NAME: SHENDYE VEDANG UPENDRA

MIS:112315171

PYTHON ASSIGNMENT 3

DATE: 21 AUGUST 2024

QUESTION 1:

Write a program to count the numbers of characters in the given string and store them in a dictionary data structure.

CODE:

```
str=input("enter a string")
mydict=dict()
for i in str:
    if i not in mydict:
        mydict[i]=1
    else:
        mydict[i]=mydict[i]+1

print(mydict)
```

OUTPUT:

```
                                        > python -u "d:\Btech 3rd semester\Python la
enter a stringVedang Shendye
{'V': 1, 'e': 3, 'd': 2, 'a': 1, 'n': 2, 'g': 1, ' ': 1, 'S': 1, 'h': 1, 'y':
PS C:\Users\Vedang shendye\Desktop>
```

QUESTION 2:

Write a program to use split and join methods in the given string and trace a birthday with a dictionary data structure.

CODE:

```
str=input("enter your birth date: ")


str2=str.split("-")

str3=str.split("-")

print("\n\nthe entered birth date is:", "/".join(str2))


mydict=dict()


mydict["Day"]=str3[0]

mydict["Month"]=str3[1]

mydict["Year"]=str3[2]


#mydict["Year"]=str(int(mydict["Year"])+20)
```

print("I will turn 20 on: ",mydict["Day"],"/",mydict["Month"],"/",int(mydict["Year"])+20)Output:

```
enter your birth date: 07-04-2005


the entered birth date is: 07/04/2005
I will turn 20 on:  07 / 04 / 2025

=== Code Execution Successful ===
```

QUESTION 3:

Write function to compute gcd and lcm of two numbers.
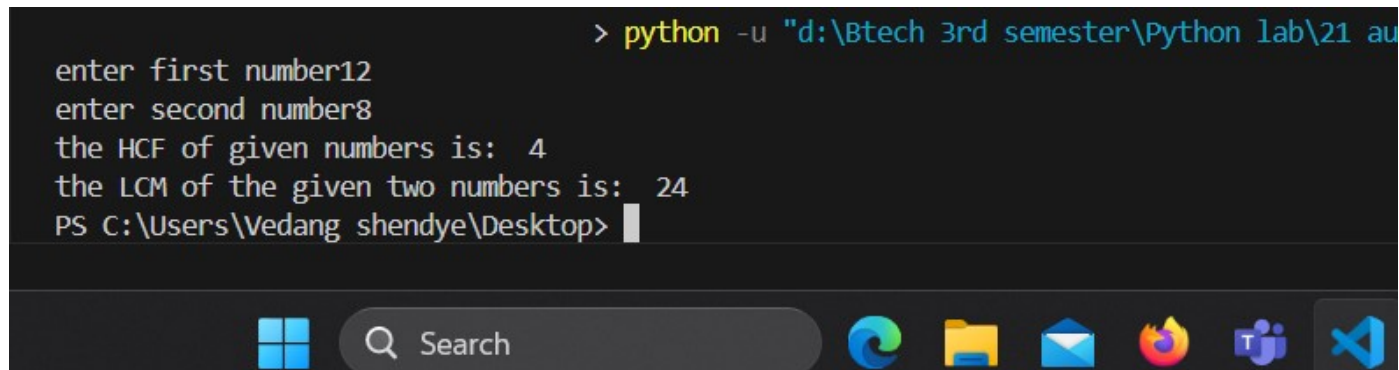
CODE:

a=(int)(input("enter first number"))

b=(int)(input("enter second number"))

hcf=1

lcm=a*b

for i in range(2,min(a,b)):

    if a%i==0 and b%i==0:

       hcf=i

print("the HCF of given numbers is: ",hcf)

```python
for i in range(max(a,b),a*b+1):

    if i%a==0 and i %b==0:

        lcm=i

        break
print("the LCM of the given two numbers is: ",lcm)
```

OUTPUT:

```
> python -u "d:\Btech 3rd semester\Python lab\21 au
enter first number12
enter second number8
the HCF of given numbers is:  4
the LCM of the given two numbers is:  24
PS C:\Users\Vedang shendye\Desktop>
```

Question 4:

Write a function ball _collide that takes two balls as parameters and computes if they are

colliding. Your function should return a Boolean representing whether or not the balls are

colliding. Represent a ball on a plane as a tuple of (x, y, r), r being the radius. If (distance

between two balls centers) <= (sum of their radii) then (they are colliding)

Code:

