Course Design A Report

Title of the Project: Calculator

Major :	**Software Engineering**
Class :	**2019**
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School of Computer Science and Technology

December 14, 2021

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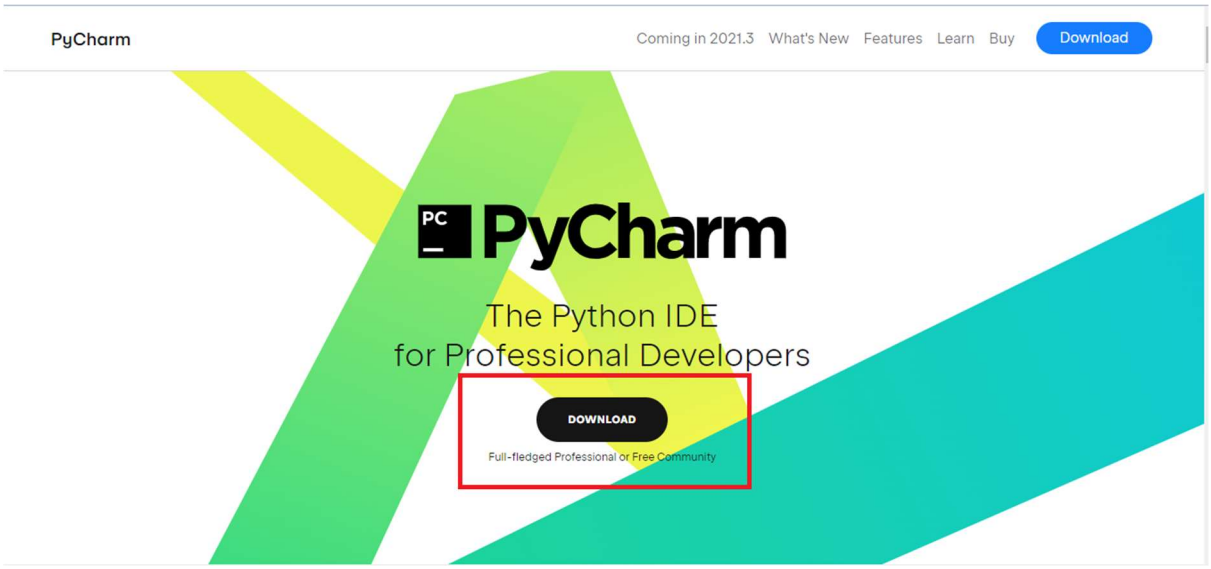
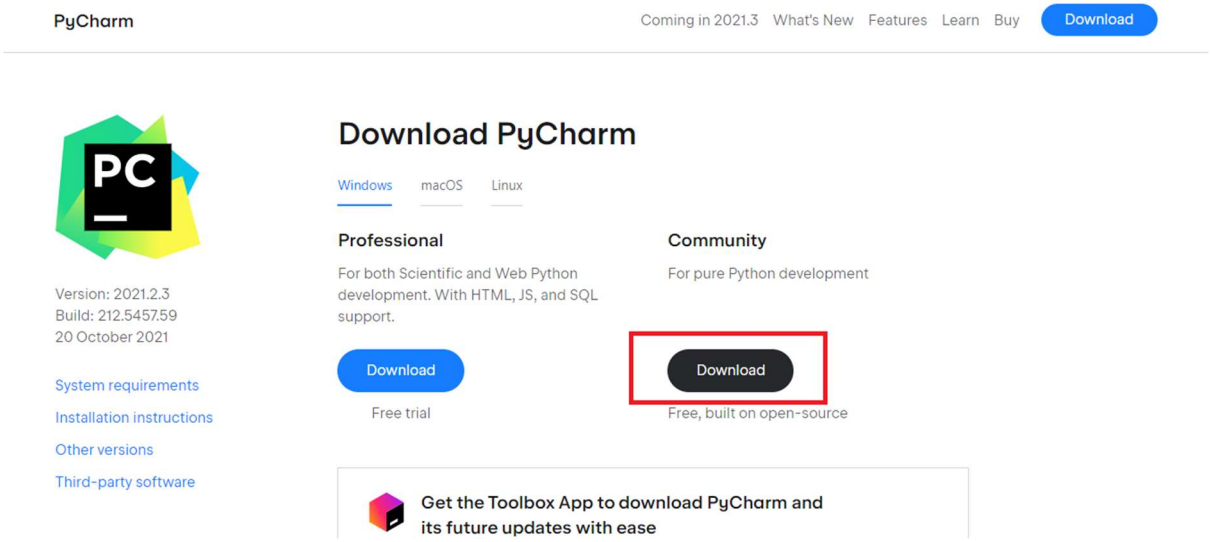
Ⅰ. Environment configuration

1. Download and install Pycharm (The whole process needs network)

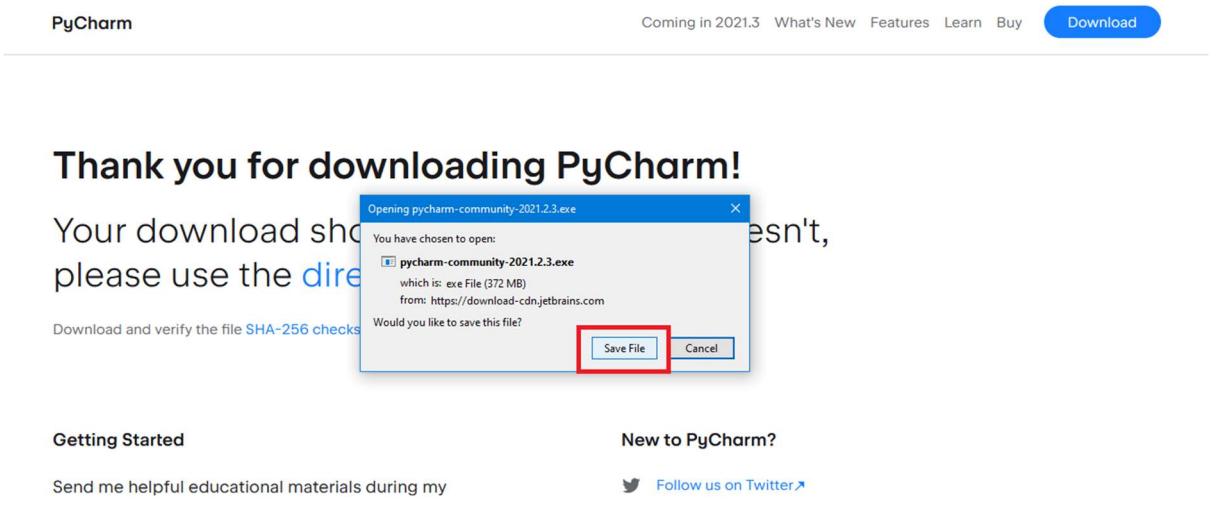
1.1. Open the official website of Pycharm, Click DOWNLOAD to download. （https://www.jetbrains.com/pycharm/）



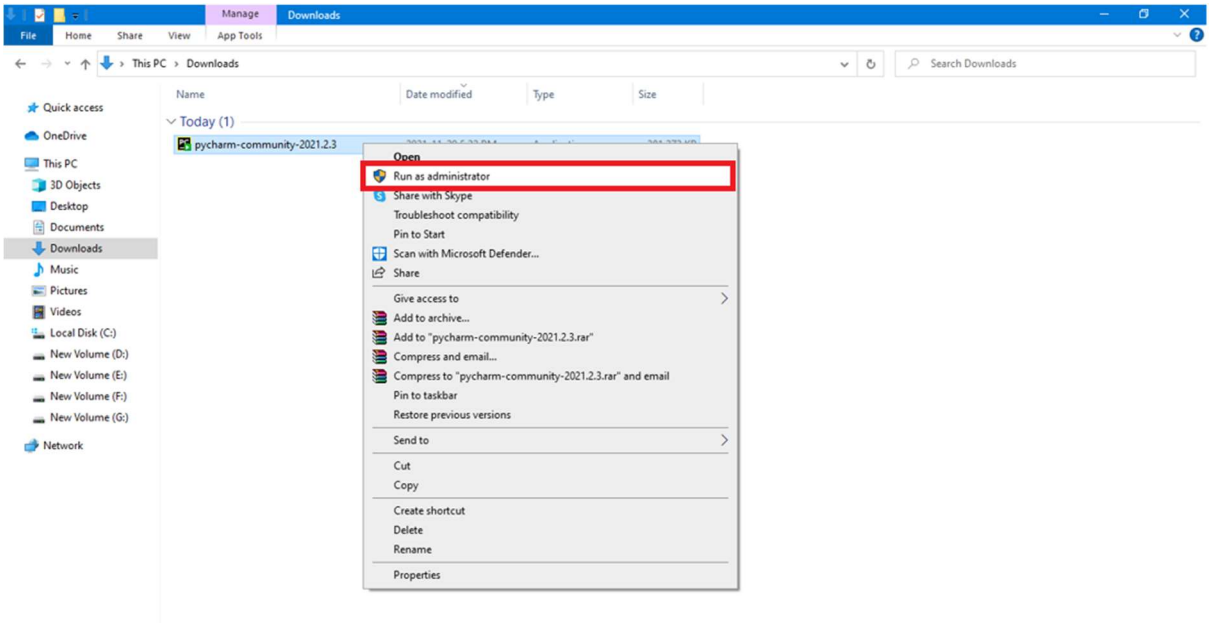
1.2. Click the download button under community to download



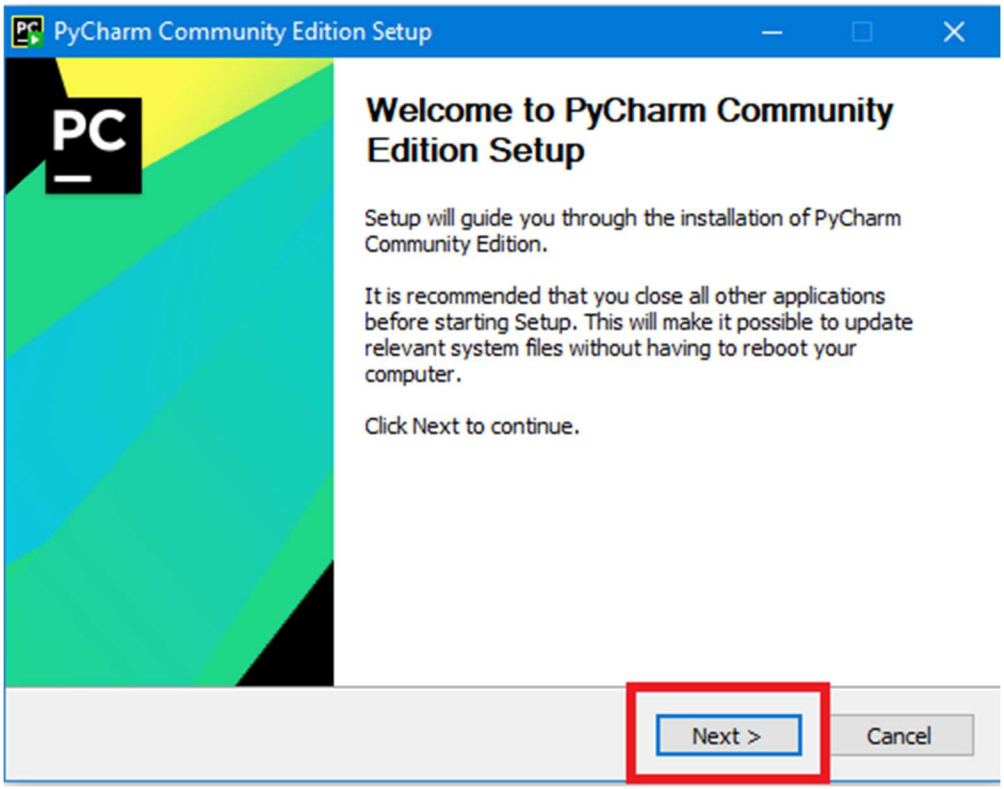
S

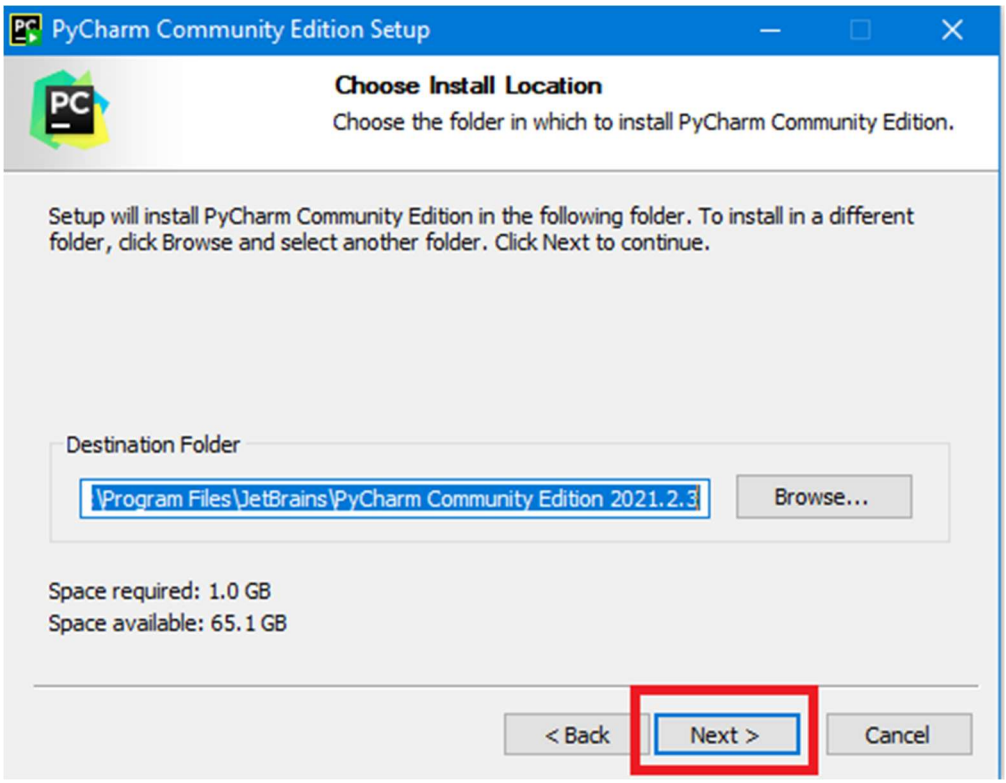


1.3. Run the installation package (in administrator mode).

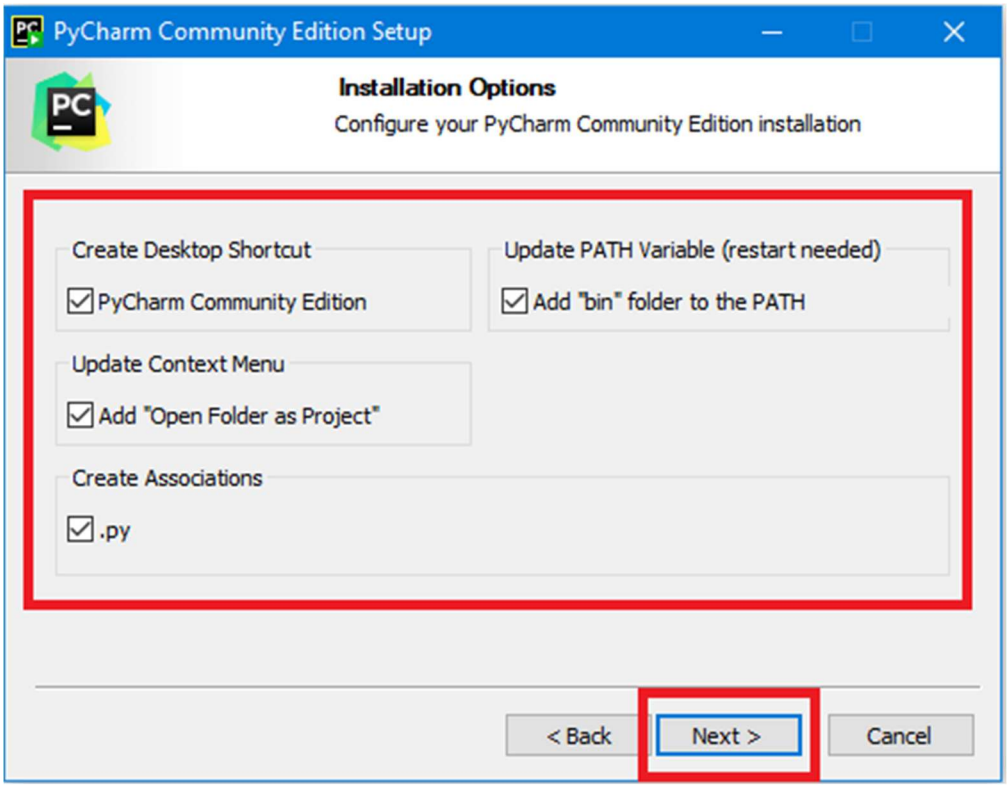


1.4. always click ‘next' to install.

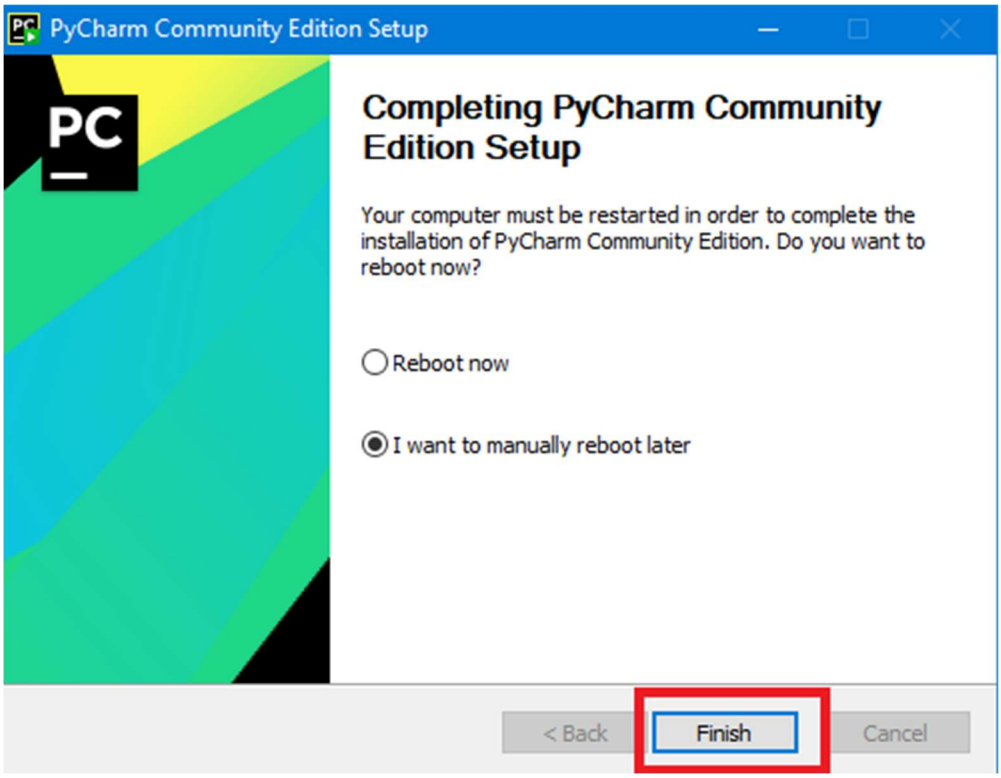




1.5. click all of the chooses

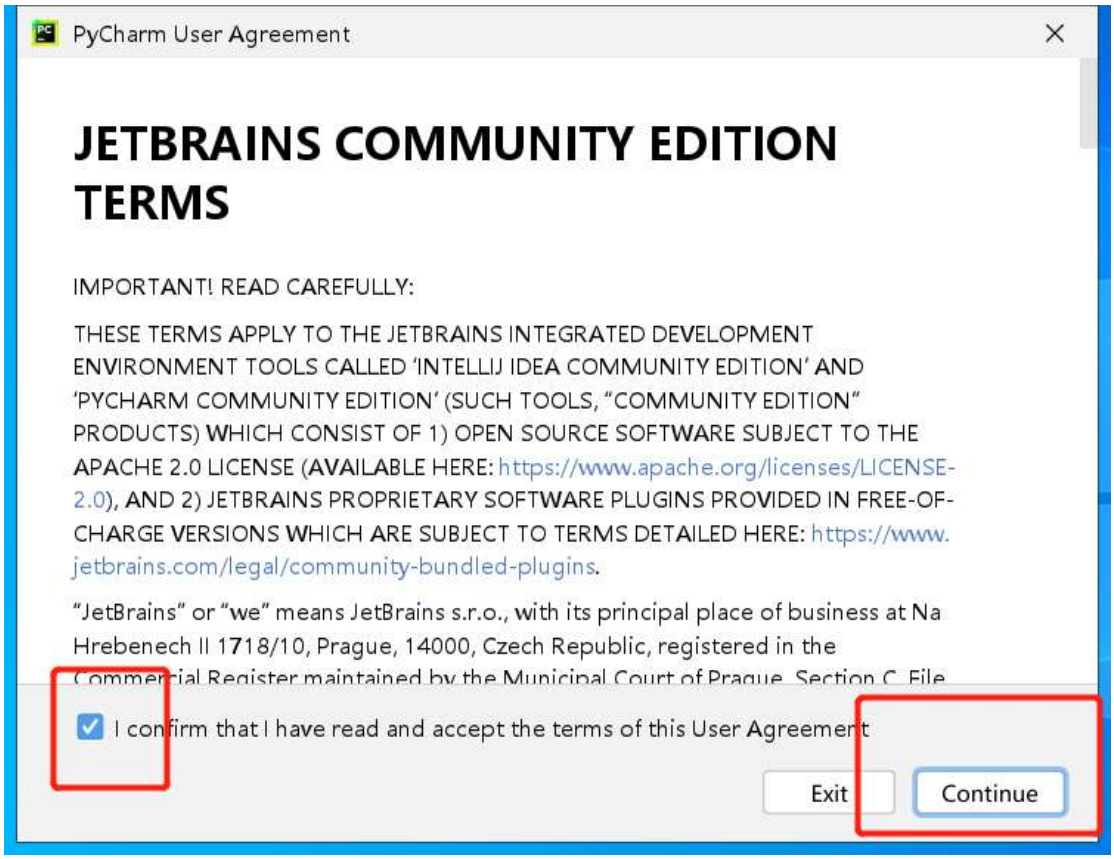


1.6. Download successful

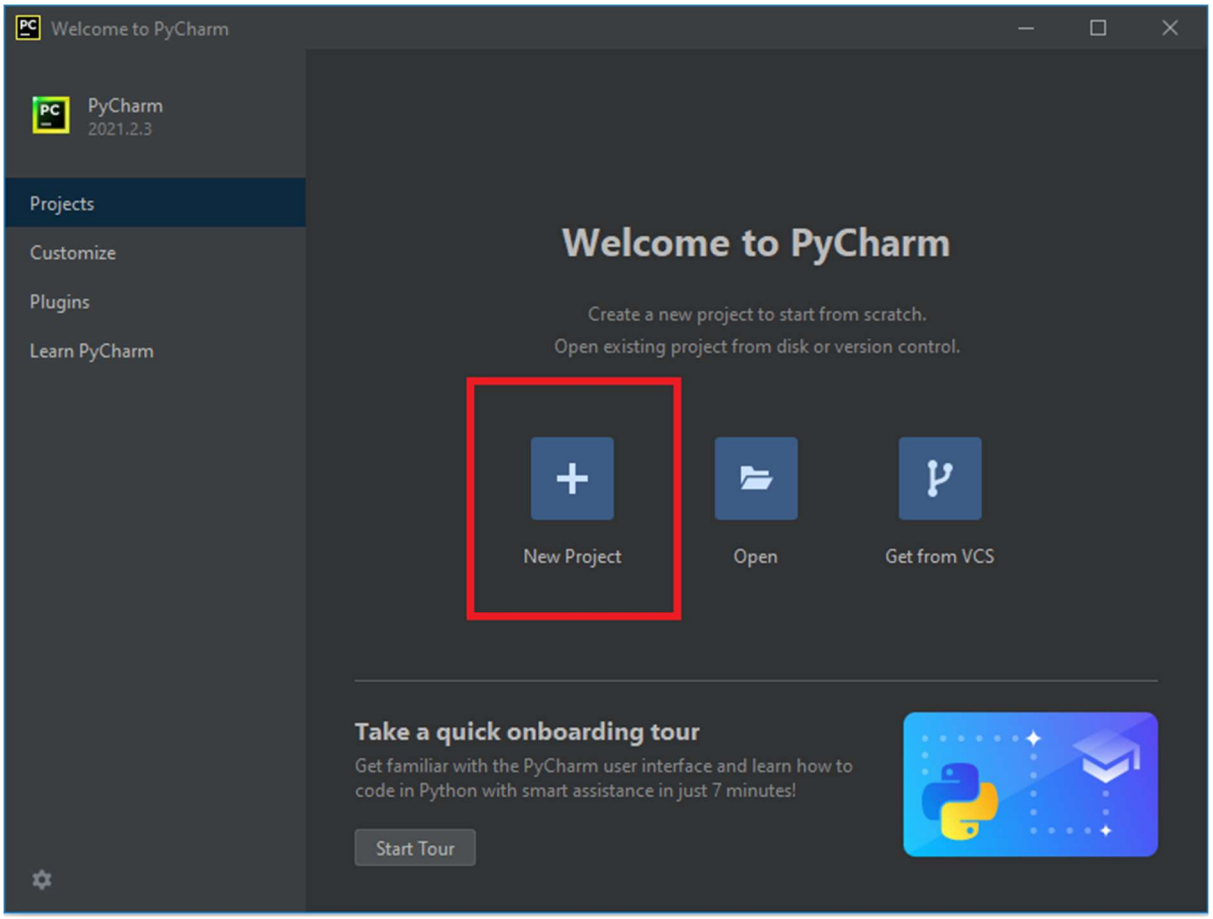


2. Create a project

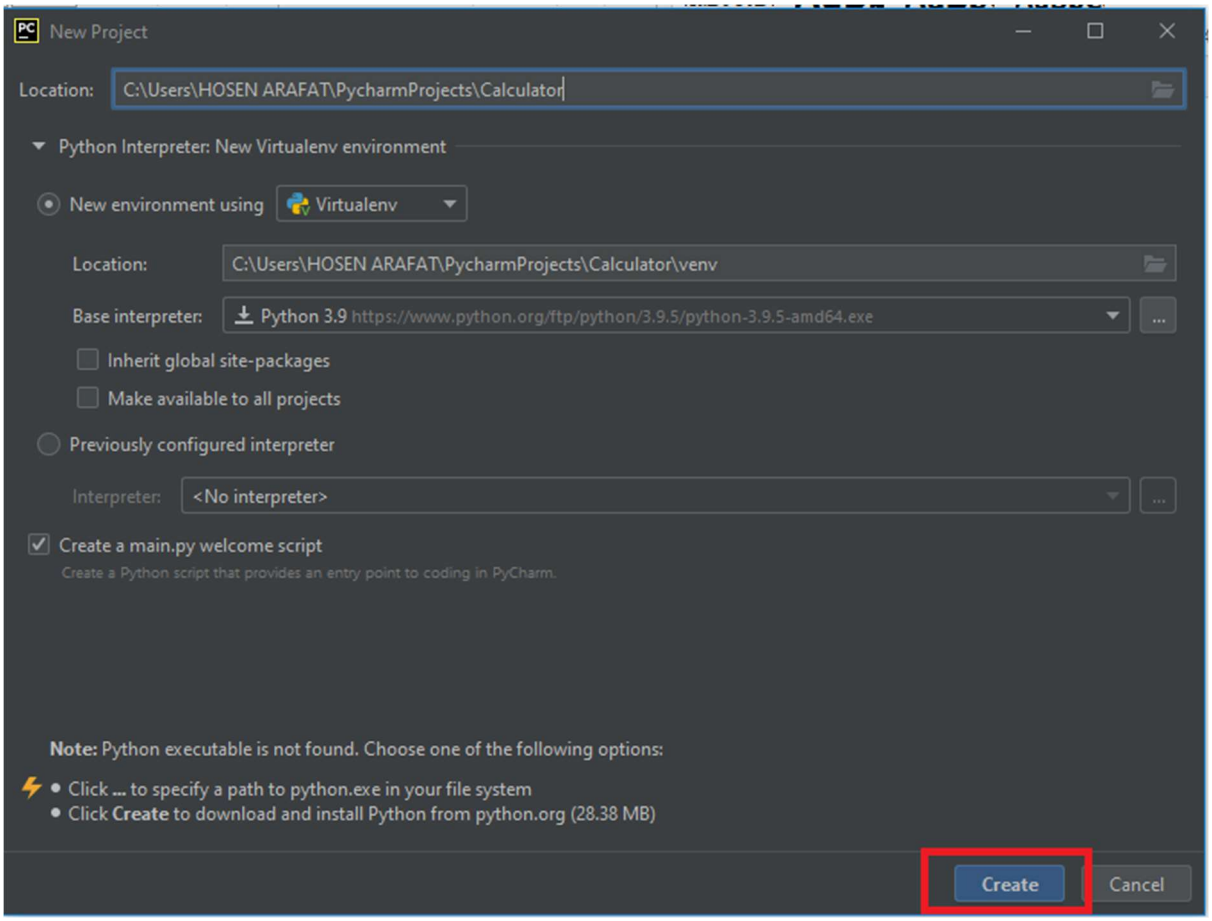
2.1. Click ‘i confrim...’ to enter the pycharm



