**FTT.py fayli**

"""  
FTT  
"""  
  
**import** tkinter  
**from** math **import pi  
  
  
class DisabledEntry(**tkinter**.**Entry**):  
 def \_\_init\_\_(self, parent, text="", \***args**, \*\***kwargs**):** tkinter**.**Entry**.**\_\_init\_\_**(self, parent, \*args, \*\*kwargs)  
 if** type**(text) !=** str**(123): text =** str**(text)  
 self.insert(0, text)  
 self.config(**state**=**tkinter**.**DISABLED**)  
  
  
class Calculator(**tkinter**.**Frame**):  
 def \_\_init\_\_(self, parent=None, title='untitled', \*\***kwargs**):** tkinter**.**Frame**.**\_\_init\_\_**(self, parent, \*\*kwargs)  
  
 self.**title **= title  
  
 self.**parent **= parent  
 self.**parent**.title("Namangan Engineering Technological Institute: IT: Drawer: " + title)  
 self.**parent**.bind('<Return>', self.**calc\_button**)  
  
 self.**free\_row **= 0  
 self.**frame **=** tkinter**.Frame(self,** bg**="green").grid(**row**=0,** column**=0)  
  
 self.**c **= { # CONSTANTS  
 'n':** tkinter**.IntVar(**value**=1),  
 'm':** tkinter**.DoubleVar(**value**=9.1e-31),  
 'e':** tkinter**.DoubleVar(**value**=1.6e-19),  
 'pi':** tkinter**.DoubleVar(**value**=pi),  
 'h':** tkinter**.DoubleVar(**value**=1.06e-34),  
 # 'd': tkinter.DoubleVar(value=5e-9),  
 # 'Eg': tkinter.DoubleVar(value=0.414),  
 }  
  
 self.**v **= { # VARIABLES  
 'd': (**tkinter**.DoubleVar(**value**=1e-9),** tkinter**.DoubleVar(**value**=1e-8),** tkinter**.IntVar(**value**=100)),  
 'Em': (**tkinter**.DoubleVar(**value**=.0),** tkinter**.DoubleVar(**value**=0.004),** tkinter**.IntVar(**value**=4))  
 }  
 self.grid(**row**=0,** column**=0)  
  
 self.gui()  
 self.calc\_button()  
  
 def func(self, d, Em):  
 n, m, e, h = self.**c**['n'].get(), self.**c**['m'].get(), self.**c**['e'].get(),** \  
 **self.**c**['h'].get()  
  
 ans = Em + (pi \* n \* h)\*\*2 / (2 \* 1.08 \* m \* e \* d\*\*2)  
 # print(f"{ans:2.2f}")  
  
 return ans  
  
 def gui(self):** tkinter**.Label(self.**frame**,** text**="O'zgarmas qiymatlar",** relief**=**tkinter**.**GROOVE**).grid(**row**=0,** column**=0,** columnspan**=4,** sticky**='ew',** pady**=(30, 1),** padx**=(10, 0))  
 r = 1  
 for key in self.**c**.keys():  
 frm =** tkinter**.Frame(self.**frame**)** tkinter**.Label(frm,** text**=key,** width**=4).grid(**row**=r,** column**=0)  
 DisabledEntry(frm,** text**=self.**c**[key].get()).grid(**row**=r,** column**=1,** columnspan**=3)  
 frm.grid(**row**=r,** column**=0,** columnspan**=4,** sticky**=**tkinter**.**W**)  
 r += 1** tkinter**.Label(self.**frame**,** text**="O'zgaruvchi qiymatlar",** relief**=**tkinter**.**GROOVE**).grid(**row**=r,** column**=0,** columnspan**=4,** sticky**='ew',** pady**=(30, 1),** padx**=(10, 0)  
 )  
 r += 1** tkinter**.Label(self.**frame**,** text**="dan").grid(**row**=r,** column**=1)** tkinter**.Label(self.**frame**,** text**="gacha").grid(**row**=r,** column**=2)** tkinter**.Label(self.**frame**,** text**="el.soni").grid(**row**=r,** column**=3)  
 r += 1  
 for key in self.**v**.keys():  
 frm =** tkinter**.Frame(self.**frame**)** tkinter**.Label(frm,** text**=key,** width**=4).grid(**row**=r,** column**=0)  
 for c in** range**(1, 4):** tkinter**.Entry(frm,** textvariable**=self.**v**[key][c-1],** width**=6).grid(**row**=r,** column**=c)  
  
 frm.grid(**row**=r,** column**=0,** columnspan**=4)  
 r += 1** tkinter**.Button(self.**frame**,** command**=self.**calc\_button**,** bg**='#66FF66',** text**='Hisobla').grid(**row**=r,** column**=0,** columnspan**=4,** sticky**='we',** padx**=20,** pady**=(20, 2))  
  
 self.**free\_row **= r + 1  
  
 def calc\_button(self,** event**=None):  
 import** matplotlib**.**pyplot **as plt  
 from** matplotlib**.**backends**.**backend\_tkagg **import** FigureCanvasTkAgg  
 **import** numpy **as np** tkinter**.Label(self.**parent**,** text**=self.**title**).grid(**row**=0,** column**=6)  
  
 figure2 =** plt**.Figure(**figsize**=(6, 5),** dpi**=100)  
 ax2 = figure2.add\_subplot(111)  
 line2 = FigureCanvasTkAgg(figure2, self.**parent**)  
 line2.get\_tk\_widget().grid(**row**=1,** column**=6,** rowspan**=12,** padx**=10,** pady**=10, ) # sticky='nwse')  
  
  
 # ax2.set\_title('AlGaAs 2D')  
 ax2.set\_xlabel('d')  
 ax2.set\_ylabel('E')  
  
 # x = list(range(self.v['B'][0].get(), self.v['B'][1].get()+1, self.v['B'][2].get()))  
 x =** np**.linspace(self.**v**['d'][0].get(), self.**v**['d'][1].get(), self.**v**['d'][2].get())  
 Em =** np**.linspace(self.**v**['Em'][0].get(), self.**v**['Em'][1].get(), self.**v**['Em'][2].get()+1)  
 # Em = [0.0, 0.01, 0.02, 0.03]  
 for q in Em:  
  
 y = []  
 for el in** range**(**len**(x)):  
 y.append(self.func(x[el], q))  
 # for d in x:  
 # y.append(self.func(d, q))  
  
 ax2.plot(x, y,** label**="Em="+**str**(q))  
 # print("x=", x)  
 # print(Em)  
  
 ax2.legend(**loc**='best',** bbox\_to\_anchor**=(0.5, 1.1),** ncol**=2,** fancybox**=True,** shadow**=True)  
 ax2.set\_ylim([4e-5, 4e-2])** print**('CALC')  
 """best  
 upper right  
 upper left  
 lower left  
 lower right  
 right  
 center left  
 center right  
 lower center  
 upper center  
 center"""  
 pass  
  
  
if** \_\_name\_\_ **== '\_\_main\_\_':  
 win =** tkinter**.Tk()  
  
 calc = Calculator(win, 'Si/Si(1-x)Ge(x)Si')  
  
 win.mainloop()**





