Co1

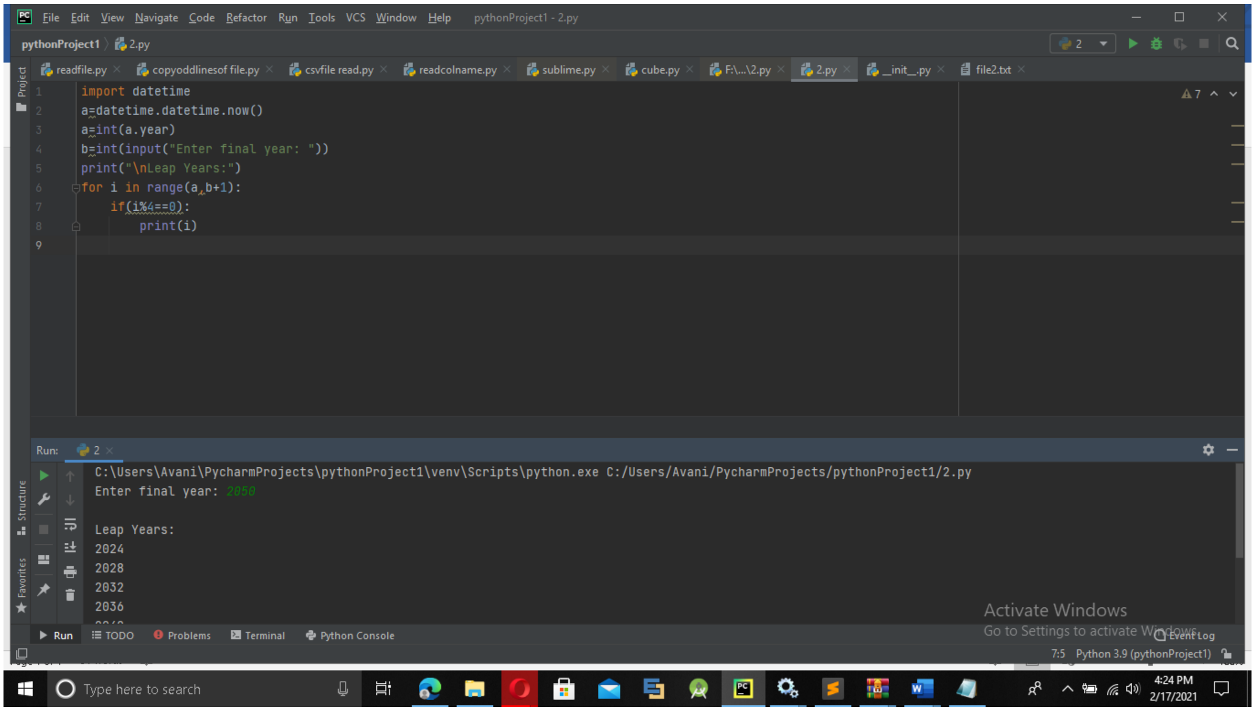
2) . Display future leap years from current year to a final year entered by user.

Ans:

```
import datetime
a=datetime.datetime.now()
a=int(a.year)
b=int(input("Enter final year: "))
print("\nLeap Years:")
for i in range(a,b+1):
    if(i%4==0):
        print(i)
```

OUTPUT

```
Enter final year: 2050

Leap Years:
2024
2028
2032
2036
2040
2044
2048
```



```
import datetime
a=datetime.datetime.now()
a=int(a.year)
b=int(input("Enter final year: "))
print("\nLeap Years:")
for i in range(a,b+1):
    if(i%4==0):
        print(i)
```

```
C:\Users\Avani\PycharmProjects\pythonProject1\venv\Scripts\python.exe C:/Users/Avani/PycharmProjects/pythonProject1/2.py
Enter final year: 2050

Leap Years:
2024
2028
2032
2036
```

3. List comprehensions:

(a) Generate positive list of numbers from a given list of integers

Ans:

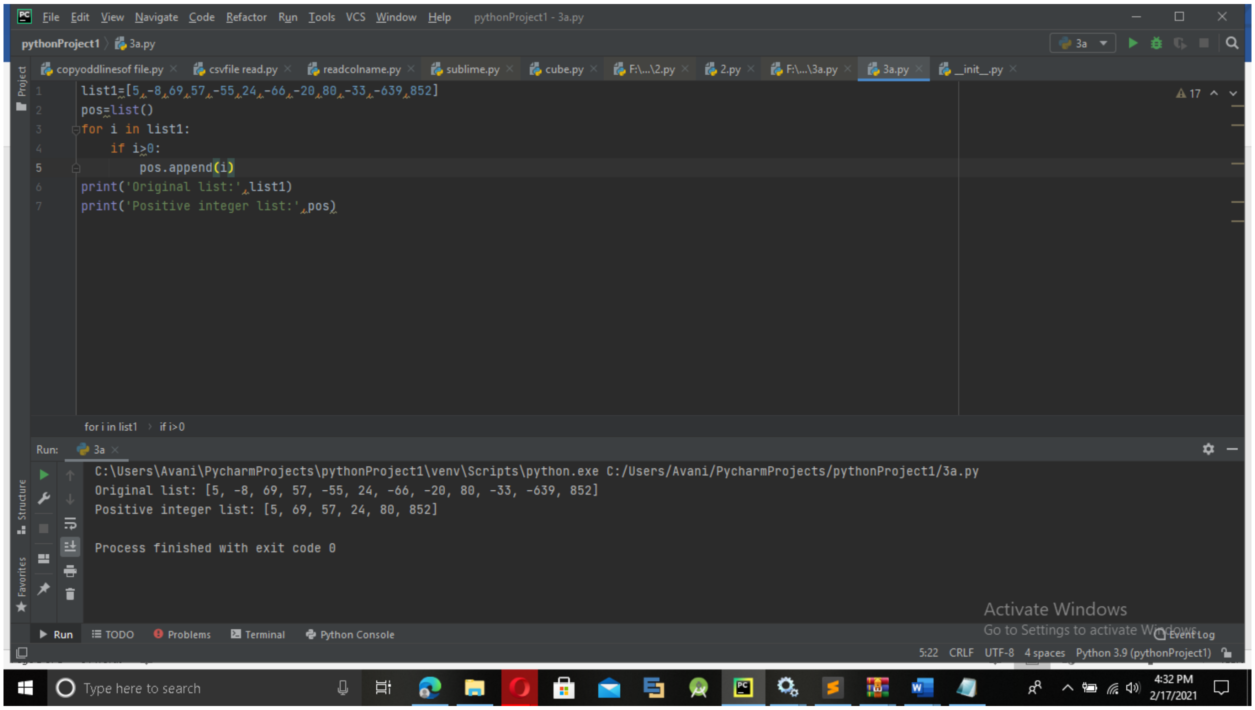
```
list1=[5,-8,69,57,-55,24,-66,-20,80,-33,-639,852]

pos=list()

for i in list1:

    if i>0:

        pos.append(i)

print('Original list:',list1)

print('Positive integer list:',pos)
```

OUTPUT

```
Original list: [5, -8, 69, 57, -55, 24, -66, -20, 80, -33, -639, 852]
```

Positive integer list: [5, 69, 57, 24, 80, 852]

