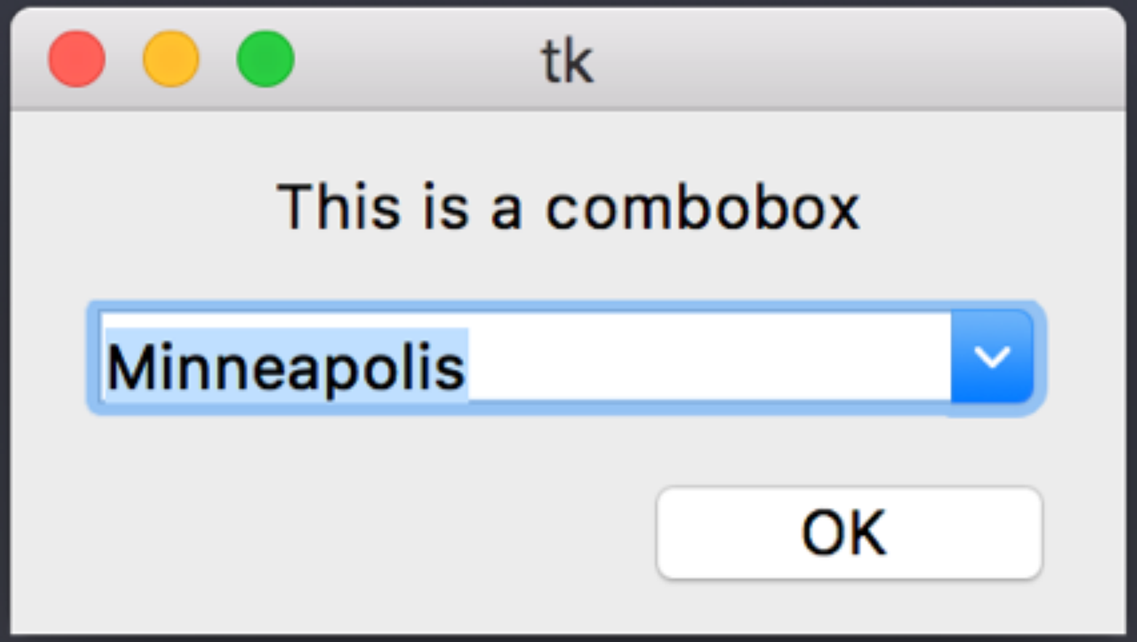


This is a normal text entry box

Username

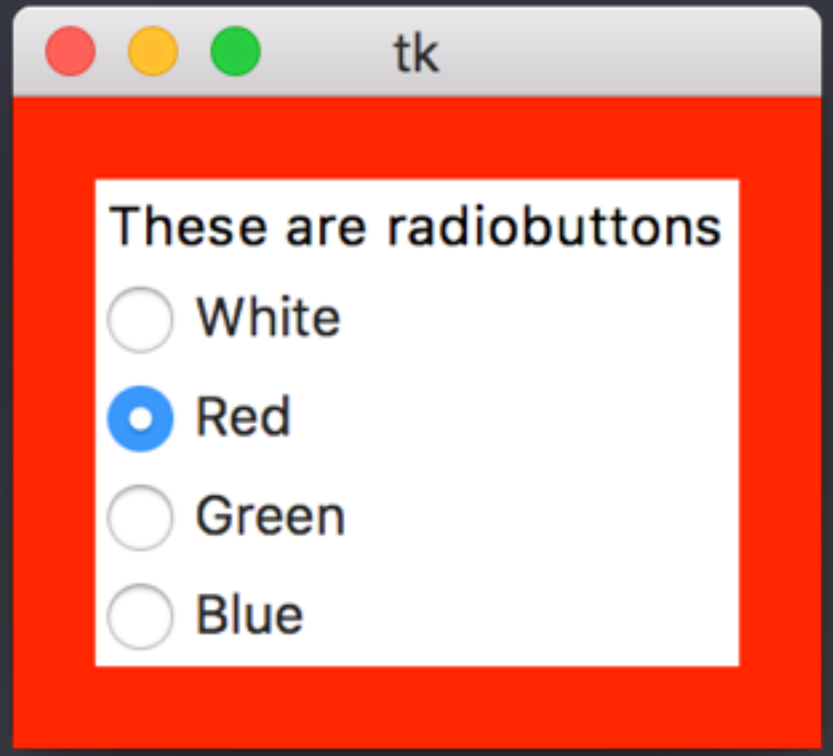
This is a secret text entry box for passwords

