

Abstract

The topic of our project is GPA Calculator using GUI so that the user can easily interact with it. It's simple and efficient to use, all we need to do is enter the Grade that a student received in a particular subject and the credit that the subject carries, and a GPA for that student will be calculated.

The project was made using python's Tkinter library, which allows us to use entry box, text box, buttons and many other intractable options. The project was made keeping in mind that these type of applications make it convenient for students to calculate their GPA.

The GPA is calculated, after entering all the required data, by using an algorithm at the then end.

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Modules

Python GUI – tkinter

Python offers multiple options for developing GUI (Graphical User Interface). Out of all the GUI methods, tkinter is most commonly used method. It is a standard Python interface to the Tk GUI toolkit shipped with Python. Python with tkinter outputs the fastest and easiest way to create the GUI applications.

To create a tkinter:

1. Importing the module – tkinter
2. Create the main window (container)
3. Add any number of widgets to the main window
4. Apply the event Trigger on the widgets.

Importing tkinter is same as importing any other module in the python code. Note that the name of the module in Python 2.x is 'Tkinter' and in Python 3.x is 'tkinter'.

```
import tkinter
```

There are two main methods used you the user need to remember while creating the Python application with GUI.

1. **Tk(screenName=None, baseName=None, className='Tk', useTk=1):** To create a main window, tkinter offers a method 'Tk(screenName=None, baseName=None, className='Tk', useTk=1)'. To change the name of the window, you can change the className to the desired one. The basic code used to create the main window of the application is:

```
m=tkinter.Tk() where m is the name of the main window object
```

2. **mainloop():** There is a method known by the name mainloop() is used when you are ready for the application to run. mainloop() is an infinite loop used to run the application, wait for an event to occur and process the event till the window is not closed.

```
m.mainloop()
```

```
import tkinter
m = tkinter.Tk()
"""
widgets are added here
"""
m.mainloop()
```

tkinter also offers access to the geometric configuration of the widgets which can organize the widgets in the parent windows. There are mainly three geometry manager classes class.

1. **pack() method:**It organizes the widgets in blocks before placing in the parent widget.
2. **grid() method:**It organizes the widgets in grid (table-like structure) before placing in the parent widget.
3. **place() method:**It organizes the widgets by placing them on specific positions directed by the programmer.

Button: To add a button in your application, this widget is used.
The general syntax is:

```
w=Button(master, option=value)
```

master is the parameter used to represent the parent window. There are number of options which are used to change the format of the Buttons. Number of options can be passed as parameters separated by commas. Some of them are listed below.

- **activebackground:** to set the background color when button is under the cursor.
- **activeforeground:** to set the foreground color when button is under the cursor.
- **bg:** to set the normal background color.
- **command:** to call a function.
- **font:** to set the font on the button label.
- **image:** to set the image on the button.
- **width:** to set the width of the button.
- **height:** to set the height of the button.

```
import tkinter as tk
r = tk.Tk()
r.title('Counting Seconds')
button = tk.Button(r, text='Stop', width=25, command=r.destroy)
button.pack()
r.mainloop()
```

Entry: It is used to input the single line text entry from the user.. For multi-line text input, Text widget is used.

The general syntax is:

```
w=Entry(master, option=value)
```

master is the parameter used to represent the parent window. There are number of options which are used to change the format of the widget. Number of options can be passed as parameters separated by commas. Some of them are listed below.

- **bd:** to set the border width in pixels.
- **bg:** to set the normal background color.
- **cursor:** to set the cursor used.
- **command:** to call a function.
- **highlightcolor:** to set the color shown in the focus highlight.
- **width:** to set the width of the button.
- **height:** to set the height of the button.

```
from tkinter import *
master = Tk()
Label(master, text='First Name').grid(row=0)
Label(master, text='Last Name').grid(row=1)
e1 = Entry(master)
e2 = Entry(master)
e1.grid(row=0, column=1)
e2.grid(row=1, column=1)
mainloop()
```

Frame: It acts as a container to hold the widgets. It is used for grouping and organizing the widgets. The general syntax is:

```
w = Frame(master, option=value)
```

master is the parameter used to represent the parent window.