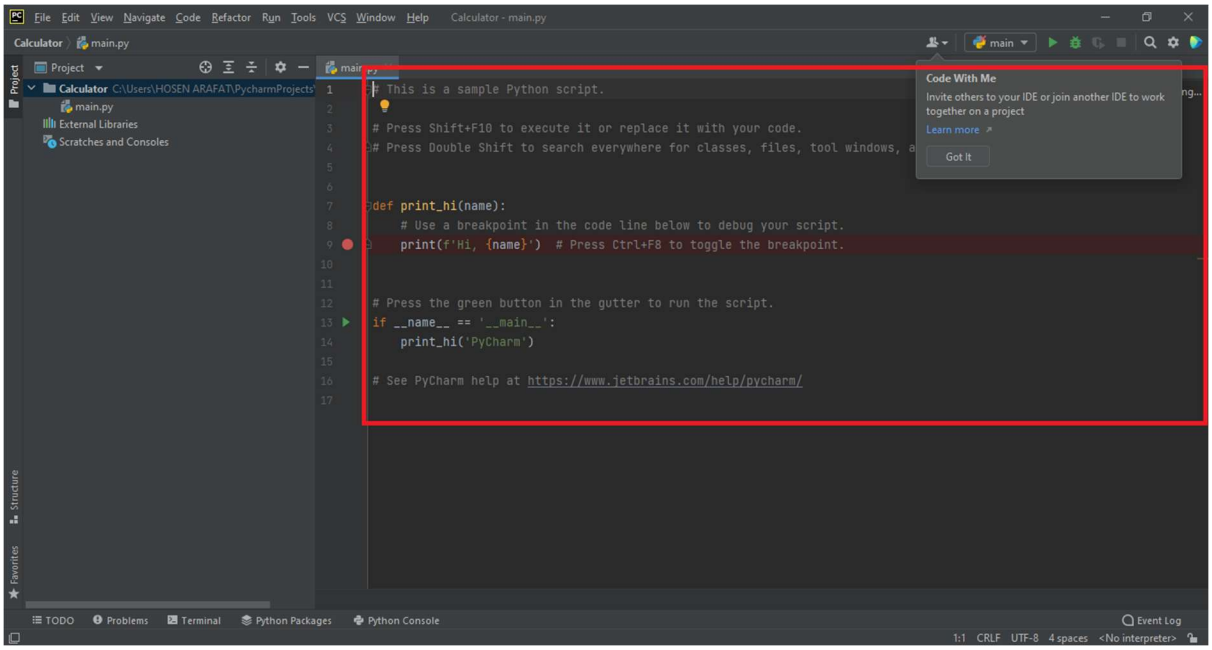
2.2. Click new project to create a project

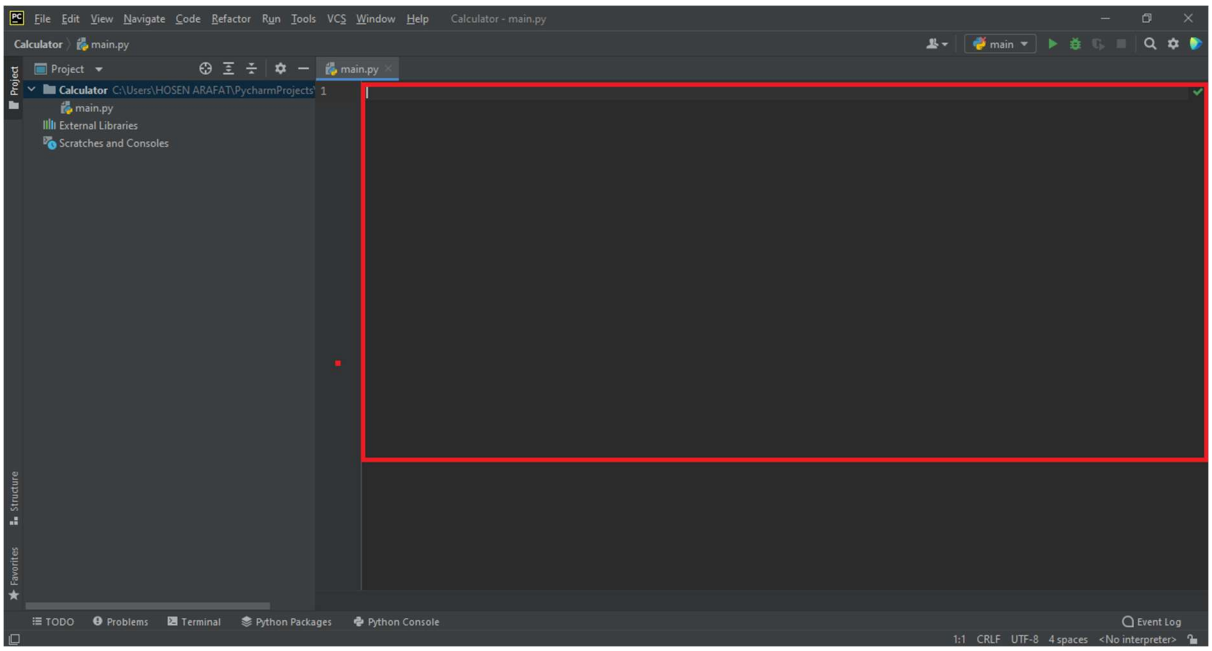


2.3. Choose the environment. The default is OK. Click create to create it



2.4. After entering, delete all codes in main.py first

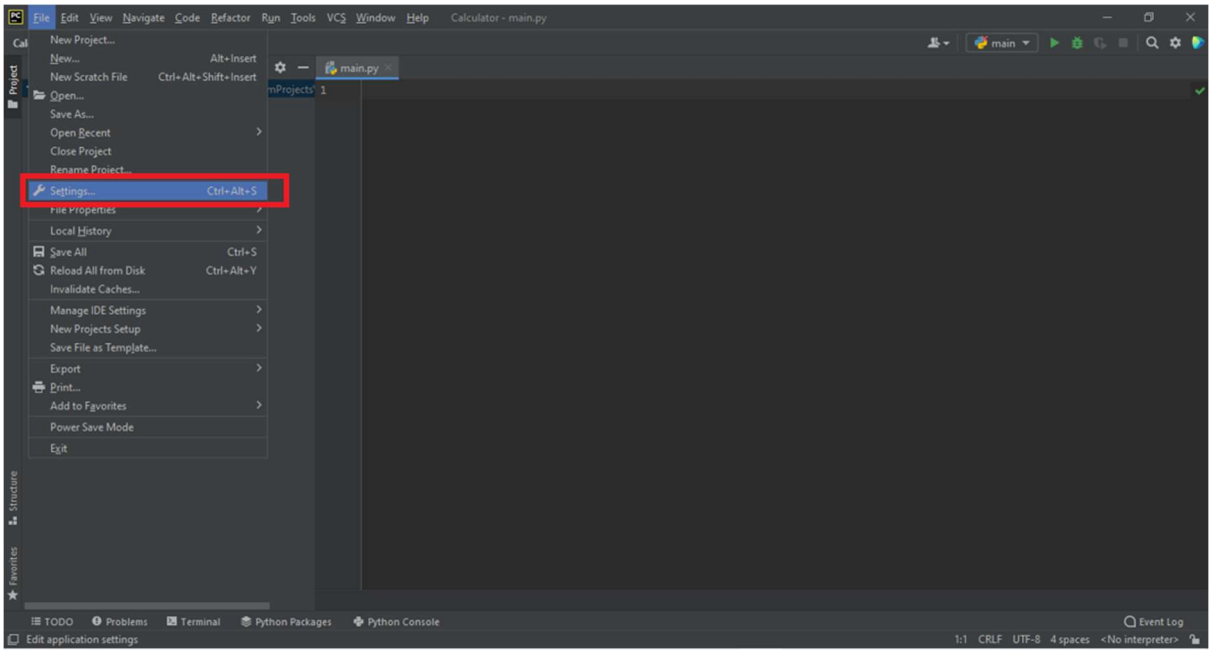


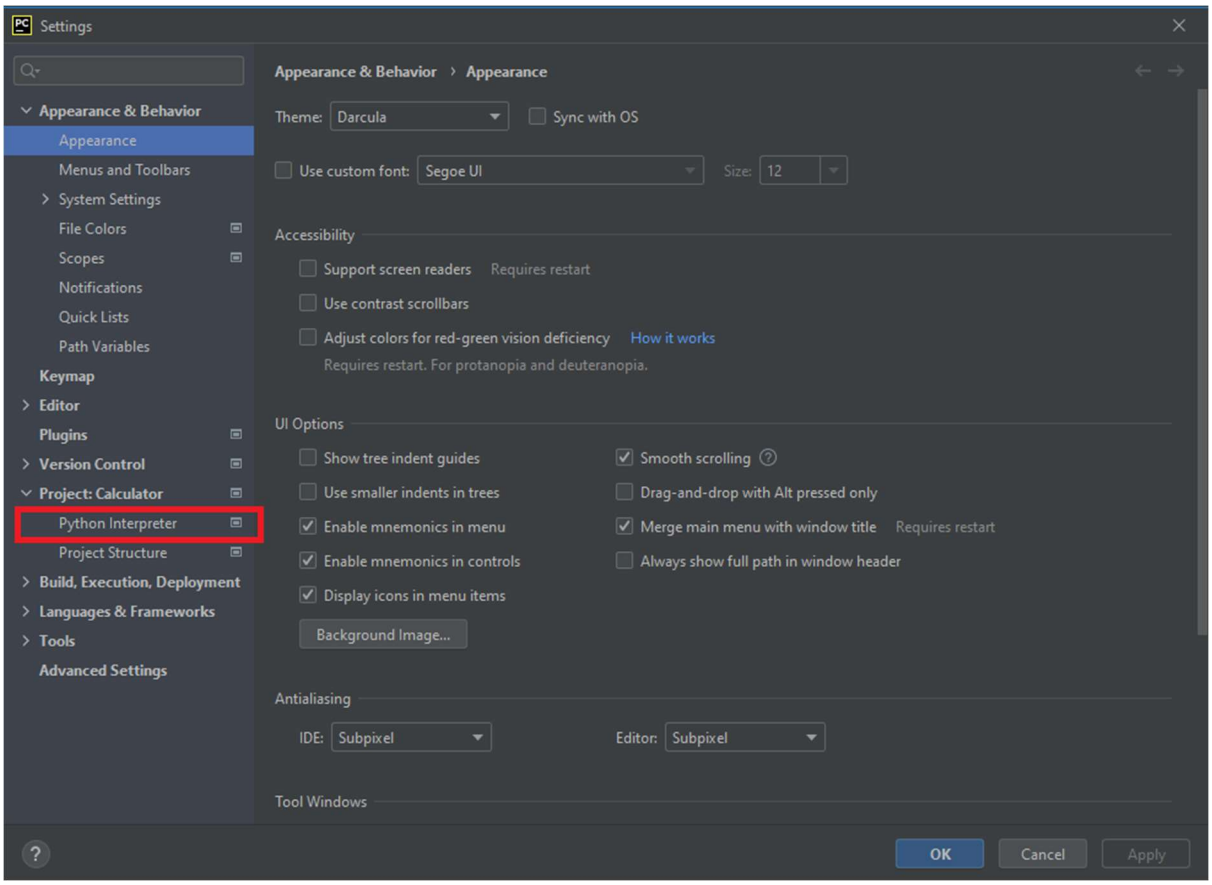


Ⅱ.Development design

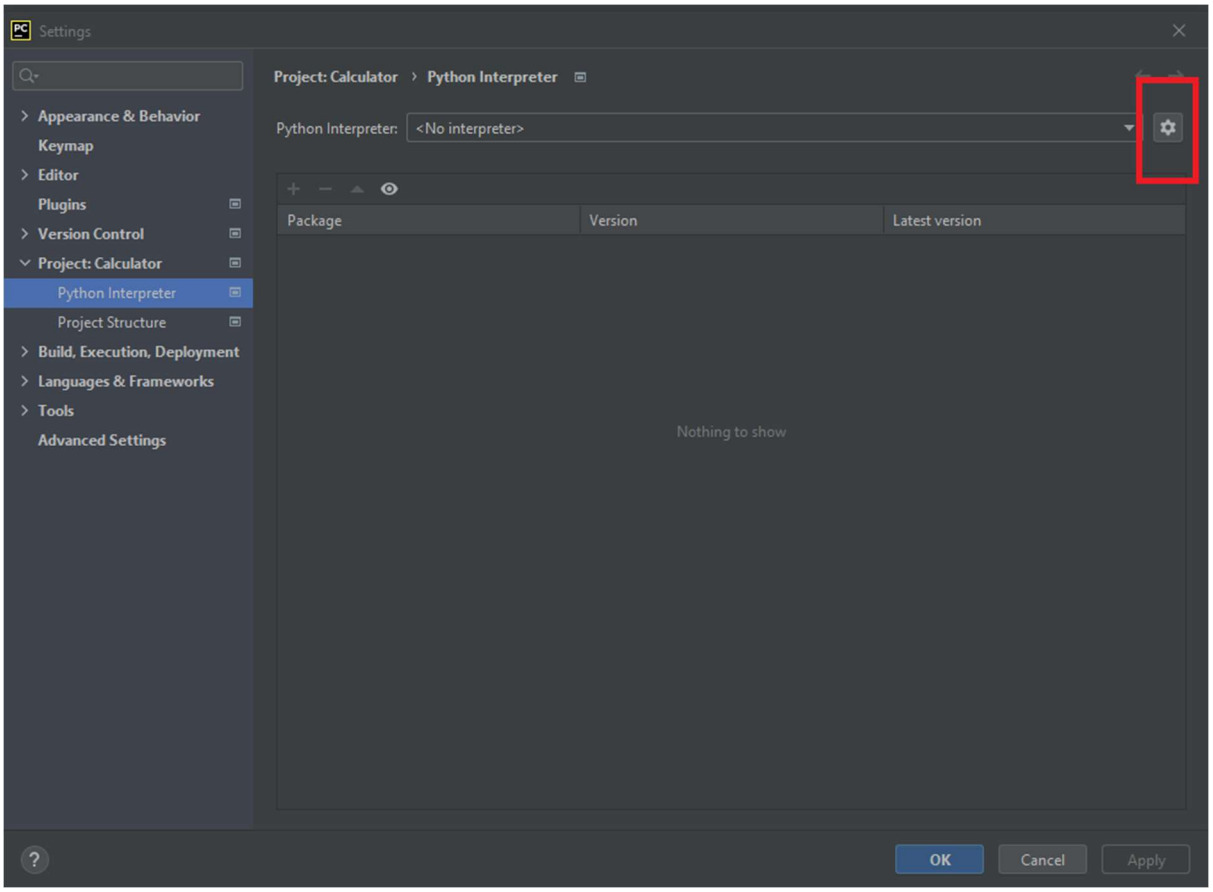
1.Basic configuration

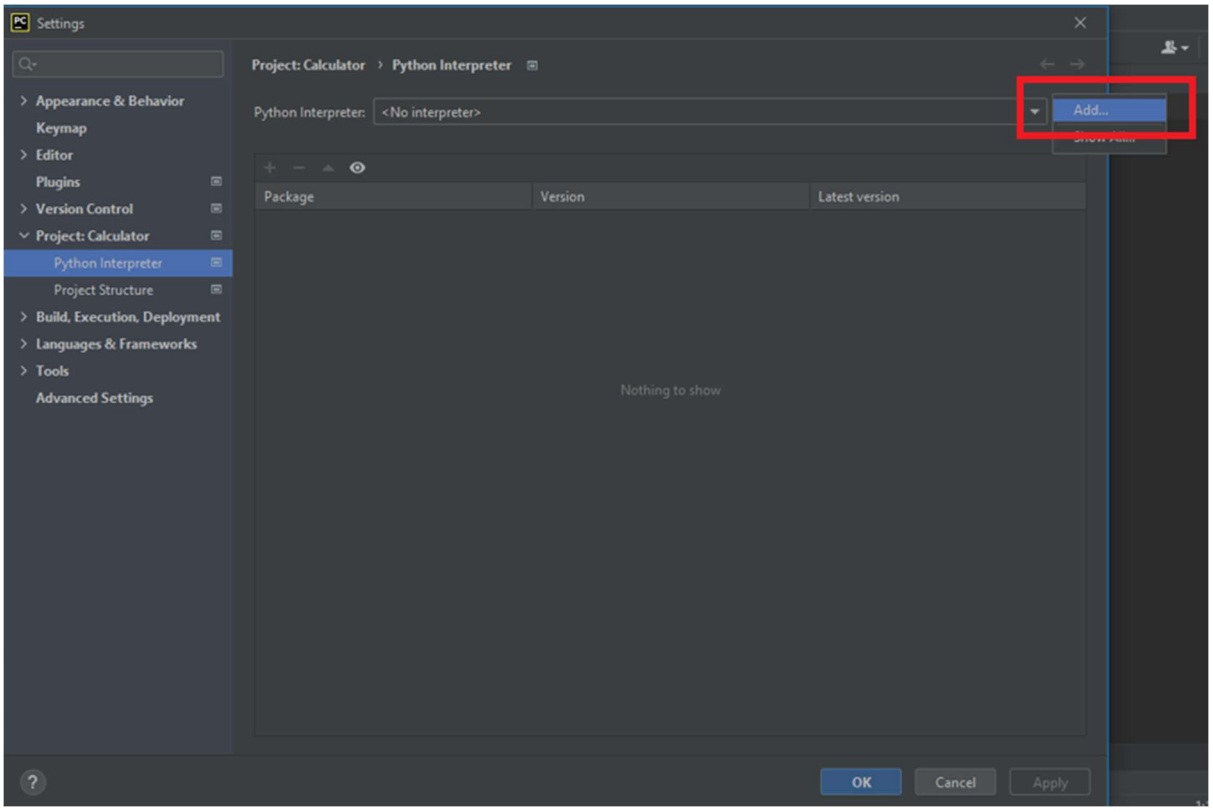
1.1. The pyinstaller library needs to be installed in this experiment. We need to import it first. First, click file - > setting to open the configuration interface and select Python interpreter under project



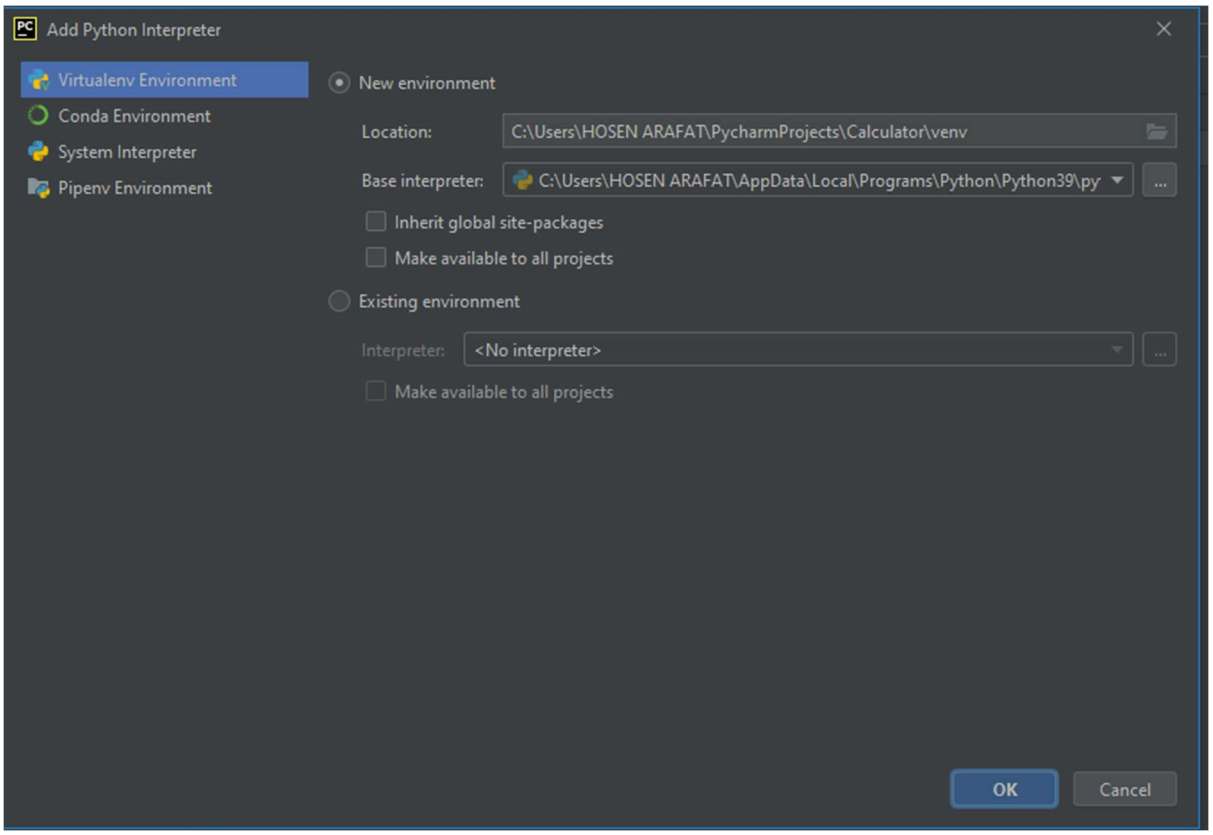

Settings
Appearance & Behavior
Appearance
Menus and Toolbars
System Settings
File Colors
Scopes
Notifications
Quick Lists
Path Variables
Keymap
Editor
Plugins
Version Control
Project: Calculator
Python Interpreter
Project Structure
Build, Execution, Deployment
Languages & Frameworks
Tools
Advanced Settings
Appearance & Behavior › Appearance
Theme: Darcula
Sync with OS
Use custom font: Segoe UI
Size: 12
Accessibility
Support screen readers
Requires restart
Use contrast scrollbars
Adjust colors for red-green vision deficiency
How it works
Requires restart. For protanopia and deuteranopia.
UI Options
Show tree indent guides
Use smaller indents in trees
Enable mnemonics in menu
Enable mnemonics in controls
Display icons in menu items
Smooth scrolling
Drag-and-drop with Alt pressed only
Merge main menu with window title
Requires restart
Always show full path in window header
Background Image...
Antialiasing
IDE: Subpixel
Editor: Subpixel
Tool Windows
OK
Cancel
Apply

