Tkinter:
Input and Output

Thomas Schwarz, SJ

Tkinter Variables

- Tkinter contains a useful mechanism to connect widgets to variables
    - This allows us to have variables change when widgets do and vice versa

Variable Classes

- Create TkInter variables: `var = StringVar()`
- Use set and get to write and read
  - `var.set("hi")  var.get()`
- Can use trace to attach an observing callback function
  - `var.trace("w", callback)`

Input / Output in Tkinter

- Entry widget allows user to enter text in tkinter
- Create widget with entry box plus four buttons
- Changes distances between miles and kilometers and yards and meters

Distance Calculator

- Create window with a string tkinter variable

```
import tkinter as tk

class MyApp:
    dictionary = {"km2m": 0.621371, "m2km": 1.60934,
                  "m2y": 1.09361, "y2m": 0.9144}
    def __init__(self):
        MyApp.main_window = tk.Tk()
        MyApp.main_window.title("Converter")
        MyApp.entry_variable = tk.StringVar()
        MyApp.entry_variable.set("hello")
        MyApp.make_widgets()
        MyApp.main_window.mainloop()
```

Distance Calculator

- Create widgets:
  - Entry box connected to the tkinter variable we just defined via textvariable

```
def make_widgets():
        MyApp.entry = tk.Entry(MyApp.main_window,
                textvariable=MyApp.entry_variable)
        MyApp.entry.grid(row=0, column =0, columnspan = 4)
        MyApp.button1 = tk.Button(MyApp.main_window, text="KM2M",
                        command = lambda : MyApp.callback("km2m"))
        MyApp.button1.grid(row=1, column = 0)
        MyApp.button2 = tk.Button(MyApp.main_window, text="M2KM",
                        command = lambda : MyApp.callback("m2km"))
        MyApp.button2.grid(row=1, column = 1)
        MyApp.button3 = tk.Button(MyApp.main_window, text="M2Y",
                          command = lambda : MyApp.callback("m2y"))
        MyApp.button3.grid(row=1, column = 2)
        MyApp.button4 = tk.Button(MyApp.main_window, text="Y2M",
```

Distance Calculator

- Create a bunch of buttons and place them
- Use the lambda trick to pass the parameter to callback

```
MyApp.button1 = tk.Button(MyApp.main_window, text="KM2M",
                          command = lambda : MyApp.callback("km2m"))
MyApp.button1.grid(row=1, column = 0)
MyApp.button2 = tk.Button(MyApp.main_window, text="M2KM",
                command = lambda : MyApp.callback("m2km"))
MyApp.button2.grid(row=1, column = 1)
MyApp.button3 = tk.Button(MyApp.main_window, text="M2Y",
                command = lambda : MyApp.callback("m2y"))
MyApp.button3.grid(row=1, column = 2)
MyApp.button4 = tk.Button(MyApp.main_window, text="Y2M",
                 command = lambda : MyApp.callback("y2m"))
MyApp.button4.grid(row=1, column = 3)
```

Distance Calculator

- Get the string from the string tkinter variable
  - Convert it to a number (if possible)
  - Change in the required manner
  - Reset the text in the Entry box

```
def callback(cmd):
        number = MyApp.entry_variable.get()
        try:
            num = float(number)
            MyApp.entry_variable.set("{:7.3f}".format(round(num *
                                        MyApp.dictionary[cmd],3)))
        except:
            MyApp.entry_variable.set("Error")
```