****



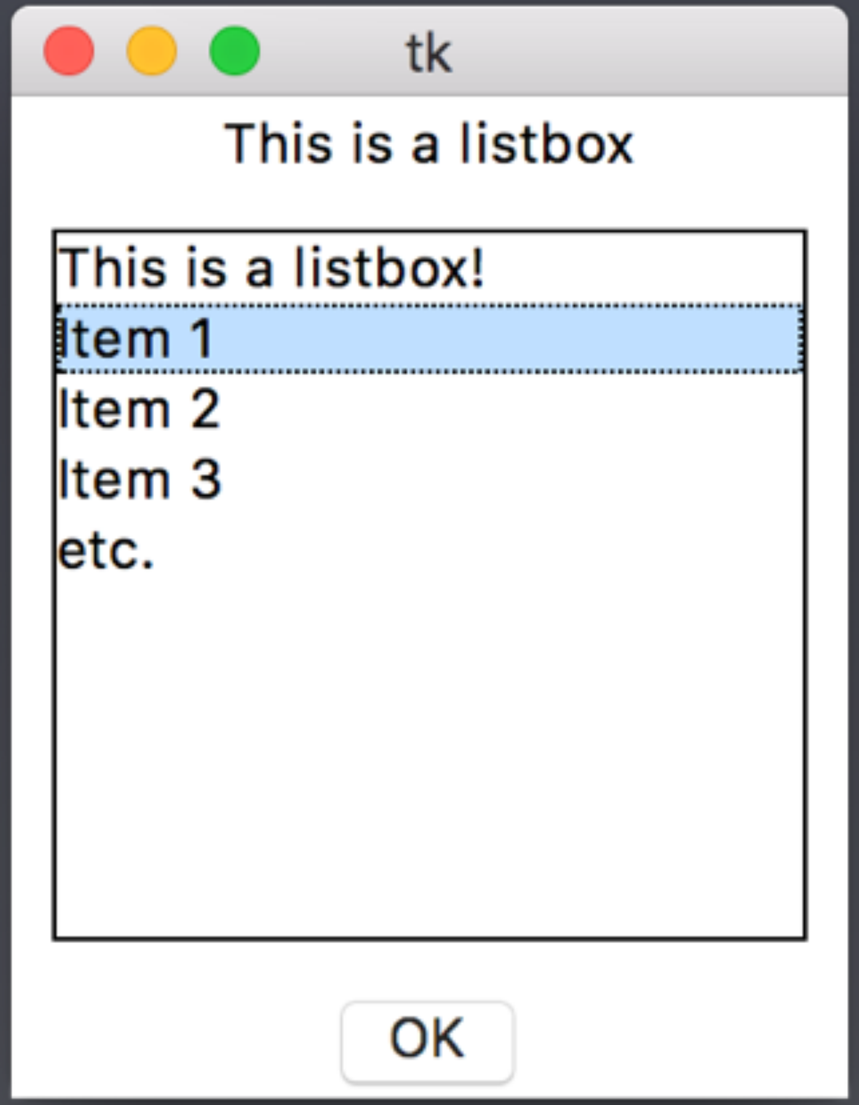
This is a combobox

Minneapolis



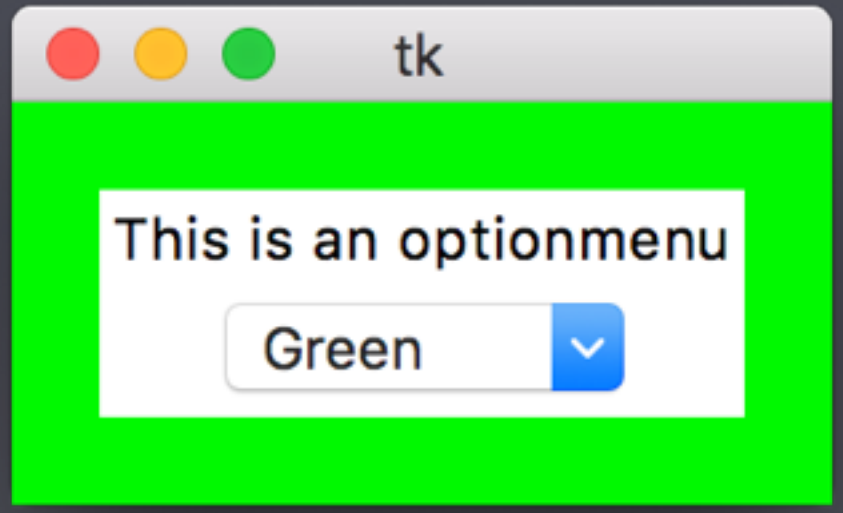
These are radiobuttons

White [✓ Red] Green Blue



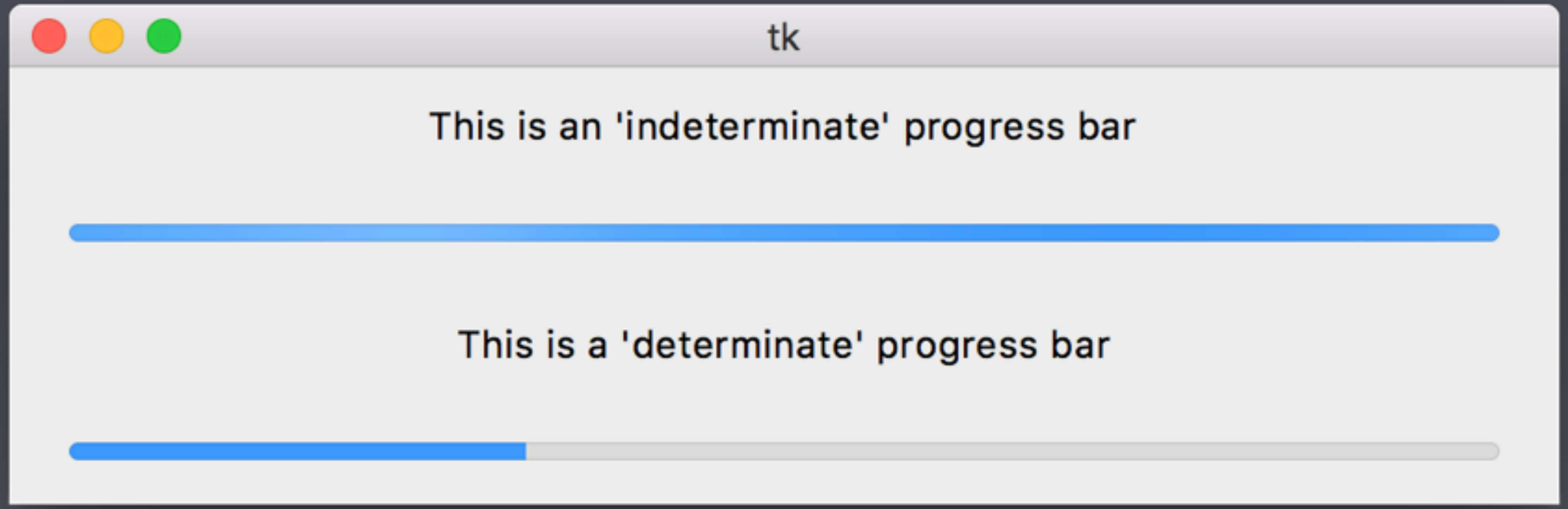
This is a listbox

This is a listbox!
Item 1
Item 2
Item 3
etc.



This is an optionmenu

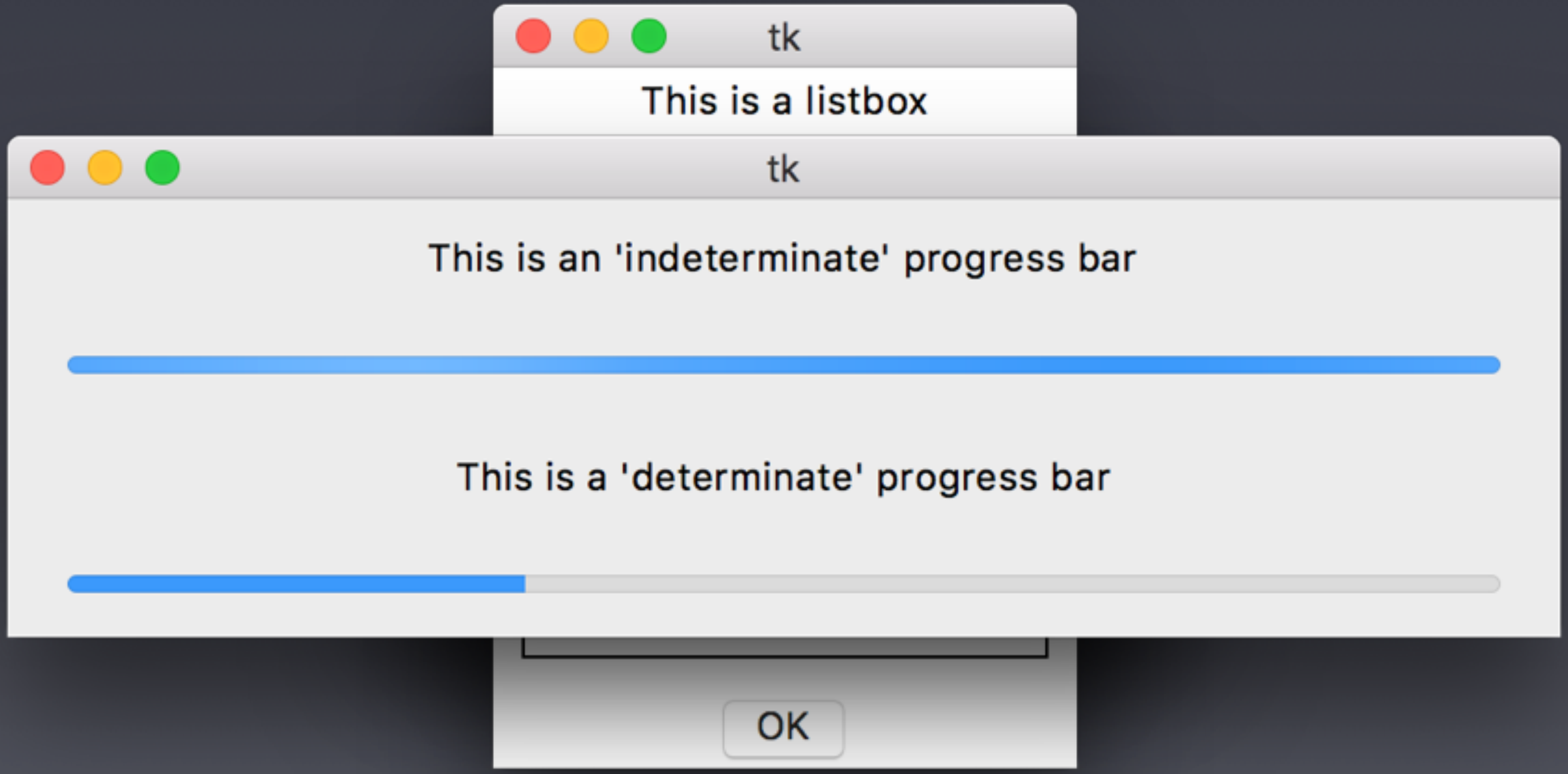
Green



This is an 'indeterminate' progress bar

This is a 'determinate' progress bar

What comes with Tkinter?