1.2. Click the configure button to select Add to add compiler.

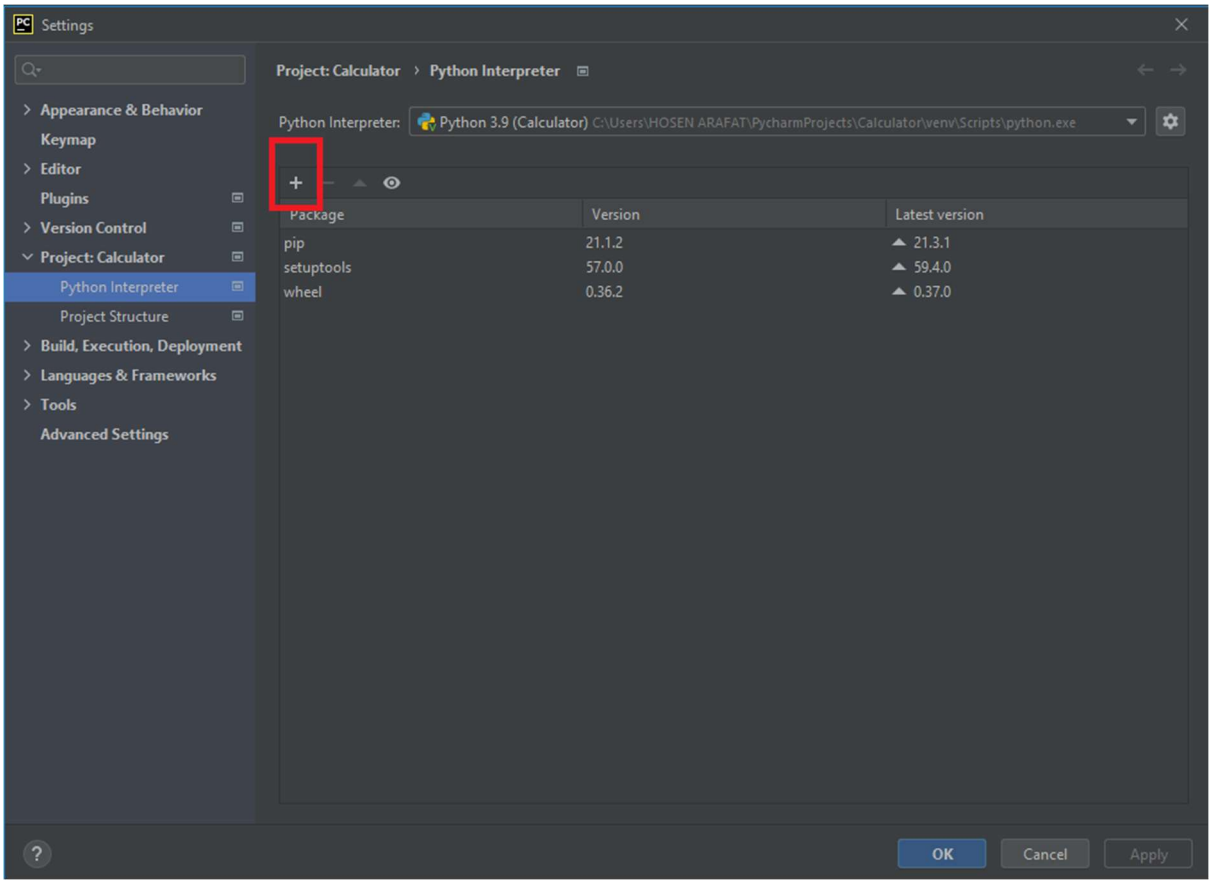


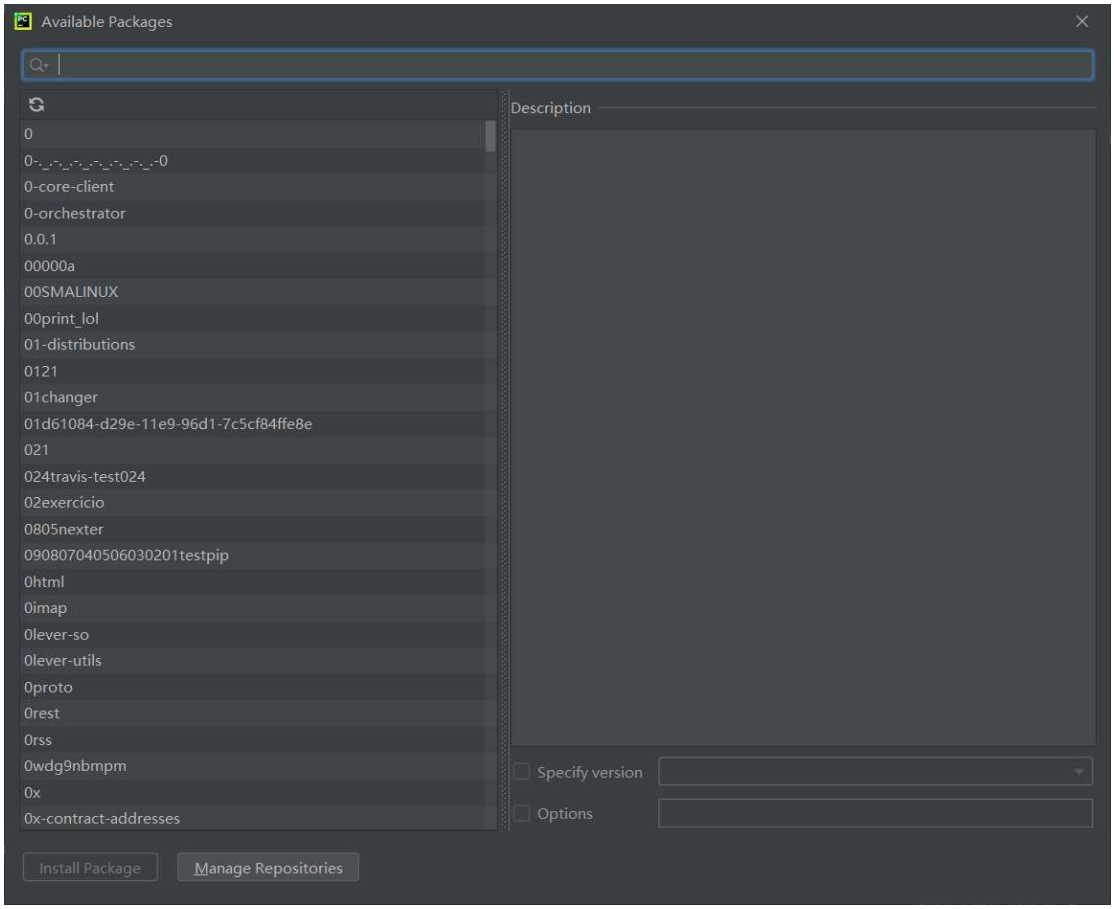


1.3. Select the python folder location in the base interpreter

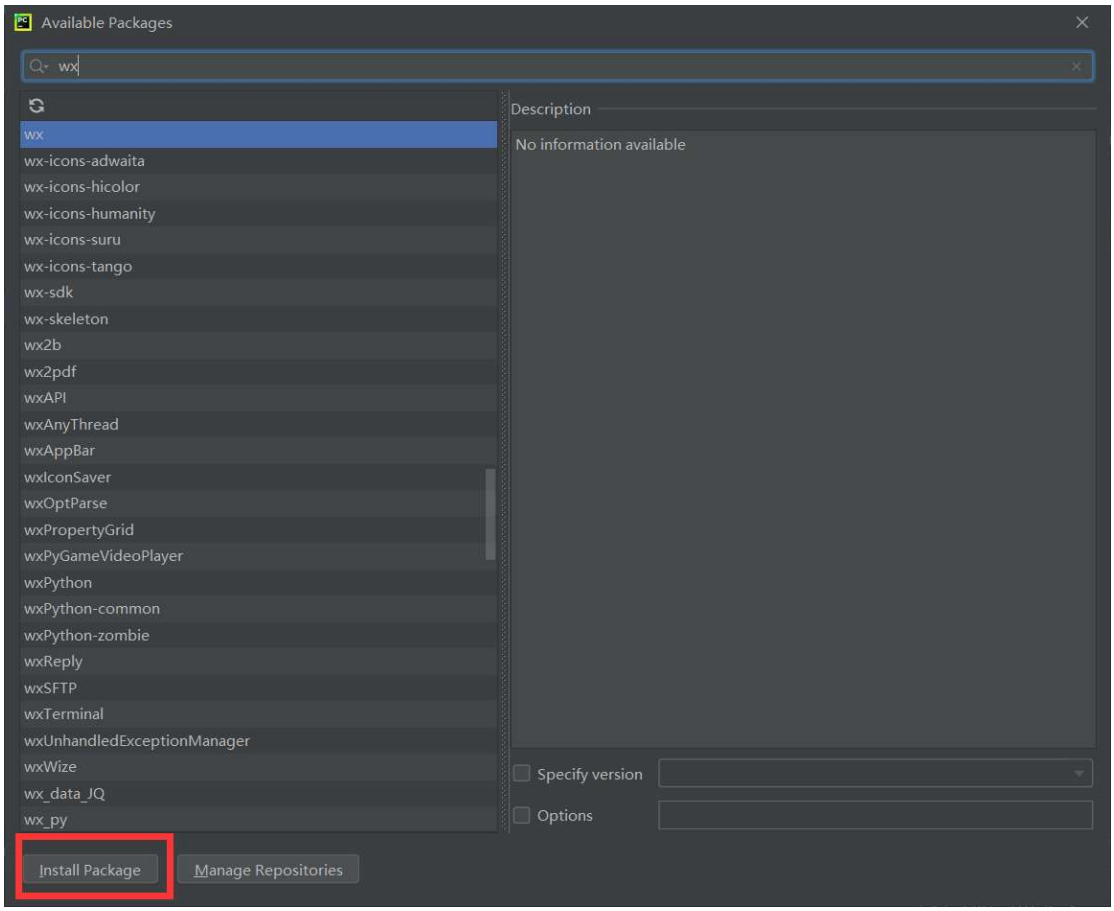


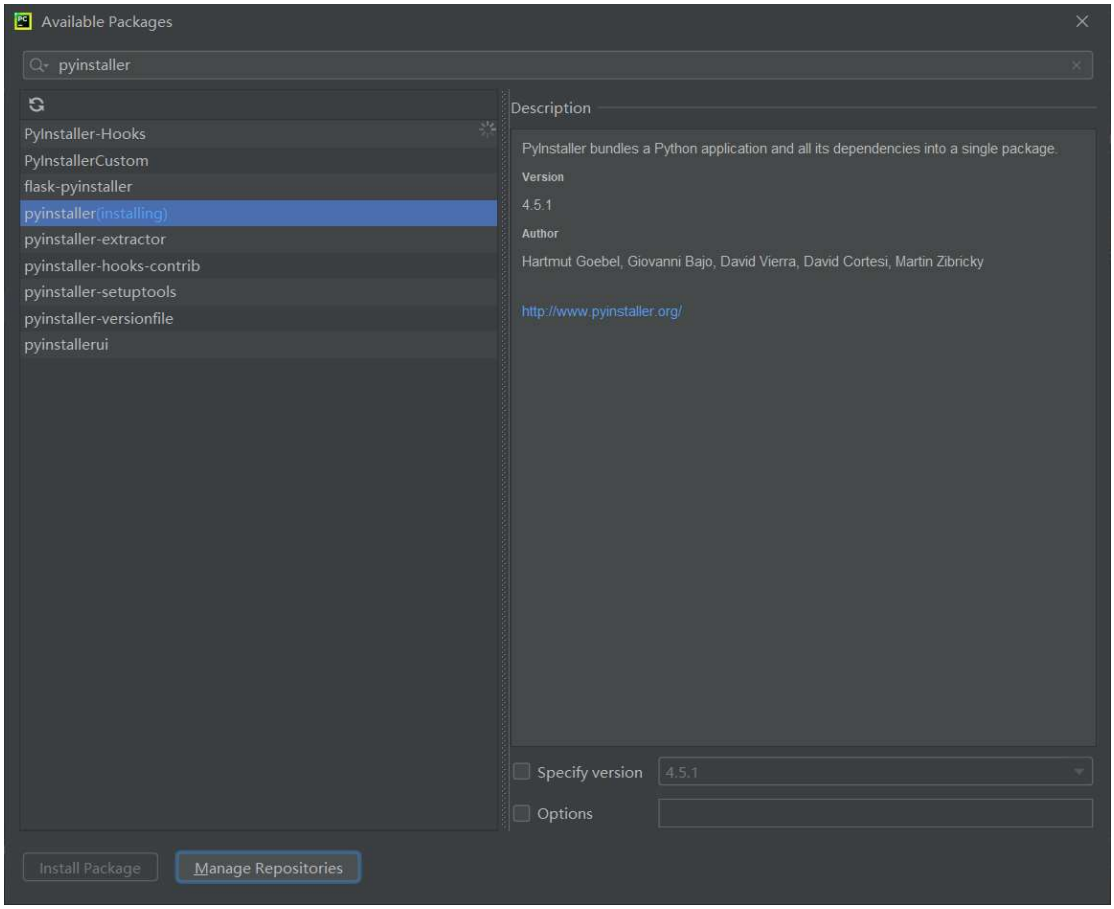
1.4. After selecting the compiler, click '+' to add the library



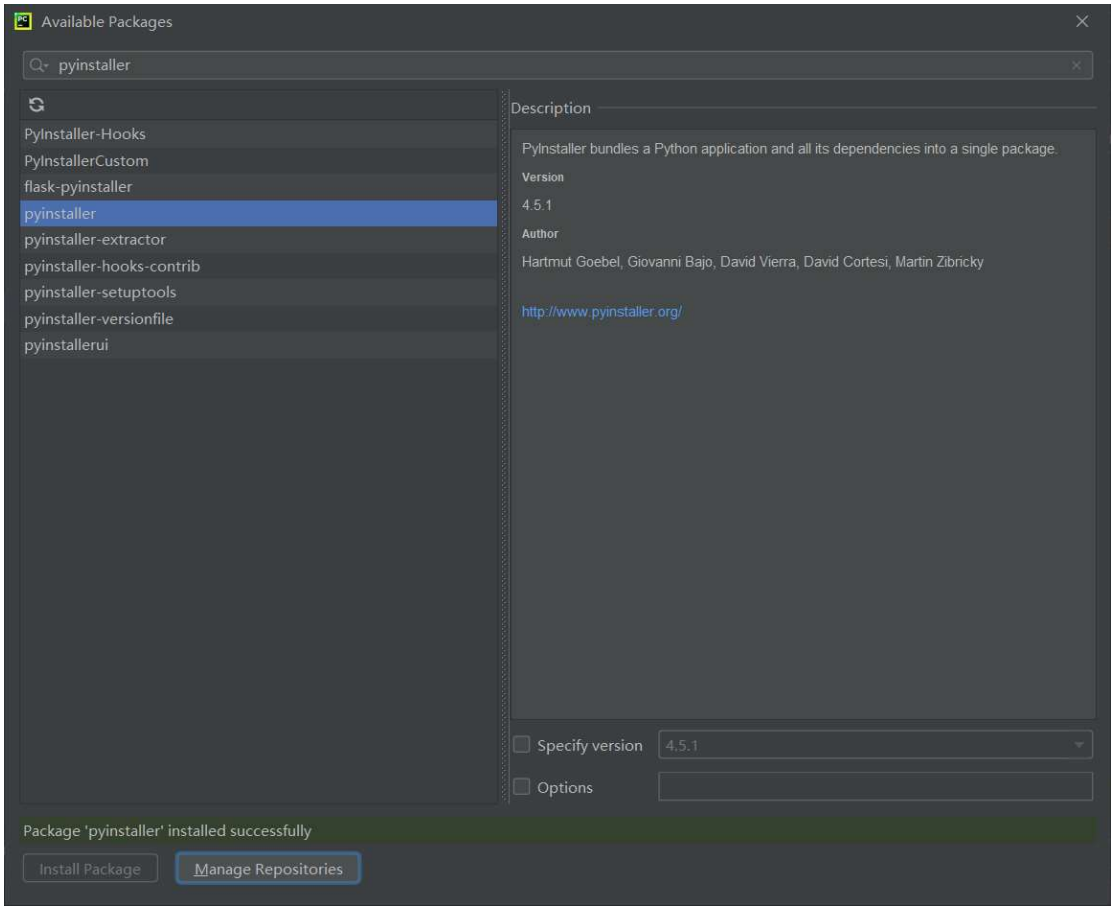

Available Packages
Description
0
0-._.-._.-._.-._.-._.-0
0-core-client
0-orchestrator
0.0.1
00000a
00SMALINUX
00print_lol
01-distributions
0121
01changer
01d61084-d29e-11e9-96d1-7c5cf84ffe8e
021
024travis-test024
02exercicio
0805nexter
090807040506030201testpip
0html
0imap
0lever-so
0lever-utils
0proto
0rest
0rss
0wdg9nbmpm
0x
0x-contract-addresses
Specify version
Options
Install Package
Manage Repositories

1.5. Select the pyinstaller library to download



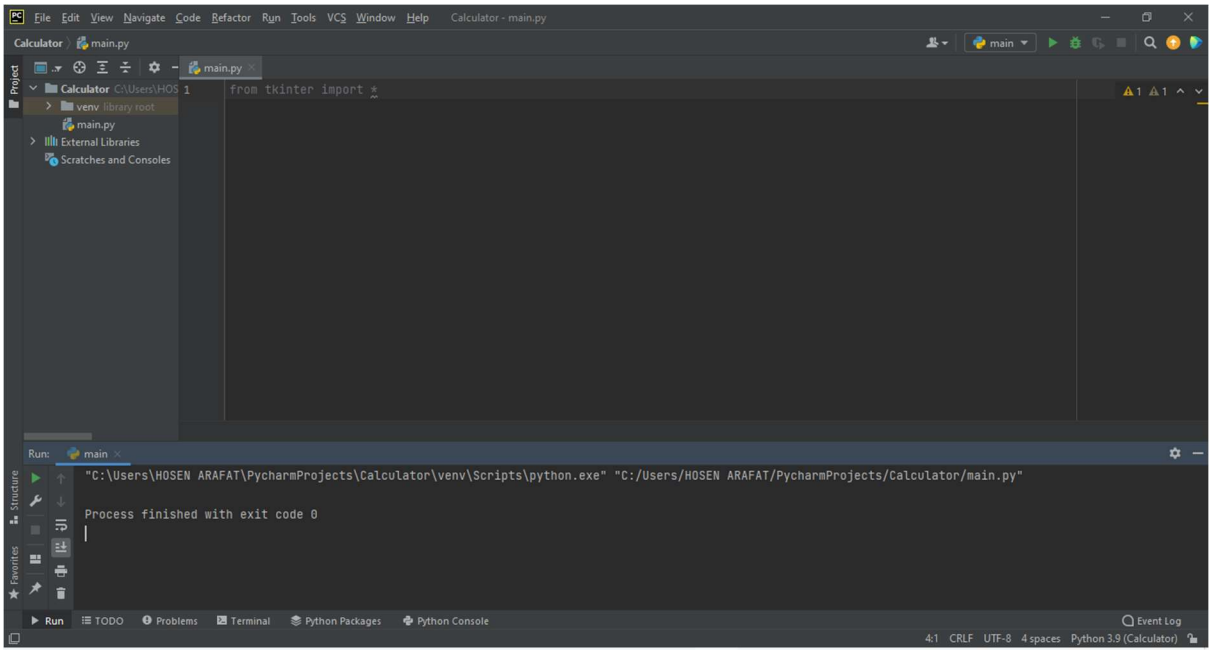

Available Packages
pyinstaller
PyInstaller-Hooks
PyInstallerCustom
flask-pyinstaller
pyinstaller(installing)
pyinstaller-extractor
pyinstaller-hooks-contrib
pyinstaller-setuptools
pyinstaller-versionfile
pyinstallerui
Description
PyInstaller bundles a Python application and all its dependencies into a single package.
Version
4.5.1
Author
Hartmut Goebel, Giovanni Bajo, David Vierra, David Cortesi, Martin Zibricky
http://www.pyinstaller.org/
Specify version
4.5.1
Options
Install Package
Manage Repositories

1.6. Download succeeded

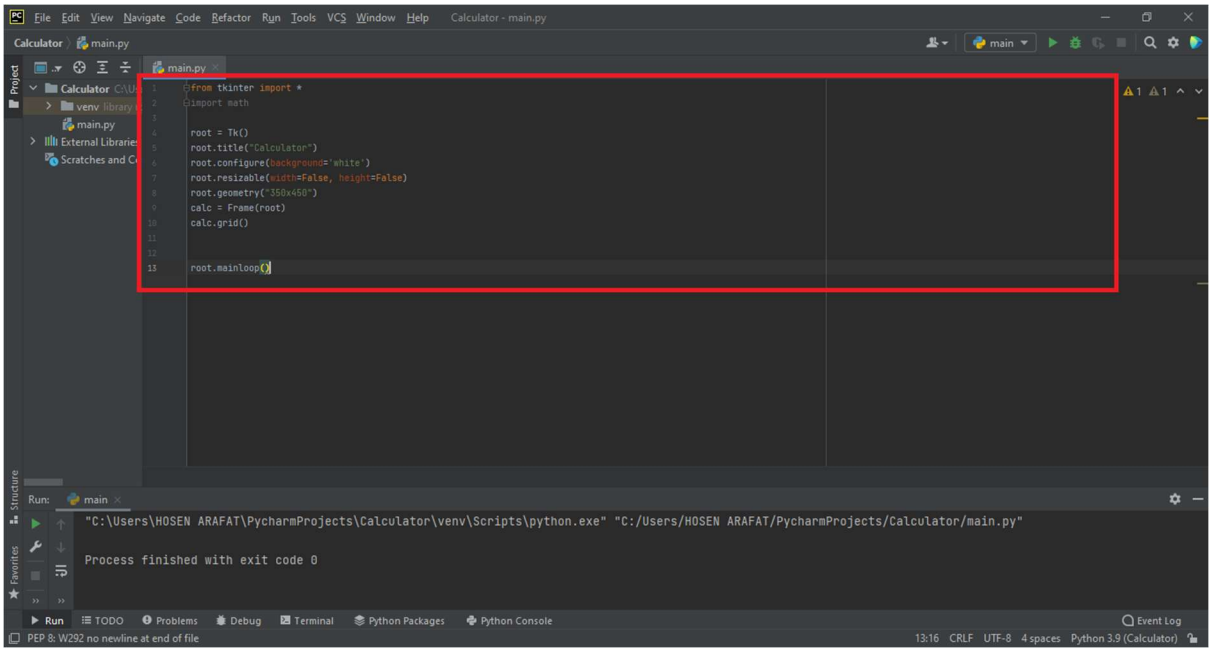


2.Interface writing

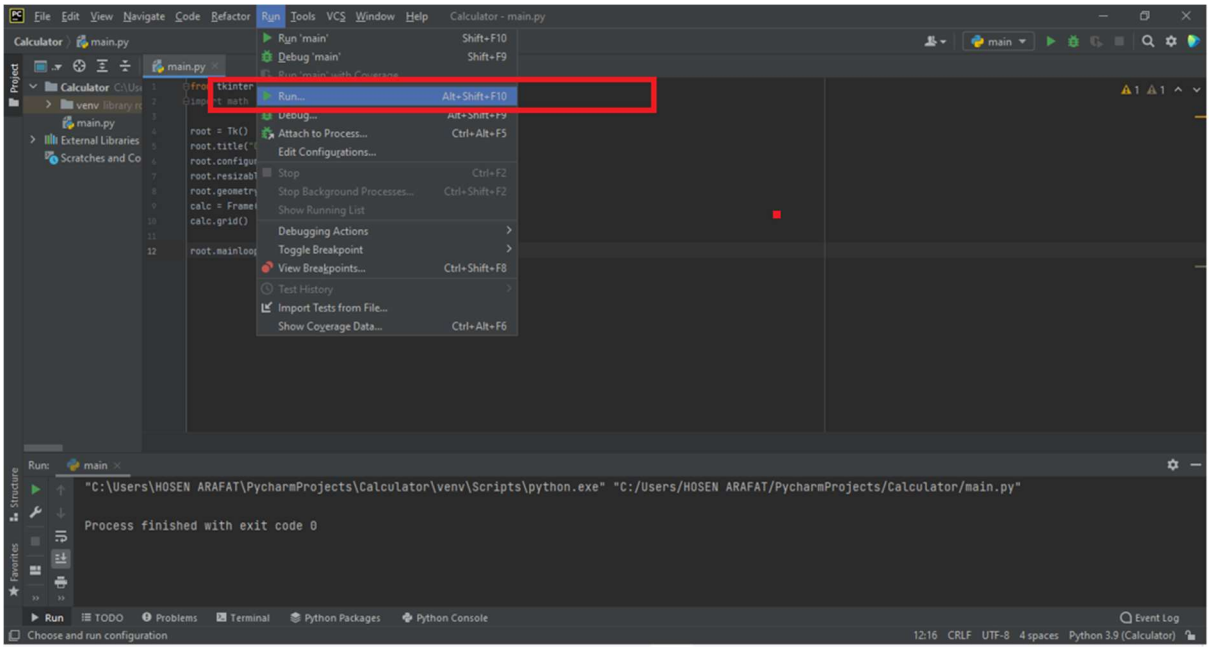
1.1. Add the Tkinter library that comes with the python compiler

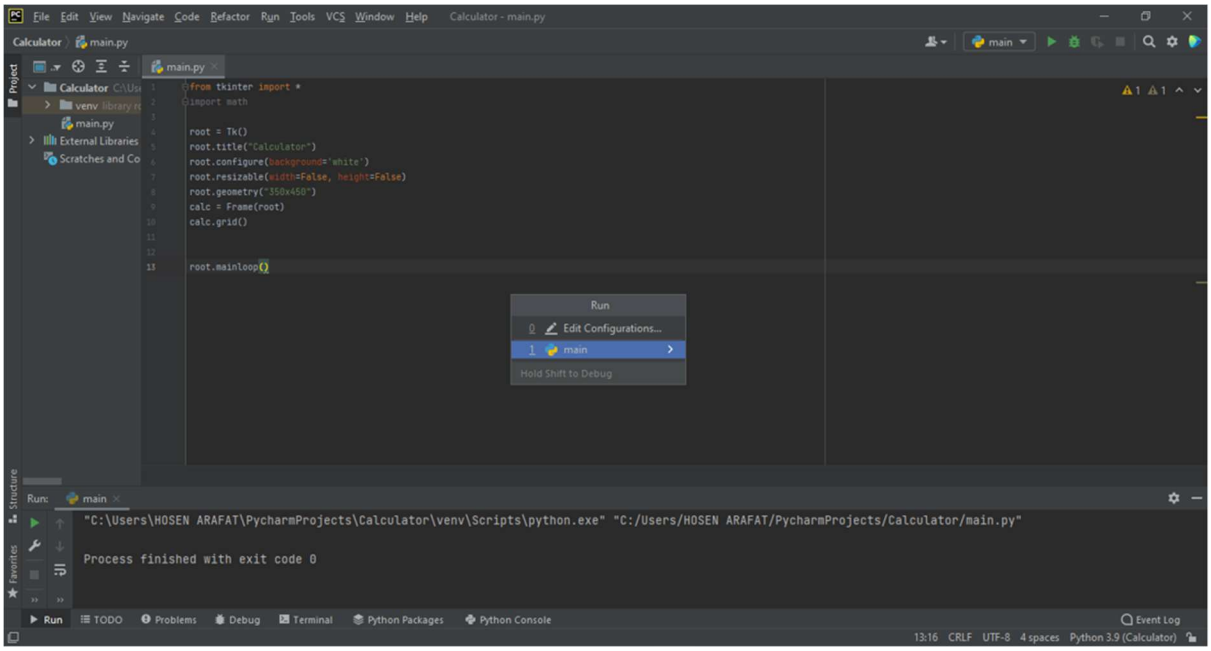


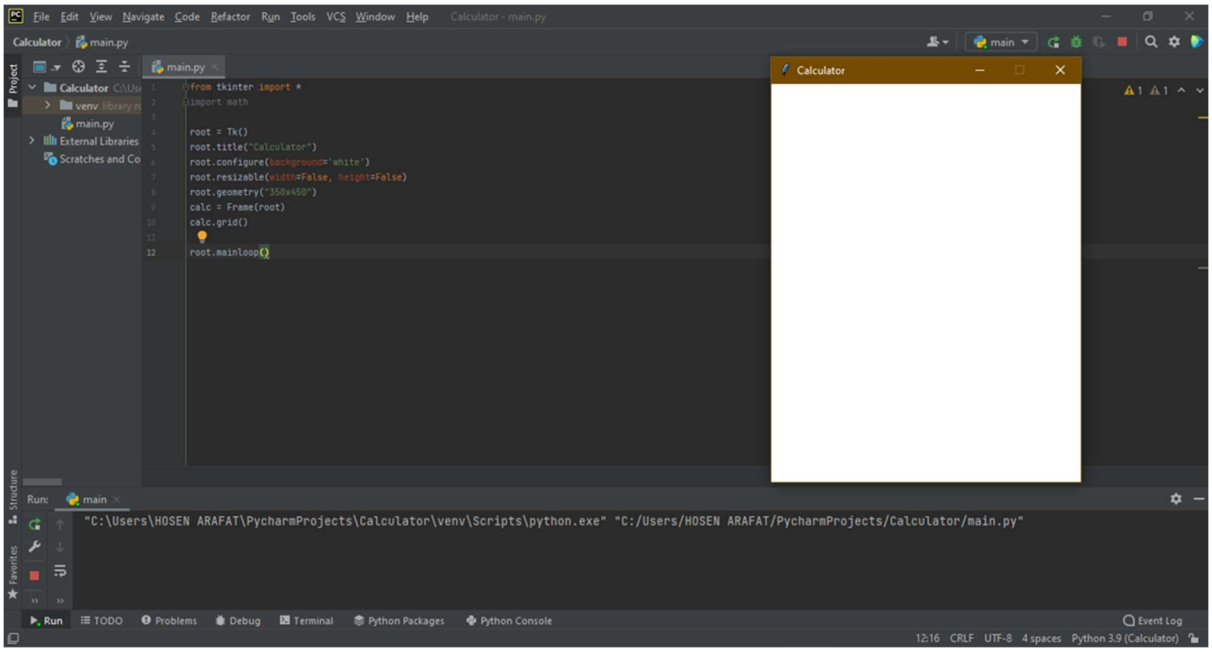
1.2. Add a form, set its title, length, width, and display



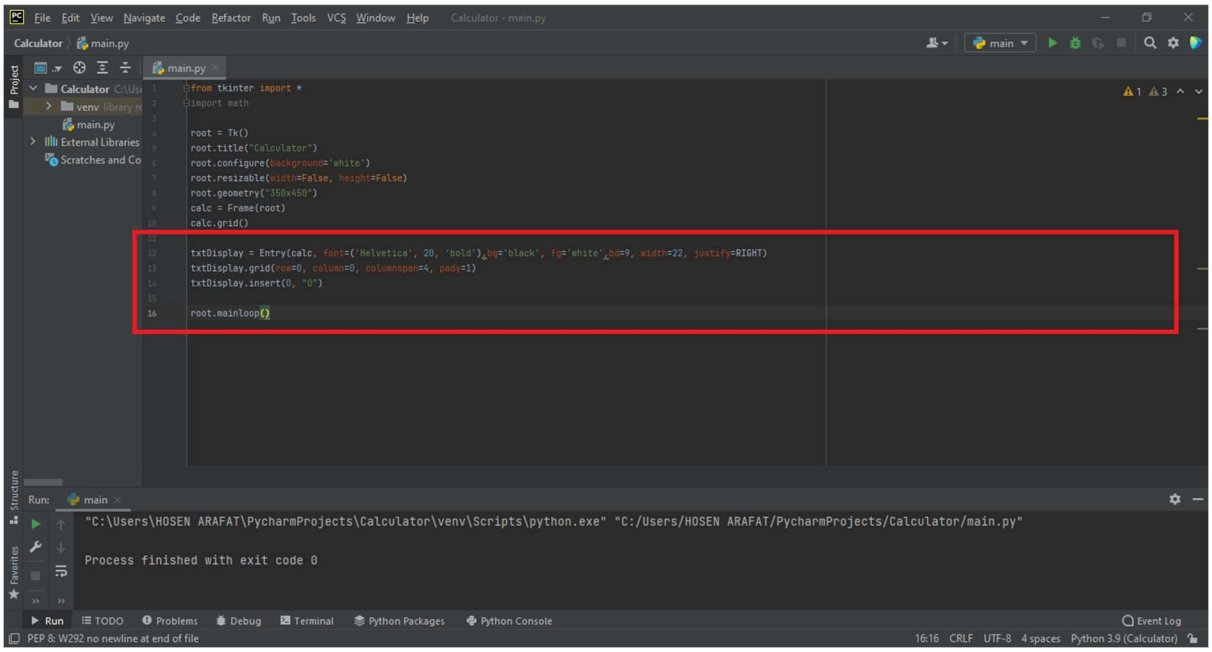
1.3. Click Run - > run... And select the main.py file to compile

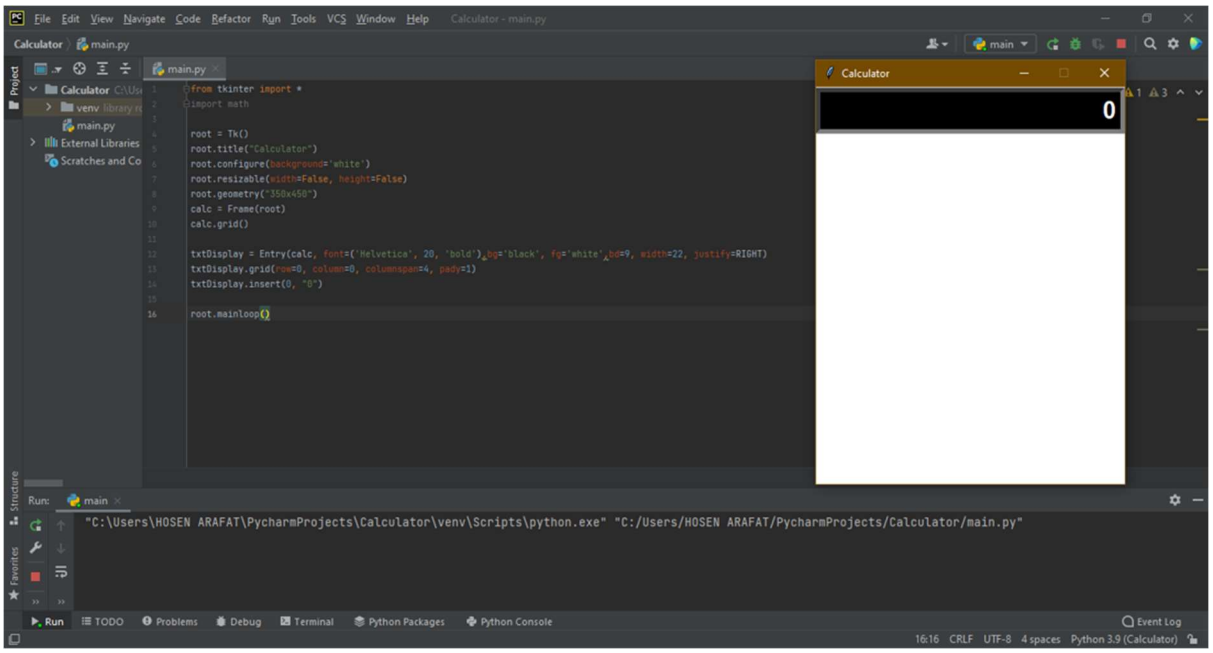




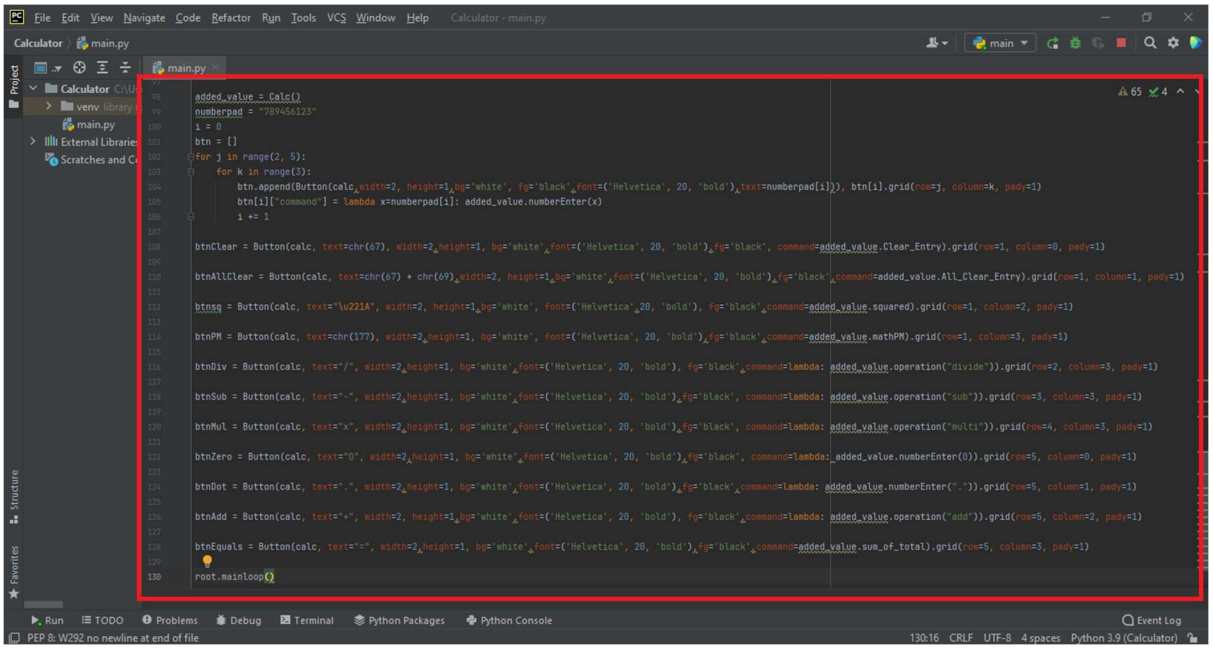


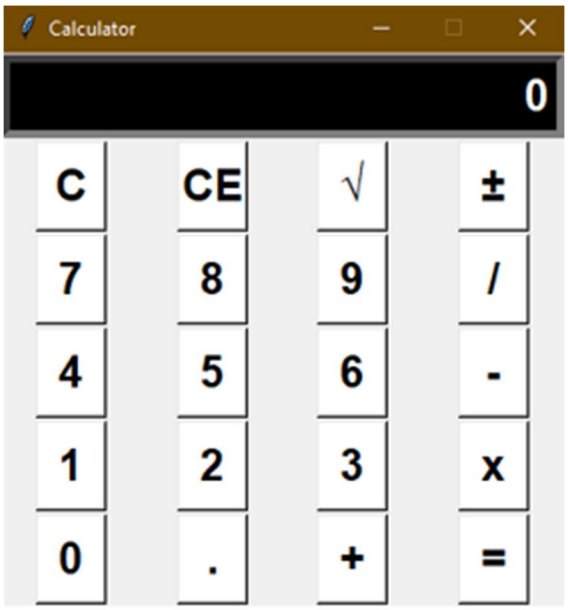
1.4. Add input text box (display box)



