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S11-07

Assignment No. 12 – Scientific Calculator

Code:

```
from tkinter import *
import math
import tkinter.messagebox

root = Tk()
root.title("Scientific Calculator")
root.configure(background='white')
root.resizable(width=False, height=False)
root.geometry("480x568+450+90")

calc = Frame(root)
calc.grid()


class Calc():
    def __init__(self):
        self.total = 0
        self.current = ''
        self.input_value = True
        self.check_sum = False
        self.op = ''
        self.result = False

    def numberEnter(self, num):
        self.result = False
        firstnum = txtDisplay.get()
        secondnum = str(num)
        if self.input_value:
            self.current = secondnum
            self.input_value = False
        else:
            if secondnum == '.':
                if secondnum in firstnum:
                    return
            self.current = firstnum + secondnum
        self.display(self.current)
```

```
def sum_of_total(self):
    self.result = True
    self.current = float(self.current)
    if self.check_sum == True:
        self.valid_function()
    else:
        self.total = float(txtDisplay.get())

def display(self, value):
    txtDisplay.delete(0, END)
    txtDisplay.insert(0, value)

def valid_function(self):
    if self.op == "add":
        self.total += self.current
    if self.op == "sub":
        self.total -= self.current
    if self.op == "multi":
        self.total *= self.current
    if self.op == "divide":
        self.total /= self.current
    if self.op == "mod":
        self.total %= self.current
    self.input_value = True
    self.check_sum = False
    self.display(self.total)

def operation(self, op):
    self.current = float(self.current)
    if self.check_sum:
        self.valid_function()
    elif not self.result:
        self.total = self.current
        self.input_value = True
        self.check_sum = True
        self.op = op
        self.result = False

def Clear_Entry(self):
    self.result = False
    self.current = "0"
    self.display(0)
    self.input_value = True
```

```
def All_Clear_Entry(self):
    self.Clear_Entry()
    self.total = 0

def pi(self):
    self.result = False
    self.current = math.pi
    self.display(self.current)

def tau(self):
    self.result = False
    self.current = math.tau
    self.display(self.current)

def e(self):
    self.result = False
    self.current = math.e
    self.display(self.current)

def mathPM(self):
    self.result = False
    self.current = -(float(txtDisplay.get()))
    self.display(self.current)

def squared(self):
    self.result = False
    self.current = math.sqrt(float(txtDisplay.get()))
    self.display(self.current)

def cos(self):
    self.result = False
    self.current = math.cos(math.radians(float(txtDisplay.get())))
    self.display(self.current)

def cosh(self):
    self.result = False
    self.current = math.cosh(math.radians(float(txtDisplay.get())))
    self.display(self.current)

def tan(self):
    self.result = False
    self.current = math.tan(math.radians(float(txtDisplay.get())))
    self.display(self.current)
```

```
def tanh(self):
    self.result = False
    self.current = math.tanh(math.radians(float(txtDisplay.get())))
    self.display(self.current)

def sin(self):
    self.result = False
    self.current = math.sin(math.radians(float(txtDisplay.get())))
    self.display(self.current)

def sinh(self):
    self.result = False
    self.current = math.sinh(math.radians(float(txtDisplay.get())))
    self.display(self.current)

def log(self):
    self.result = False
    self.current = math.log(float(txtDisplay.get()))
    self.display(self.current)

def exp(self):
    self.result = False
    self.current = math.exp(float(txtDisplay.get()))
    self.display(self.current)

def acosh(self):
    self.result = False
    self.current = math.acosh(float(txtDisplay.get()))
    self.display(self.current)

def asinh(self):
    self.result = False
    self.current = math.asinh(float(txtDisplay.get()))
    self.display(self.current)

def expm1(self):
    self.result = False
    self.current = math.expm1(float(txtDisplay.get()))
    self.display(self.current)

def lgamma(self):
    self.result = False
    self.current = math.lgamma(float(txtDisplay.get()))
    self.display(self.current)
    def degrees(self):
        self.result = False
        self.current = math.degrees(float(txtDisplay.get()))
        self.display(self.current)

    def log2(self):
        self.result = False
        self.current = math.log2(float(txtDisplay.get()))
        self.display(self.current)

    def log10(self):
        self.result = False
        self.current = math.log10(float(txtDisplay.get()))
        self.display(self.current)

    def log1p(self):
        self.result = False
        self.current = math.log1p(float(txtDisplay.get()))
        self.display(self.current)


added_value = Calc()

txtDisplay = Entry(calc, font=('Helvetica', 20, 'bold'),
                   bg='black', fg='white',
                   bd=30, width=28, justify=RIGHT)
txtDisplay.grid(row=0, column=0, columnspan=4, pady=1)
txtDisplay.insert(0, "0")