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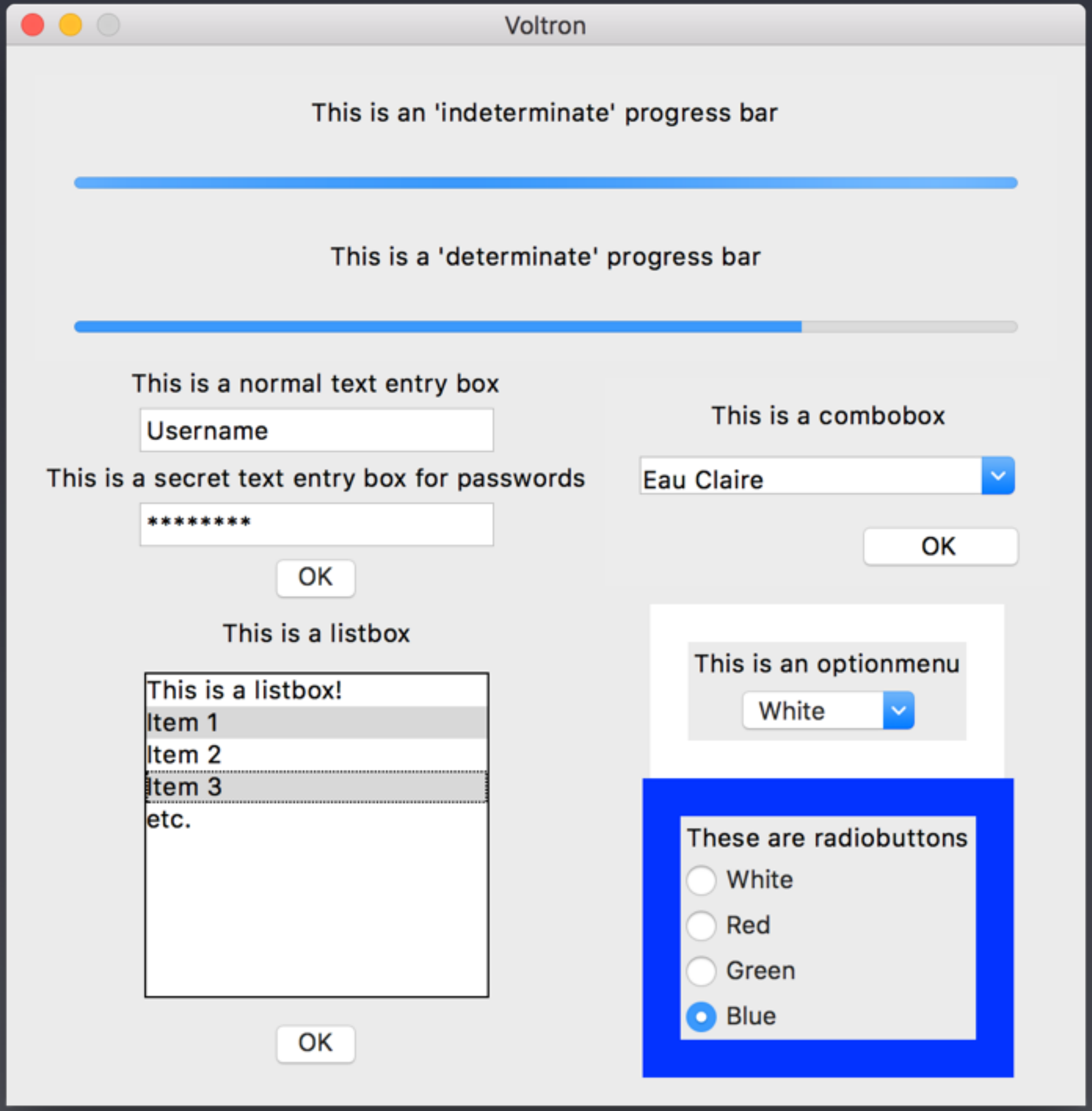
What comes with Tkinter?



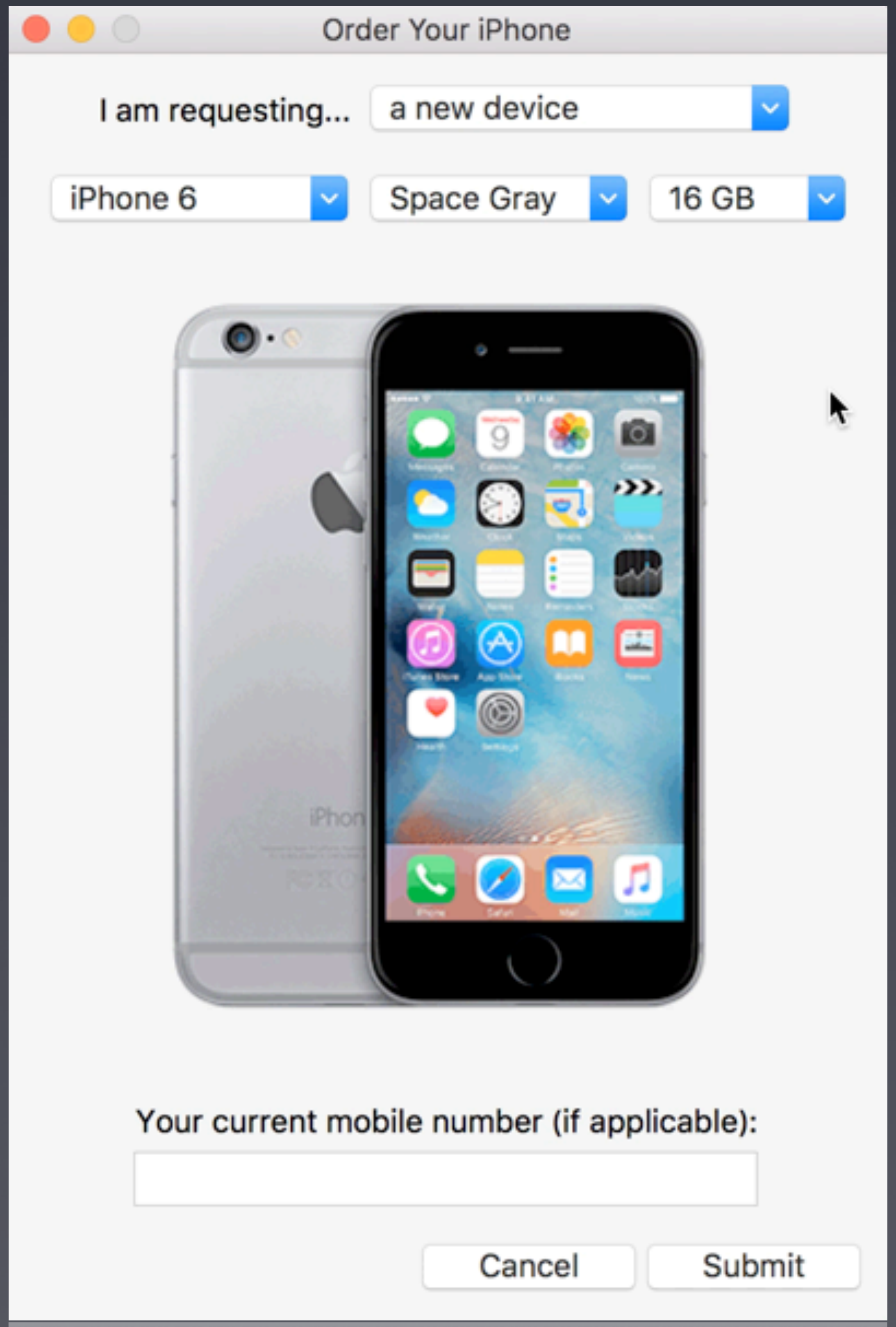
What comes with Tkinter?

- The examples in ‘Tkinter_Widget_Examples.py’ explore different widgets and different means of interacting with those widgets

- Several make use of Tkinter variables for storing and retrieving values from the inputs

- Comboboxes, Listboxes and OptionMenus can all be dynamically generated and updated using Python lists and dictionaries for mappings

The Things You Can Do



Order Your iPhone

I am requesting... a new device

iPhone 6 | Space Gray | 16 GB

Your current mobile number (if applicable):

Getting Started

‘Tkinter’ v. ‘ttk’

- ‘Tkinter’ is the base library that creates the GUI app and contains all the widgets
- ‘ttk’ is an add-on that provided themed versions of several Tkinter widgets and several special widgets not available in Tkinter

Getting Started

Creating a “boilerplate”

- Yes, there’s a bit of code to go with Tkinter
- The “boilerplate” is a basic template we will use as the base for any future GUI script