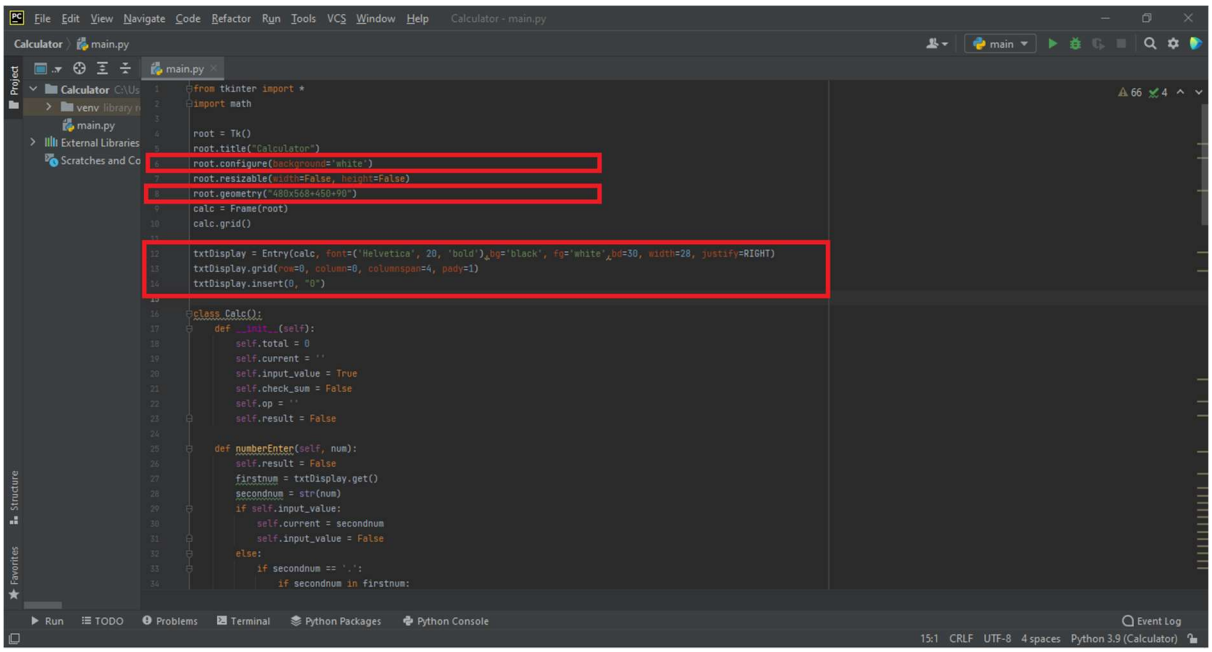


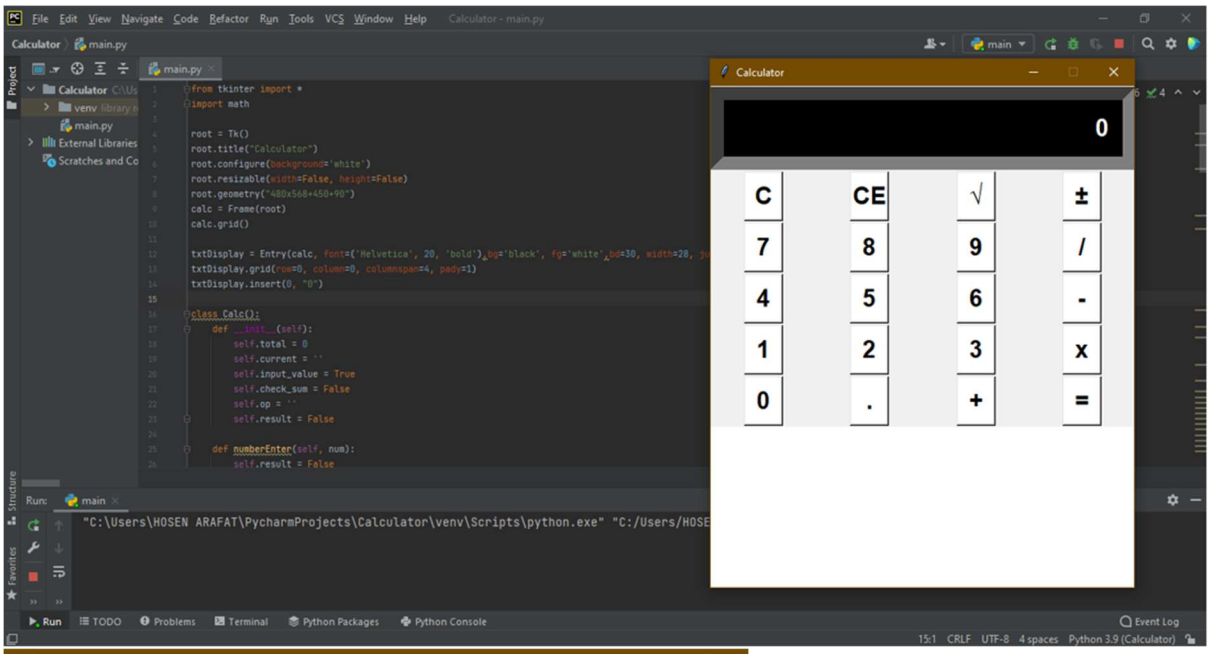
1.5. Add buttons for 1-9 and other operations





1.6. Add bigger length, width, and display




File Edit View Navigate Code Refactor Run Tools VCS Window Help
Calculator - main.py
Calculator
main.py
main
Project
Calculator C:\Us
venv library r
main.py
External Libraries
Scratches and Co
main.py
from tkinter import *
import math
root = Tk()
root.title("Calculator")
root.configure(background='white')
root.resizable(width=False, height=False)
root.geometry("480x568+450+90")
calc = Frame(root)
calc.grid()
txtDisplay = Entry(calc, font=('Helvetica', 20, 'bold'),bg='black', fg='white',bd=30, width=28,
txtDisplay.grid(row=0, column=0, columnspan=4, pady=1)
txtDisplay.insert(0, "0")
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
Calculator
0
C
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7
8
9
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-
1
2
3
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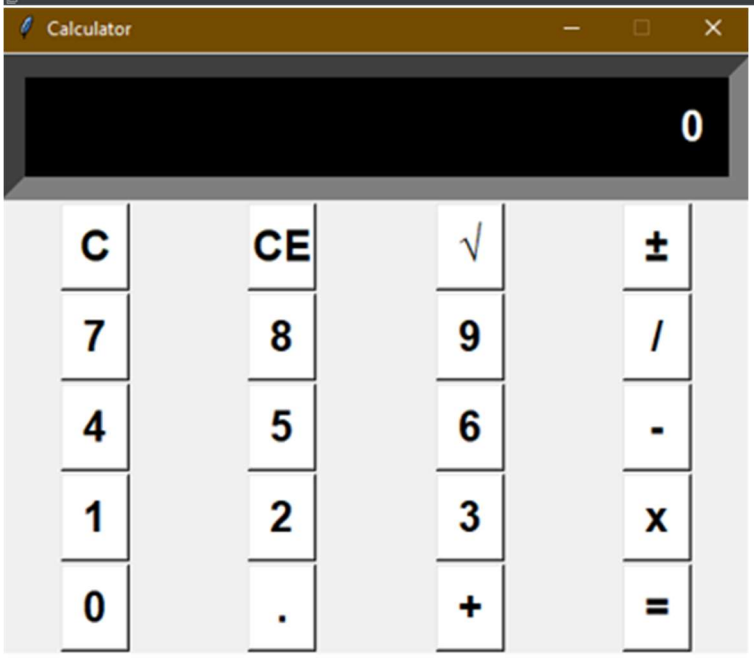
Run:
main
"C:\Users\HOSEN ARAFAT\PycharmProjects\Calculator\venv\Scripts\python.exe" "C:/Users/HOSE
Structure
Favorites
Run
TODO
Problems
Terminal
Python Packages
Python Console
Event Log
15:1 CRLF UTF-8 4 spaces Python 3.9 (Calculator)


Calculator
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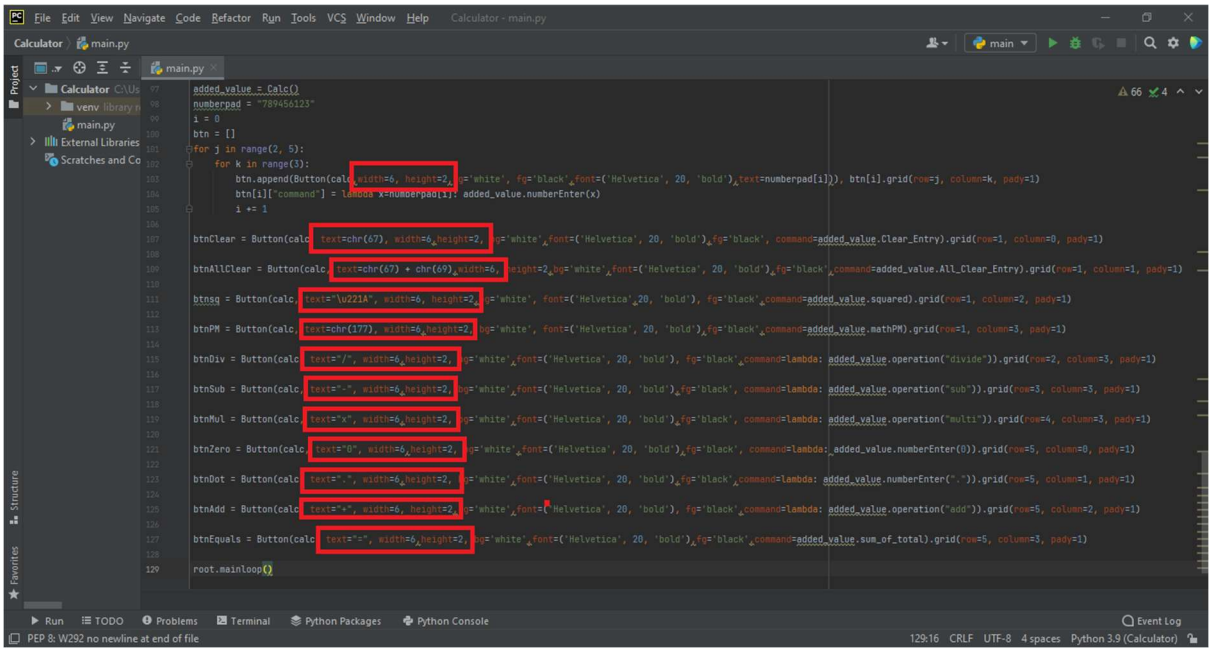
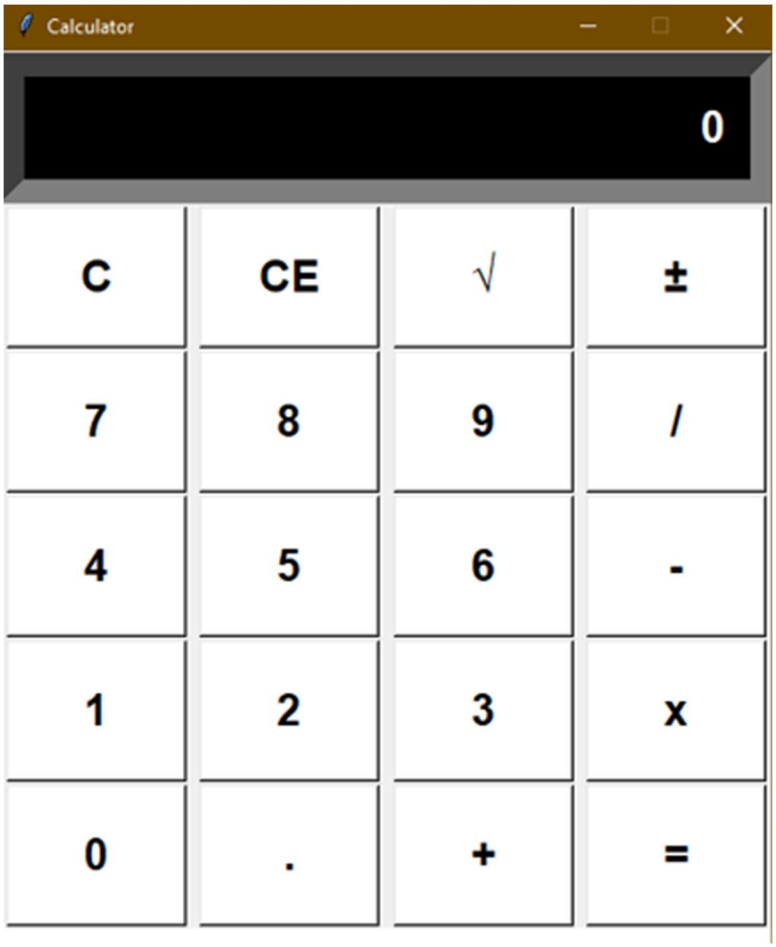
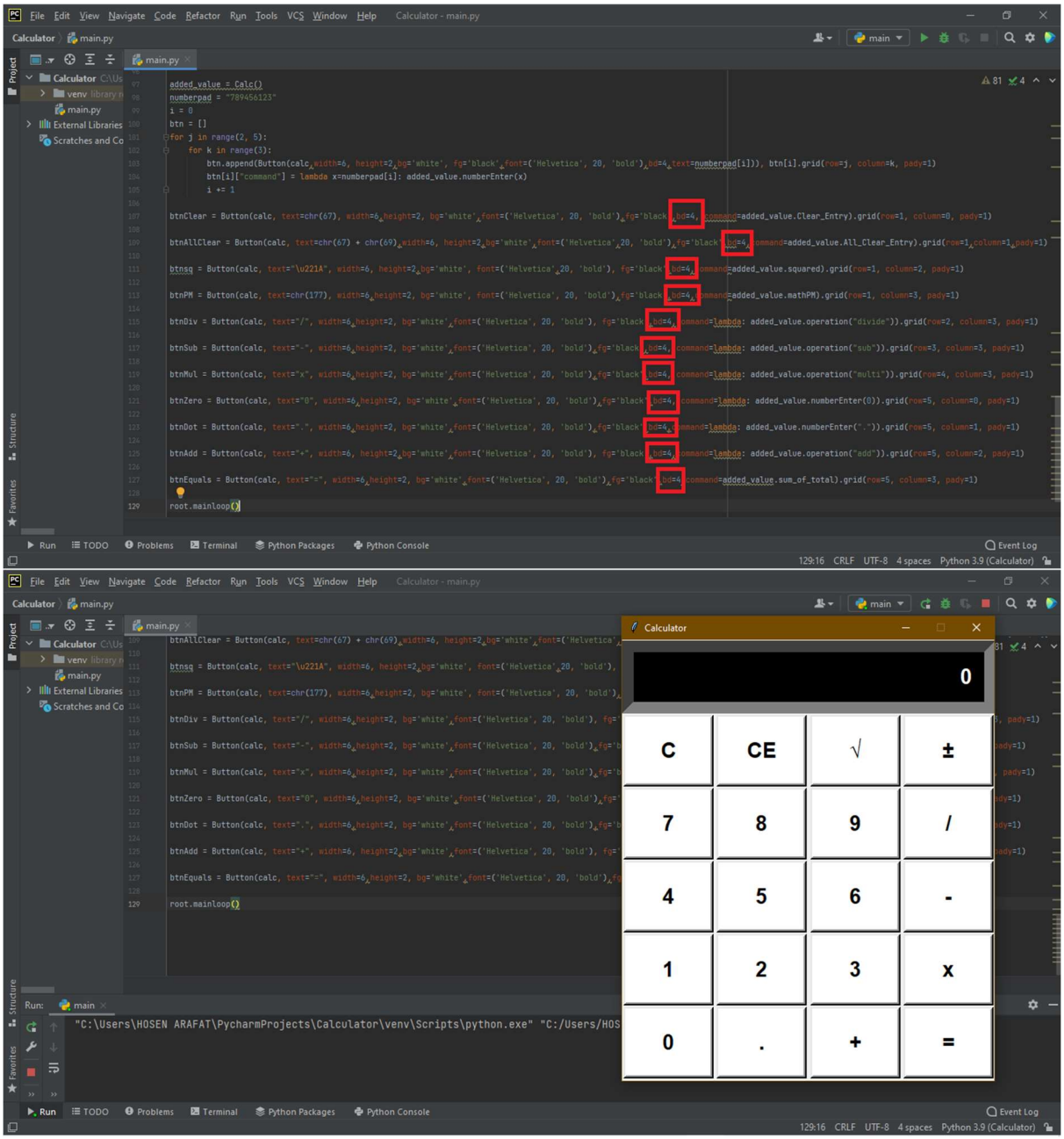
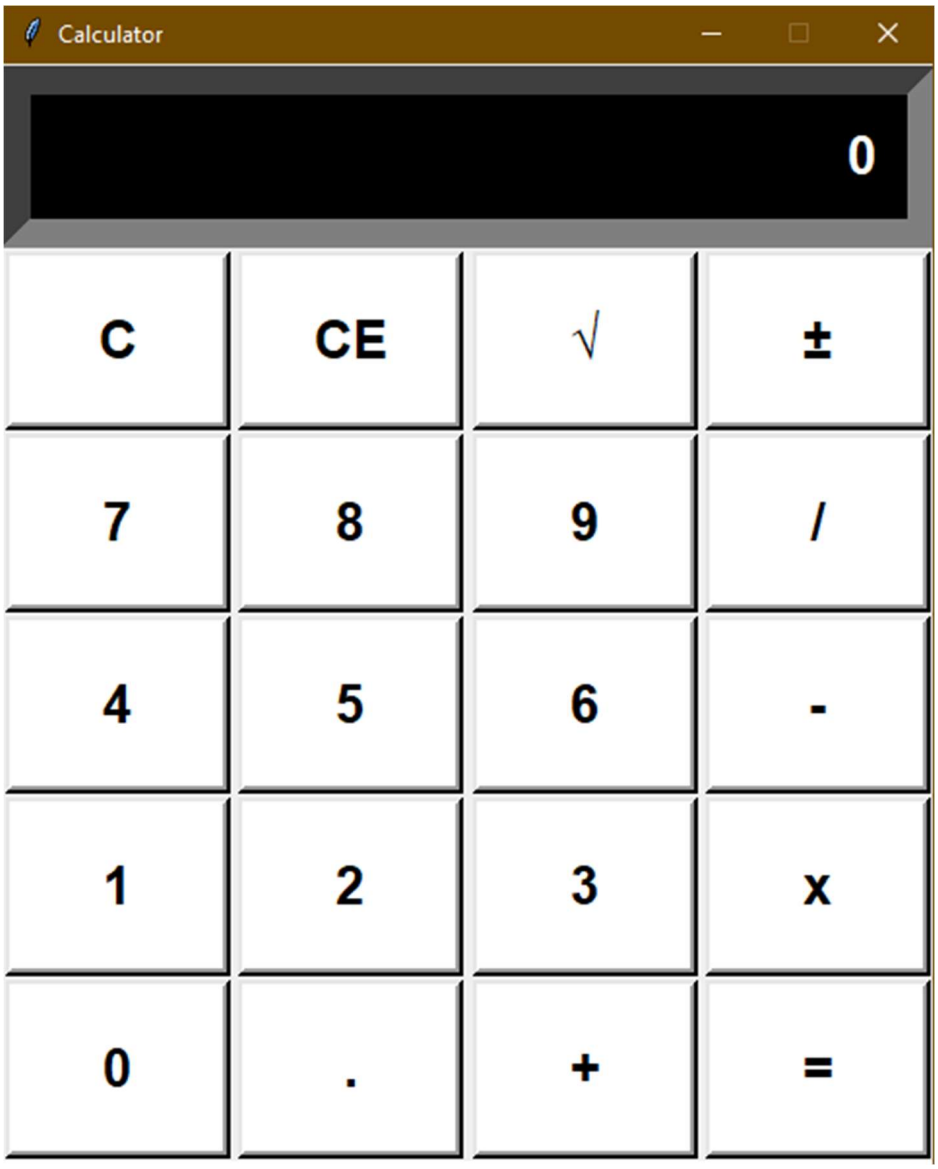
1.7. Add bigger buttons for 1-9 and other operations





1.8. Add buttons border for 1-9 and other operations




Calculator
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5
6
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1
2
3
x
0
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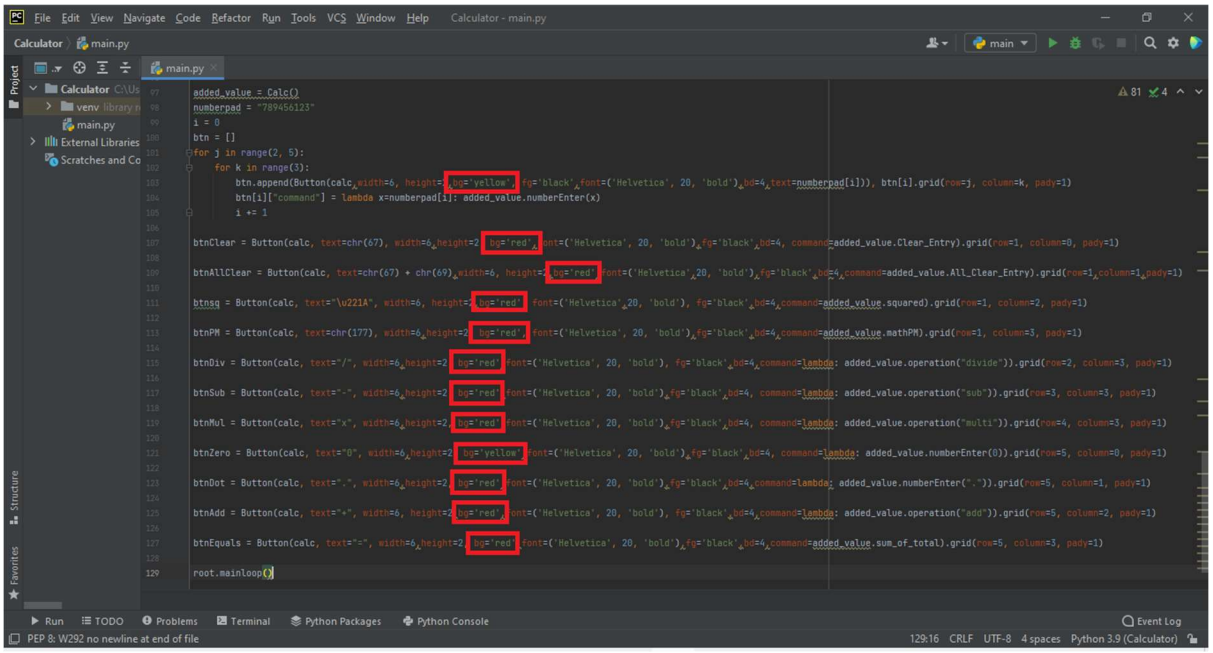
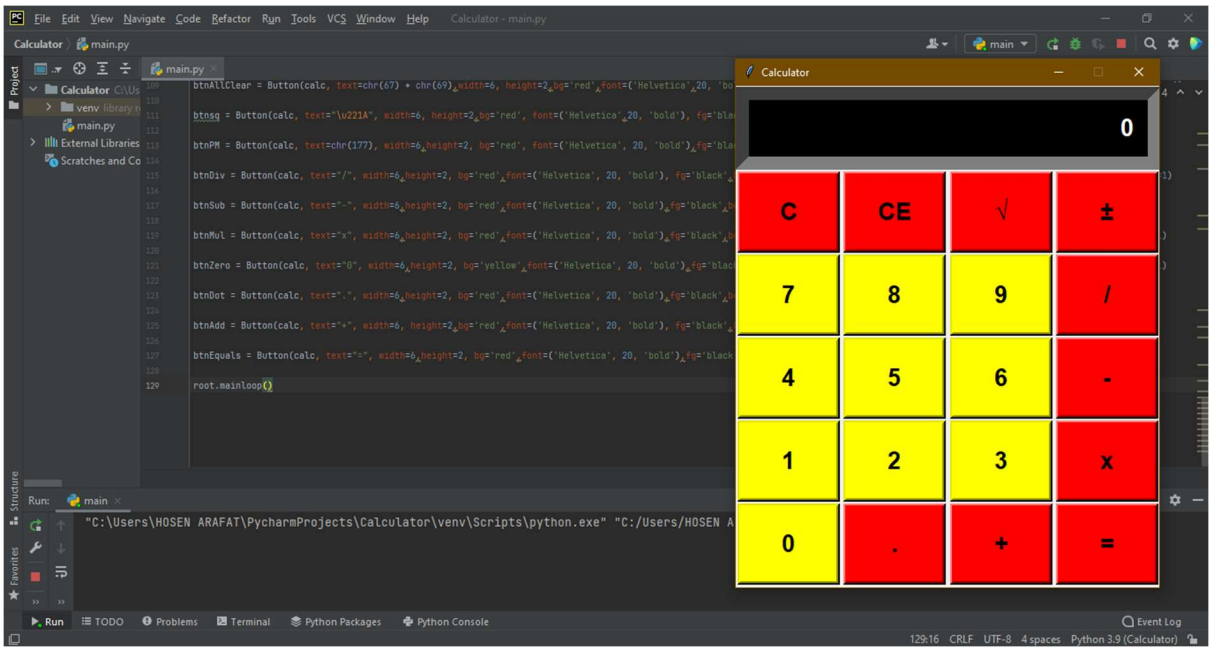
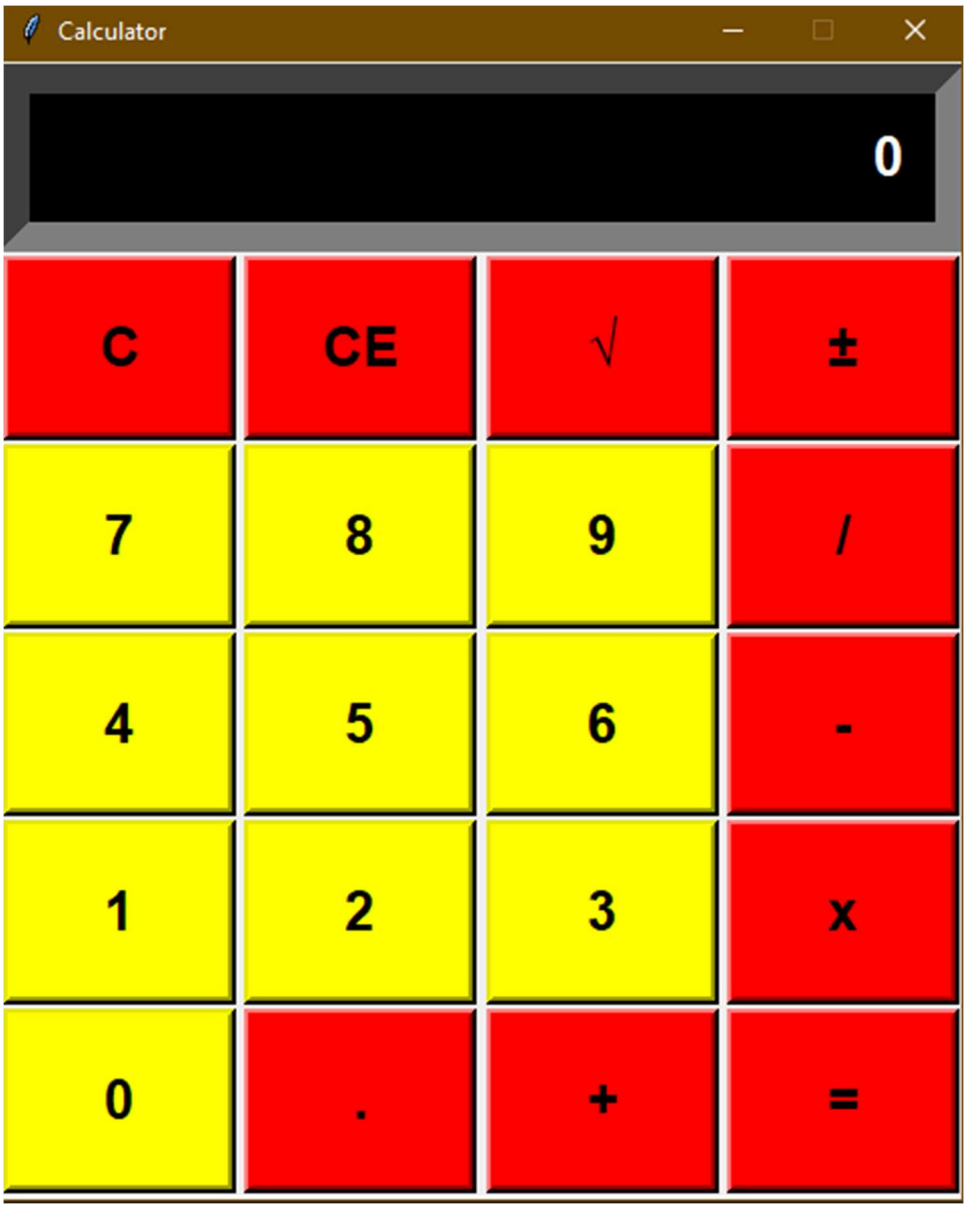
=