Process finished with exit code 0


File Edit View Navigate Code Refactor Run Tools VCS Window Help pythonProject1 - 3a.py
pythonProject1 3a.py
copyoddlinesof file.py csvfile read.py readcolname.py sublime.py cube.py F:\...\2.py 2.py F:\...\3a.py 3a.py __init__.py
for i in list1 › if i>0
Run: 3a
Run TODO Problems Terminal Python Console
Activate Windows
Go to Settings to activate Windows.
Event Log
5:22 CRLF UTF-8 4 spaces Python 3.9 (pythonProject1)
Type here to search
4:32 PM
2/17/2021

```
list1=[5,-8,69,57,-55,24,-66,-20,80,-33,-639,852]
pos=list()
for i in list1:
    if i>0:
        pos.append(i)
print('Original list:',list1)
print('Positive integer list:',pos)
```

```
C:\Users\Avani\PycharmProjects\pythonProject1\venv\Scripts\python.exe C:/Users/Avani/PycharmProjects/pythonProject1/3a.py
Original list: [5, -8, 69, 57, -55, 24, -66, -20, 80, -33, -639, 852]
Positive integer list: [5, 69, 57, 24, 80, 852]

Process finished with exit code 0
```

11. Find biggest of 3 numbers entered.

Ans:

```
a=int(input('Enter 1st no: '))
b=int(input('Enter 2nd no: '))
c=int(input('Enter 3rd no: '))
if a>b and b>c:
    print(a,'is the biggest number')
elif b>a and b>c:
    print(b,'is the biggest number')
else:
    print(c,'is the biggest number')
```

OUTPUT

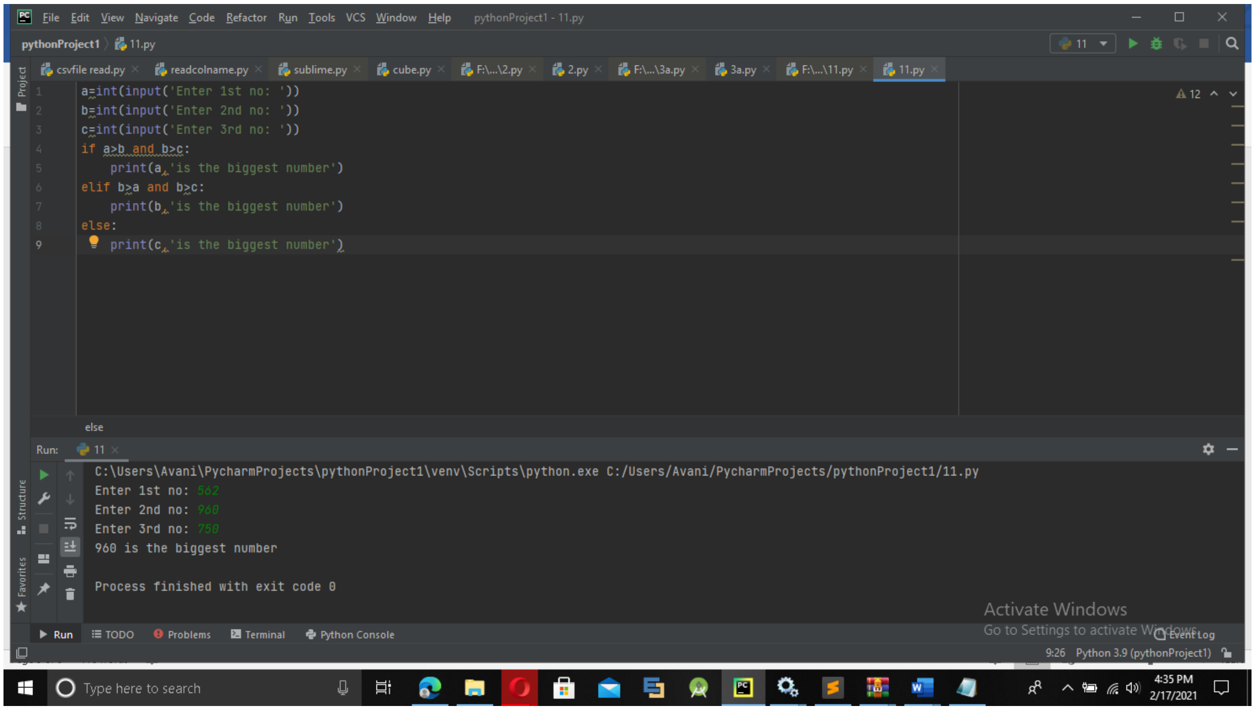
Enter 1st no: 562

Enter 2nd no: 960

Enter 3rd no: 750

960 is the biggest number

Process finished with exit code 0



```
a=int(input('Enter 1st no: '))
b=int(input('Enter 2nd no: '))
c=int(input('Enter 3rd no: '))
if a>b and b>c:
    print(a,'is the biggest number')
elif b>a and b>c:
    print(b,'is the biggest number')
else:
    print(c,'is the biggest number')
```

```
C:\Users\Avani\PycharmProjects\pythonProject1\venv\Scripts\python.exe C:/Users/Avani/PycharmProjects/pythonProject1/11.py
Enter 1st no: 562
Enter 2nd no: 960
Enter 3rd no: 750
960 is the biggest number

Process finished with exit code 0
```

13. Create a list of colors from comma-separated color names entered by user. Display first and last colors.

Ans:

```
colors=(input('Enter colors separated by commas: ')).split(',')

print('First color:',colors[0])

print('Last color:',colors[len(colors)-1])
```