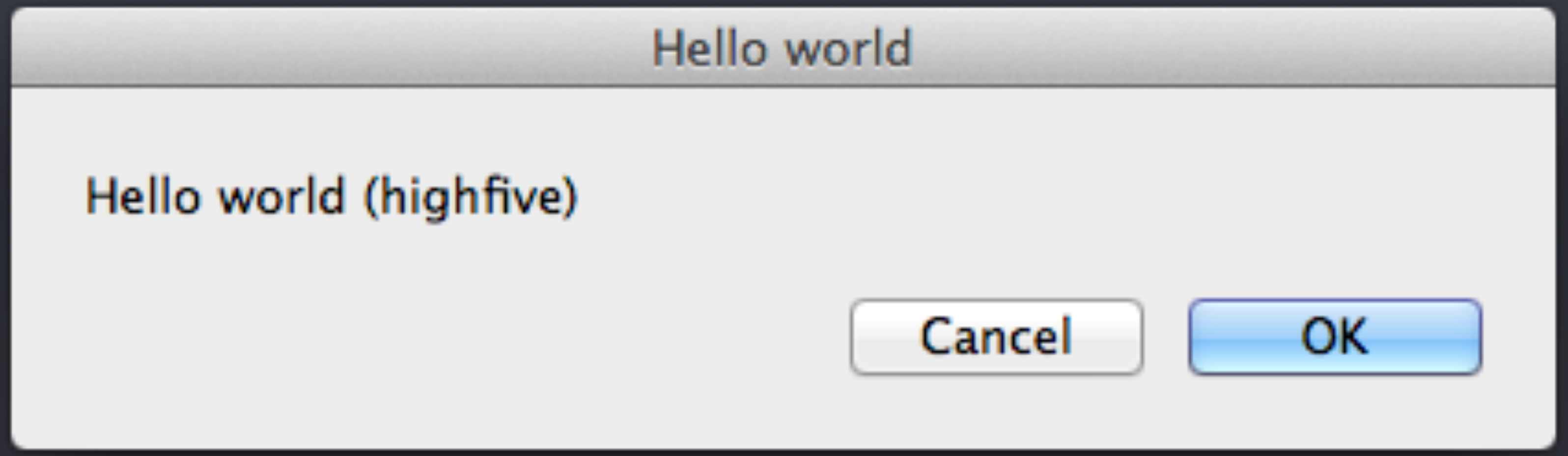
We’re going to do a walkthrough of this code

Basic and Ugly

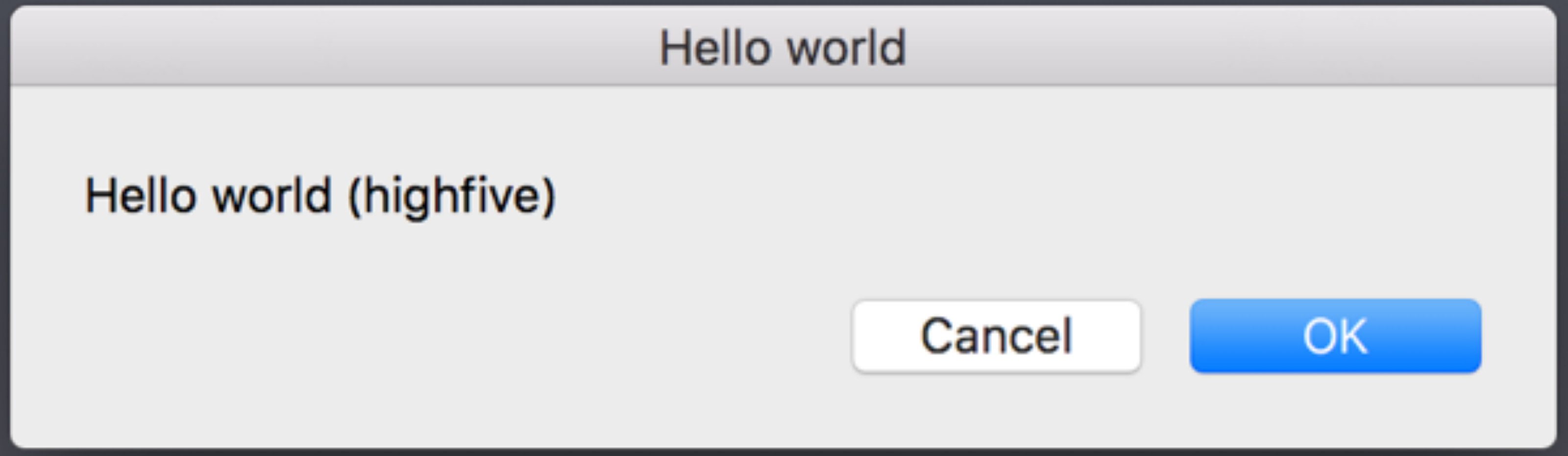
The boilerplate will try to match the basic look of an OS X modal dialog.

The dialog on the top is from Mavericks.

The dialog on the bottom is El Capitain.


Hello world

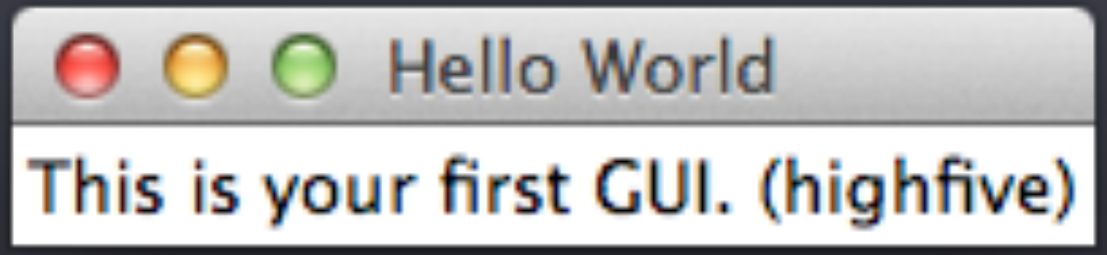
Hello world (highfive)


Hello world

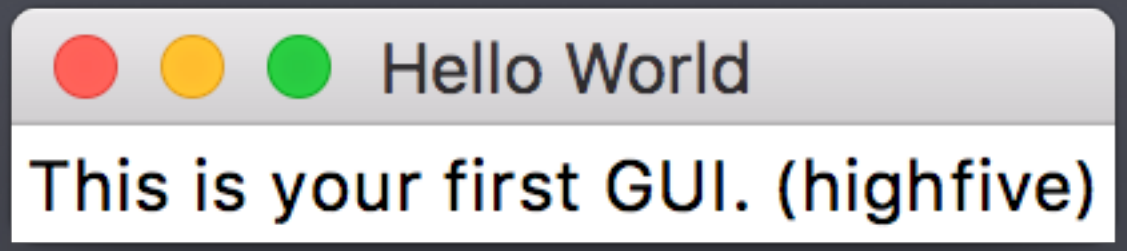
Hello world (highfive)

Basic and Ugly

```
import Tkinter as tk

class App(tk.Frame):
    def __init__(self, master):
        tk.Frame.__init__(self, master)
        self.pack()
        self.master.title("Hello World")

        tk.Label(self, text="This is your first GUI.
(highfive)").pack()


if __name__ == '__main__':
    root = tk.Tk()
    app = App(root)
    app.mainloop()
```



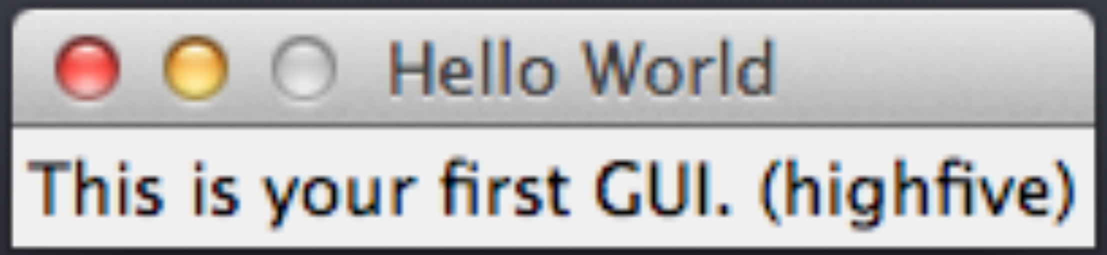
This is your first GUI. (highfive)



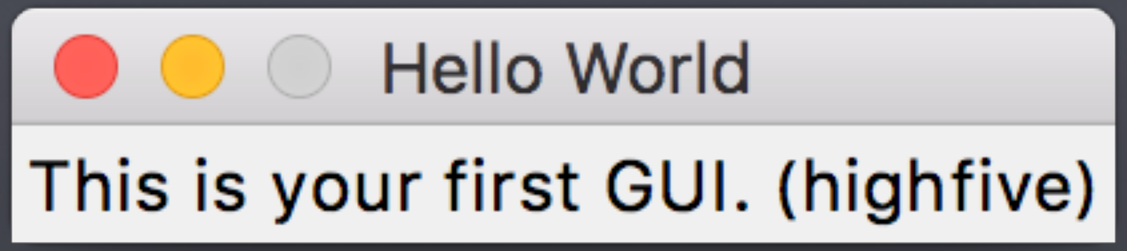
This is your first GUI. (highfive)