1.9. Add buttons background color for 1-9 and other operations



```
added_value = Calc()
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='yellow', fg='black', 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='red', font=('Helvetica', 20, 'bold'), fg='black', 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='red', font=('Helvetica', 20, 'bold'), fg='black', 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='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=added_value.squared).grid(row=1, column=2, pady=1)

btnPM = Button(calc, text=chr(177), width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=added_value.mathPM).grid(row=1, column=3, pady=1)

btnDiv = Button(calc, text="/", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=lambda: added_value.operation("divide")).grid(row=2, column=3, pady=1)

btnSub = Button(calc, text="-", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=lambda: added_value.operation("sub")).grid(row=3, column=3, pady=1)

btnMul = Button(calc, text="x", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=lambda: added_value.operation("multi")).grid(row=4, column=3, pady=1)

btnZero = Button(calc, text="0", width=6, height=2, bg='yellow', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=lambda: added_value.numberEnter(0)).grid(row=5, column=0, pady=1)

btnDot = Button(calc, text=".", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=lambda: added_value.numberEnter(".")).grid(row=5, column=1, pady=1)

btnAdd = Button(calc, text="+", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=lambda: added_value.operation("add")).grid(row=5, column=2, pady=1)

btnEquals = Button(calc, text="=", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=added_value.sum_of_total).grid(row=5, column=3, pady=1)

root.mainloop()
```




Calculator
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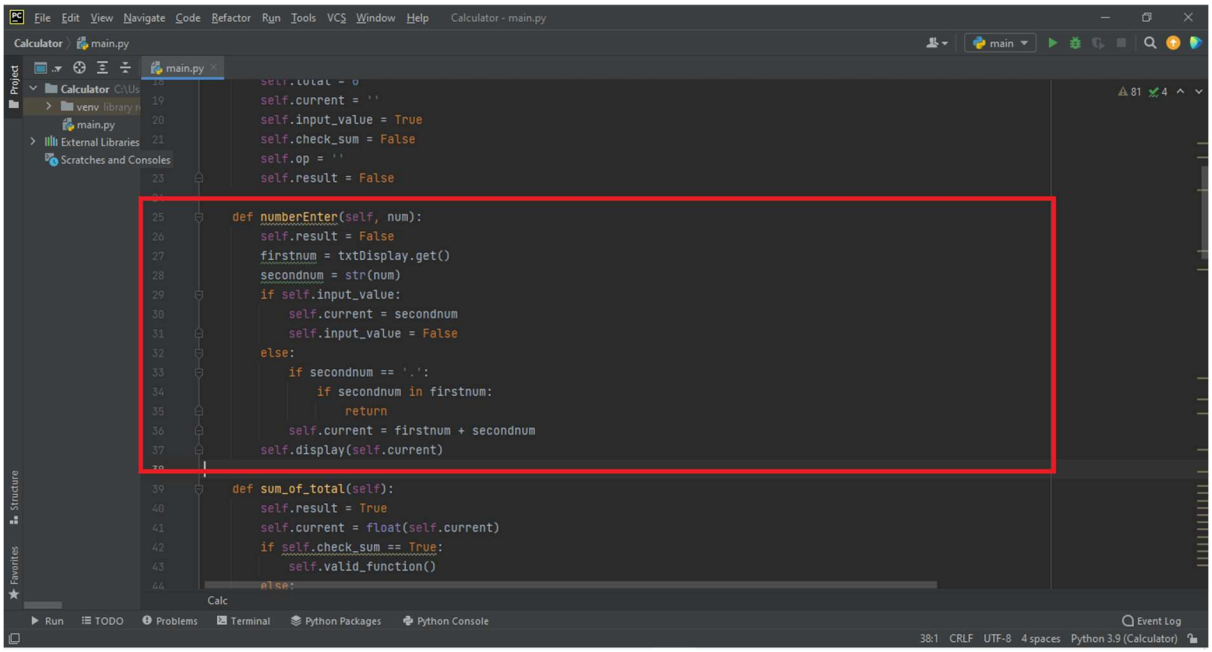
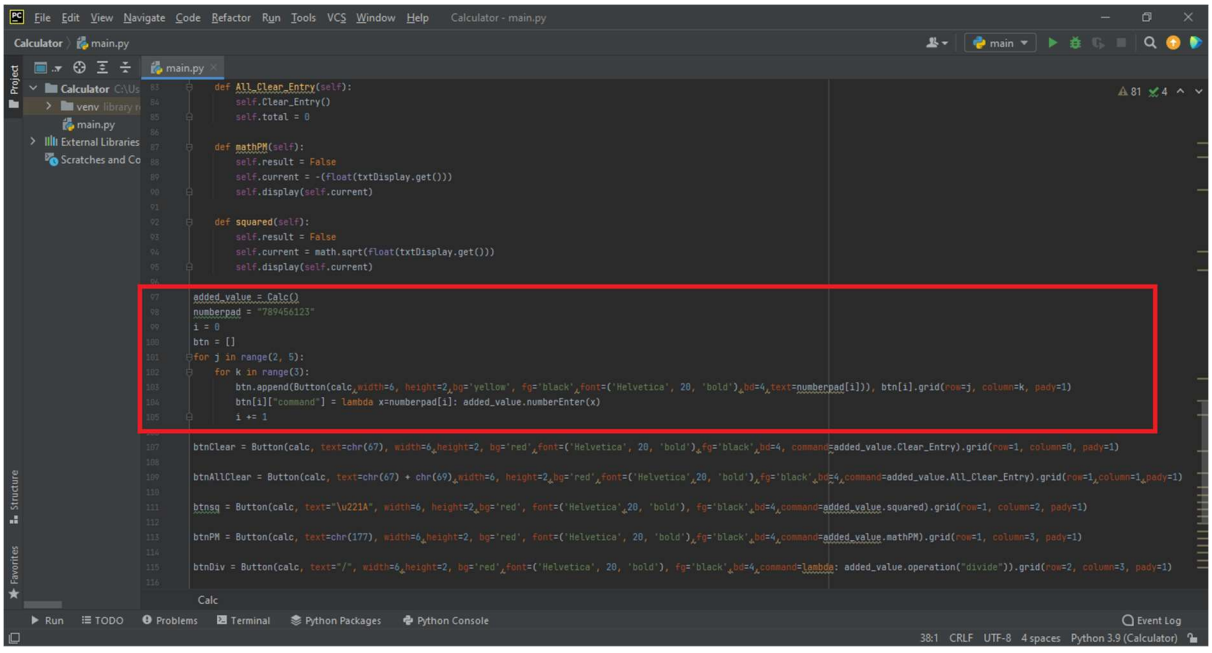
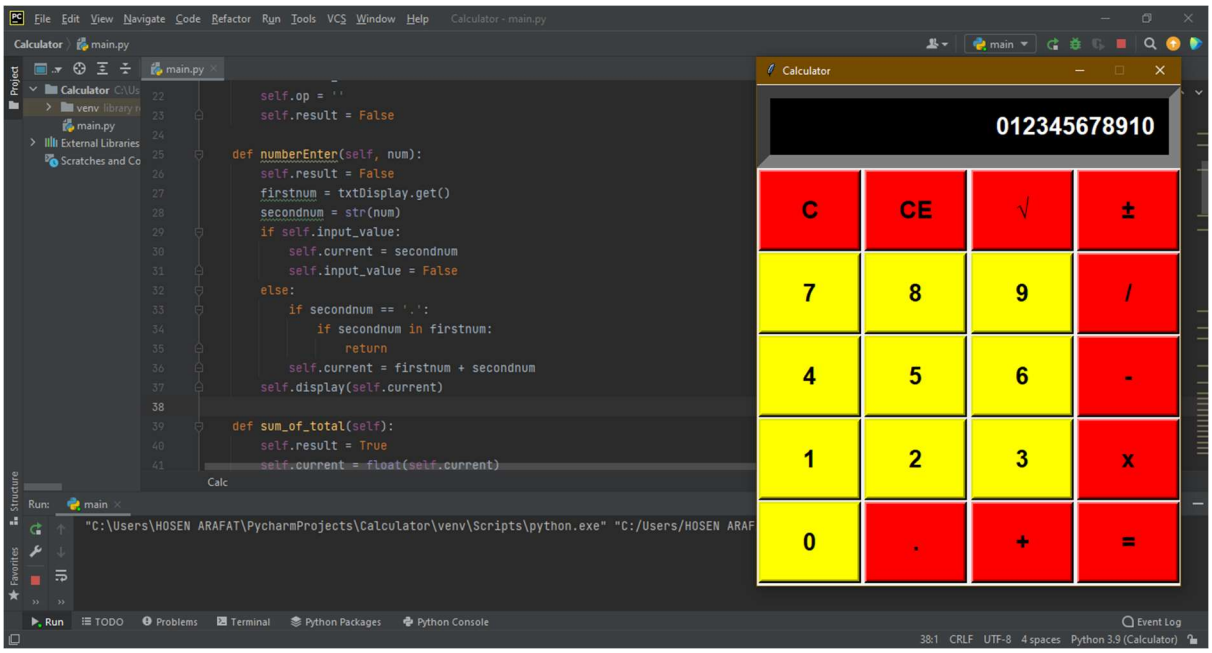
3.logic design

3.1 Write the number enter function of the input box, and add the change function to the 1-9 button. When the button inputs a number, it will be updated in the input box in real time.






File Edit View Navigate Code Refactor Run Tools VCS Window Help Calculator - main.py
Calculator main.py
main.py
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)
Calc
Run: main
"C:\Users\HOSEN ARAFAT\PycharmProjects\Calculator\venv\Scripts\python.exe" "C:/Users/HOSEN ARAF
Run TODO Problems Terminal Python Packages Python Console Event Log
38:1 CRLF UTF-8 4 spaces Python 3.9 (Calculator)
Calculator
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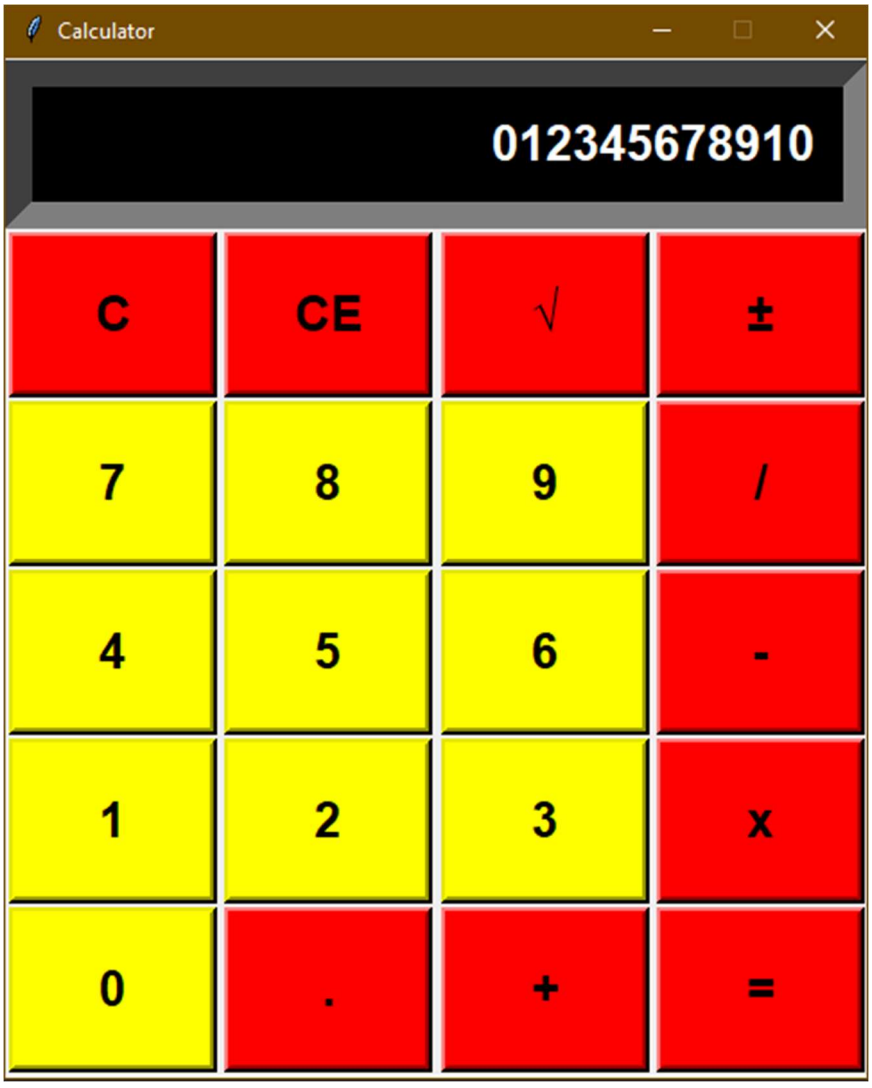
4 5 6 -
1 2 3 x
0 . + =


Calculator
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4 5 6 -
1 2 3 x
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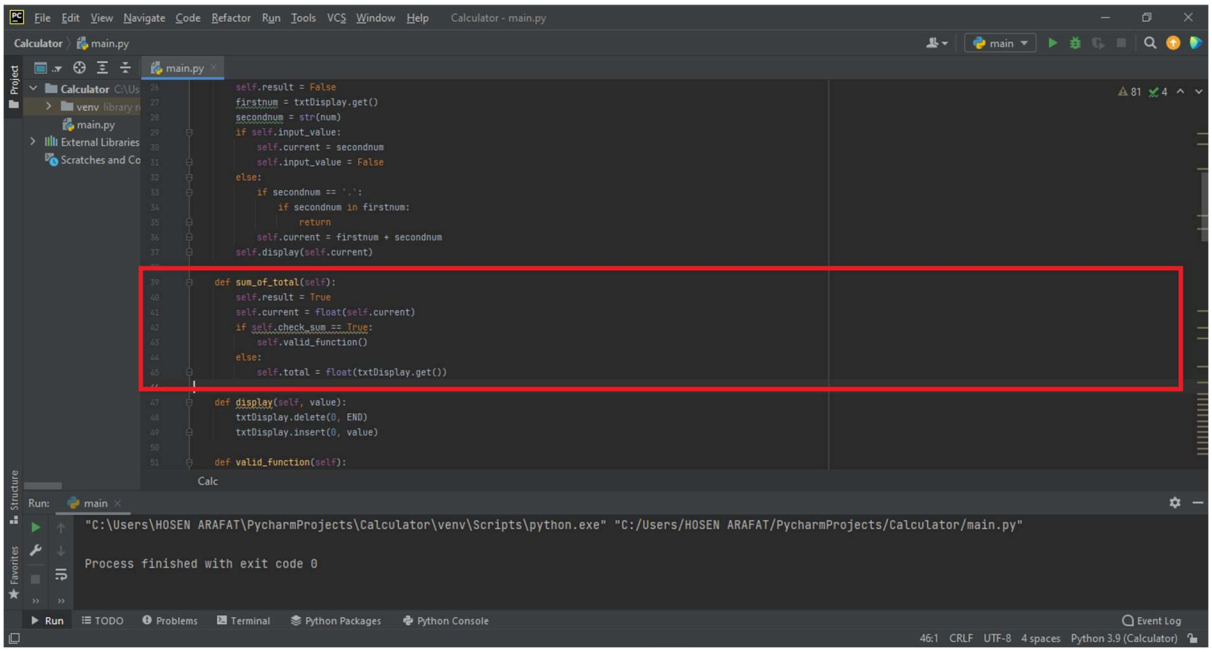
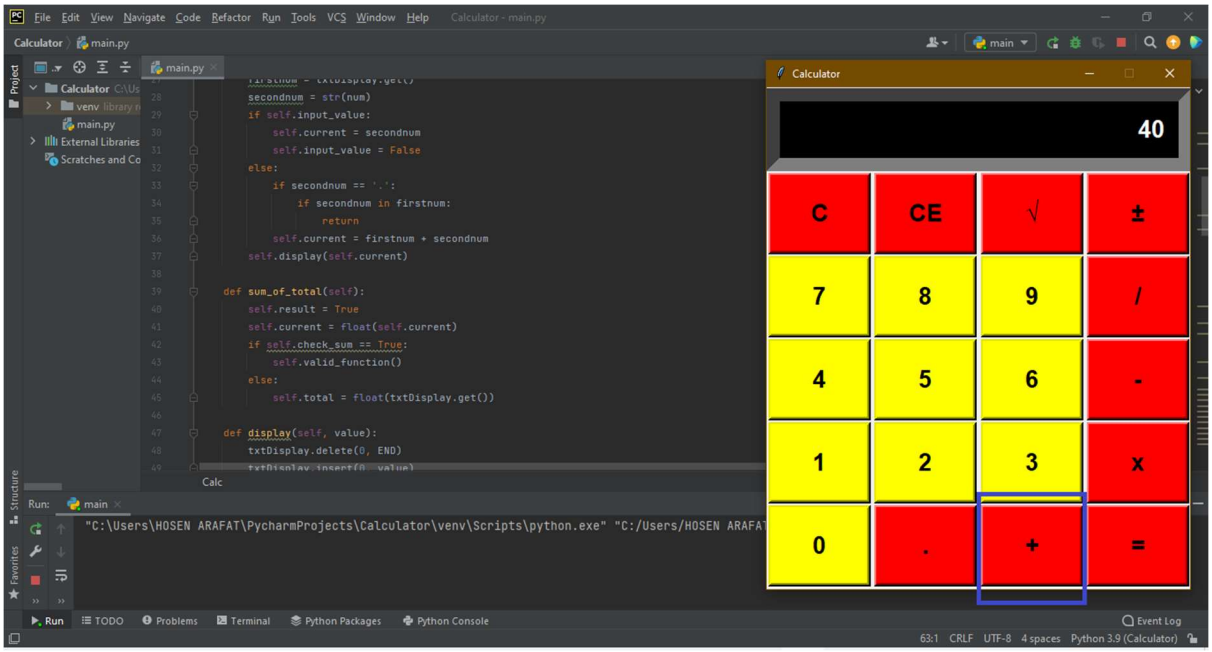
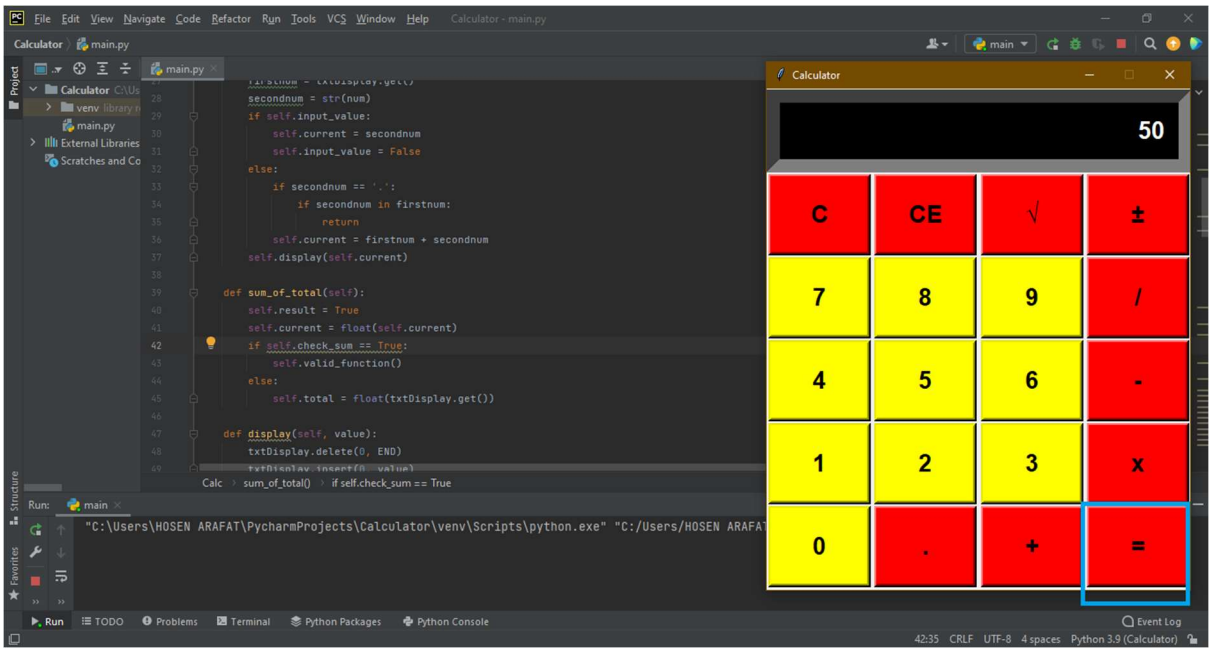
3.2 Write the sum of total function.






Calculator
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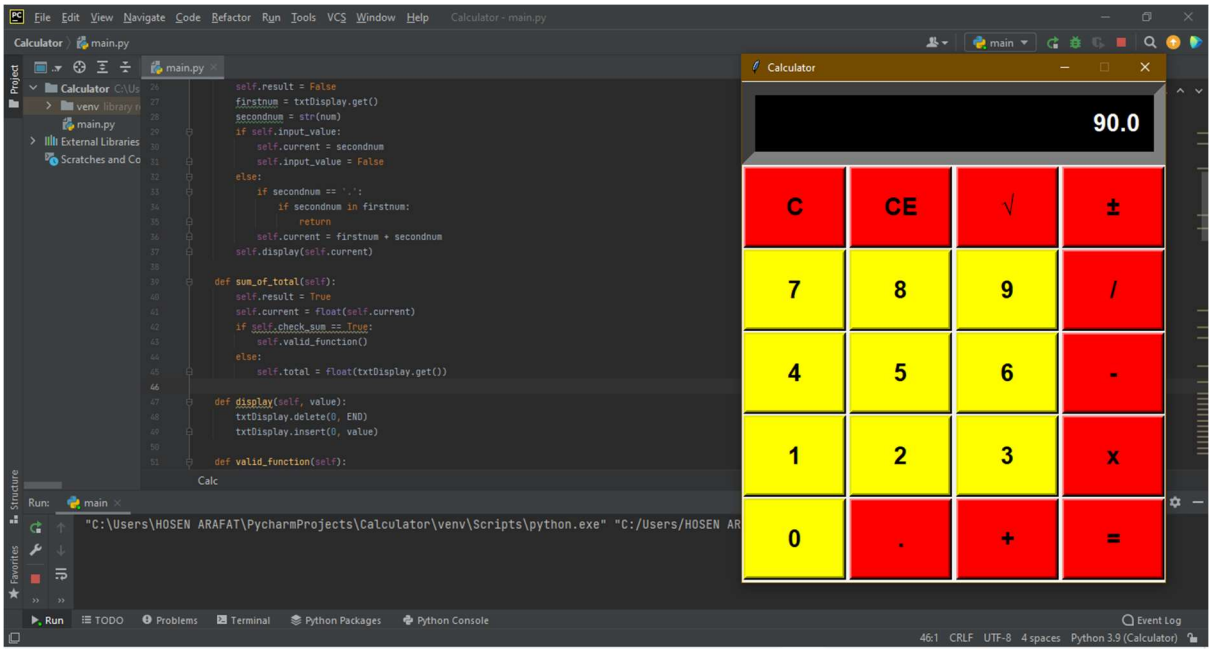
Calculator
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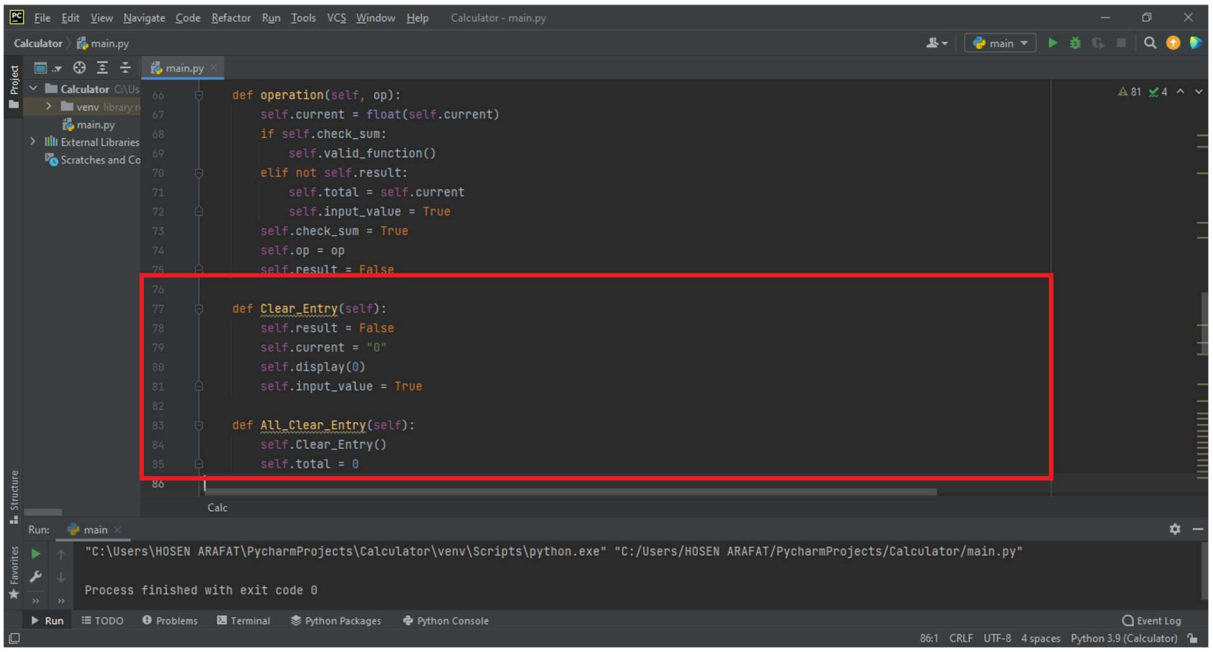
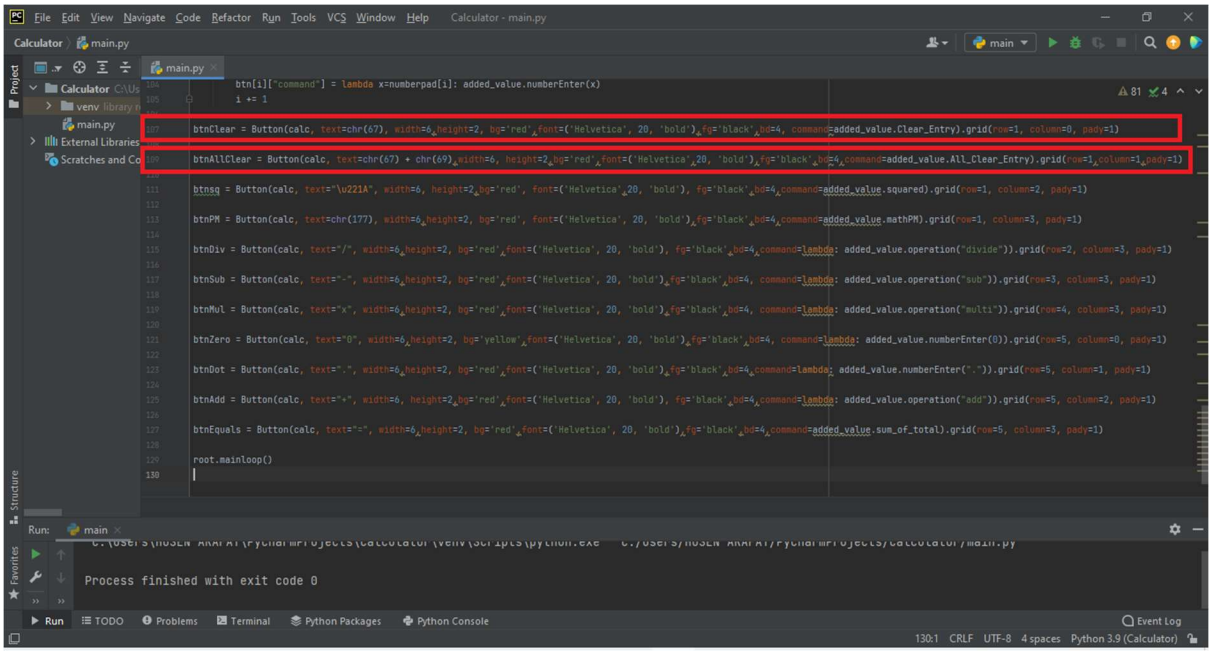
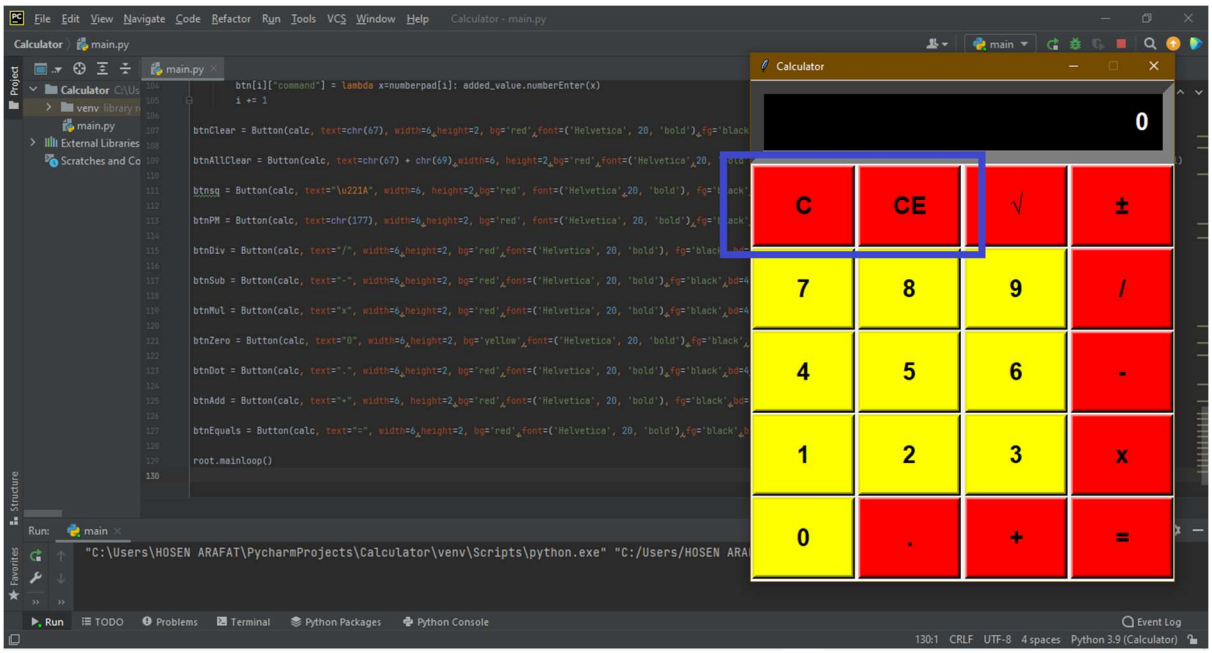
3.3. Write the Clear Entry and All Clear Entry function.