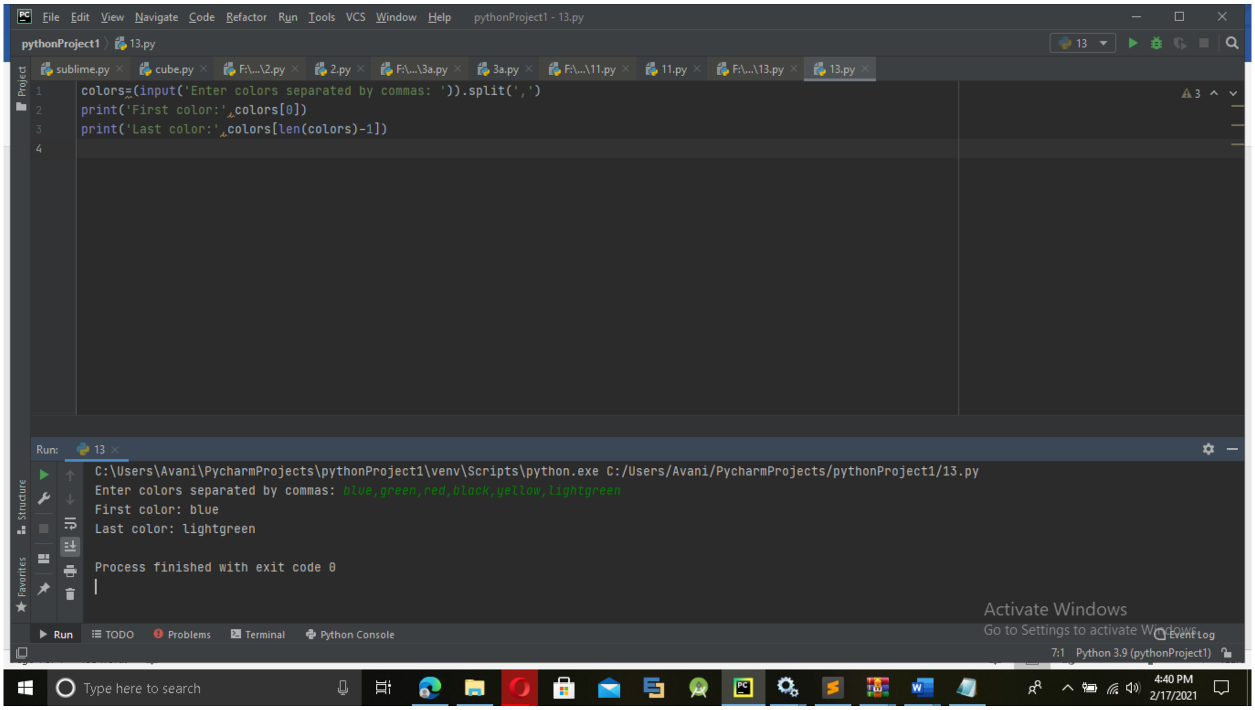
OUTPUT

Enter colors separated by commas: blue,green,red,black,yellow,lightgreen

First color: blue

Last color: lightgreen

Process finished with exit code 0



File Edit View Navigate Code Refactor Run Tools VCS Window Help pythonProject1 - 13.py
pythonProject1 13.py
sublime.py cube.py F:\...\2.py 2.py F:\...\3a.py 3a.py F:\...\11.py 11.py F:\...\13.py 13.py
Run: 13
Run TODO Problems Terminal Python Console
Activate Windows
Go to Settings to activate Windows.
Event Log
7:1 Python 3.9 (pythonProject1)
Type here to search
4:40 PM
2/17/2021

```
colors=(input('Enter colors separated by commas: ')).split(',')
print('First color:',colors[0])
print('Last color:',colors[len(colors)-1])
```

```
C:\Users\Avani\PycharmProjects\pythonProject1\venv\Scripts\python.exe C:/Users/Avani/PycharmProjects/pythonProject1/13.py
Enter colors separated by commas: blue,green,red,black,yellow,lightgreen
First color: blue
Last color: lightgreen

Process finished with exit code 0
```

15. Print out all colors from color-list1 not contained in color-list2.

Ans:

colors1=set((input('Enter colors separated by commas: ')).split(','))

colors2=set((input('Enter colors separated by commas: ')).split(','))

print('Colors in color-list1 not contained in color-list2 are: ',list(colors1.difference(colors2)))

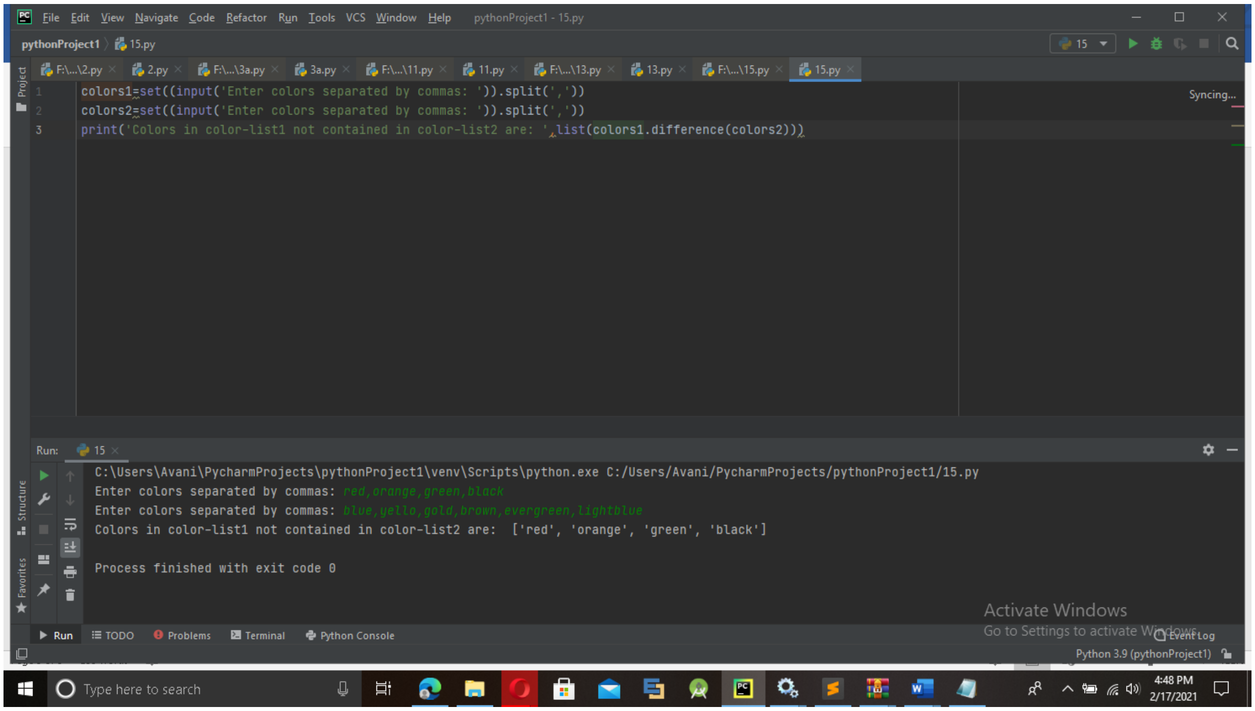
OUTPUT

Enter colors separated by commas: red,orange,green,black

Enter colors separated by commas: blue,yello,gold,brown,evergreen,lightblue

Colors in color-list1 not contained in color-list2 are: ['red', 'orange', 'green', 'black']

Process finished with exit code 0



File Edit View Navigate Code Refactor Run Tools VCS Window Help pythonProject1 - 15.py
pythonProject1 〉 15.py
F:\...\2.py 2.py F:\...\3a.py 3a.py F:\...\11.py 11.py F:\...\13.py 13.py F:\...\15.py 15.py
Syncing...
Run: 15
Run TODO Problems Terminal Python Console
Activate Windows
Go to Settings to activate Windows.
Event Log
Python 3.9 (pythonProject1)
Type here to search
4:48 PM
2/17/2021

```
colors1=set((input('Enter colors separated by commas: ')).split(','))
colors2=set((input('Enter colors separated by commas: ')).split(','))
print('Colors in color-list1 not contained in color-list2 are: ',list(colors1.difference(colors2)))
```

```
C:\Users\Avani\PycharmProjects\pythonProject1\venv\Scripts\python.exe C:/Users/Avani/PycharmProjects/pythonProject1/15.py
Enter colors separated by commas: red,orange,green,black
Enter colors separated by commas: blue,yello,gold,brown,evergreen,lightblue
Colors in color-list1 not contained in color-list2 are:  ['red', 'orange', 'green', 'black']

Process finished with exit code 0
```