Basic Appearance

```
. . .
import subprocess

class App(tk.Frame):
    def __init__(self, master):
        . . .
        self.master.resizable(False, False)
        self.master.tk_setPalette(background='#ececec')

        x = (self.master.winfo_screenwidth() -
self.master.winfo_reqwidth()) / 2
        y = (self.master.winfo_screenheight() -
self.master.winfo_reqheight()) / 3
        self.master.geometry("+{}+{}".format(x, y))

        self.master.config(menu= tk.Menu(self.master))
        . . .

if __name__ == '__main__':
    . . .
    subprocess.call(['/usr/bin/osascript', '-e', 'tell app "Finder" to
set frontmost of process "Python" to true'])
    . . .
```


Hello World

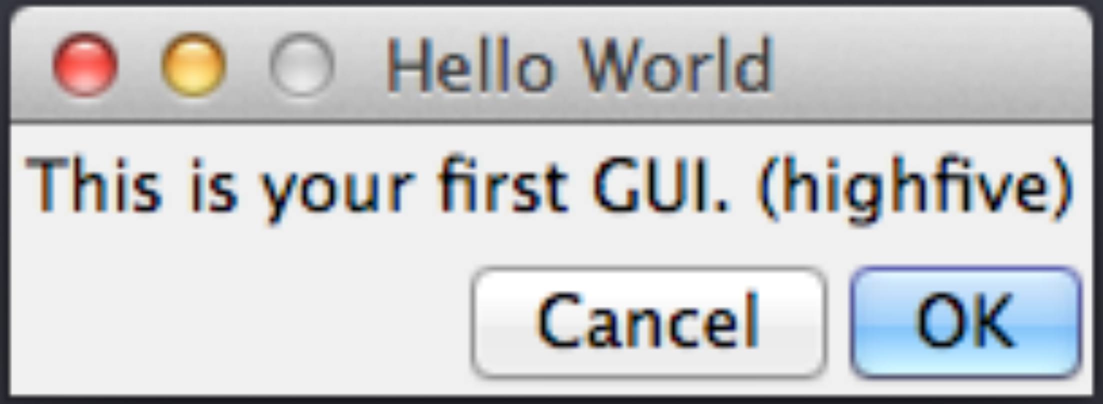
This is your first GUI. (highfive)

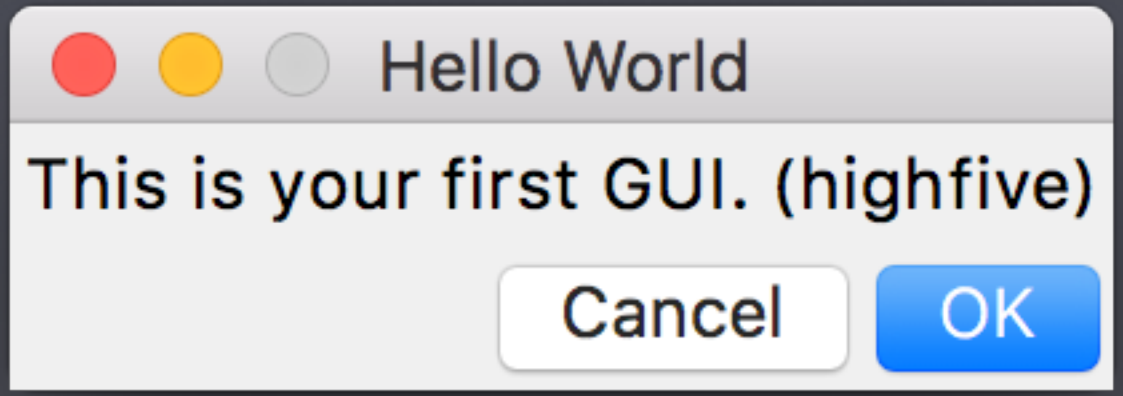

Hello World

This is your first GUI. (highfive)

OK and Cancel

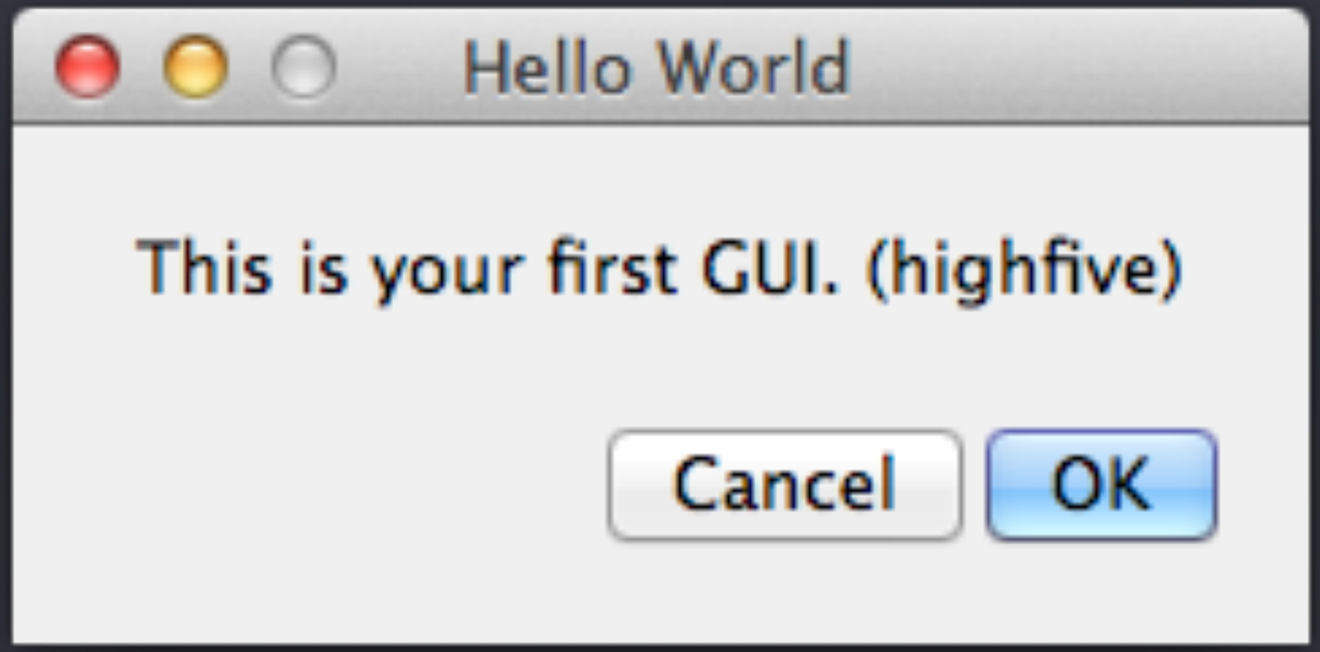
```
class App(tk.Frame):
    def __init__(self, master):
    . . .
    tk.Button(self, text='OK', default='active',
command=self.click_ok).pack(side='right')

    tk.Button(self, text='Cancel',
command=self.click_cancel).pack(side='right')
    . . .

def click_ok(self):
    print("The user clicked 'OK'")

def click_cancel(self):
    print("The user clicked 'Cancel'")
    self.master.destroy()
    . . .
```



