1. Work with built-in packages

a. math module

#help("modules")

import math

print("the value of pi is:",math.pi)

import math as m

print("the value of pi is:",m.pi)

from math import pi,sqrt

print("the square root of 36 is:",math.sqrt(36))

print("the value of pi is:",math.pi)

print(math.cos(90))

print(math.sin(45))

print(math.tan(180))

print(math.cos(90))

#print(math.cosec(90))

Output:

>> %Run q1.py

the value of pi is: 3.141592653589793

the value of pi is: 3.141592653589793

the square root of 36 is: 6.0

the value of pi is: 3.141592653589793

-0.4480736161291701

0.8509035245341184

1.3386902103511544

-0.4480736161291701

>>>

b.time module

import time

print("current time in sec:",time.time())

print("current time:",time.ctime())

print("current time after 30 sec:",time.ctime(time.time()+30))

t=time.localtime()

print("time t:",t)

print("current year:",t.tm\_year)

print("current month:",t.tm\_mon)

print("current day:",t.tm\_mday)

print("current hour:",t.tm\_hour)

print("current minute:",t.tm\_min)

print("current second:",t.tm\_sec)

print("current weakday:",t.tm\_wday)

output:

> %Run q2.py

current time in sec: 1639985071.7600775

current time: Mon Dec 20 12:54:31 2021

current time after 30 sec: Mon Dec 20 12:55:01 2021

time t: time.struct\_time(tm\_year=2021, tm\_mon=12, tm\_mday=20, tm\_hour=12, tm\_min=54, tm\_sec=31, tm\_wday=0, tm\_yday=354, tm\_isdst=0)

current year: 2021

current month: 12

current day: 20

current hour: 12

current minute: 54

current second: 31

current weakday: 0

>>>

c. calender module

import calendar

mm=int(input("Enter month:"))

yy=int(input("Enter year:"))

print(calendar.month(yy,mm)) #calendar of a given month

#print(calendar.calendar(2022)) #calendar of a given year

print(calendar.calendar(2000))

output:

>>> %Run q3.py

Enter month:3

Enter year:2020

March 2020

Mo Tu We Th Fr Sa Su

1

2 3 4 5 6 7 8

9 10 11 12 13 14 15

16 17 18 19 20 21 22

23 24 25 26 27 28 29

30 31

2000

January February March

Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su

1 2 1 2 3 4 5 6 1 2 3 4 5

3 4 5 6 7 8 9 7 8 9 10 11 12 13 6 7 8 9 10 11 12

10 11 12 13 14 15 16 14 15 16 17 18 19 20 13 14 15 16 17 18 19

17 18 19 20 21 22 23 21 22 23 24 25 26 27 20 21 22 23 24 25 26

24 25 26 27 28 29 30 28 29 27 28 29 30 31

31

April May June

Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su

1 2 1 2 3 4 5 6 7 1 2 3 4

3 4 5 6 7 8 9 8 9 10 11 12 13 14 5 6 7 8 9 10 11

10 11 12 13 14 15 16 15 16 17 18 19 20 21 12 13 14 15 16 17 18

17 18 19 20 21 22 23 22 23 24 25 26 27 28 19 20 21 22 23 24 25

24 25 26 27 28 29 30 29 30 31 26 27 28 29 30

July August September

Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su

1 2 1 2 3 4 5 6 1 2 3

3 4 5 6 7 8 9 7 8 9 10 11 12 13 4 5 6 7 8 9 10

10 11 12 13 14 15 16 14 15 16 17 18 19 20 11 12 13 14 15 16 17

17 18 19 20 21 22 23 21 22 23 24 25 26 27 18 19 20 21 22 23 24

24 25 26 27 28 29 30 28 29 30 31 25 26 27 28 29 30

31

October November December

Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su

1 1 2 3 4 5 1 2 3

2 3 4 5 6 7 8 6 7 8 9 10 11 12 4 5 6 7 8 9 10

9 10 11 12 13 14 15 13 14 15 16 17 18 19 11 12 13 14 15 16 17

16 17 18 19 20 21 22 20 21 22 23 24 25 26 18 19 20 21 22 23 24

23 24 25 26 27 28 29 27 28 29 30 25 26 27 28 29 30 31

30 31

>>>

d.datetime module

import datetime

t=datetime.time(22,56,44,5) #time class(hr,min,sec,microsec)

print(t)

print("Hour",t.hour)

print("Minute",t.minute)

print("Second",t.second)

print("Microsecond",t.microsecond)

print(".............................")

d=datetime.date.today() #date class

print(d)

td=datetime.timedelta(days=2) #timedelta class

print(td)

d2=d+td #adding 2 da

print(d2)

print("d2-d=",d2-d)

#d1=datetime.date.today()

dt=datetime.datetime.combine(d,t)

print(dt)

output:

>> %Run q4.py

22:56:44.000005

Hour 22

Minute 56

Second 44

Microsecond 5

.............................

2021-12-20

2 days, 0:00:00

2021-12-22

d2-d= 2 days, 0:00:00

2021-12-20 22:56:44.000005

>>>

e. import random

mylist = ["apple", "banana", "cherry"]

print(random.choice(mylist)) #Returns a random element from the given sequence

print(random.choices(mylist, k=2))

print(random.sample(mylist, k=2)) #Return a list that contains any 2 of the items from a list:

random.shuffle(mylist)

print(mylist) #Takes a sequence and returns the sequence in a random order

print(random.randrange(3, 9)) #Return a number between 3 and 9:

output:

>>> %Run q6.py

cherry

['apple', 'apple']

['banana', 'cherry']

['banana', 'cherry', 'apple']

7

>>>

f.

import statistics

l1=[1,2,3,4,4]

print("mean",statistics.mean(l1))

print("median",statistics.median(l1))

print("mode",statistics.mode(l1))

print("harmonic\_mean",statistics.harmonic\_mean(l1))

print("statistics\_varience",statistics.variance(l1))

print("statistics\_median\_low",statistics.median\_low([-11, 5.5, -3.4, 7.1, -9, 22]))

output:

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)

Circle.py

pi=3.14

def area(pi,r):

return pi\*r\*r

def perimeter(pi,r):

return 2\*pi\*r

init.py

\_\_init\_\_

Rectangle.py

def area(a,b):

return a\*b

def perimeter(a,b):

return 2\*(a+b)

graphicsuse.py

from graphics import rectangle

from graphics import circle

print("Read values: \n Rectangle:\n")

l=int(input("Enter length"))

b=int(input("Enter breadth"))

r\_area=rectangle.area(l,b)

r\_perimeter=rectangle.perimeter(l,b)

print("Circle:\n")

r=int(input("Enter radius"))

area=circle.area(circle.pi,r)

perimeter=circle.perimeter(circle.pi,r)

print("Area of Rectangle:",r\_area)

print("Area of Circle:",area)

print("Perimeter of Rectangle:",r\_perimeter)

print("Perimeter of Circle:",perimeter)

output:

>>> %Run graphicsuse.py

Read values:

Rectangle:

Enter length5

Enter breadth6

Circle:

Enter radius3

Area of Rectangle: 30

Area of Circle: 28.259999999999998

Perimeter of Rectangle: 22

Perimeter of Circle: 18.84

>>>