File Edit View Navigate Code Refactor Run Tools VCS Window Help
Calculator - main.py
Calculator
main.py
Project
Calculator
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main.py
External Libraries
Scratches and Co
btnClear = Button(calc, text=chr(67), width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'),
btnAllClear = Button(calc, text=chr(67) + chr(69), width=6, height=2, bg='red', font=('Helvetica', 20,
btnsq = Button(calc, text="\u221A", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'),
btnPM = Button(calc, text=chr(177), width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'),
btnDiv = Button(calc, text="/", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'),
btnSub = Button(calc, text="-", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'),
btnMul = Button(calc, text="x", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'),
btnZero = Button(calc, text="0", width=6, height=2, bg='yellow', font=('Helvetica', 20, 'bold'),
btnDot = Button(calc, text=".", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'),
btnAdd = Button(calc, text="+", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'),
btnEquals = Button(calc, text="=", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'),
root.mainloop()
Run:
main
"C:\Users\HOSEN ARAFAT\PycharmProjects\Calculator\venv\Scripts\python.exe" "C:/Users/HOSEN ARA
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Python Console
Event Log
130:1 CRLF UTF-8 4 spaces Python 3.9 (Calculator)
Calculator
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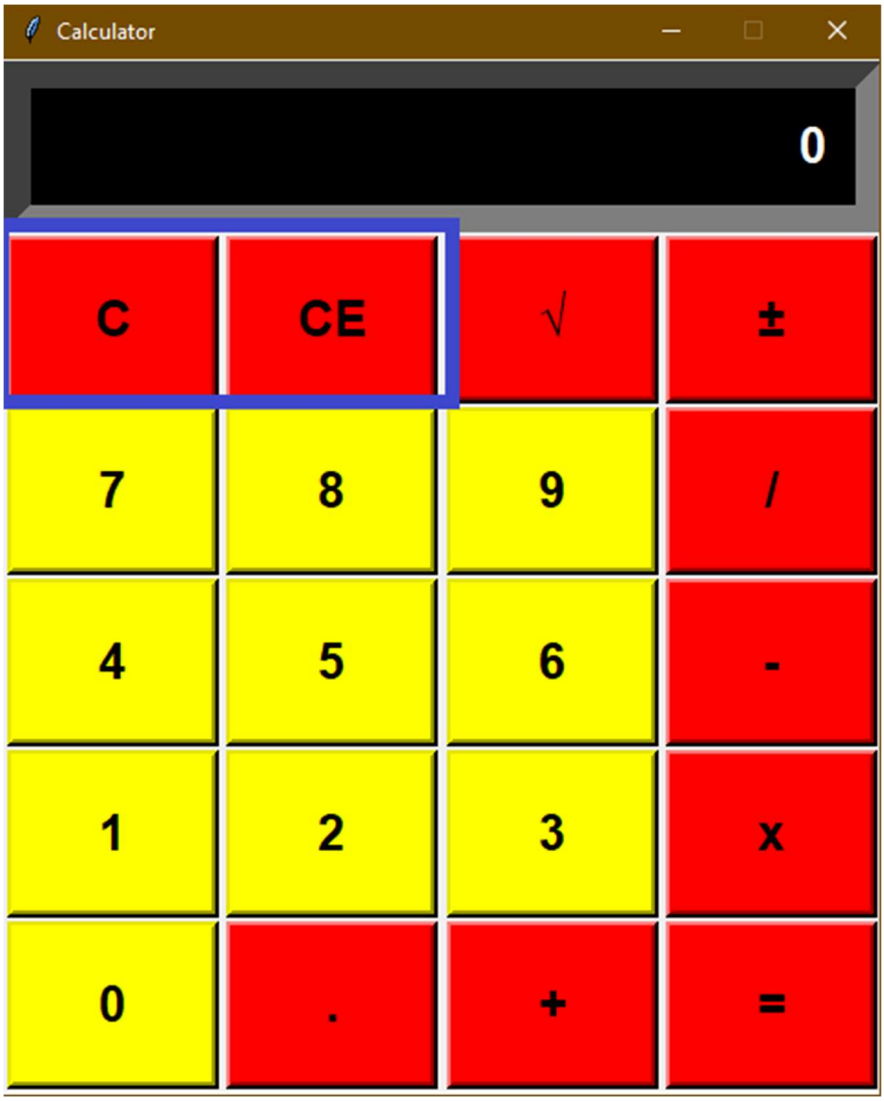
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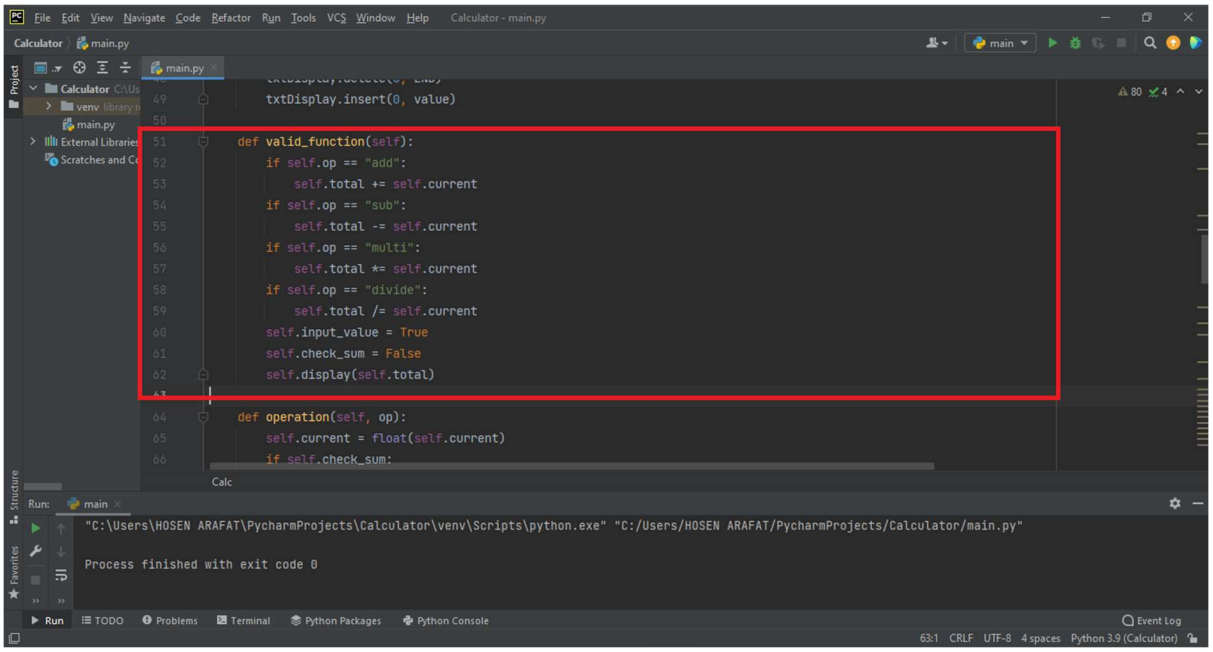
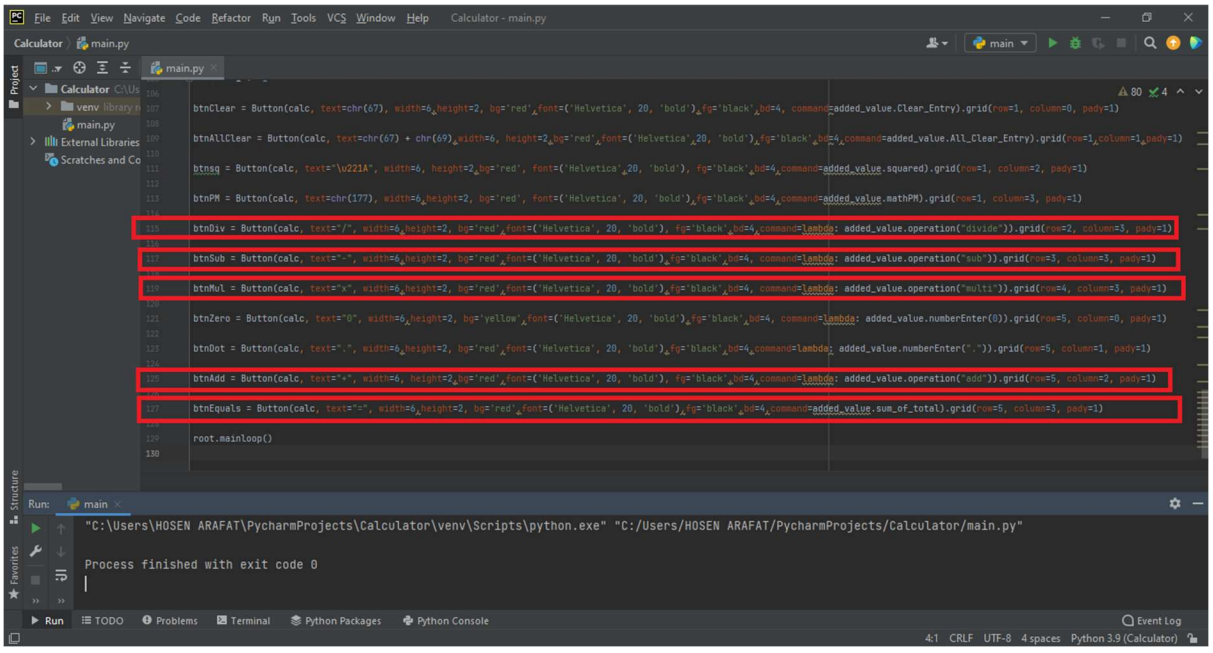
3.4 Compiling calculation function add, subtract, multiply and divide, and equal function, and write code, click the button to call the corresponding function



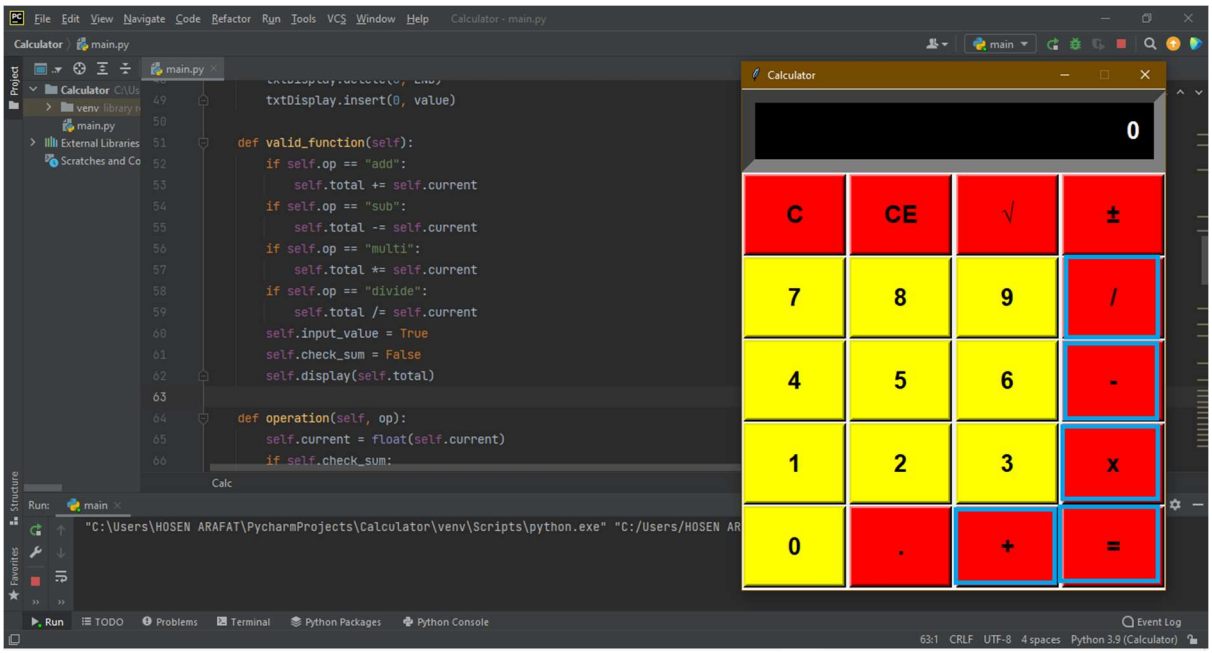
```
        txtDisplay.insert(0, value)

    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
        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:
```

```
"C:\Users\HOSEN ARAFAT\PycharmProjects\Calculator\venv\Scripts\python.exe" "C:/Users/HOSEN ARAFAT/PycharmProjects/Calculator/main.py"

Process finished with exit code 0
```



```
btnClear = Button(calc, text=chr(67), width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', 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='red', font=('Helvetica', 20, 'bold'), fg='black', 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='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=added_value.squared).grid(row=1, column=2, pady=1)

btnPM = Button(calc, text=chr(177), width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=added_value.mathPM).grid(row=1, column=3, pady=1)

btnDiv = Button(calc, text="/", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=lambda: added_value.operation("divide")).grid(row=2, column=3, pady=1)

btnSub = Button(calc, text="-", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=lambda: added_value.operation("sub")).grid(row=3, column=3, pady=1)

btnMul = Button(calc, text="x", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=lambda: added_value.operation("multi")).grid(row=4, column=3, pady=1)

btnZero = Button(calc, text="0", width=6, height=2, bg='yellow', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=lambda: added_value.numberEnter(0)).grid(row=5, column=0, pady=1)

btnDot = Button(calc, text=".", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=lambda: added_value.numberEnter(".")).grid(row=5, column=1, pady=1)

btnAdd = Button(calc, text="+", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=lambda: added_value.operation("add")).grid(row=5, column=2, pady=1)

btnEquals = Button(calc, text="=", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=added_value.sum_of_total).grid(row=5, column=3, pady=1)

root.mainloop()
```

```
"C:\Users\HOSEN ARAFAT\PycharmProjects\Calculator\venv\Scripts\python.exe" "C:/Users/HOSEN ARAFAT/PycharmProjects/Calculator/main.py"

Process finished with exit code 0
```


File Edit View Navigate Code Refactor Run Tools VCS Window Help Calculator - main.py
Calculator main.py
main.py
Calculator
venv
main.py
External Libraries
Scratches and Co
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
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:
Calc
Run: main
"C:\Users\HOSEN ARAFAT\PycharmProjects\Calculator\venv\Scripts\python.exe" "C:/Users/HOSEN AR
Run TODO Problems Terminal Python Packages Python Console
Event Log
63:1 CRLF UTF-8 4 spaces Python 3.9 (Calculator)
Calculator
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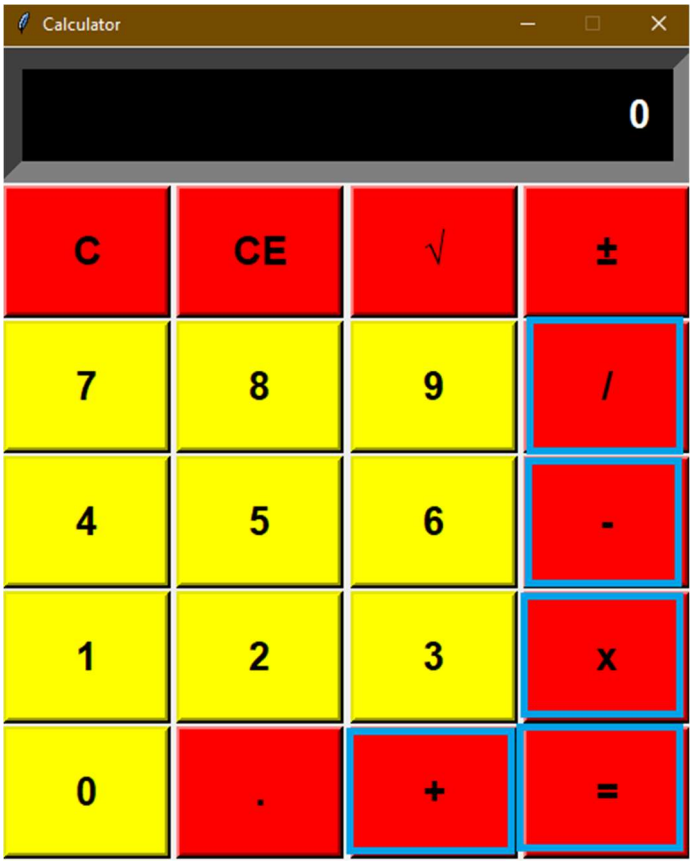
4 5 6 -
1 2 3 x
0 . + =


Calculator
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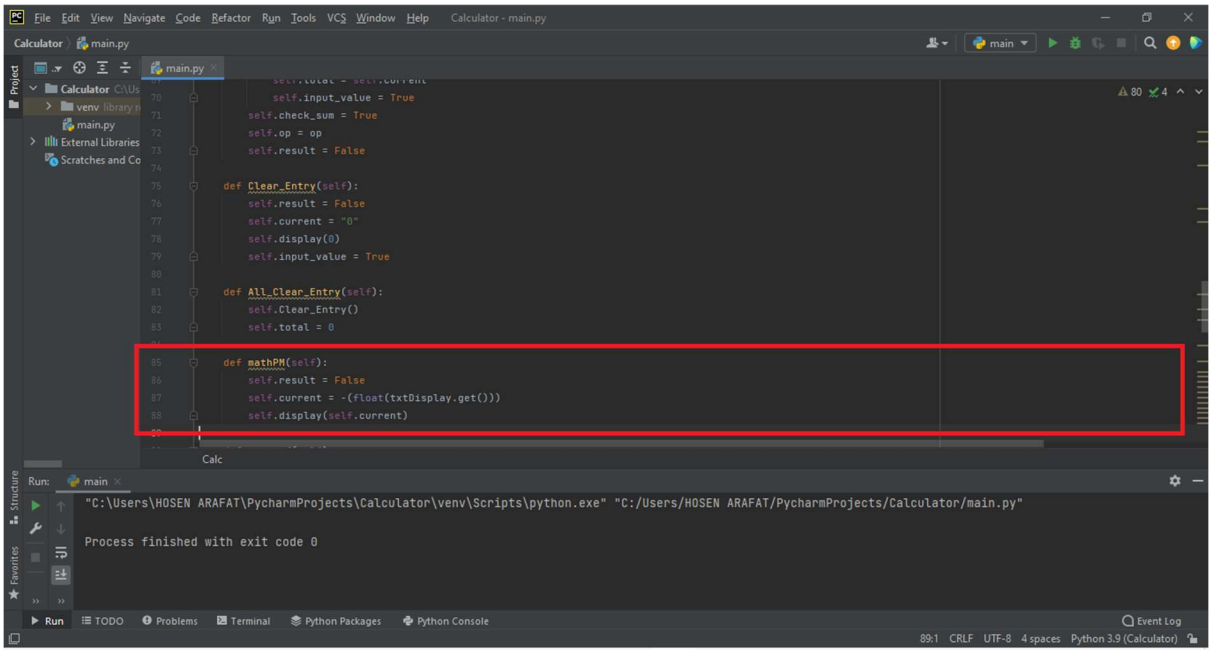
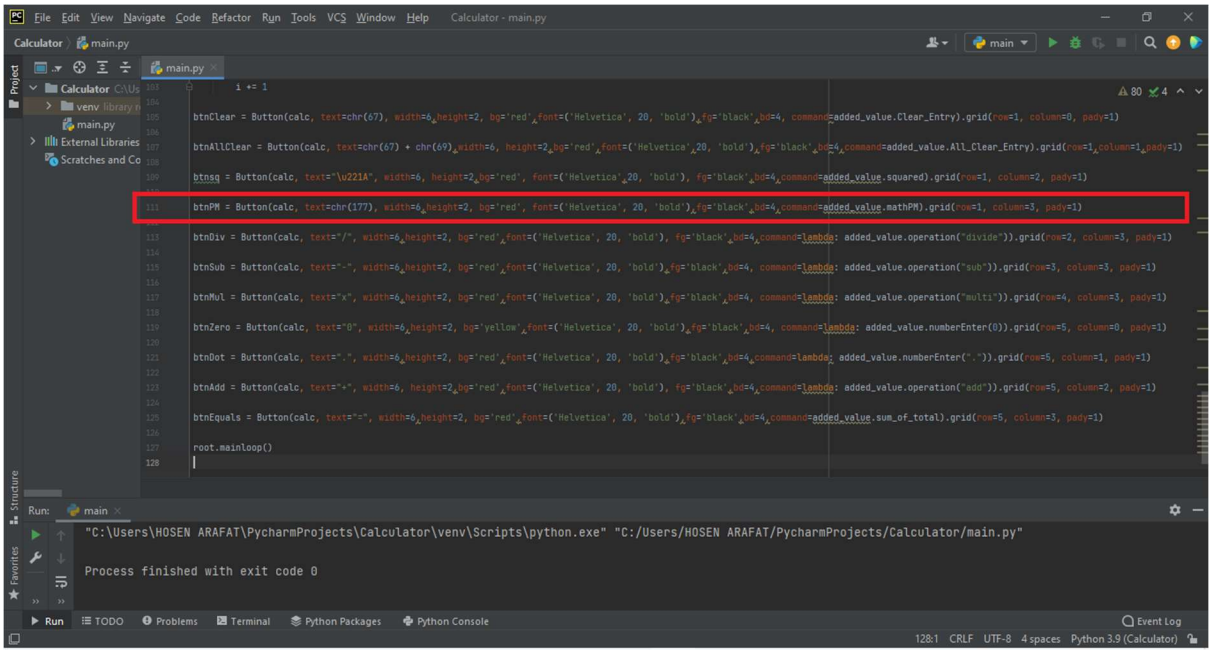
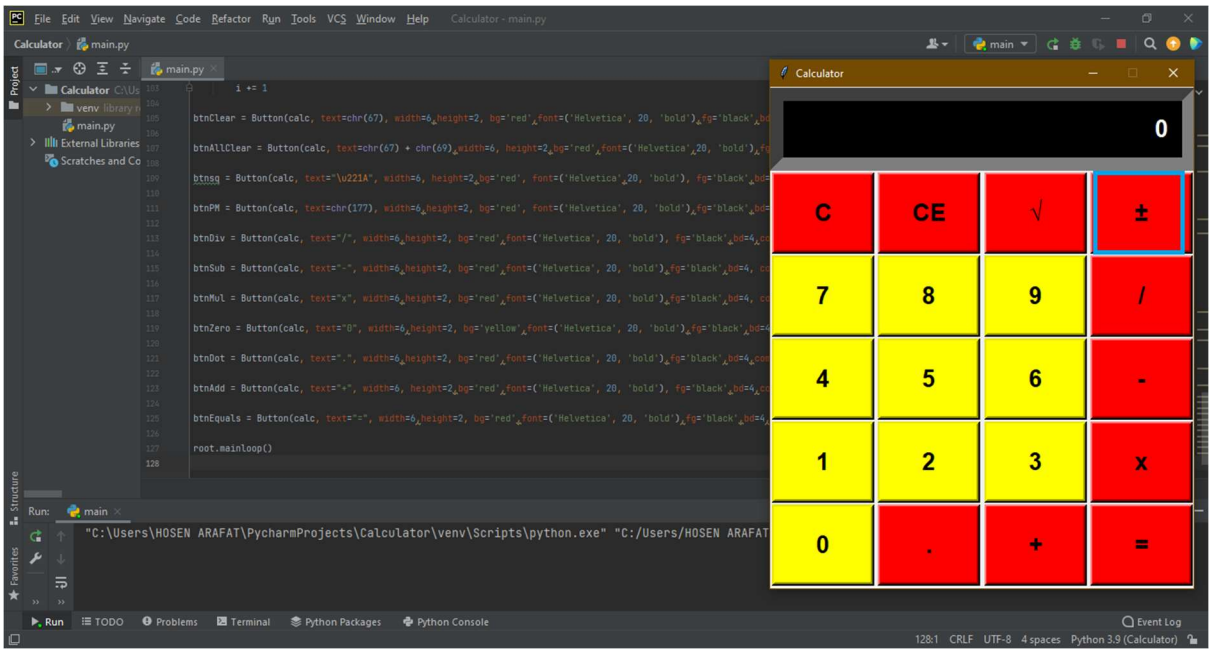
C CE √ ±
7 8 9 /
4 5 6 -
1 2 3 x
0 . + =