# Your button creation and grid placement code continues...

numberpad = "789456123"
i = 0
btn = []
for j in range(2, 5):
    for k in range(3):
        btn.append(Button(calc, width=6, height=2,
                          bg='black', fg='white',
                          font=('Helvetica', 20, 'bold'),
                          bd=4, text=numberpad[i]))
        btn[i].grid(row=j, column=k, pady=1)
        btn[i]["command"] = lambda x=numberpad[i]:
added_value.numberEnter(x)
```

```
        i += 1

btnClear = Button(calc, text=chr(67), width=6,
                height=2, bg='powder blue',
                font=('Helvetica', 20, 'bold'),
                bd=4, command=added_value.Clear_Entry
                ).grid(row=1, column=0, pady=1)
btnAllClear = Button(calc, text=chr(67)+chr(69),
width=6, height=2,
bg='powder blue',
font=('Helvetica',20,'bold'),
bd=4,
command=added_value.All_Clear_Entry
).grid(row=1, column= 1, pady = 1)
btnsq = Button(calc, text="\u221A",width=6, height=2,
bg='powder blue', font=('Helvetica',
20,'bold'),
bd=4,command=added_value.squared
).grid(row=1, column= 2, pady = 1)
btnAdd = Button(calc, text="+",width=6, height=2,
bg='powder blue',
font=('Helvetica',20,'bold'),
bd=4,command=lambda:added_value.operation("add")
).grid(row=1, column= 3, pady = 1)
btnSub = Button(calc, text="-",width=6,
height=2,bg='powder blue',
font=('Helvetica',20,'bold'),
bd=4,command=lambda:added_value.operation("sub")
).grid(row=2, column= 3, pady = 1)
btnMul = Button(calc, text="x",width=6,
height=2,bg='powder blue',
font=('Helvetica',20,'bold'),
bd=4,command=lambda:added_value.operation("multi")
).grid(row=3, column= 3, pady = 1)
btnDiv = Button(calc, text="/",width=6,
height=2,bg='powder blue',
font=('Helvetica',20,'bold'),
bd=4,command=lambda:added_value.operation("divide")
).grid(row=4, column= 3, pady = 1)
btnZero = Button(calc, text="0",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=lambda:added_value.numberEnter(0)
).grid(row=5, column= 0, pady = 1)
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btnDot = Button(calc, text=".",width=6,
height=2,bg='powder blue',
font=('Helvetica',20,'bold'),
bd=4,command=lambda:added_value.numberEnter(".")
).grid(row=5, column= 1, pady = 1)
btnPM = Button(calc, text=chr(177),width=6,
height=2,bg='powder blue',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.mathPM
).grid(row=5, column= 2, pady = 1)
btnEquals = Button(calc, text="=",width=6,
height=2,bg='powder blue',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.sum_of_total
).grid(row=5, column= 3, pady = 1)
# ROW 1 :
btnPi = Button(calc, text="pi",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.pi
).grid(row=1, column= 4, pady = 1)
btnCos = Button(calc, text="Cos",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.cos
).grid(row=1, column= 5, pady = 1)
btntan = Button(calc, text="tan",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.tan
).grid(row=1, column= 6, pady = 1)
btnsin = Button(calc, text="sin",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.sin
).grid(row=1, column= 7, pady = 1)
# ROW 2 :
btn2Pi = Button(calc, text="2pi",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.tau
).grid(row=2, column= 4, pady = 1)
btnCosh = Button(calc, text="Cosh",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.cosh
).grid(row=2, column= 5, pady = 1)
btntanh = Button(calc, text="tanh",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.tanh
).grid(row=2, column= 6, pady = 1)
btnsinh = Button(calc, text="sinh",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.sinh
).grid(row=2, column= 7, pady = 1)
# ROW 3 :
btnlog = Button(calc, text="log",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.log
).grid(row=3, column= 4, pady = 1)
btnExp = Button(calc, text="exp",width=6, height=2,
bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.exp
).grid(row=3, column= 5, pady = 1)
btnMod = Button(calc, text="Mod",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=lambda:added_value.operation("mod")
).grid(row=3, column= 6, pady = 1)
btnE = Button(calc, text="e",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.e
).grid(row=3, column= 7, pady = 1)
# ROW 4 :
btnlog10 = Button(calc, text="log10",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.log10
).grid(row=4, column= 4, pady = 1)
btncos = Button(calc, text="log1p",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.log1p
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).grid(row=4, column= 5, pady = 1)
btnexpm1 = Button(calc, text="expm1",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd = 4,command=added_value.expm1
).grid(row=4, column= 6, pady = 1)
btngamma = Button(calc, text="gamma",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.lgamma
).grid(row=4, column= 7, pady = 1)
# ROW 5 :
btnlog2 = Button(calc, text="log2",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.log2
).grid(row=5, column= 4, pady = 1)
btndeg = Button(calc, text="deg",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.degrees
).grid(row=5, column= 5, pady = 1)
btnacosh = Button(calc, text="acosh",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.acosh
).grid(row=5, column= 6, pady = 1)
btnasinh = Button(calc, text="asinh",width=6,
height=2,bg='black',fg='white',
font=('Helvetica',20,'bold'),
bd=4,command=added_value.asinh
).grid(row=5, column= 7, pady = 1)
lblDisplay = Label(calc, text = "Scientific Calculator",
font=('Helvetica',30,'bold'),
bg='black',fg='white',justify=CENTER)
lblDisplay.grid(row=0, column= 4,columnspan=4)
def iExit():
  iExit = tkinter.messagebox.askyesno("Scientific Calculator", "Do you want to
exit ?")