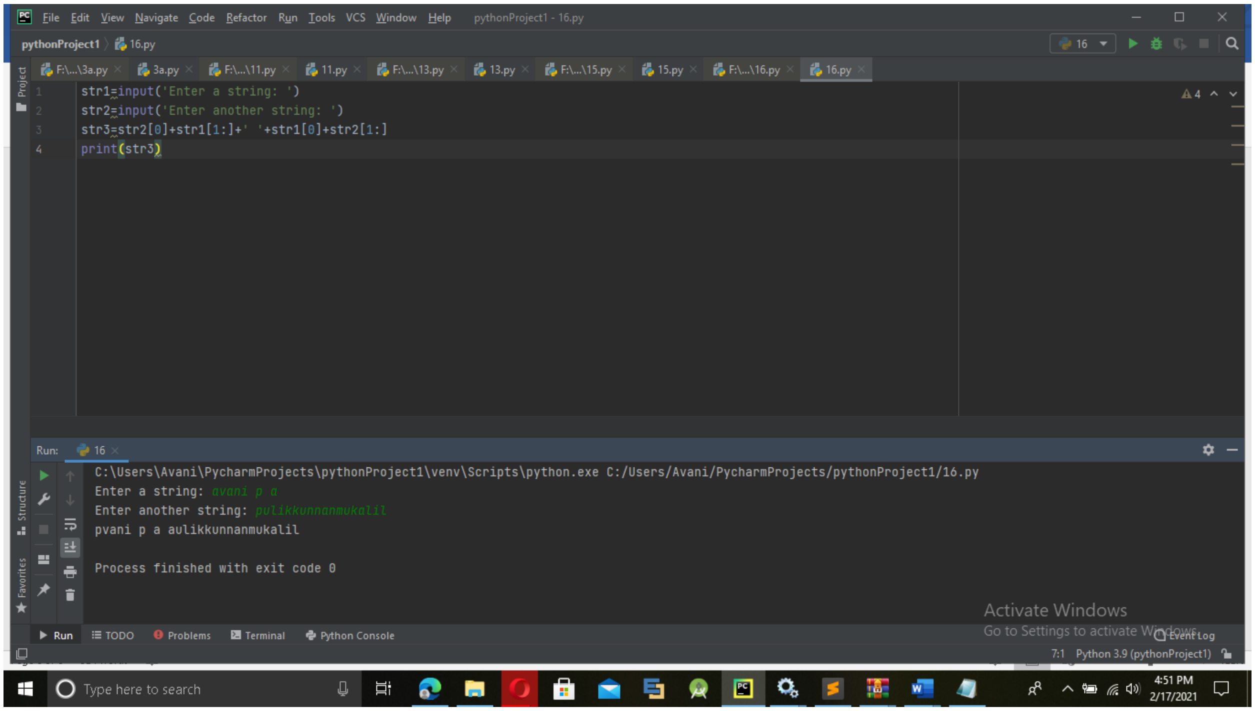
16. Create a single string separated with space from two strings by swapping the character at position 1.

Ans:

```
str1=input('Enter a string: ')

str2=input('Enter another string: ')

str3=str2[0]+str1[1:]+' '+str1[0]+str2[1:]

print(str3)
```

OUTPUT

```
Enter a string: avani p a

Enter another string: pulikkunnanmukalil

pvani p a aulikkunnanmukalil


Process finished with exit code 0
```



```
str1=input('Enter a string: ')
str2=input('Enter another string: ')
str3=str2[0]+str1[1:]+' '+str1[0]+str2[1:]
print(str3)
```

```
C:\Users\Avani\PycharmProjects\pythonProject1\venv\Scripts\python.exe C:/Users/Avani/PycharmProjects/pythonProject1/16.py
Enter a string: avani p a
Enter another string: pulikkunnanmukalil
pvani p a aulikkunnanmukalil

Process finished with exit code 0
```

Co3

2. Create a package graphics with modules rectangle, circle and sub-package 3D-graphics with modules cuboid and sphere. Include methods to find area and perimeter of respective figures in each module. Write programs that finds area and perimeter of figures by different importing statements. (Include selective import of modules and import * statements)

ans:

circle.py

findarea.py

import circle

from rectangle import *

from Graphics._3D_graphics import cuboid,sphere

a=float(input('Enter length of the rectangle: '))

b=float(input('Enter breadth of the rectangle: '))

area(a,b)

r=float(input('Enter the radius of the circle: '))

circle.area(r)

```
l=float(input('Enter length of the cuboid: '))
b=float(input('Enter breadth of the cuboid: '))
h=float(input('Enter height of the cuboid: '))
cuboid.area(l,b,h)
r=float(input('Enter the radius of the sphere: '))
sphere.area(r)
```

findperimeter.py

```
import circle
from rectangle import *
from Graphics._3D_graphics import cuboid,sphere
a=float(input('Enter length of the rectangle: '))
b=float(input('Enter breadth of the rectangle: '))
perimeter(a,b)
r=float(input('Enter the radius of the circle: '))
circle.circumference(r)
l=float(input('Enter length of the cuboid: '))
b=float(input('Enter breadth of the cuboid: '))
h=float(input('Enter height of the cuboid: '))
cuboid.perimeter(l,b,h)
r=float(input('Enter the radius of the sphere: '))
sphere.perimeter(r)
```

rectangle.py

```
def area(a,b):
   print('Area of rectangle with sides',a,'and',b,'is: ','%.2f'%(a*b),'Sq.units')
def perimeter(a,b):
   print('Perimeter of rectangle with sides',a,'and',b,'is:','%.2f'%(2*(a+b)),'units')
```

3D_graphics

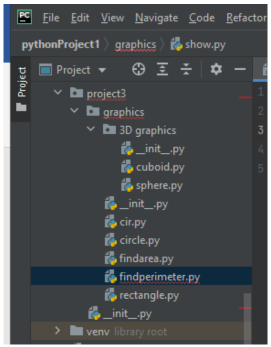
Cuboid.py

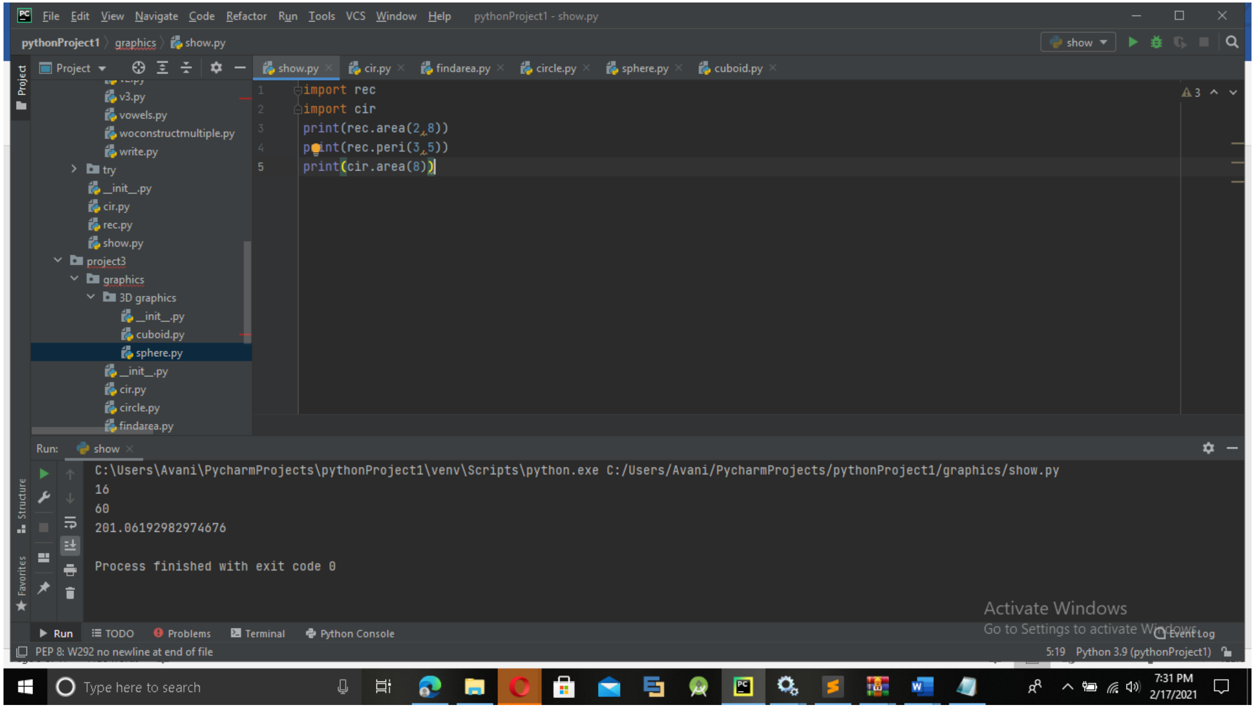
```
def area(l,b,h):
    print('Total surface area of cuboid with dimensions',l,',',b,',',h,'is:','%.2f'%(2*((l*b)+(b*h)+(l*h))),'Sq.units')
def perimeter(l,b,h):
    print('Perimeter of cuboid with dimensions', l, ',', b, ',', h, 'is:','%.2f'%(4*(l+b+h)),'units')
```