3.5. Write the mathPM function.






File Edit View Navigate Code Refactor Run Tools VCS Window Help Calculator - main.py
Calculator main.py
main
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External Libraries
Scratches and Co
main.py
i += 1
btnClear = Button(calc, text=chr(67), width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd
btnAllClear = Button(calc, text=chr(67) + chr(69), width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg
btnsq = Button(calc, text="\u221A", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd
btnPM = Button(calc, text=chr(177), width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd
btnDiv = Button(calc, text="/", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, co
btnSub = Button(calc, text="-", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, co
btnMul = Button(calc, text="x", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, co
btnZero = Button(calc, text="0", width=6, height=2, bg='yellow', font=('Helvetica', 20, 'bold'), fg='black', bd=4
btnDot = Button(calc, text=".", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, co
btnAdd = Button(calc, text="+", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, co
btnEquals = Button(calc, text="=", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4
root.mainloop()
Calculator
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"C:\Users\HOSEN ARAFAT\PycharmProjects\Calculator\venv\Scripts\python.exe" "C:/Users/HOSEN ARAFAT
Structure
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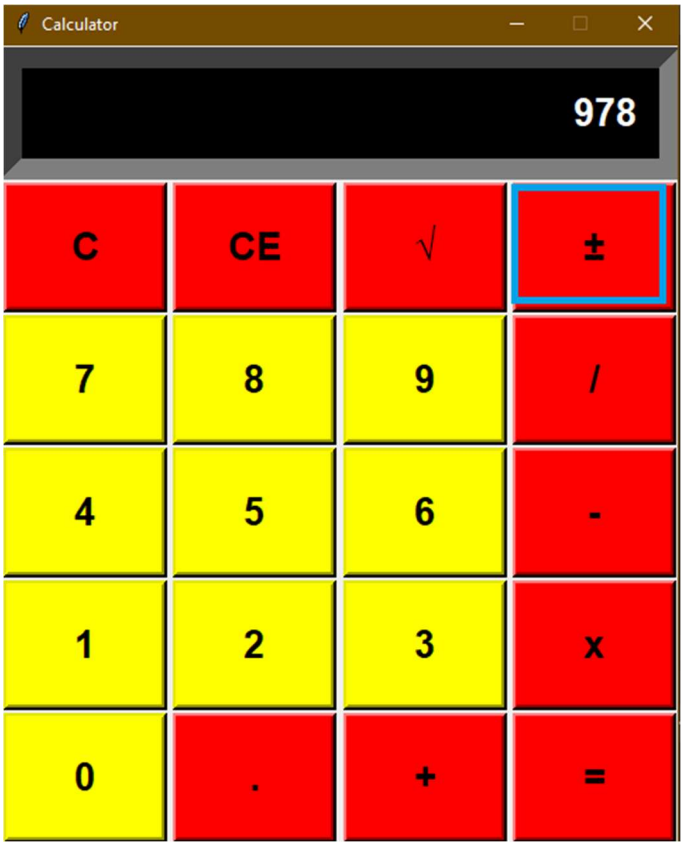
Run TODO Problems Terminal Python Packages Python Console Event Log
128:1 CRLF UTF-8 4 spaces Python 3.9 (Calculator)


Calculator
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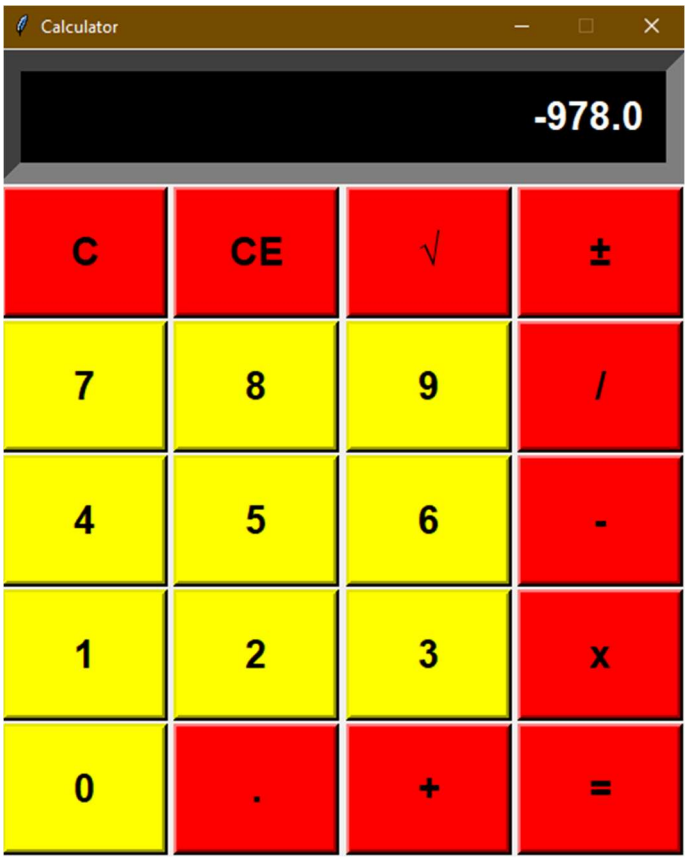
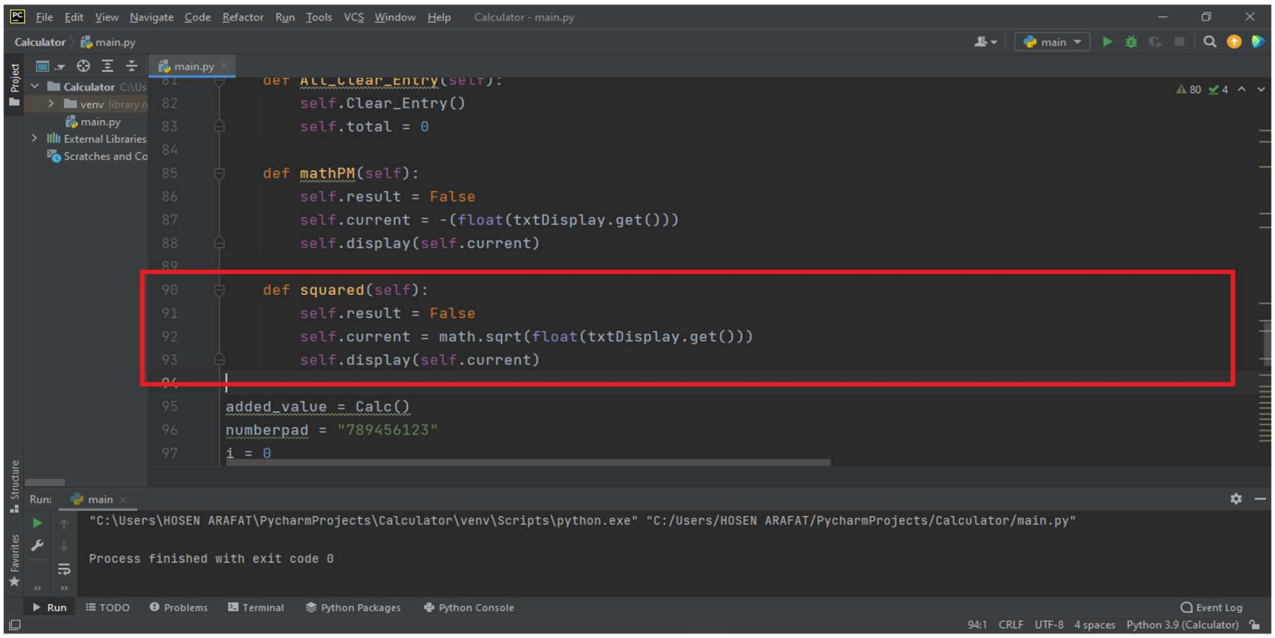
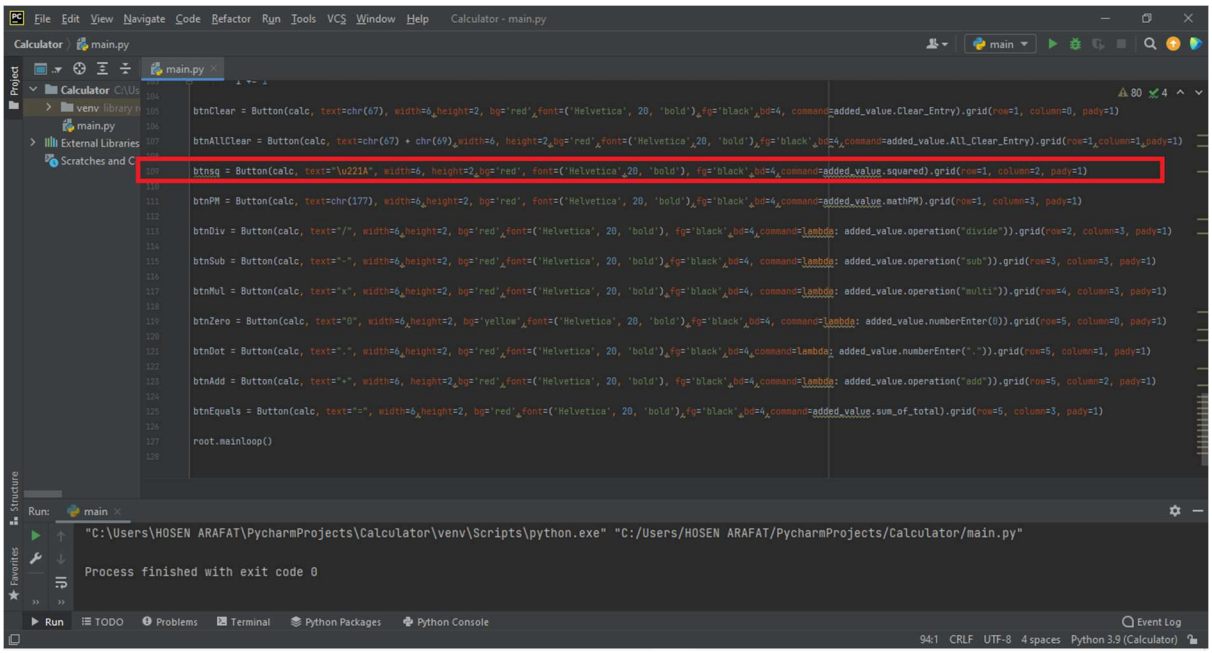


3.6. Write the Squared function.




File Edit View Navigate Code Refactor Run Tools VCS Window Help Calculator - main.py
Calculator main.py
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Project
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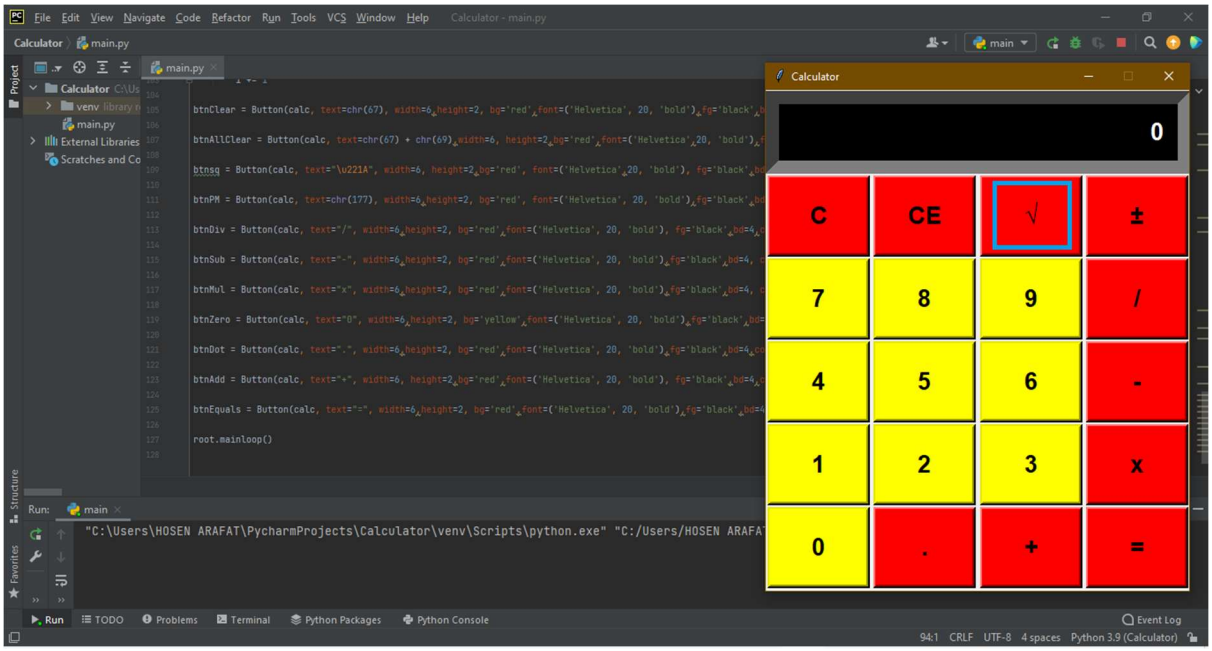
venv
main.py
External Libraries
Scratches and C
main.py
btnClear = Button(calc, text=chr(67), width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=added_value.Clear_Entry).grid(row=1, column=0, pady=1)
btnAllClear = Button(calc, text=chr(67) + chr(69), width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', 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='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=added_value.squared).grid(row=1, column=2, pady=1)
btnPM = Button(calc, text=chr(177), width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=added_value.mathPM).grid(row=1, column=3, pady=1)
btnDiv = Button(calc, text="/", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=lambda: added_value.operation("divide")).grid(row=2, column=3, pady=1)
btnSub = Button(calc, text="-", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=lambda: added_value.operation("sub")).grid(row=3, column=3, pady=1)
btnMul = Button(calc, text="x", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=lambda: added_value.operation("multi")).grid(row=4, column=3, pady=1)
btnZero = Button(calc, text="0", width=6, height=2, bg='yellow', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=lambda: added_value.numberEnter(0)).grid(row=5, column=0, pady=1)
btnDot = Button(calc, text=".", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=lambda: added_value.numberEnter(".")).grid(row=5, column=1, pady=1)
btnAdd = Button(calc, text="+", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=lambda: added_value.operation("add")).grid(row=5, column=2, pady=1)
btnEquals = Button(calc, text="=", width=6, height=2, bg='red', font=('Helvetica', 20, 'bold'), fg='black', bd=4, command=added_value.sum_of_total).grid(row=5, column=3, pady=1)
root.mainloop()
Run: main
"C:\Users\HOSEN ARAFAT\PycharmProjects\Calculator\venv\Scripts\python.exe" "C:/Users/HOSEN ARAFAT/PycharmProjects/Calculator/main.py"
Process finished with exit code 0
Run TODO Problems Terminal Python Packages Python Console
Event Log
94:1 CRLF UTF-8 4 spaces Python 3.9 (Calculator)


File Edit View Navigate Code Refactor Run Tools VCS Window Help Calculator - main.py
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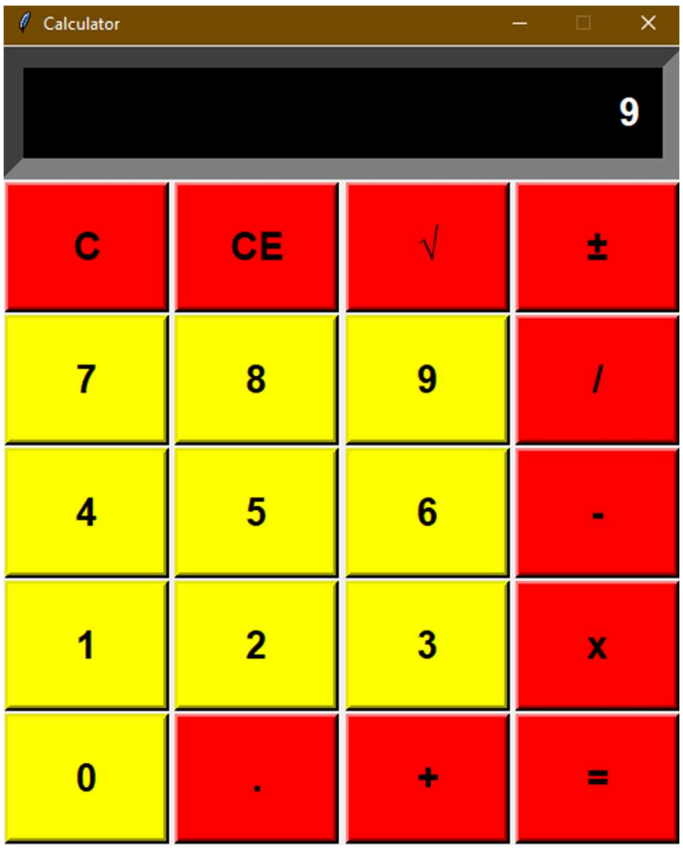
Run: main
"C:\Users\HOSEN ARAFAT\PycharmProjects\Calculator\venv\Scripts\python.exe" "C:/Users/HOSEN ARAFA
Run TODO Problems Terminal Python Packages Python Console
Event Log
94:1 CRLF UTF-8 4 spaces Python 3.9 (Calculator)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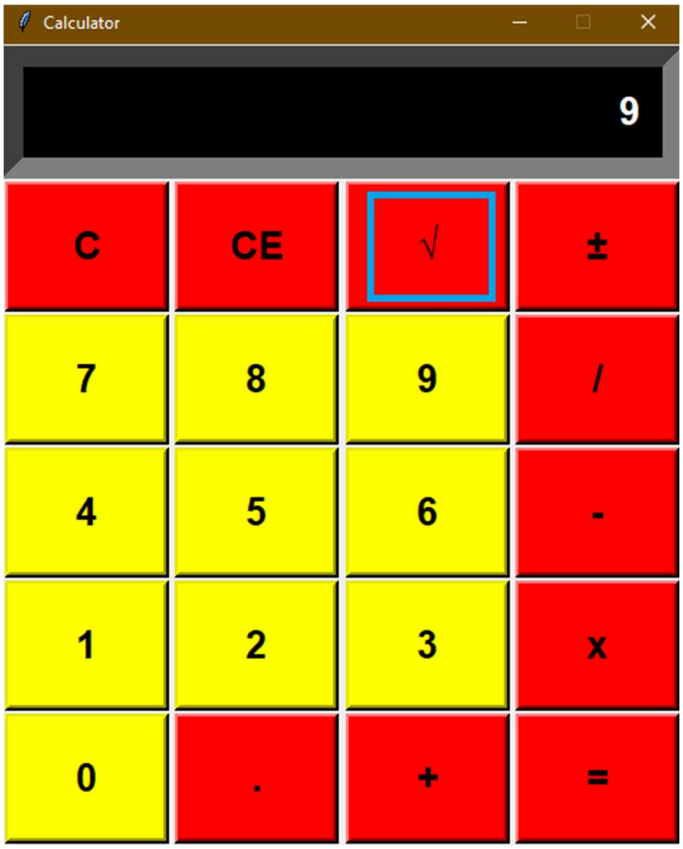
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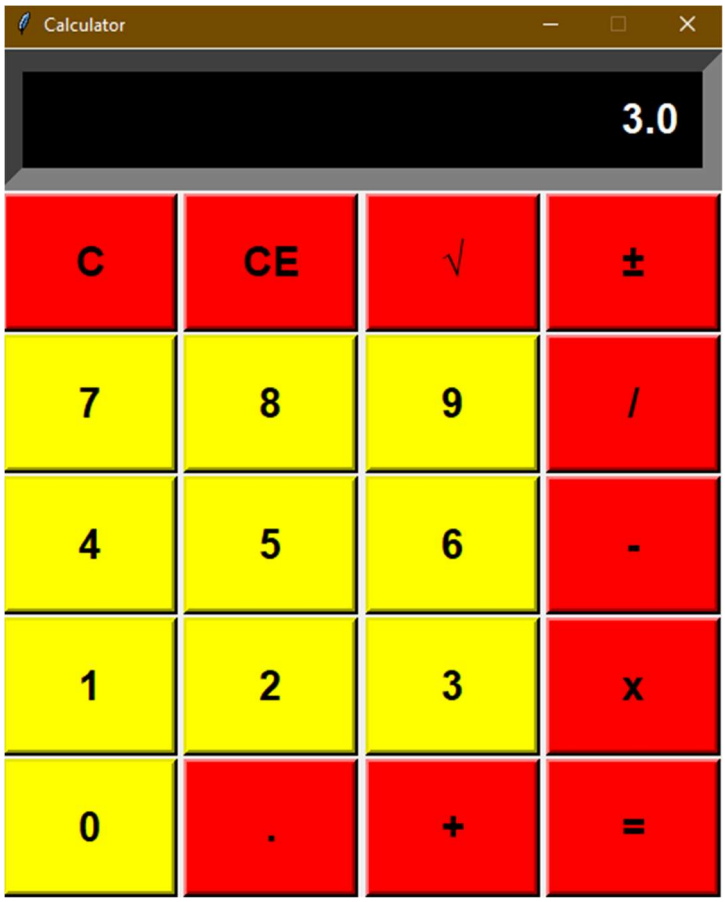
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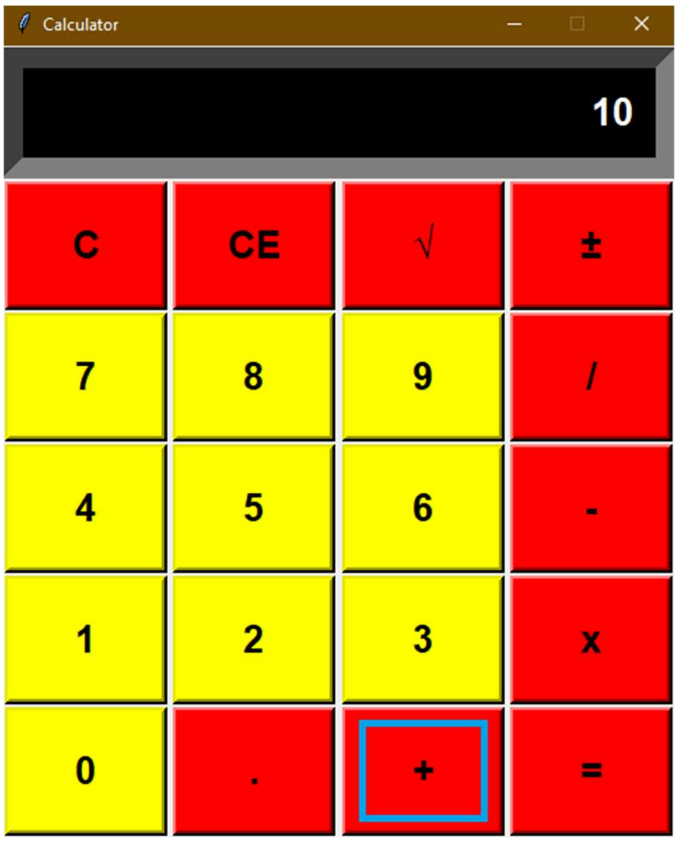
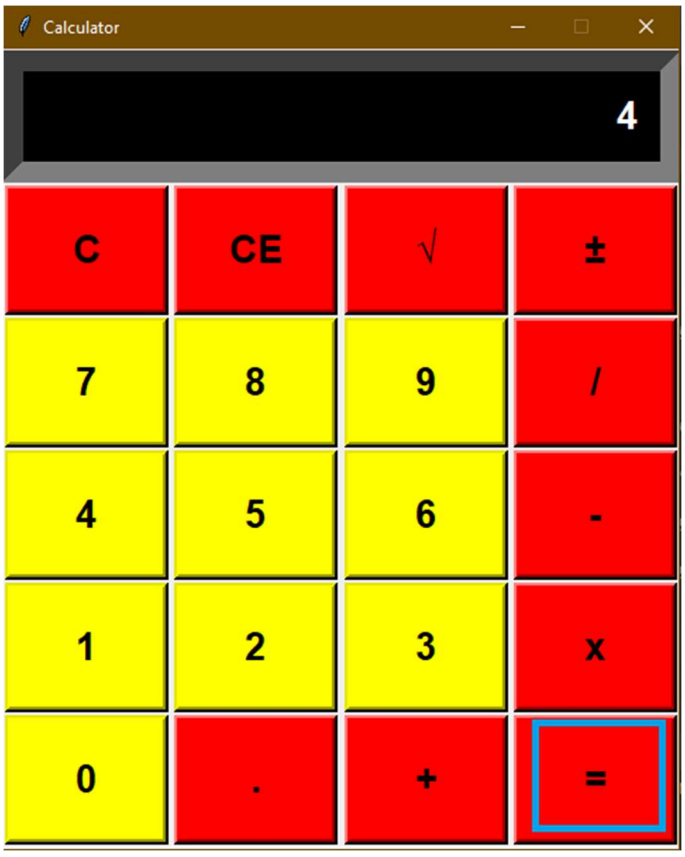
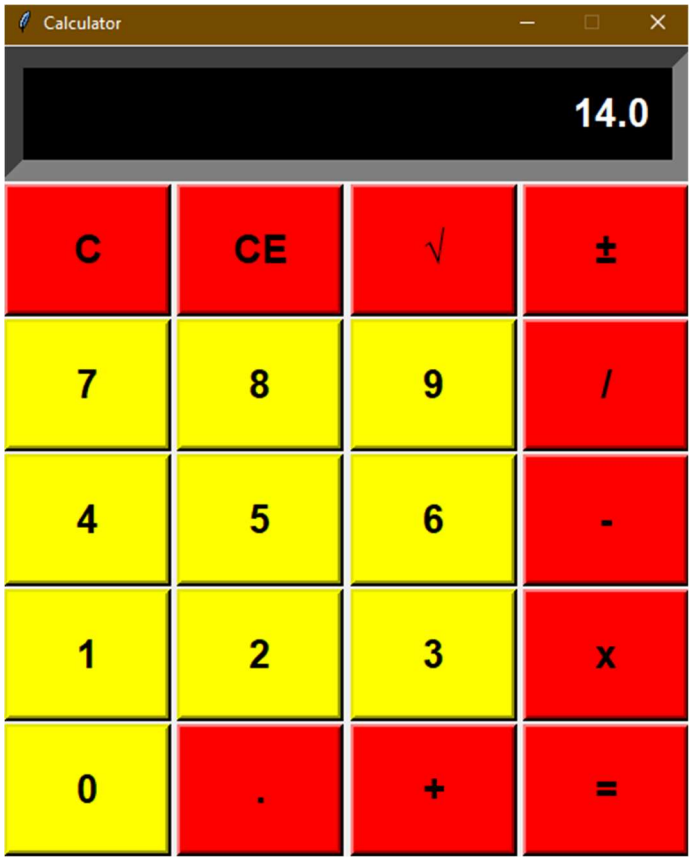
3.7 Run the program for calculator related operations