  if iExit > 0:
    root.destroy()
    return
def Scientific():
  root.resizable(width=False, height=False)
```
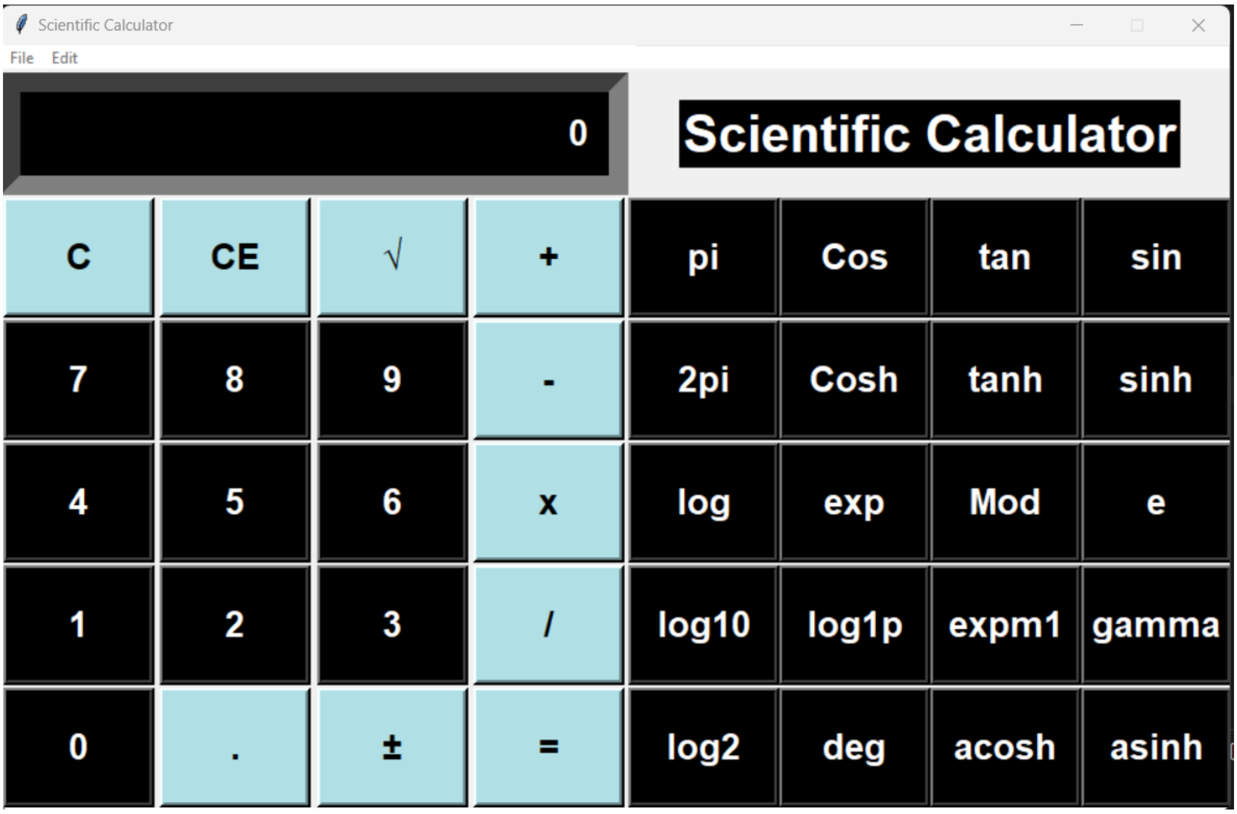

```
   root.geometry("944x568+0+0")
 def Standard():
   root.resizable(width=False, height=False)
   root.geometry("480x568+0+0")
 menubar = Menu(calc)
 # ManuBar 1 :
 filemenu = Menu(menubar, tearoff = 0)
 menubar.add_cascade(label = 'File', menu = filemenu)
 filemenu.add_command(label = "Standard", command = Standard)
 filemenu.add_command(label = "Scientific", command = Scientific)
 filemenu.add_separator()
 filemenu.add_command(label = "Exit", command = iExit)
 # ManuBar 2 :
 editmenu = Menu(menubar, tearoff = 0)
 menubar.add_cascade(label = 'Edit', menu = editmenu)
 editmenu.add_command(label = "Cut")
 editmenu.add_command(label = "Copy")
 editmenu.add_separator()
 editmenu.add_command(label = "Paste")
 root.config(menu=menubar)
root.mainloop()
```

Output:


Scientific Calculator
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Scientific Calculator
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