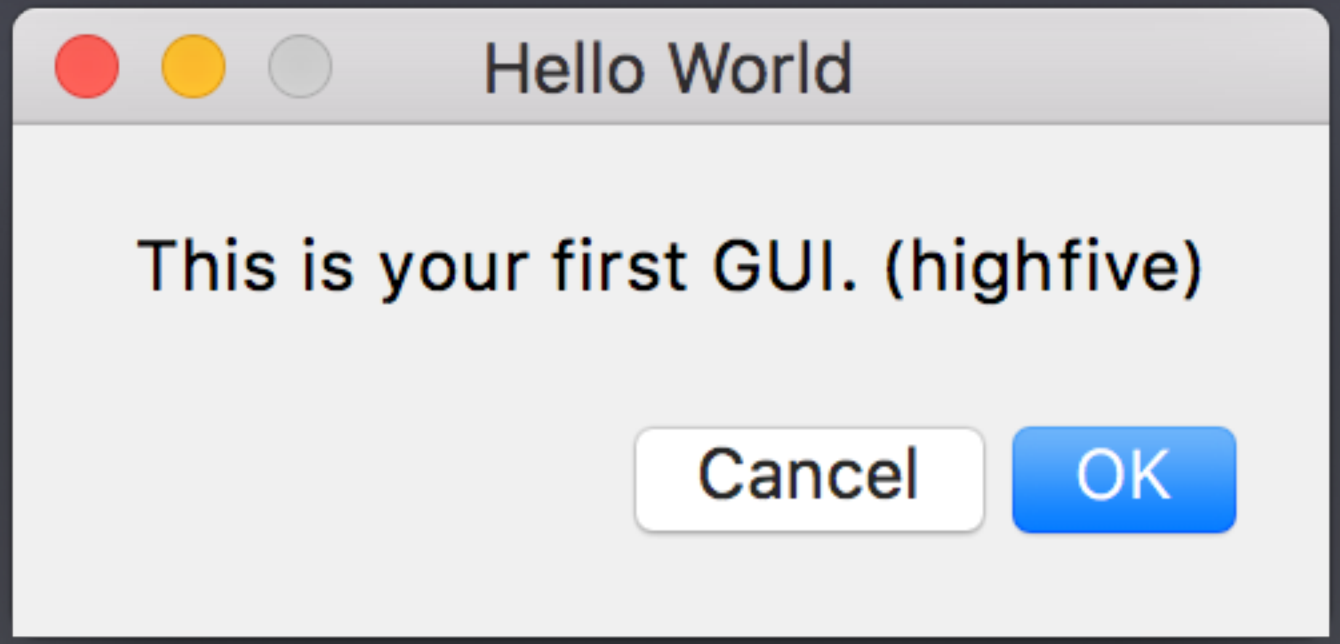


Organize With Frames

```
class App(tk.Frame):
    def __init__(self, master):
    . . .
    dialog_frame = tk.Frame(self)
    dialog_frame.pack(padx=20, pady=15)

    tk.Label(dialog_frame, text="This is your first GUI.
(highfive)").pack()

    button_frame = tk.Frame(self)
    button_frame.pack(padx=15, pady=(0, 15), anchor=‘e')

    tk.Button(button_frame, text='OK', default='active',
command=self.click_ok).pack(side=‘right')

    tk.Button(button_frame, text='Cancel',
command=self.click_cancel).pack(side='right')
    . . .
```


Hello World

This is your first GUI. (highfive)


Hello World

This is your first GUI. (highfive)

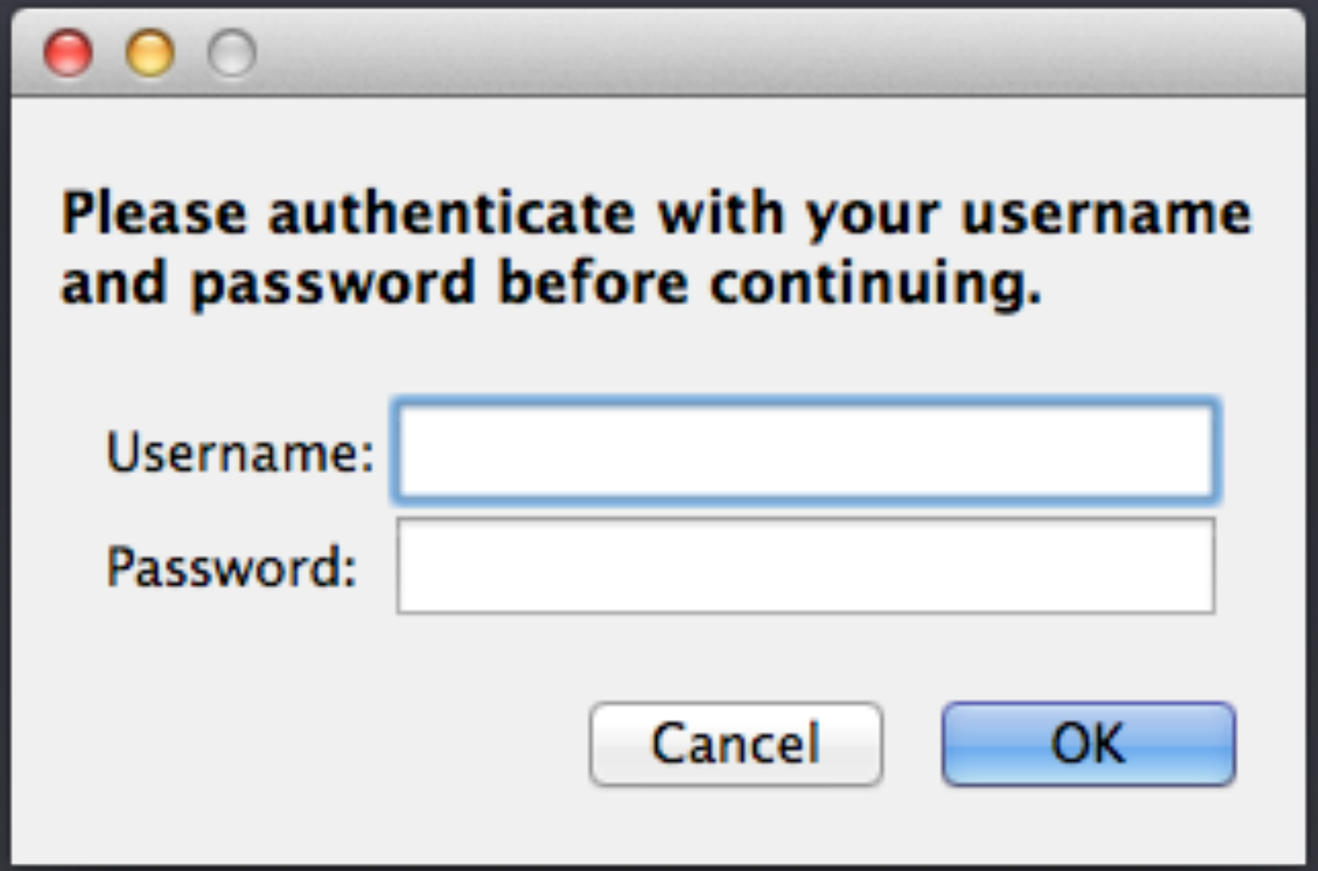
Final Touches

```
import AppKit
. . .

class App(tk.Frame):
    def __init__(self, master):
        . . .
        self.master.protocol('WM_DELETE_WINDOW', self.click_cancel)
        self.master.bind('<Return>', self.click_ok)
        self.master.bind('<Escape>', self.click_cancel)
        . . .

if __name__ == '__main__':
    info = AppKit.NSBundle.mainBundle().infoDictionary()
    info['LSUIElement'] = True
    . . .
```

Example Time

We’re going to check out two example Tkinter GUI prompts that use more advanced options built on top of our boilerplate code.