sphere.py

```
def area(r):
    print('Area of sphere with radius',r,'is:','%.2f'%(4*(3.14*r*r)),'Sq.units')
def perimeter(r):
    print('Perimeter of (great circle of) sphere with radius',r,'is:','%.2f'%(2*3.14*r),'units')
```

OUTPUT




File Edit View Navigate Code Refactor Run Tools VCS Window Help pythonProject1 - show.py
pythonProject1 graphics show.py
show
Project
show.py cir.py findarea.py circle.py sphere.py cuboid.py
v3.py
vowels.py
woconstructmultiple.py
write.py
try
__init__.py
cir.py
rec.py
show.py
project3
graphics
3D graphics
__init__.py
cuboid.py
sphere.py
__init__.py
cir.py
circle.py
findarea.py
Run: show
Run TODO Problems Terminal Python Console
Activate Windows
Go to Settings to activate Windows.
Event Log
PEP 8: W292 no newline at end of file
5:19 Python 3.9 (pythonProject1)
Type here to search
7:31 PM
2/17/2021

```
import rec
import cir
print(rec.area(2,8))
print(rec.peri(3,5))
print(cir.area(8))
```

```
C:\Users\Avani\PycharmProjects\pythonProject1\venv\Scripts\python.exe C:/Users/Avani/PycharmProjects/pythonProject1/graphics/show.py
16
60
201.06192982974676

Process finished with exit code 0
```

CO4

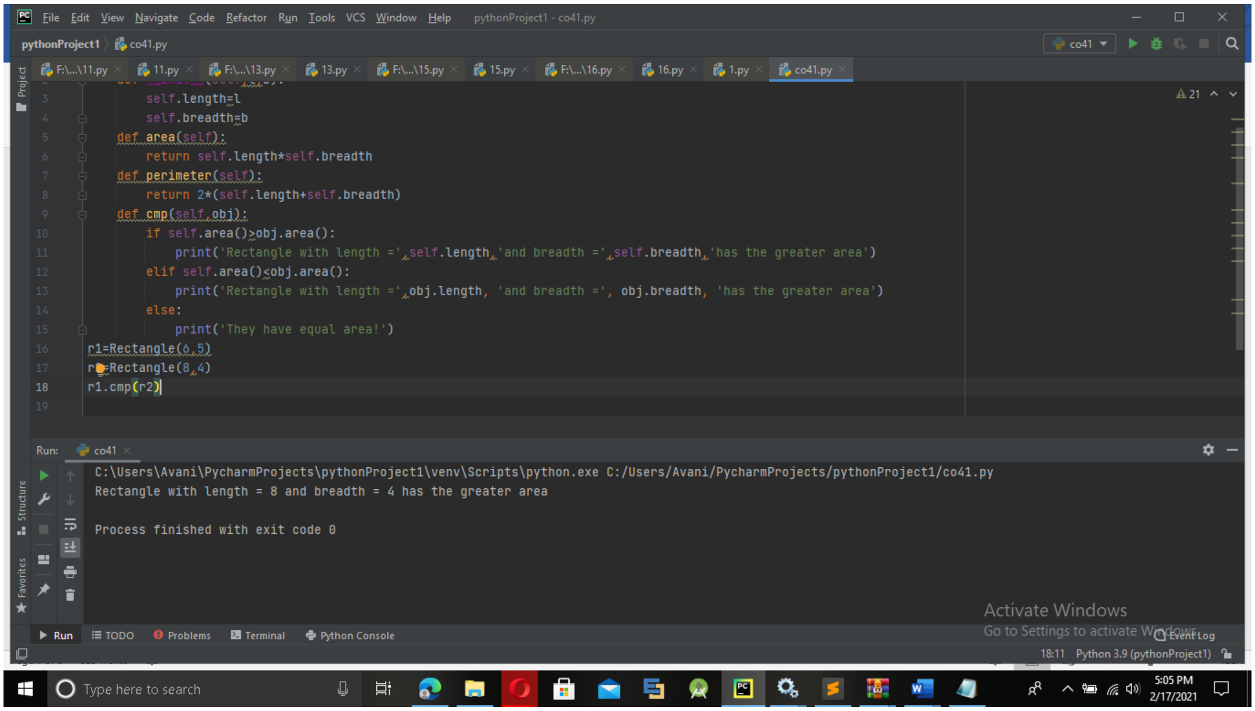
1. Create Rectangle class with attributes length and breadth and methods to find area and perimeter. Compare two Rectangle objects by their area.

Ans:

```
class Rectangle:
  def __init__(self,l,b):
    self.length=l
    self.breadth=b
  def area(self):
    return self.length*self.breadth
  def perimeter(self):
    return 2*(self.length+self.breadth)
  def cmp(self,obj):
    if self.area()>obj.area():
      print('Rectangle with length =',self.length,'and breadth =',self.breadth,'has the greater area')
    elif self.area()<obj.area():
      print('Rectangle with length =',obj.length, 'and breadth =', obj.breadth, 'has the greater area')
    else:
      print('They have equal area!')
r1=Rectangle(6,5)
r2=Rectangle(8,4)
r1.cmp(r2)
```

OUTPUT

```
Rectangle with length = 8 and breadth = 4 has the greater area


Process finished with exit code 0
```



```
        self.length=l
        self.breadth=b
    def area(self):
        return self.length*self.breadth
    def perimeter(self):
        return 2*(self.length+self.breadth)
    def cmp(self,obj):
        if self.area()>obj.area():
            print('Rectangle with length =',self.length,'and breadth =',self.breadth,'has the greater area')
        elif self.area()<obj.area():
            print('Rectangle with length =',obj.length, 'and breadth =', obj.breadth, 'has the greater area')
        else:
            print('They have equal area!')
r1=Rectangle(6,5)
r2=Rectangle(8,4)
r1.cmp(r2)
```

```
C:\Users\Avani\PycharmProjects\pythonProject1\venv\Scripts\python.exe C:/Users/Avani/PycharmProjects/pythonProject1/co41.py
Rectangle with length = 8 and breadth = 4 has the greater area

Process finished with exit code 0
```

2.Create a Bank account with members account number, name, type of account and balance. Write constructor and methods to deposit at the bank and withdraw an amount from the bank.