There are number of options which are used to change the format of the widget. Number of options can be passed as parameters separated by commas. Some of them are listed below.

- **highlightcolor:** To set the color of the focus highlight when widget has to be focused.
- **bd:** to set the border width in pixels.
- **bg:** to set the normal background color.
- **cursor:** to set the cursor used.
- **width:** to set the width of the widget.
- **height:** to set the height of the widget.

```
from tkinter import *
root = Tk()
frame = Frame(root)
frame.pack()
bottomframe = Frame(root)
bottomframe.pack( side = BOTTOM )
redbutton = Button(frame, text = 'Red', fg='red')
redbutton.pack( side = LEFT)
greenbutton = Button(frame, text = 'Brown', fg='brown')
greenbutton.pack( side = LEFT )
bluebutton = Button(frame, text = 'Blue', fg='blue')
bluebutton.pack( side = LEFT )
blackbutton = Button(bottomframe, text = 'Black', fg='black')
blackbutton.pack( side = BOTTOM)
root.mainloop()
```

Label: It refers to the display box where you can put any text or image which can be updated any time as per the code.

The general syntax is:

```
w=Label(master, option=value)
```

master is the parameter used to represent the parent window.

There are number of options which are used to change the format of the widget. Number of options can be passed as parameters separated by commas. Some of them are listed below.

- **bg:** to set he normal background color.
- **bg** to set he normal background color.
- **command:** to call a function.
- **font:** to set the font on the button label.
- **image:** to set the image on the button.
- **width:** to set the width of the button.
- **height**” to set the height of the button.

```
from tkinter import *
root = Tk()
w = Label(root, text='GeeksForGeeks.org!')
w.pack()
root.mainloop()
```

Message: It refers to the multi-line and non-editable text. It works same as that of Label.
The general syntax is:

```
w = Message(master, option=value)
```

master is the parameter used to represent the parent window.

There are number of options which are used to change the format of the widget. Number of options can be passed as parameters separated by commas. Some of them are listed below.

- **bd:** to set the border around the indicator.
- **bg:** to set the normal background color.
- **font:** to set the font on the button label.
- **image:** to set the image on the widget.
- **width:** to set the width of the widget.
- **height:** to set the height of the widget.

```
from tkinter import *
```

```
main = Tk()
```

```
ourMessage = 'This is our Message'
```

```
messageVar = Message(main, text = ourMessage)
```

```
messageVar.config(bg='lightgreen')
```

```
messageVar.pack( )
```

```
main.mainloop( )
```

