Code Examples for Lecture 5

Example: Nested-Widget

```
import tkinter as tk
from tkinter import ttk

root = tk.Tk()
root.title("Container Example")
style = ttk.Style()
style.configure(".", font=("Arial",24))
top = ttk.Frame(name="top", borderwidth=5, padding=5, relief="ridge")
bottom = ttk.Frame(name="bottom", borderwidth=5, padding=5, relief="ridge")
inner = ttk.Frame(bottom, name="inner", borderwidth=5, padding=5, relief="ridge")
ttk.Label(top, name="label1", text="Label 1: Inside top frame").pack()
ttk.Label(top, name="label2", text="Label 2: Inside top frame").pack()
ttk.Label(bottom, name="label3", text="Label 3: Inside bottom frame").pack()
ttk.Label(inner, name="label4", text="Label 4: Inside inner frame").pack()
btn_quit = ttk.Button(name="quit", text="Quit", command=root.destroy)
top.pack(fill=tk.BOTH)
bottom.pack(fill=tk.BOTH)
inner.pack(fill=tk.BOTH)
btn_quit.pack()

root.mainloop()
```

Widget Hierarchy Inspection Function

```
def dump_widget(widget, indent=0):
    print((" "*indent) + str(widget))
    for w in widget.winfo_children():
        dump_widget(w, indent+2)
```

Example: TopLevel Widget

```
import tkinter as tk

root = tk.Tk()
root.title("The Root Window")
win1 = tk.Toplevel()
win1.title("Window 1")
win2 = tk.Toplevel()
win2.title("Window 2")

root.mainloop()
```

Example: Feet-to-Meters Application ("pack" version)

```
import tkinter as tk
from tkinter import ttk

class App(tk.Frame):
    def __init__(self, parent):
        super().__init__(parent)
        self.mainframe = ttk.Frame(root)
        self.mainframe.pack()

        self.feet = tk.StringVar()
        self.meters = tk.StringVar()
        self.feet_entry = ttk.Entry(self.mainframe, width=7,
                                    textvariable=self.feet)
        self.feet_entry.pack()
        ttk.Label(self.mainframe, text="feet").pack()
        ttk.Label(self.mainframe, text="is equivalent to").pack()
        ttk.Label(self.mainframe, textvariable=self.meters).pack()
        ttk.Label(self.mainframe, text="meters").pack()
        ttk.Button(self.mainframe, text="Calculate",
                   command=self.calculate).pack()

        self.feet_entry.focus()
        self.feet_entry.bind("<Return>", self.calculate)

    def calculate(self, *args):
        try:
            value = float(self.feet.get())
            self.meters.set(int(0.3048 * value * 10000.0 + 0.5)/10000.0)
        except ValueError:
            pass

if __name__ == "__main__":
    root = tk.Tk()
    root.title("Feet to Meters")
    app = App(root)
    root.mainloop()
```

Example: Canvas Creation

```
import tkinter as tk

root = tk.Tk()
root.title("Canvas Example")
frame = tk.Frame()
frame.pack()
canvas = tk.Canvas(frame, width=500, height=400, background='gray75')
canvas.pack()

root.mainloop()
```

Example: Creating Canvas Items

```
import tkinter as tk

root = tk.Tk()
root.title("Canvas Example")
frame = tk.Frame()
frame.pack()
canvas = tk.Canvas(frame, width=500, height=400, background='gray75')
canvas.pack()

canvas.create_rectangle(100, 100, 200, 200,
    width=2, fill="lightblue")

canvas.create_oval(120, 120, 140, 150,
    width=3, fill="lightgray", outline="green")

canvas.create_oval(160, 120, 180, 150,
    width=3, fill="lightgray", outline="green")

canvas.create_line(120, 175, 180, 175,
    width=10, fill="brown")

canvas.create_text(150, 210, text='Hello, World!',
    anchor='n', fill='red', font=("Arial",30))

root.mainloop()
```

Example: Turtle Graphics Integration

```
import turtle
import tkinter as tk

def draw():
    for i in range(5):
        turtle.forward(150)
        turtle.right(144)

root = tk.Tk()
canvas = tk.Canvas(width=400, height=400, bg="black")
canvas.grid(column=0,row=0,columnspan=3)
turtle = turtle.RawTurtle(canvas)
turtle.pencolor("green")
turtle.width(3)
turtle.shape("turtle")
tk.Button(text="Draw", command=draw).grid(column=0,row=1)
tk.Button(text="Reset", command=turtle.reset).grid(column=1,row=1)
tk.Button(text="Quit", command=root.destroy).grid(column=2,row=1)

root.mainloop()
```

Example: Matplotlib Integration

```
import tkinter as tk
import matplotlib
matplotlib.use('TkAgg')
from matplotlib.backends.backend_tkagg import FigureCanvasTkAgg
from matplotlib.figure import Figure
import numpy as np

def plot1(canvas, axes):
    axes.clear()
    x = np.arange(100)
    axes.plot(x,x**2)
    canvas.draw()

def plot2(canvas, axes):
    axes.clear()
    x = np.arange(0,2*np.pi,0.1)
    axes.plot(x,np.sin(x))
    canvas.draw()

root = tk.Tk()
root.title("Matplotlib Integration")

# create Matplotlib figure and plotting axes
fig = Figure()
ax = fig.add_subplot()

# create a canvas to host the figure and place it into the root window
canvas = FigureCanvasTkAgg(fig, master=root)
canvas.get_tk_widget().grid(column=0, row=0, columnspan=3)

# create a few action buttons
tk.Button(text="Plot1", command=lambda: plot1(canvas,ax)).grid(column=0, row=1)
tk.Button(text="Plot2", command=lambda: plot2(canvas,ax)).grid(column=1, row=1)
tk.Button(text="Quit", command=root.destroy).grid(column=2, row=1)

root.mainloop()
```