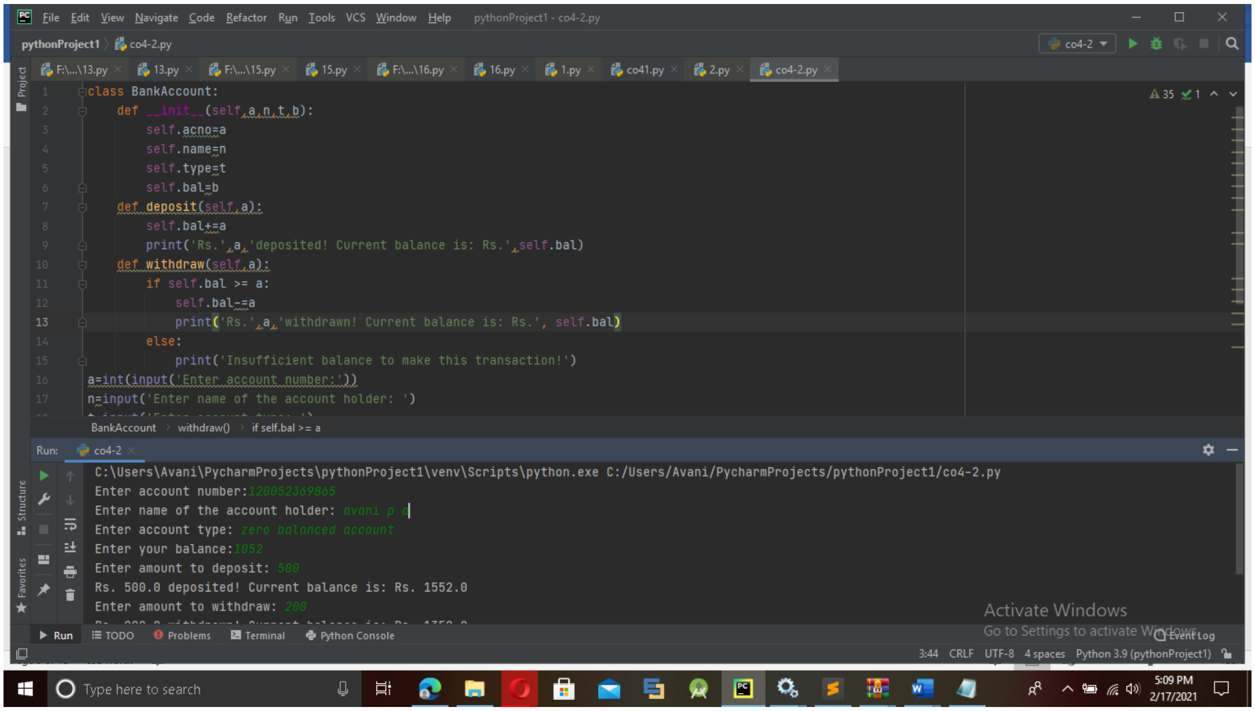
Ans:

```
class BankAccount:
  def __init__(self,a,n,t,b):
    self.acno=a
    self.name=n
    self.type=t
    self.bal=b
  def deposit(self,a):
    self.bal+=a
    print('Rs.',a,'deposited! Current balance is: Rs.',self.bal)
  def withdraw(self,a):
    if self.bal >= a:
      self.bal-=a
      print('Rs.',a,'withdrawn! Current balance is: Rs.', self.bal)
```

```
        else:
            print('Insufficient balance to make this transaction!')
a=int(input('Enter account number:'))
n=input('Enter name of the account holder: ')
t=input('Enter account type: ')
b=float(input('Enter your balance:'))
ac1=BankAccount(a,n,t,b)
ac1.deposit(float(input('Enter amount to deposit: ')))
ac1.withdraw(float(input('Enter amount to withdraw: ')))
```

OUTPUT

```
Enter account number:120052369865
Enter name of the account holder: avani p a
Enter account type: zero balanced account
Enter your balance:1052
Enter amount to deposit: 500
Rs. 500.0 deposited! Current balance is: Rs. 1552.0
Enter amount to withdraw: 200
Rs. 200.0 withdrawn! Current balance is: Rs. 1352.0

Process finished with exit code 0
```


File Edit View Navigate Code Refactor Run Tools VCS Window Help
pythonProject1 - co4-2.py
pythonProject1 〉 co4-2.py
F:\...\13.py
13.py
F:\...\15.py
15.py
F:\...\16.py
16.py
1.py
co41.py
2.py
co4-2.py
BankAccount › withdraw() › if self.bal >= a
Run: co4-2
Run
TODO
Problems
Terminal
Python Console
Activate Windows
Go to Settings to activate Windows.
Event Log
3:44 CRLF UTF-8 4 spaces Python 3.9 (pythonProject1)
Type here to search
5:09 PM
2/17/2021

```
class BankAccount:
    def __init__(self,a,n,t,b):
        self.acno=a
        self.name=n
        self.type=t
        self.bal=b
    def deposit(self,a):
        self.bal+=a
        print('Rs.',a,'deposited! Current balance is: Rs.',self.bal)
    def withdraw(self,a):
        if self.bal >= a:
            self.bal-=a
            print('Rs.',a,'withdrawn! Current balance is: Rs.', self.bal)
        else:
            print('Insufficient balance to make this transaction!')
a=int(input('Enter account number:'))
n=input('Enter name of the account holder: ')
```

```
C:\Users\Avani\PycharmProjects\pythonProject1\venv\Scripts\python.exe C:/Users/Avani/PycharmProjects/pythonProject1/co4-2.py
Enter account number:120052369865
Enter name of the account holder: avani p a
Enter account type: zero balanced account
Enter your balance:1052
Enter amount to deposit: 500
Rs. 500.0 deposited! Current balance is: Rs. 1552.0
Enter amount to withdraw: 200
```

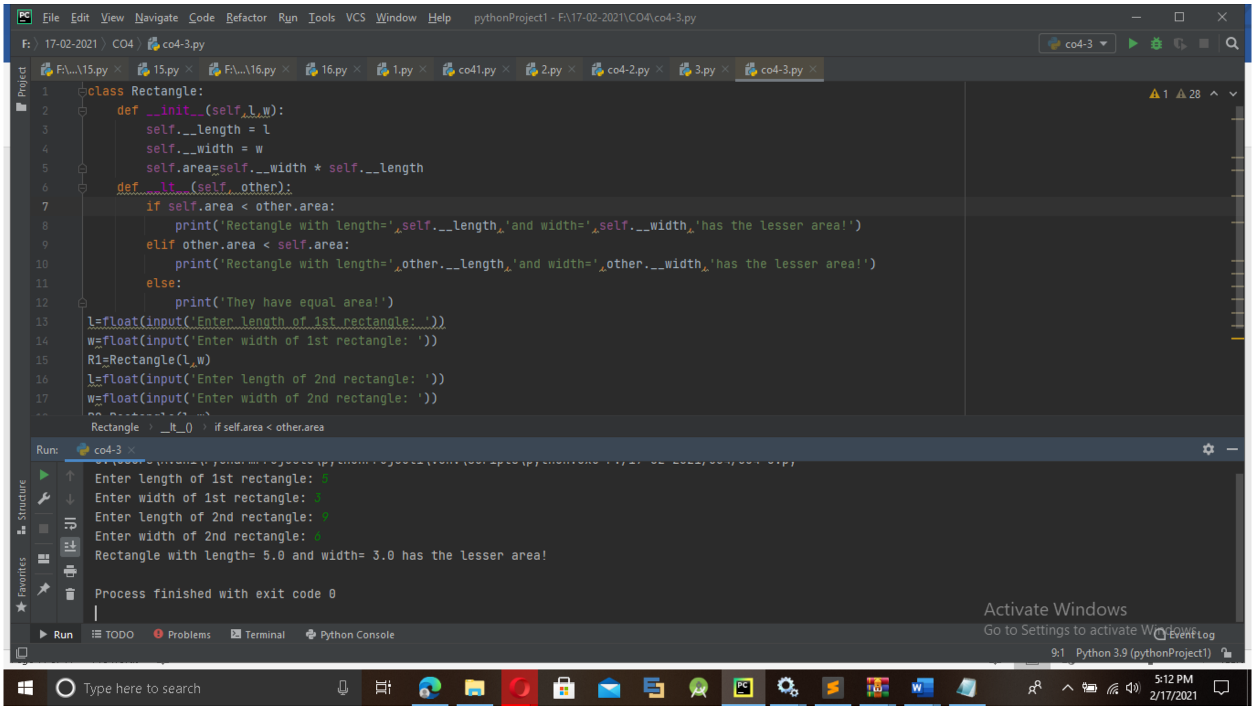
3.Create a class Rectangle with private attributes length and width. Overload '<' operator to compare the area of 2 rectangles.