Source Code

```
from tkinter import *
```

```
master = Tk()
```

```
Label(master, text='GPA CALCULATOR', bg='black',fg='yellow',font='Helvetica 18  
bold').grid(row=0, column=1)
```

```
Label(master, text=' Name ').grid(row=1) # textbox label
```

```
Label(master, text='Registration No ').grid(row=2)
```

```
Label(master, text=' A ').grid(row=4)
```

```
Label(master, text=' B ').grid(row=5)
```

```
Label(master, text=' C ').grid(row=6)
```

```
Label(master, text=' D ').grid(row=7)
```

```
Label(master, text=' E ').grid(row=8)
```

```
Label(master, text=' F ').grid(row=9)
```

```
Label(master, text=' G ').grid(row=10)
```

```
Label(master, text='Slot').grid(row=3, column=0)
```

```
Label(master, text='Subjec tName').grid(row=3, column=1)
```

```
Label(master, text='Grade').grid(row=3, column=3)
```

```
Label(master, text='Credit').grid(row=3, column=4)
```

```
Label(master, text='NOTE: Please leave empty if no subject is there.').grid(row=11, column=0)
```

```
# declare textbox for name
```

```
name = Entry(master)
```

```
name.grid(row=1, column=1)
```

```
regno = Entry(master)
```

```
regno.grid(row=2, column=1)
```

```
n1 = Entry(master).grid(row=4, column=1)
```

```
n2 = Entry(master).grid(row=5, column=1)
```

```
n3 = Entry(master).grid(row=6, column=1)
```

```
n4 = Entry(master).grid(row=7, column=1)
```

```
n5 = Entry(master).grid(row=8, column=1)
```

```
n6 = Entry(master).grid(row=9, column=1)
```

```
n7 = Entry(master).grid(row=10, column=1)
```

```
# declare textbox for grade
```

```
m1 = Entry(master)
```

```
m2 = Entry(master)
```

```
m3 = Entry(master)
```

```
m4 = Entry(master)
```

```
m5 = Entry(master)
```

```
m6 = Entry(master)
```

```
m7 = Entry(master)
```

```
m1.grid(row=4, column=3)
```

```
m2.grid(row=5, column=3)
```

```
m3.grid(row=6, column=3)
```

```
m4.grid(row=7, column=3)
```

```
m5.grid(row=8, column=3)
```

```
m6.grid(row=9, column=3)
```

```
m7.grid(row=10, column=3)
```

```
# declare textbox for credit
```

```
c1 = Entry(master)
```

```
c2 = Entry(master)
```

```
c3 = Entry(master)
```

```
c4 = Entry(master)
```

```
c5 = Entry(master)
```

```
c6 = Entry(master)
```

```
c7 = Entry(master)
```

```
c1.grid(row=4, column=4)
```

```
c2.grid(row=5, column=4)
```

```
c3.grid(row=6, column=4)
```

```
c4.grid(row=7, column=4)
```

```
c5.grid(row=8, column=4)
```

```
c6.grid(row=9, column=4)
```

```
c7.grid(row=10, column=4)
```

```
Label(master, text=' ').grid(row=2, column=2) # for gap after name of subject
```

```
Label(master, text=' ').grid(row=2, column=5) # for last line gap
```

```
Label(master, text=' ').grid(row=2, column=5)
```

```
Label(master, text=' ').grid(row=13) # for gap
```

```
t1 = Text(master, width=20, height=4)
```

```
t1.grid(row=14, column=1)
```

```
Label(master, text=' ').grid(row=15) # for gap
```



```

def disp():

    # if marks is left blank take marks as 0 other wise convert the grade into points

    if len(m1.get()) == 0: #STRING INPUT, if length of marks=0 i.e no input

        g1 = 0 # grade is set to 0 if no input is given

    else:

        mm1 = m1.get()

        if len(c1.get()) == 0: #INTEGER INPUT, if length of credir=0 i.e no credit specified, it is
considered as 0

            gg1 = 0 #gg for credits

        else:

            gg1 = int(c1.get()) #read input from first input box in grade column

        if m1.get() == 'O' or m1.get() == 'o':

            g1 = 10

        elif m1.get() == 'A+' or m1.get() == 'a+':

            g1 = 9

        elif m1.get() == 'A' or m1.get() == 'a':

            g1 = 8

        elif m1.get() == 'B+' or m1.get() == 'b+':

            g1 = 7

        elif m1.get() == 'B' or m1.get() == 'b':

            g1 = 6

        elif m1.get() == 'C' or m1.get() == 'c':

            g1 = 5

        elif m1.get() == 'P' or m1.get() == 'p':

            g1 = 4

        else:

            g1 = 0

```

```
mm2 = m2.get() #STRING INPUT
gg2 = int(c2.get()) #INTEGER INPUT
if mm2 == 'O' or mm2 == 'o':
    g2 = 10
elif mm2 == 'A+' or mm2 == 'a+':
    g2 = 9
elif mm2 == 'A' or mm2 == 'a':
    g2 = 8
elif mm2 == 'B+' or mm2 == 'b+':
    g2 = 7
elif mm2 == 'B' or mm2 == 'b':
    g2 = 6
elif mm2 == 'C' or mm2 == 'c':
    g2 = 5
elif mm2 == 'P' or mm2 == 'p':
    g2 = 4
else:
    g2 = 0
```

```
mm3 = m3.get()
gg3 = int(c3.get())
if mm3 == 'O' or mm3 == 'o':
    g3 = 10
elif mm3 == 'A+' or mm3 == 'a+':
    g3 = 9
elif mm3 == 'A' or mm3 == 'a':
    g3 = 8
```