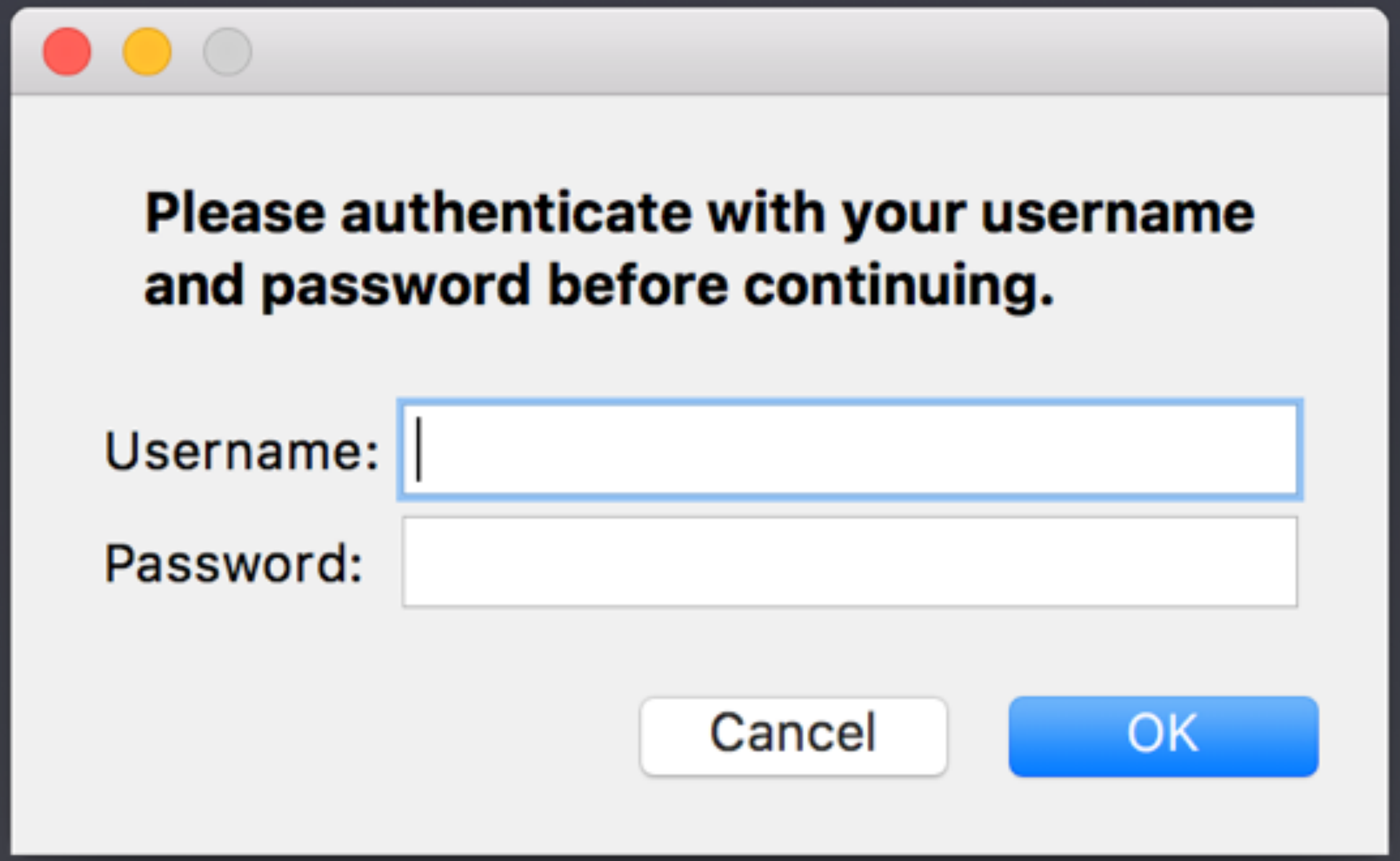
Password Prompt



Please authenticate with your username and password before continuing.

Username:

Password:



Please authenticate with your username and password before continuing.

Username:

Password:

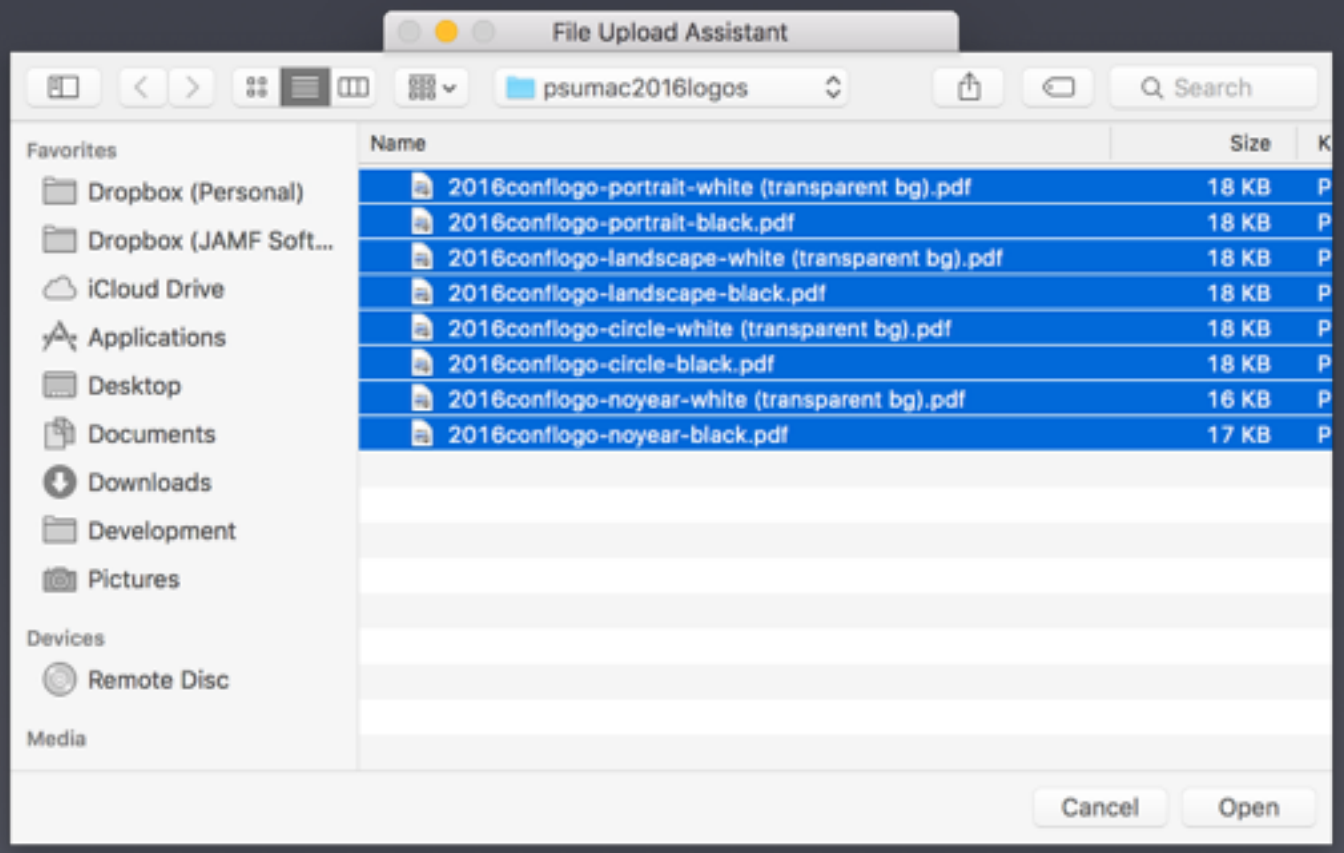
Password Prompt

```
class App(tk.Frame):
    def __init__(self, master):
        . . .

        tk.Message(self, text="Please authenticate with your username and password before 
continuing.”, font='System 14 bold', justify='left', aspect=800).pack(pady=(15, 0))
        . . .
```

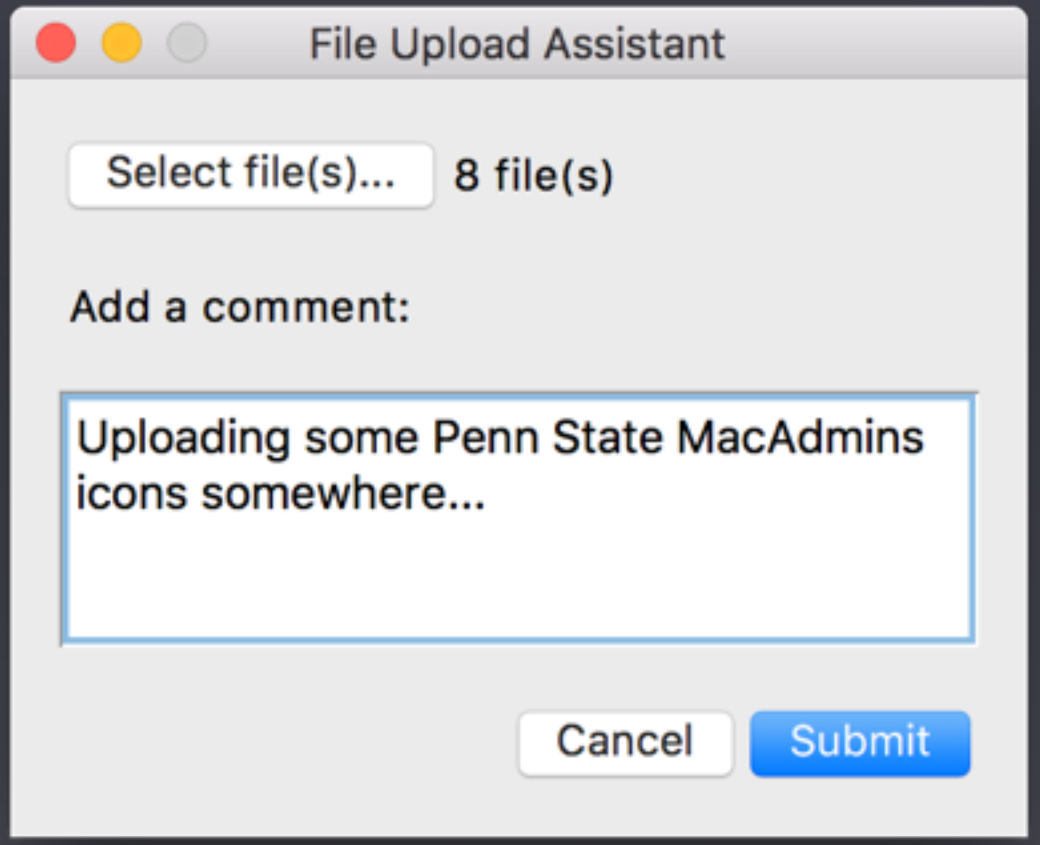
Password Prompt

```
        dialog_frame = tk.Frame(self)
        dialog_frame.pack(padx=20, pady=15, anchor='w')

        tk.Label(dialog_frame, text='Username:').grid(row=0, column=0, sticky='w')

        self.user_input = tk.Entry(dialog_frame, background='white', width=24)
        self.user_input.grid(row=0, column=1, sticky='w')
        self.user_input.focus_set()

        tk.Label(dialog_frame, text='Password:').grid(row=1, column=0, sticky='w')

        self.pass_input = tk.Entry(dialog_frame, background='white', width=24, show='*')
        self.pass_input.grid(row=1, column=1, sticky='w')
        . . .

    def click_ok(self, event=None):
        print("The user clicked 'OK':\nUsername: {}\nPassword: {}".format(self.user_input.get(),
self.pass_input.get()))
```