Ans:

```
class Rectangle:
  def __init__(self,l,w):
    self.__length = l
    self.__width = w
    self.area=self.__width * self.__length
  def __lt__(self, other):
    if self.area < other.area:
      print('Rectangle with length=',self.__length,'and width=',self.__width,'has the lesser area!')
    elif other.area < self.area:
      print('Rectangle with length=',other.__length,'and width=',other.__width,'has the lesser area!')
    else:
        print('They have equal area!')
l=float(input('Enter length of 1st rectangle: '))
w=float(input('Enter width of 1st rectangle: '))
R1=Rectangle(l,w)
l=float(input('Enter length of 2nd rectangle: '))
w=float(input('Enter width of 2nd rectangle: '))
R2=Rectangle(l,w)
R1<R2
```

OUTPUT

```
Enter length of 1st rectangle: 5
Enter width of 1st rectangle: 3
Enter length of 2nd rectangle: 9
Enter width of 2nd rectangle: 6
Rectangle with length= 5.0 and width= 3.0 has the lesser area!

Process finished with exit code 0
```



File Edit View Navigate Code Refactor Run Tools VCS Window Help
pythonProject1 - F:\17-02-2021\CO4\co4-3.py
F: 17-02-2021 CO4 co4-3.py
co4-3
F:\...\15.py
15.py
F:\...\16.py
16.py
1.py
co41.py
2.py
co4-2.py
3.py
co4-3.py
Rectangle › __lt__() › if self.area < other.area
Run: co4-3
Run
TODO
Problems
Terminal
Python Console
Activate Windows
Go to Settings to activate Windows.
Event Log
9:1 Python 3.9 (pythonProject1)
Type here to search
5:12 PM
2/17/2021

```
class Rectangle:
    def __init__(self,l,w):
        self.__length = l
        self.__width = w
        self.area=self.__width * self.__length
    def __lt__(self, other):
        if self.area < other.area:
            print('Rectangle with length=',self.__length,'and width=',self.__width,'has the lesser area!')
        elif other.area < self.area:
            print('Rectangle with length=',other.__length,'and width=',other.__width,'has the lesser area!')
        else:
            print('They have equal area!')
l=float(input('Enter length of 1st rectangle: '))
w=float(input('Enter width of 1st rectangle: '))
R1=Rectangle(l,w)
l=float(input('Enter length of 2nd rectangle: '))
w=float(input('Enter width of 2nd rectangle: '))
```

```
Enter length of 1st rectangle: 5
Enter width of 1st rectangle: 3
Enter length of 2nd rectangle: 9
Enter width of 2nd rectangle: 6
Rectangle with length= 5.0 and width= 3.0 has the lesser area!

Process finished with exit code 0
```

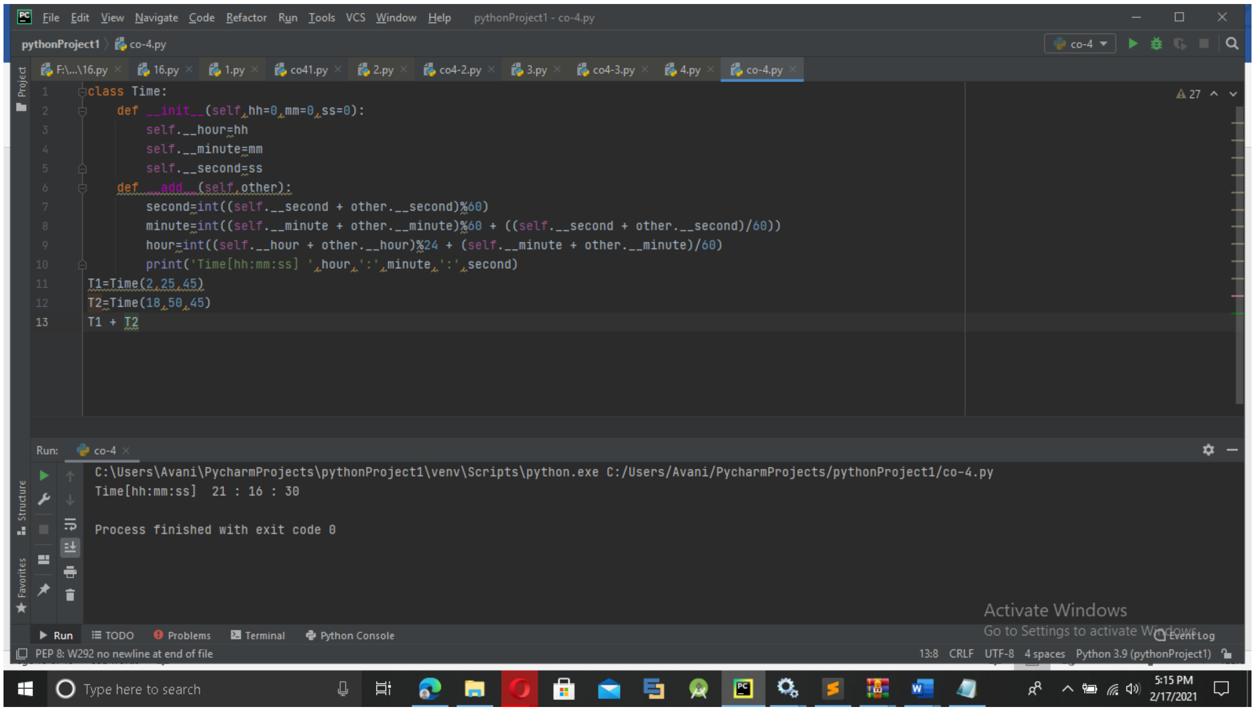
4.Create a class Time with private attributes hour, minute and second. Overload '+' operator to find sum of 2 time.