elif mm3 == 'B+' or mm3 == 'b':

g3 = 7

elif mm3 == 'B' or mm3 == 'b':

g3 = 6

elif mm3 == 'C' or mm3 == 'c':

g3 = 5

elif mm3 == 'P' or mm3 == 'p':

g3 = 4

else:

g3 = 0

mm4 = m4.get()

gg4 = int(c4.get())

if mm4 == 'O' or mm4 == 'o':

g4 = 10

elif mm4 == 'A+' or mm4 == 'a':

g4 = 9

elif mm4 == 'A' or mm4 == 'a':

g4 = 8

elif mm4 == 'B+' or mm4 == 'b':

g4 = 7

elif mm4 == 'B' or mm4 == 'b':

g4 = 6

elif mm4 == 'C' or mm4 == 'c':

g4 = 5

elif mm4 == 'P' or mm4 == 'p':

g4 = 4

else:

g4 = 0

mm5 = m5.get()

gg5 = int(c5.get())

if mm5 == 'O' or mm5 == 'o':

g5 = 10

elif mm5 == 'A+' or mm5 == 'a':

g5 = 9

elif mm5 == 'A' or mm5 == 'a':

g5 = 8

elif mm5 == 'B+' or mm5 == 'b':

g5 = 7

elif mm5 == 'B' or mm5 == 'b':

g5 = 6

elif mm5 == 'C' or mm5 == 'c':

g5 = 5

elif mm5 == 'P' or mm5 == 'p':

g5 = 4

else:

g5 = 0

mm6 = m6.get()

gg6 = int(c6.get())

if mm6 == 'O' or mm6 == 'o':

g6 = 10

elif mm6 == 'A+' or mm6 == 'a':

g6 = 9

elif mm6 == 'A' or mm6 == 'a':

```
g6 = 8
elif mm6 == 'B+' or mm6 == 'b+':

    g6 = 7
elif mm6 == 'B' or mm6 == 'b':

    g6 = 6
elif mm6 == 'C' or mm6 == 'c':

    g6 = 5
elif mm6 == 'P' or mm6 == 'p':

    g6 = 4
else:

    g6 = 0
```

```
mm7 = m7.get()
gg7 = int(c7.get())
if mm7 == 'O' or mm7 == 'o':

    g7 = 10
elif mm7 == 'A+' or mm7 == 'a+':

    g7 = 9
elif mm7 == 'A' or mm7 == 'a':

    g7 = 8
elif mm7 == 'B+' or mm7 == 'b+':

    g7 = 7
elif mm7 == 'B' or mm7 == 'b':

    g7 = 6
elif mm7 == 'C' or mm7 == 'c':

    g7 = 5
elif mm7 == 'P' or mm7 == 'p':

    g7 = 4
```

else:

g7 = 0

totcr = (gg1 + gg2 + gg3 + gg4 + gg5 + gg6 + gg7)

gpa = ((g1 * gg1) + (g2 * gg2) + (g3 * gg3) + (g4 * gg4) + (g5 * gg5) + (g6 * gg6) + (g7 * gg7)) /
totcr

t1.delete('1.0', END) # to make empty every time calculate is pressed

st = "Result\nFirst Name:" + str(name.get()) + "\nReg No:" + str(regno.get()) + "\nYour GPA is
%0.2f" % (gpa)

t1.grid(row=13,column=1)

t1.insert(END, st)

Button(master, text='Calculate', command=disp).grid(row=11, column=3)

master.mainloop()

Output Snapshot

7 GPA Calculator

Name

XYZ

Registration No

RA1611003011394

Slot

SubjectName

A

CN

B

TOC

C

MATHS

D

DBMS

E

PY

F

PD

G

DM

Grade

Credit

O

4

A+

3

O

4

O

3

A

4

B

3

A

4

Calculate

NOTE: Please leave empty if no subject is there.

First Name:XYZ

Reg No:RA1611003011394

Your GPA is 8.00