File Uploader



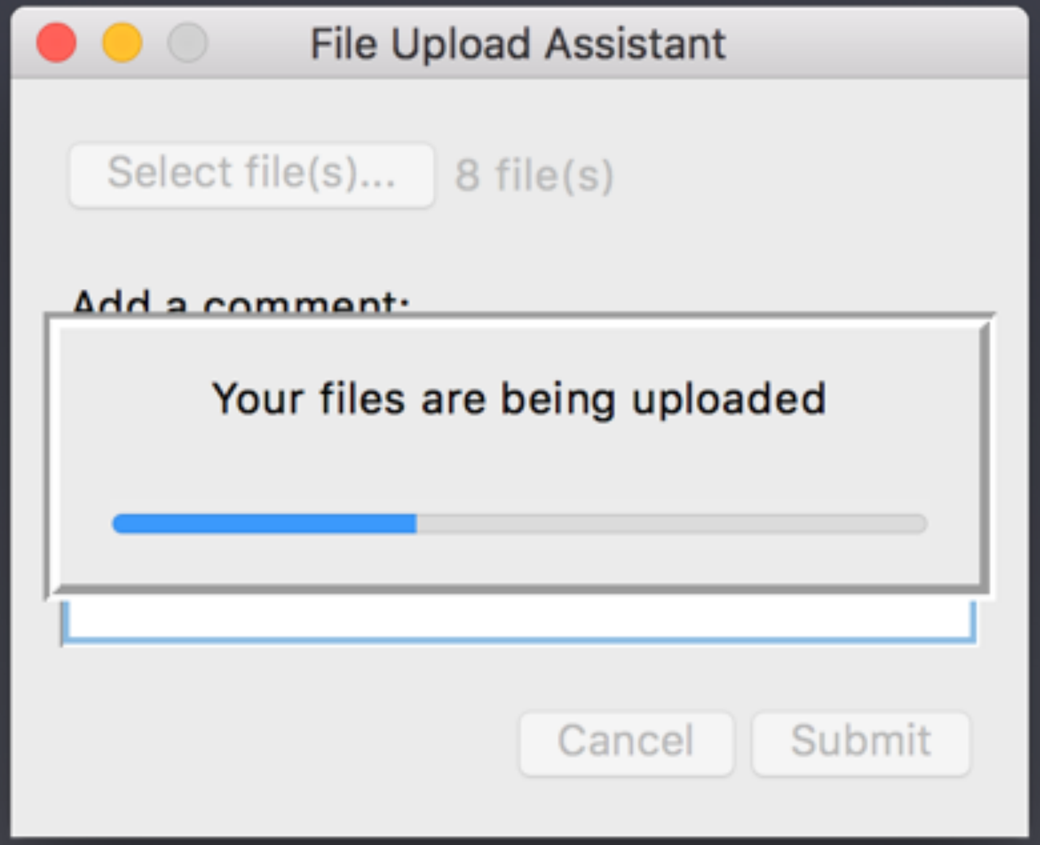
Name	Size	K
2016conflogo-portrait-white (transparent bg).pdf	18 KB	P
2016conflogo-portrait-black.pdf	18 KB	P
2016conflogo-landscape-white (transparent bg).pdf	18 KB	P
2016conflogo-landscape-black.pdf	18 KB	P
2016conflogo-circle-white (transparent bg).pdf	18 KB	P
2016conflogo-circle-black.pdf	18 KB	P
2016conflogo-noyear-white (transparent bg).pdf	16 KB	P
2016conflogo-noyear-black.pdf	17 KB	P



8 file(s)

Add a comment:

Uploading some Penn State MacAdmins icons somewhere...



8 file(s)

Your files are being uploaded

File Uploader

```
. . .
self.file_count = tk.StringVar(value='')
. . .
self.file_label = tk.Label(file_frame, textvariable=self.file_count, anchor='e')
self.file_label.pack(side='right')

tk.Label(self, text="Add a comment:").pack(padx=15, pady=(15, 0), anchor='w')

text_frame = tk.Frame(self, borderwidth=1, relief='sunken')
text_frame.pack(padx=15, pady=15)

self.text = tk.Text(text_frame, width=30, height=4, highlightbackground='#ffffff',
highlightcolor="#7baedc",
                    bg='#ffffff', wrap=tk.WORD, font=("System", 14))
self.text.focus_set()
self.text.pack()
. . .
```

File Uploader

```
. . .
import tkFileDialog
. . .

def file_picker(self):
    self.selected_files = tkFileDialog.askopenfilenames(parent=self)
    self.file_count.set('{} file(s)'.format(len(self.selected_files)))
    . . .
```

File Uploader

```
. . .
def _toggle_state(self, state):
    state = state if state in ('normal', 'disabled') else 'normal'
    widgets = (self.file_button, self.file_label, self.text, self.submit_button,
self.cancel_button)
    for widget in widgets:
        widget.configure(state=state)
    . . .
```

File Uploader

```
. . .
class LoadingFrame(tk.Frame):
    def __init__(self, master, count):
        tk.Frame.__init__(self, master, borderwidth=5, relief='groove')
        self.grid(row=0, column=0)

        tk.Label(self, text="Your files are being uploaded").pack(padx=15, pady=10)

        self.progress = ttk.Progressbar(self, orient='horizontal', length=250, 
mode='determinate')
        self.progress.pack(padx=15, pady=10)
        self.progress['value'] = 0
        self.progress['maximum'] = count
        . . .
```

File Uploader

```
. . .
def click_submit(self, event=None):
    print("The user clicked 'OK'")
    comment = self.text.get('1.0', 'end')

    if comment.rstrip():
        print('The user entered a comment:')
        print(comment.rstrip())

    if self.selected_files:
        loading = LoadingFrame(self.master, len(self.selected_files))
        self._toggle_state('disabled')
        print('The user has selected files:')
        for path in self.selected_files:
            loading.progress['value'] += 1
            self.update()
            print 'File {}/{}'.format(loading.progress['value'], loading.progress['maximum'])
            time.sleep(2)
            with open(path) as f:
                print('Opened file: {}: {}'.format(path, f))

        print('Loading screen finished')
        loading.destroy()
        self._toggle_state('normal')
        . . .
```

Interested in More?

Official python.org Docs
https://docs.python.org/2/library/tkinter.html

Stack Overflow
http://stackoverflow.com/questions/tagged/tkinter

Effbot (old Tkinter docs)
http://effbot.org/tkinterbook/

TkDocs (new Tkinter docs)
http://www.tkdocs.com/

Thank you!

Q&A?