Ans:

```
class Time:
  def __init__(self,hh=0,mm=0,ss=0):
    self.__hour=hh
    self.__minute=mm
    self.__second=ss
  def __add__(self,other):
    second=int((self.__second + other.__second)%60)
    minute=int((self.__minute + other.__minute)%60 + ((self.__second + other.__second)/60))
    hour=int((self.__hour + other.__hour)%24 + (self.__minute + other.__minute)/60)
    print('Time[hh:mm:ss] ',hour,':',minute,':',second)
T1=Time(2,25,45)
T2=Time(18,50,45)
T1 + T2
```

OUTPUT

```
Time[hh:mm:ss]  21 : 16 : 30


Process finished with exit code 0
```



File Edit View Navigate Code Refactor Run Tools VCS Window Help pythonProject1 - co-4.py
pythonProject1 co-4.py
F:\...\16.py 16.py 1.py co41.py 2.py co4-2.py 3.py co4-3.py 4.py co-4.py
co-4
Run: co-4
Run TODO Problems Terminal Python Console
PEP 8: W292 no newline at end of file
13:8 CRLF UTF-8 4 spaces Python 3.9 (pythonProject1)
Activate Windows
Go to Settings to activate Windows.
Event Log
Type here to search
5:15 PM
2/17/2021

```
class Time:
    def __init__(self,hh=0,mm=0,ss=0):
        self.__hour=hh
        self.__minute=mm
        self.__second=ss
    def __add__(self,other):
        second=int((self.__second + other.__second)%60)
        minute=int((self.__minute + other.__minute)%60 + ((self.__second + other.__second)/60))
        hour=int((self.__hour + other.__hour)%24 + (self.__minute + other.__minute)/60)
        print('Time[hh:mm:ss] ',hour,':',minute,':',second)
T1=Time(2,25,45)
T2=Time(18,50,45)
T1 + T2
```

```
C:\Users\Avani\PycharmProjects\pythonProject1\venv\Scripts\python.exe C:/Users/Avani/PycharmProjects/pythonProject1/co-4.py
Time[hh:mm:ss]  21 : 16 : 30

Process finished with exit code 0
```

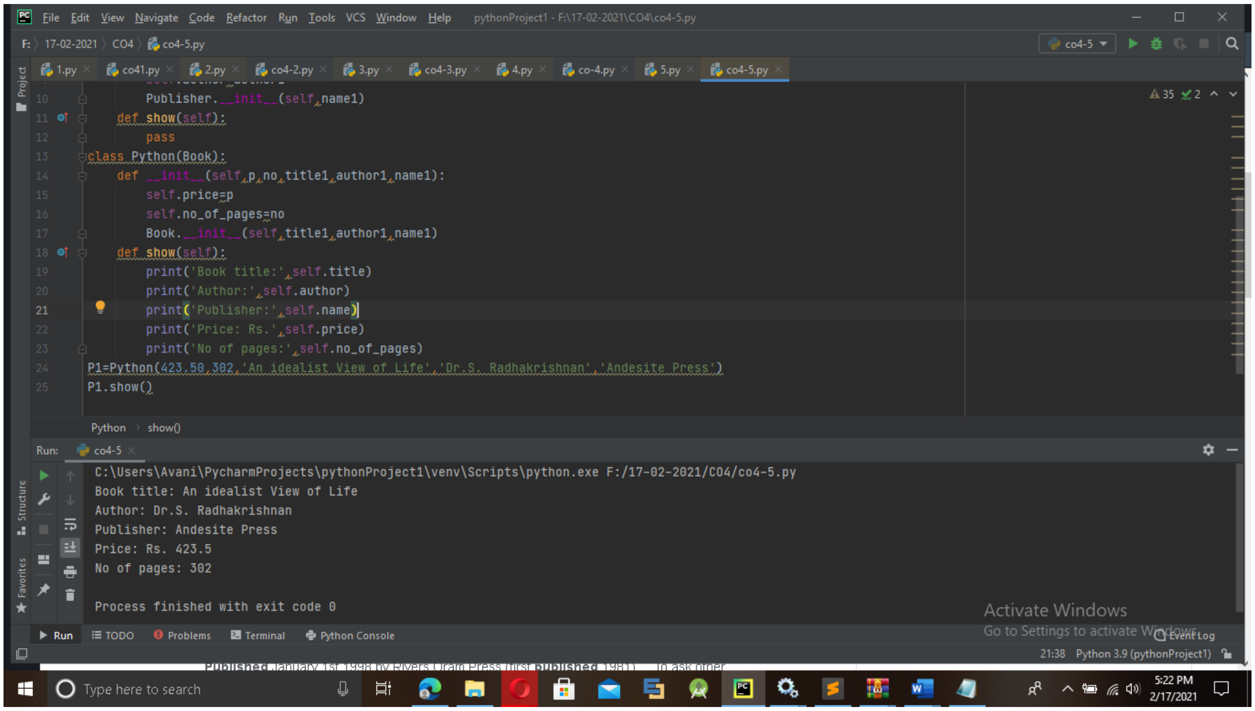
5.Create a class Publisher (name). Derive class Book from Publisher with attributes title and author. Derive class Python from Book with attributes price and no_of_pages. Write a program that displays information about a Python book. Use base class constructor invocation and method overriding.

Ans:

```
class Publisher:
  def __init__(self,name1):
    self.name=name1
  def show(self):
    pass
class Book(Publisher):
  def __init__(self,title1,author1,name1):
    self.title=title1
    self.author=author1
    Publisher.__init__(self,name1)
  def show(self):
    pass
class Python(Book):
  def __init__(self,p,no,title1,author1,name1):
    self.price=p
    self.no_of_pages=no
    Book.__init__(self,title1,author1,name1)
  def show(self):
    print('Book title:',self.title)
    print('Author:',self.author)
    print('Publisher:',self.name)
    print('Price: Rs.',self.price)
    print('No of pages:',self.no_of_pages)
P1=Python(423.50,302,'An idealist View of Life','Dr.S. Radhakrishnan','Andesite Press')
P1.show()
```

OUTPUT

```
Book title: An idealist View of Life
Author: Dr.S. Radhakrishnan
Publisher: Andesite Press
Price: Rs. 423.5
No of pages: 302

Process finished with exit code 0
```



File Edit View Navigate Code Refactor Run Tools VCS Window Help
pythonProject1 - F:\17-02-2021\CO4\co4-5.py
F: 〉 17-02-2021 〉 CO4 〉 co4-5.py
1.py
co41.py
2.py
co4-2.py
3.py
co4-3.py
4.py
co-4.py
5.py
co4-5.py
Python › show()
Run: co4-5
Run
TODO
Problems
Terminal
Python Console
Activate Windows
Go to Settings to activate Windows.
Event Log
21:38 Python 3.9 (pythonProject1)
Type here to search
5:22 PM
2/17/2021

```
        Publisher.__init__(self,name1)
    def show(self):
        pass
class Python(Book):
    def __init__(self,p,no,title1,author1,name1):
        self.price=p
        self.no_of_pages=no
        Book.__init__(self,title1,author1,name1)
    def show(self):
        print('Book title:',self.title)
        print('Author:',self.author)
        print('Publisher:',self.name)
        print('Price: Rs.',self.price)
        print('No of pages:',self.no_of_pages)
P1=Python(423.50,302,'An idealist View of Life','Dr.S. Radhakrishnan','Andesite Press')
P1.show()
```

```
C:\Users\Avani\PycharmProjects\pythonProject1\venv\Scripts\python.exe F:/17-02-2021/CO4/co4-5.py
Book title: An idealist View of Life
Author: Dr.S. Radhakrishnan
Publisher: Andesite Press
Price: Rs. 423.5
No of pages: 302

Process finished with exit code 0
```