Making a simple GUI in Python

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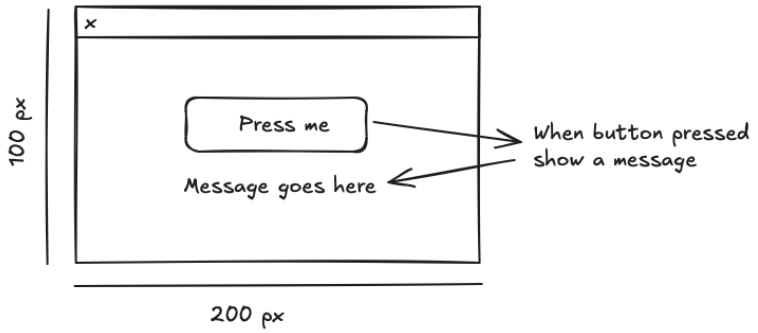
1 Introduction

We are going to have a quick look at creating a program with a user interface. This makes use of a Python package called TKinter.

Let's start with the simplest UI I can think of that does something. So like many user interfaces I start with a sketch of what I'm trying to create. We simply want a button that when I press it shows a message. I've also decided how big I want the window to be.



So let's start VSCode and create a program called simpleUI.py then enter the following code.

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```
1  from tkinter import *
2
3  # this function is what will be called when the button is pressed
4  def button_press():
5      msg = Label(window, text= "You pressed the button")
6      msg.place(x=30, y=50)
7      button.configure(bg="red", fg="yellow")
8
9  # Create the application window
10 window = Tk()
11 window.geometry("200x100")
12
13 # Create a window and add it to the window
14 button = Button(text = "Press me", command = button_press)
15 button.place(x=30, y= 20, width=120, height=25)
16
17 # loop means the program keeps running
18 window.mainloop()
```

Let's look through the program. Before we can use tkinter we need to include the package and this is what we do on the first line.

Next we are going to write the functions that are going to be called when 'events' happen. Events are 'raised' when the user interacts with the interface. As you'll see most of this event handling is hidden from us with tkinter.

On line 4 we define our one and only function for this program and give it a meaningful name. In this case we call it button_press.

On line 5 we create a tkinter Label element and save this in a variable called message. We provide it two parameters, the window it will appear in and the text we want to display.

Line 6 then tells the interface where, within the window, we want the label placed.

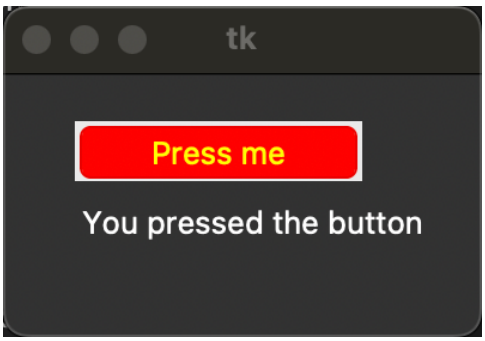
Then, just for fun, we will get the button to change it's background (bg) and foreground (fg) colours.

Ok so now we have the event handler we can create the main window. This happens on lines 10 and 11.

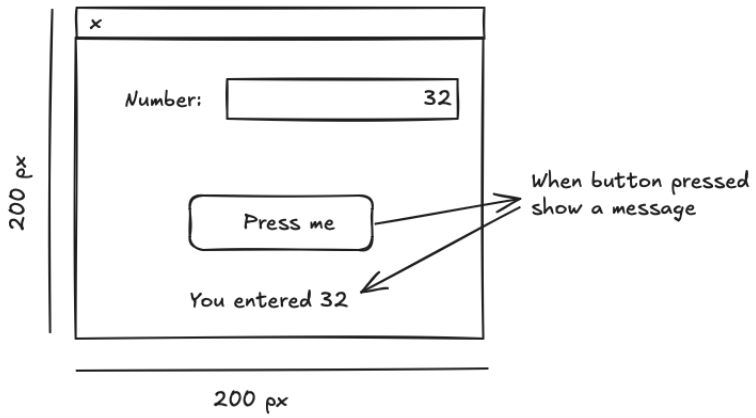
Next we create a button, line 14, and associate the event handler function with it. Then we `place` it in the window and tell it what size it is.

Finally, line 18, we call the windows `mainloop` function so that it keeps checking for events.

When we run the program we will see a small window (200 x 100 pixels) with a single button. When we press the button the button will change colour and a text message will be shown under the button.



OK so let's make the program a little more interesting. We'll get some information from the user. This requires us to use an `entry` box. Again I'll start by sketching out what I want.



So, we need to ...

1. change the size of the window
2. move the button down
3. move the message down
4. add a label to the window
5. add a data entry box to the window
6. change what is printed to include the text from the data entry box.

So ammend your program to look like this.

```
from tkinter import *
# only include the next line if on a mac
from tkmacosx import Button

def button_press():
    msg = Label(window, text= f"You entered {entry_box.get()}")
    msg.place(x=30, y=120)
    button.configure(bg="red", fg="yellow")

window = Tk()
window.geometry("200x200")
button = Button(text = "Press me", command = button_press)
button.place(x=30, y= 80, width=120, height=25)

prompt = Label(text = "Number:")
prompt.place(x = 10, y= 30)

entry_box = Entry(text=0)
entry_box.place(x = 70, y=30, width = 120, height = 25)
window.mainloop()
```

Challenge 1.

Create a program that will ask for two numbers and print out their sum when you press the button.

Challenge 2.

There are many controls in tkinter. Can you use the following commands in your code and explain what they do?

```
window.title("My Program")

text_box = Text(width= 20, height=10)
```