1) “add” 10+4=14



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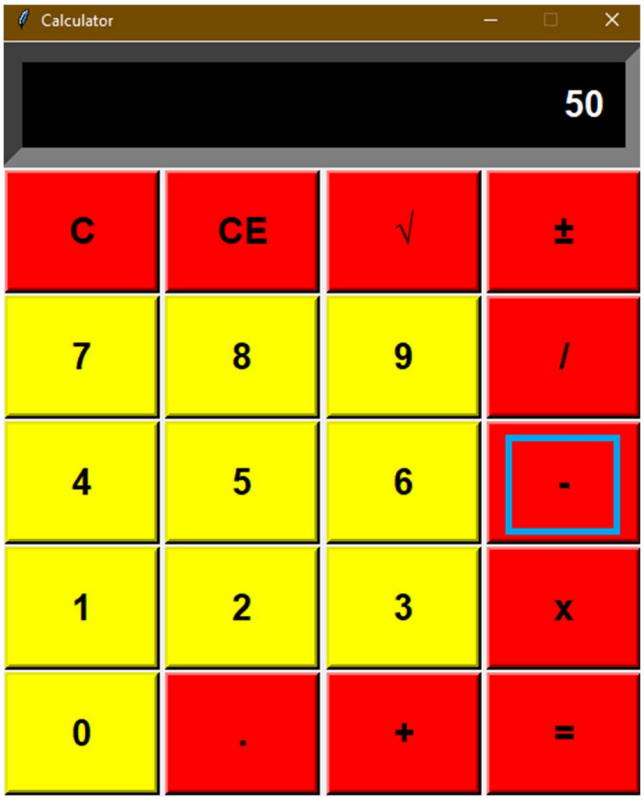
2) “sub” 50 – 6 = 44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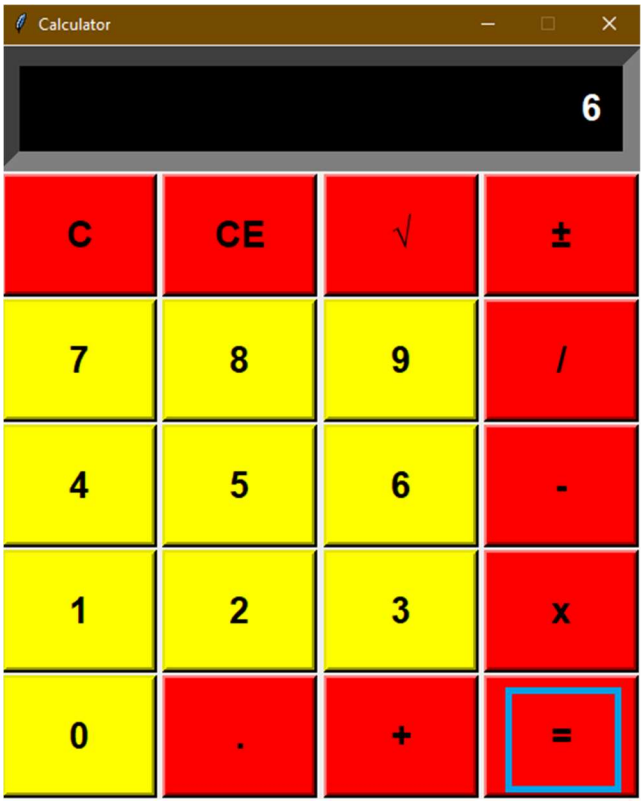
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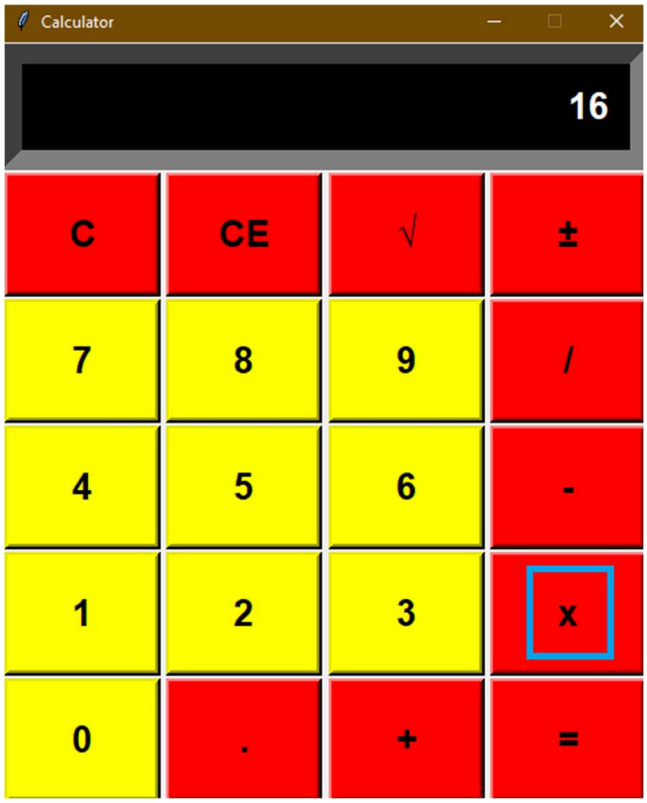
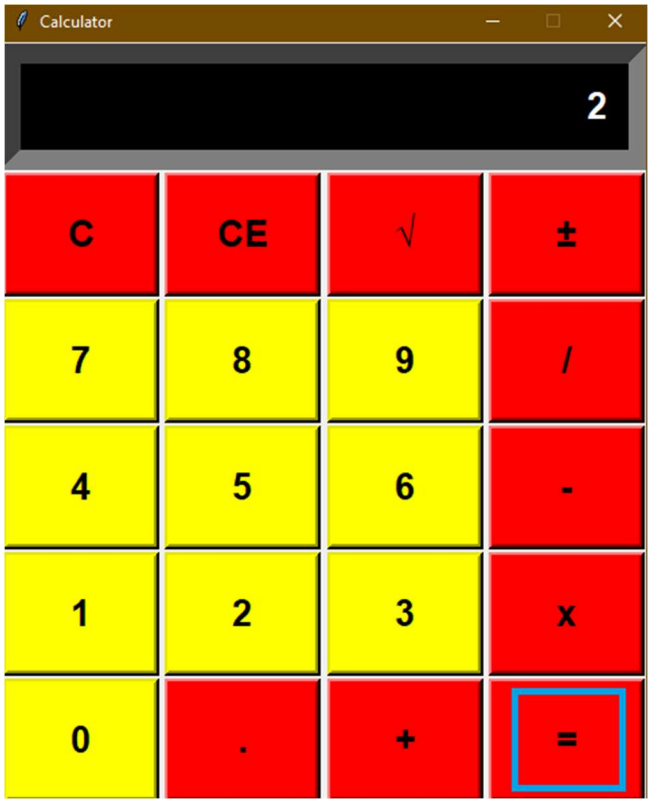
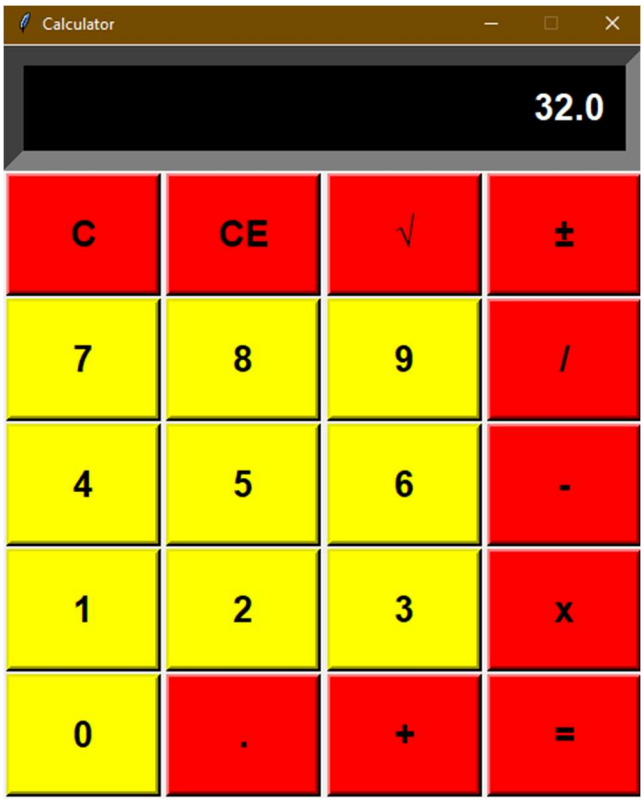
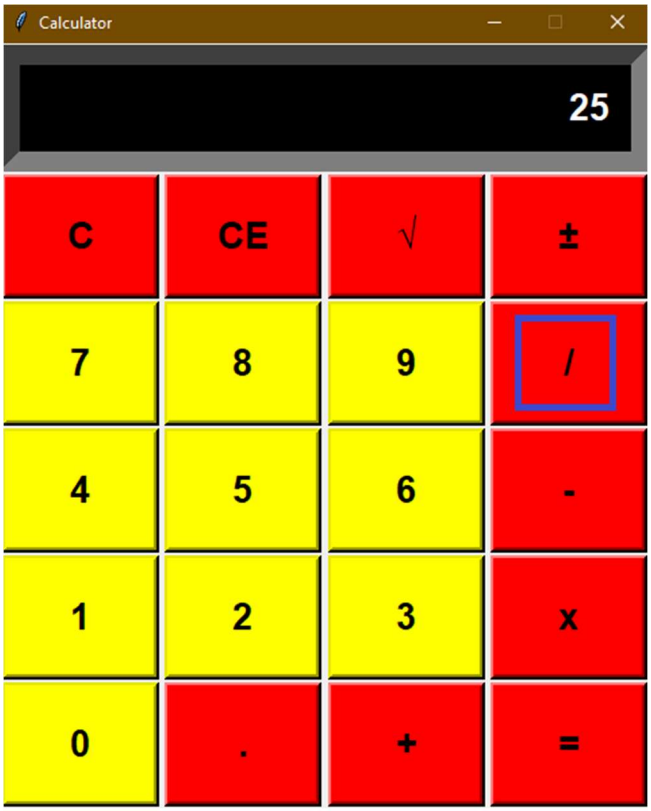
3) “multi” 16 * 2 = 32

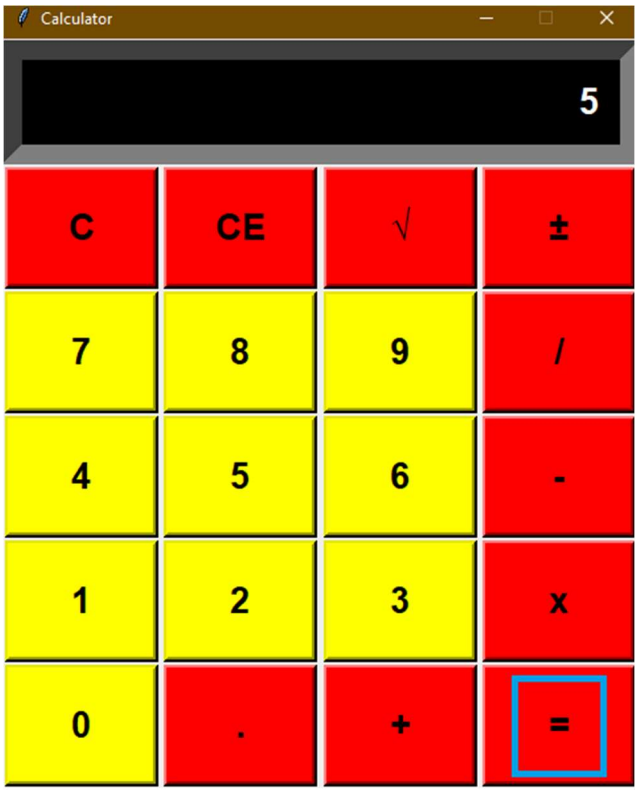






4) “divide” 25 / 5 = 5




Calculator
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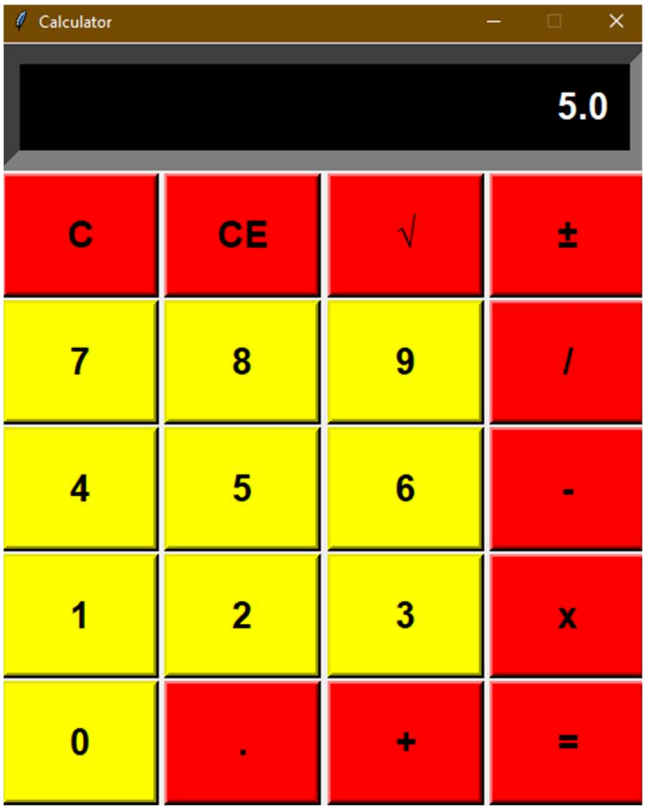
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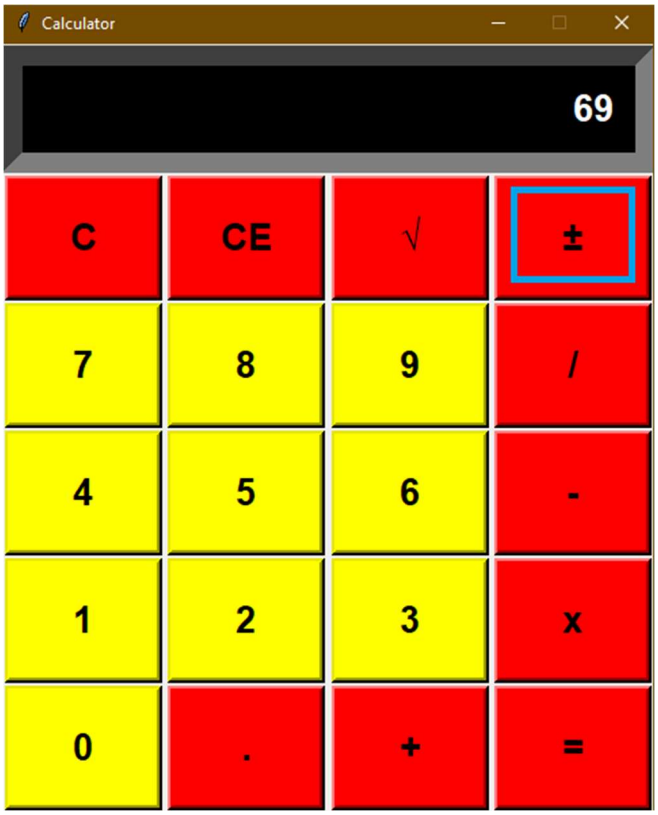
5) “mathPM” 69 ±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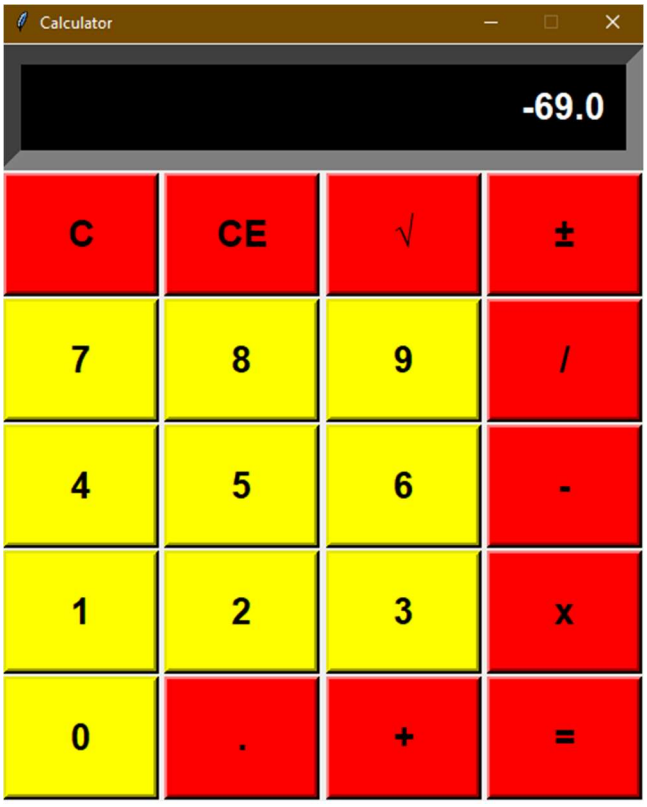
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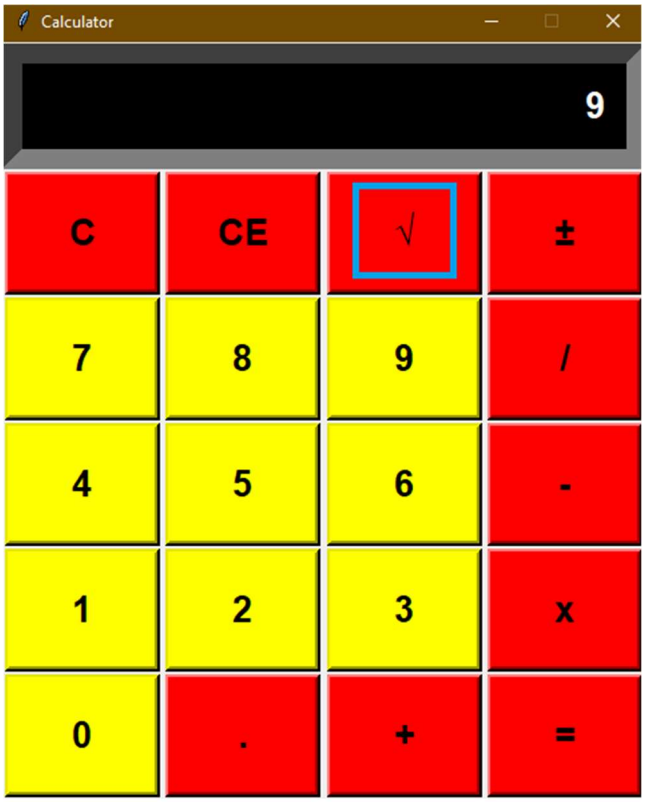
6) “Squared” 9√


Calculator
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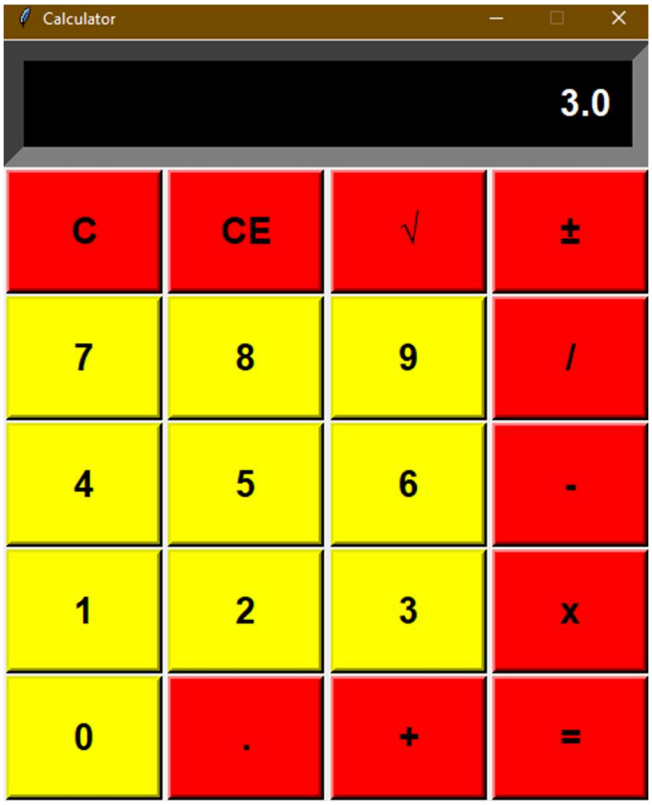
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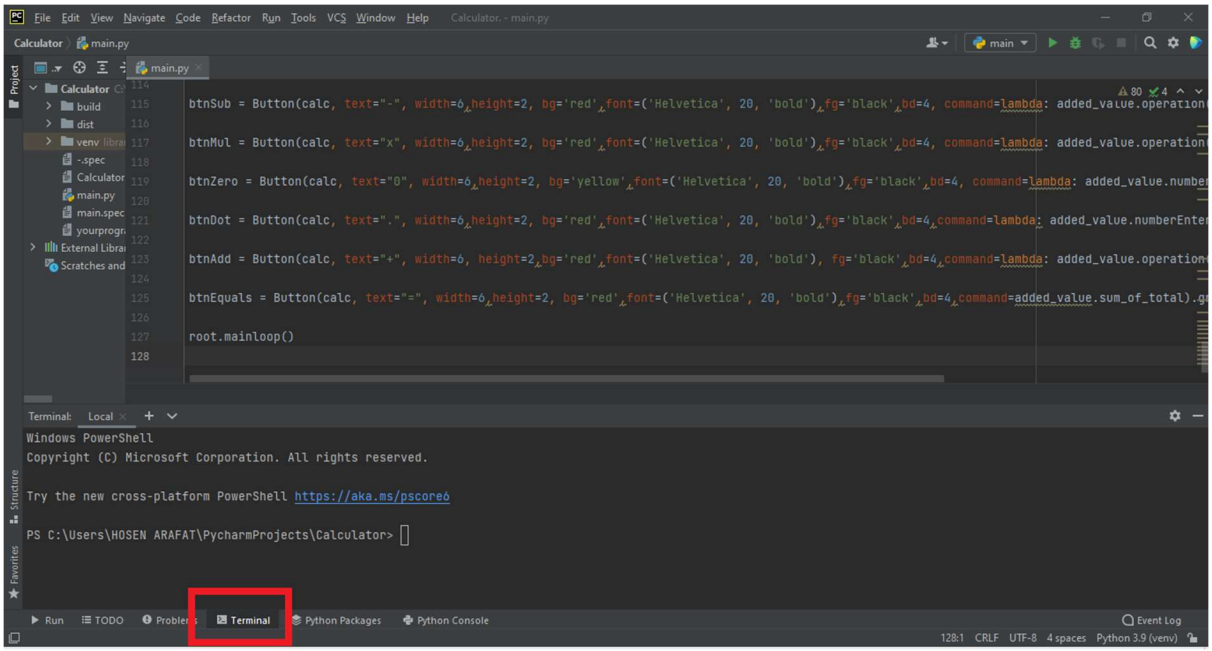
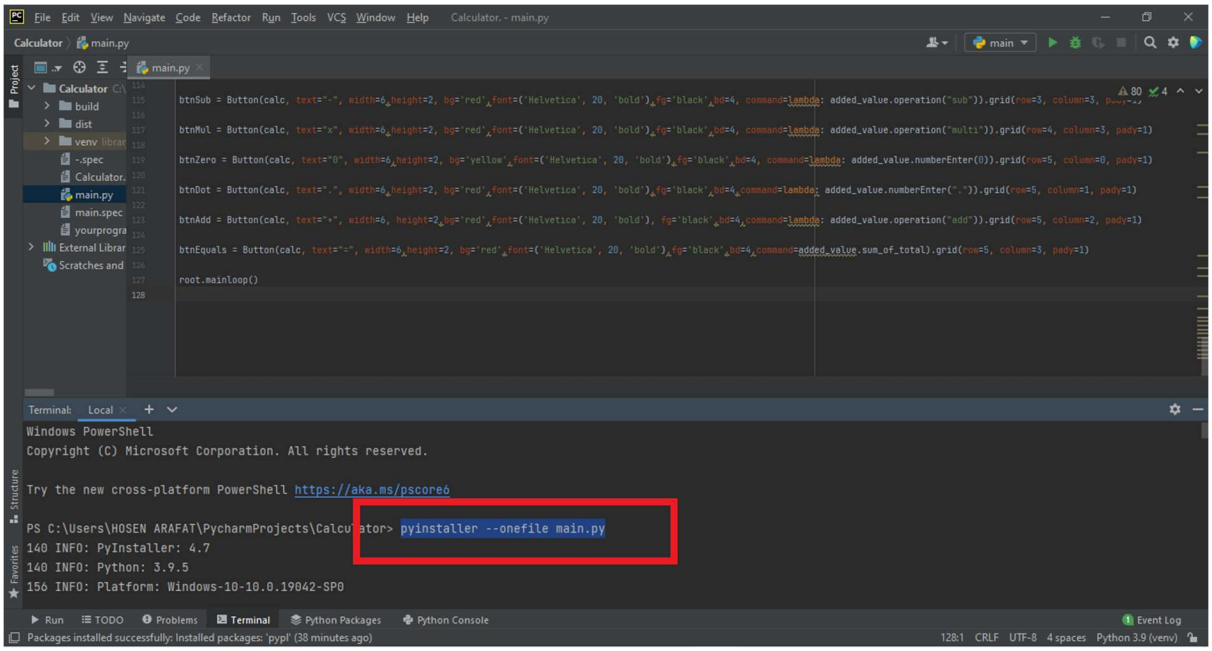
III. Packaged applications

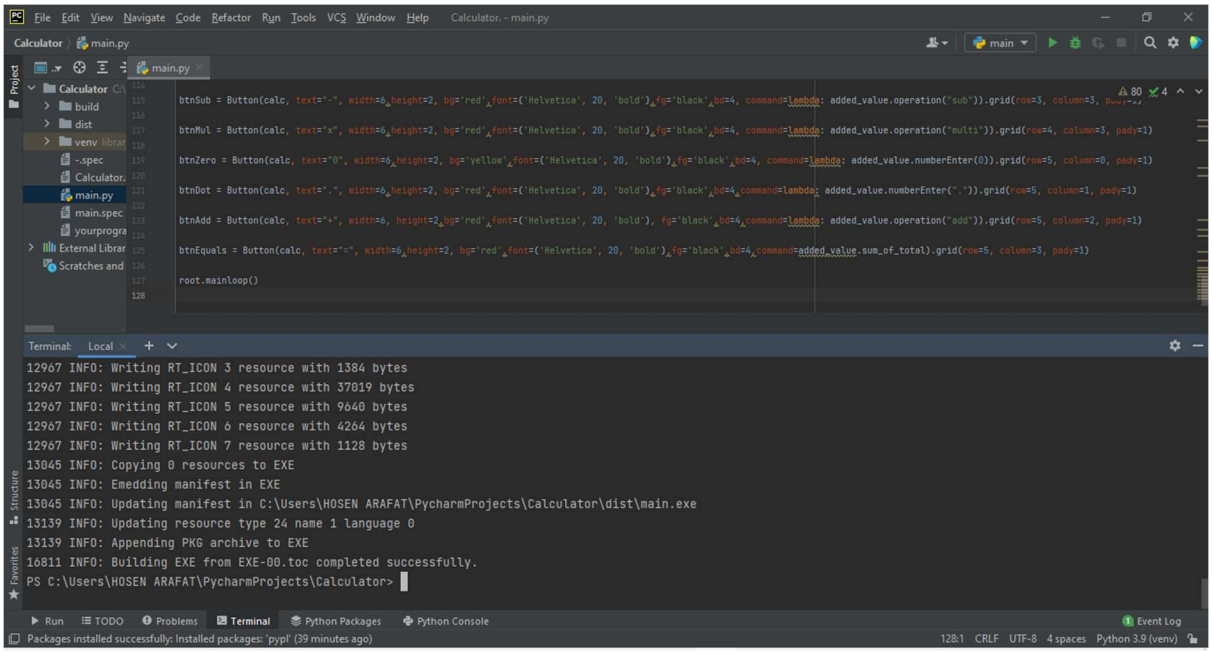
1. Click terminal to open the terminal



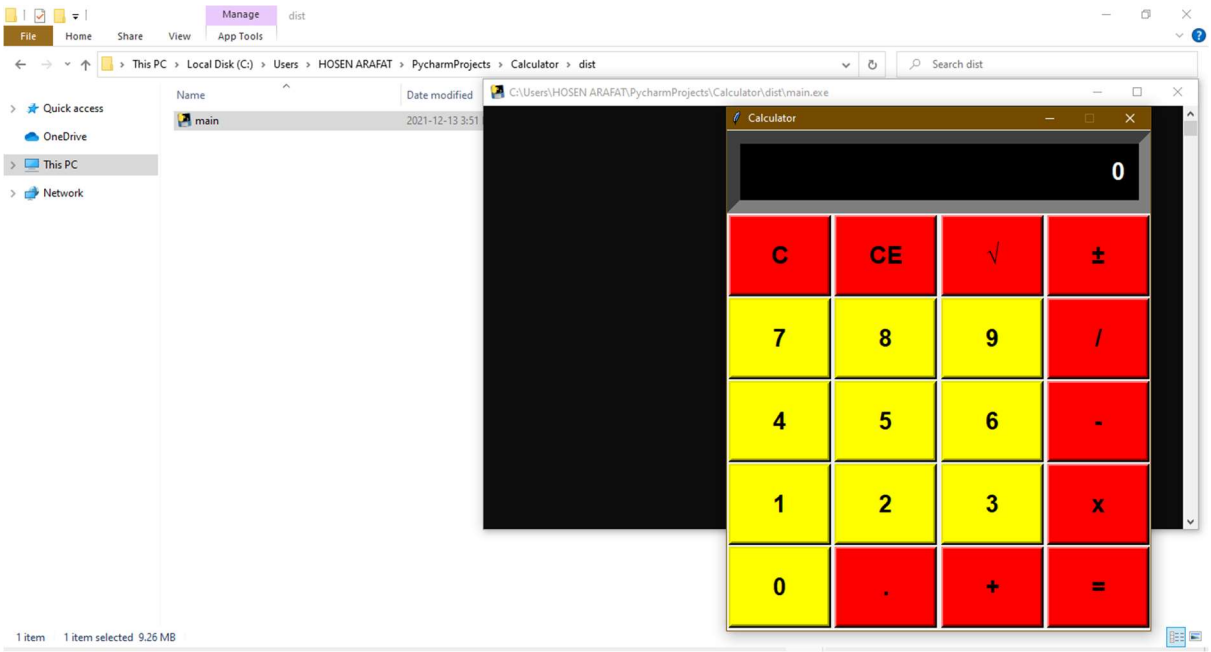
2. Enter the code "pyinstaller –onefile main.py " package "



3. Package succeeded



4.Open the main.exe file in the dist folder



IV.Coedes

```
from tkinter import *
import math


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


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")


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
        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 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)

added_value = Calc()
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='yellow', fg='black',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='red',font=('Helvetica', 20, 'bold'),fg='black',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='red',font=('Helvetica',20, 'bold'),fg='black',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='red', font=('Helvetica',20, 'bold'), fg='black',bd=4,command=added_value.squared).grid(row=1,
```

```
column=2, pady=1)

btnPM = Button(calc, text=chr(177), width=6,height=2,
bg='red', font=('Helvetica', 20,
'bold'),fg='black',bd=4,command=added_value.mathPM).grid(ro
w=1, column=3, pady=1)

btnDiv = Button(calc, text="/", width=6,height=2,
bg='red',font=('Helvetica', 20, 'bold'),
fg='black',bd=4,command=lambda:
added_value.operation("divide")).grid(row=2, column=3, pady=1)

btnSub = Button(calc, text="-", width=6,height=2,
bg='red',font=('Helvetica', 20, 'bold'),fg='black',bd=4,
command=lambda: added_value.operation("sub")).grid(row=3,
column=3, pady=1)

btnMul = Button(calc, text="x", width=6,height=2,
bg='red',font=('Helvetica', 20, 'bold'),fg='black',bd=4,
command=lambda: added_value.operation("multi")).grid(row=4,
column=3, pady=1)

btnZero = Button(calc, text="0", width=6,height=2,
```

```
bg='yellow',font=('Helvetica', 20, 'bold'),fg='black',bd=4,
command=lambda: added_value.numberEnter(0)).grid(row=5,
column=0, pady=1)
```

```
btnDot = Button(calc, text=".", width=6,height=2,
bg='red',font=('Helvetica', 20,
'bold'),fg='black',bd=4,command=lambda:
added_value.numberEnter(".")).grid(row=5, column=1, pady=1)
```

```
btnAdd = Button(calc, text="+", width=6,
height=2,bg='red',font=('Helvetica', 20, 'bold'),
fg='black',bd=4,command=lambda:
added_value.operation("add")).grid(row=5, column=2, pady=1)
```

```
btnEquals = Button(calc, text="=", width=6,height=2,
bg='red',font=('Helvetica', 20,
'bold'),fg='black',bd=4,command=added_value.sum_of_total).grid
(row=5, column=3, pady=1)
```

```
root.mainloop()
```