import math

```python
ball1=(0,0,5)
ball2=(12,13,4)


def ball_collide(a,b):
    dist=(a[0]-b[0])*(a[0]-b[0])+(a[1]-b[1])*(a[1]-b[1])
    dist=math.sqrt(dist)

    if dist>a[2]+b[2]:
        return False
    else:
        return True


answer=ball_collide(ball1,ball2)
print("the value of answer is: ",answer)
```
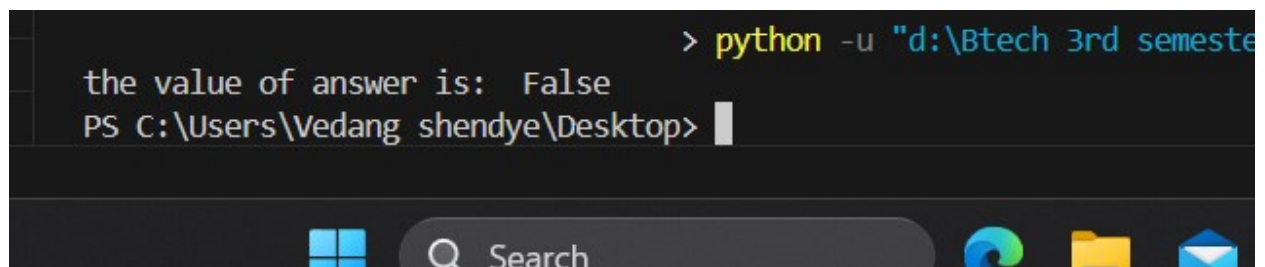
OUTPUT:


```
> python -u "d:\Btech 3rd semeste
the value of answer is:  False
PS C:\Users\Vedang shendye\Desktop> |
```
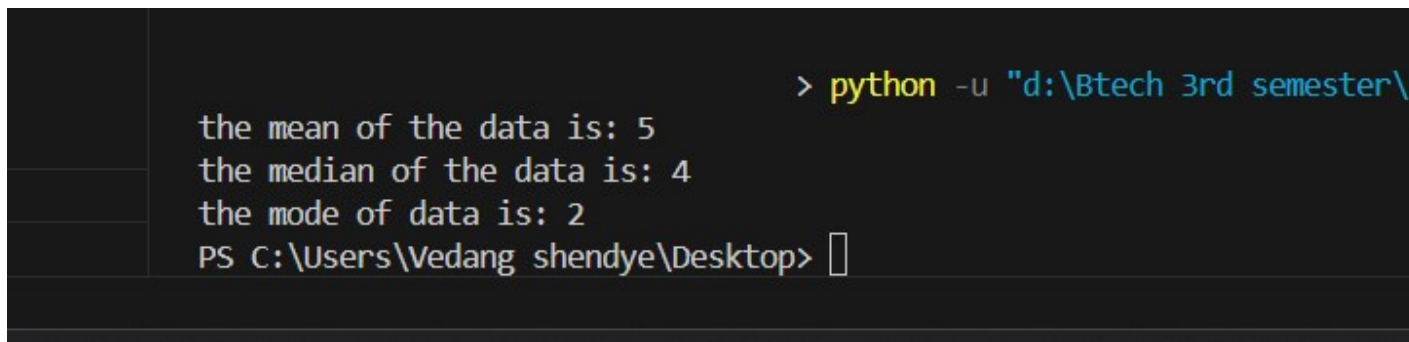
Question 5:

Code:

```python
import statistics
```

```
data=[4,3,7,1,3,7,2,2,2,4,2,8,9,10,11]
print("the mean of the data is:",(statistics.mean(data)))
print("the median of the data is:",statistics.median(data))
print("the mode of data is:",statistics.mode(data))
```

OUTPUT:

```
                                              > python -u "d:\Btech 3rd semester\
    the mean of the data is: 5
    the median of the data is: 4
    the mode of data is: 2
    PS C:\Users\Vedang shendye\Desktop> 
```

QUESTION 6:

Write a program to implement

a. Bubble sort,

b. Merge sort,

c. Selection sort and

d. Insertion sort.

Execute these sorting algorithms using switch case.

Code:

```
data=[1,5,7,6,3,2,8,9,10,11]
```

```python
def bubble(arr,size):
    for i in range(0,size):
        for j in range (0,size-1):
            if arr[j]>arr[j+1]:
                temp=arr[j]
                arr[j]=arr[j+1]
                arr[j+1]=temp


# bubble(data,10)
# print("after bubble sort, array becomes:\n",data)


def mergesort(a, p, r):
    if p < r:
        q = (p + r) // 2
        mergesort(a, p, q)
        mergesort(a, q + 1, r)
        merge(a, p, q, r)


def merge(a, p, q, r):
    n1 = q - p + 1
    n2 = r - q

    left = [a[p + i] for i in range(n1)] + [float('inf')]
    right = [a[q + 1 + i] for i in range(n2)] + [float('inf')]

    i = 0
```

```python
        j = 0

        for k in range(p, r + 1):
            if left[i] <= right[j]:
                a[k] = left[i]
                i += 1
            else:
                a[k] = right[j]
                j += 1


def insertion_sort(arr):
    size = len(arr)
    for i in range(1, size):
        key = arr[i]
        j = i - 1
        while j >= 0 and arr[j] > key:
            arr[j + 1] = arr[j]
            j -= 1
        arr[j + 1] = key


def selection(arr,size):

    for i in range(0,size):
        min=999999
        minindex=0
        for j in range(i,size):
            if arr[i]<min:
```

```python
                min=arr[i]

                minindex=i


        temp=arr[i]

        arr[i]=min

        arr[minindex]=temp


inp=int(input("enter 1 for bubble sort,2for merge sort,3 for selection sort, 4 for insertion sort:
"))


if inp==1:

    bubble(data,10)
elif inp==2:

    mergesort(data,0,9)


elif inp==3:

    selection(data,10)


elif inp==4:

    insertion_sort(data)


print("after sorting, array becomes:\n",data)
```

OUTPUT:

```
                                           > python -u  d:\Btech 3rd semester\Python lab\21 august\
enter 1 for bubble sort,2for merge sort,3 for selection sort, 4 for insertion sort: 1
after sorting, array becomes:
 [1, 2, 3, 5, 6, 7, 8, 9, 10, 11]
PS C:\Users\Vedang shendye\Desktop>
```