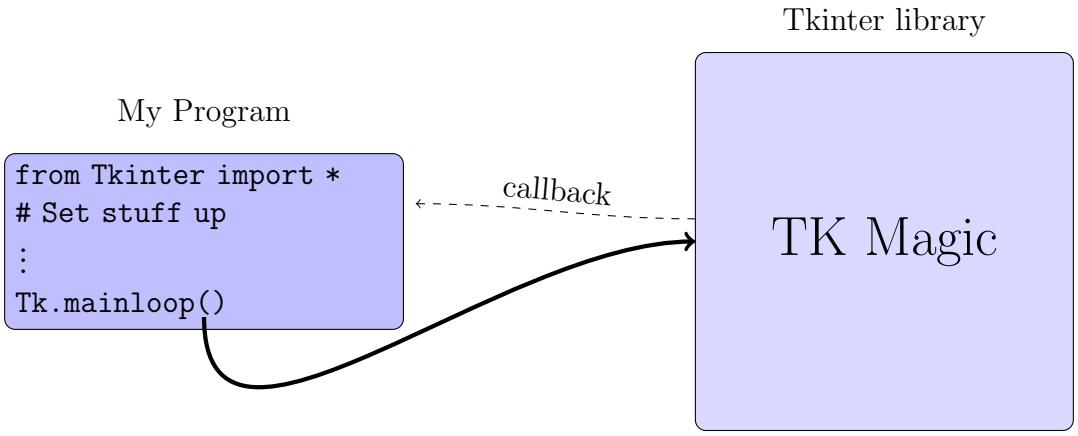
4330 Assignment 10 *

June 4, 2020

Write your code for the following problems in a single file named:

`hw10-`*`lastname`*`.py`

The typical model for a program with a Graphical User Interface (GUI) using the Tkinter library is as follows: we write our program which sets up everything we will want to do, and then we cede control to an *event handling loop* within the TK library:



The TK library will then take care of all the interaction with the operating system, and handle things like redrawing or resizing a window when necessary and catching mouse and keyboard activity. The idea is that if we wish our program to do something specific with some of these events (e.g., maybe a mouse click on a certain button), we will register a *callback function* in our setup code. For example, consider the following two lines of code which might be in our program:

```
Mybutton = Button(text="Foo", command=bar)
Mybutton.pack()
```

The first line creates an abstract `Button` object, having a text property equal to `"Foo"`, and associates it with a function called `bar`, which we have also written somewhere in our program. The second line 'packs' the button into the window; that is, it turns the abstract button object into an actual button in the window for this program. The button will have "Foo" written on it, and anytime the user clicks it, TK will detect that and call the function `bar`. This is a typical example of a callback function - it is a function which will be called when the event handling loop detects some particular event(s). So the way a typical GUI program works is that:

- we setup some initial screen and functions which will handle events we are interested in,
- we then cede control to the TK event handling loop,
- that loop will intercept events from the operating system, and call our functions when it detects an event for which we have given a callback function,
- after one of our callback functions has been called and finished, control returns to the TK event handling loop. (The behavior here is actually a bit more subtle, but this is the essence of it).

TK provides access to *widgets*, which represent various items commonly found in a GUI. One of those widgets is a *canvas* widget, which is something that can be drawn on. TK provides various functions for drawing lines, rectangles, ellipses, text, and more, onto a canvas object. With this assignment, you'll find a brief (but heavily commented) program which demonstrates a few of these.

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(1) (30 points) Write a program using Tkinter which draws a caricature of yourself on a canvas object. The GUI should have two buttons, one which draws the picture and one which erases it. There is a small demo program and a link to a TKinter reference site on Blackboard, both of which may be helpful. On the TKinter reference site, you can find methods for drawing other things on a canvas object, and using other colors.