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Roll No :- 3

Class :- MSC CS Part 1

Algorithm Mini Project

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Maximum Subarray Problem

Aim: Write a Python3 program to implement the maximum subarray problem.

Filename: maxSubArray.py

Code:

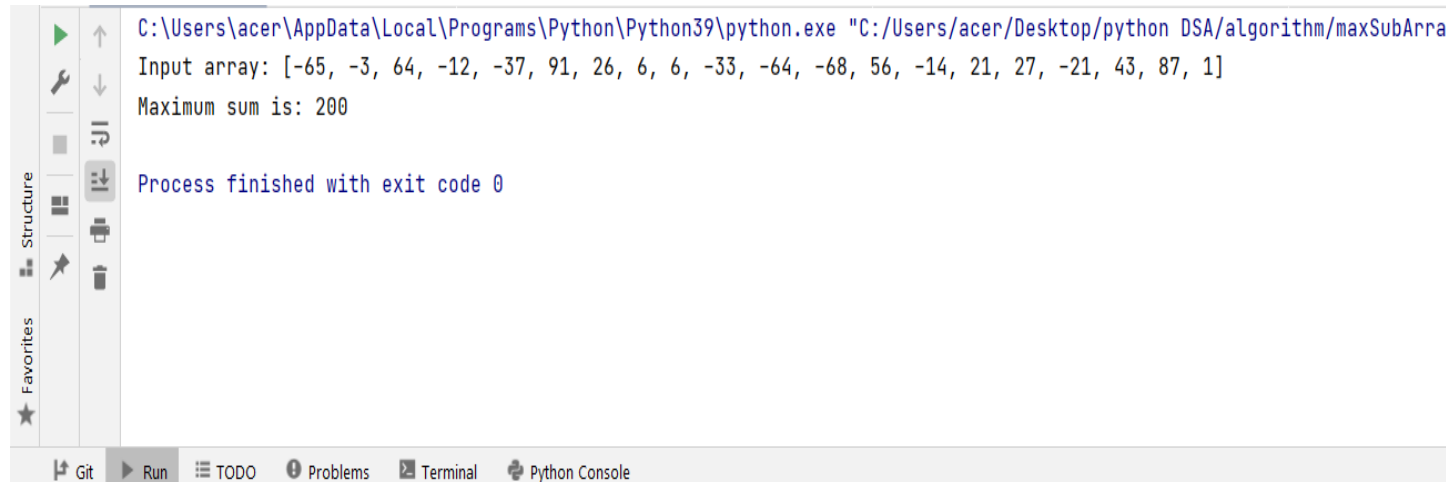
```
def maxSubArray(arr):  
    maxSum = 0  
    curSum = 0  
    for i in range(len(arr)):  
        curSum = curSum + arr[i]  
        if(curSum > maxSum):  
            maxSum = curSum  
        if(curSum<0):  
            curSum = 0  
    return maxSum  
  
arr =  
[-65,-3,64,-12,-37,91,26,6,6,-33,-64,-68,56,-14,21,27,-21,4  
3,87,1]  
print(f"Input array: {arr}")  
print(f"Maximum sum is: {maxSubArray(arr)}")
```

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Output:-



```
C:\Users\acer\AppData\Local\Programs\Python\Python39\python.exe "C:/Users/acer/Desktop/python DSA/algorithm/maxSubArra
Input array: [-65, -3, 64, -12, -37, 91, 26, 6, 6, -33, -64, -68, 56, -14, 21, 27, -21, 43, 87, 1]
Maximum sum is: 200

Process finished with exit code 0
```

The screenshot shows a Python IDE interface. On the left, there is a sidebar with 'Structure' and 'Favorites' tabs. The main area displays the execution output of a Python script. The output shows the command used to run the script, the input array, the calculated maximum sum, and the exit code. At the bottom, there is a toolbar with buttons for 'Git', 'Run', 'TODO', 'Problems', 'Terminal', and 'Python Console'.

Merge Sort

Aim: Write a Python3 program to implement merge sort.

Filename: mergeSort.py

Code:

```
def mergeSort(array):
    if len(array) > 1:
        r = len(array)//2
        L = array[:r]
        M = array[r:]
        mergeSort(L)
        mergeSort(M)
        i = j = k = 0
        while i < len(L) and j < len(M):
            if L[i] < M[j]:
                array[k] = L[i]
                i += 1
            else:
                array[k] = M[j]
                j += 1
            k += 1
        while i < len(L):
```

```
array[k] = L[i]
```

```
i += 1
```

```
k += 1
```

```
while j < len(M):
```

```
    array[k] = M[j]
```

```
    j += 1
```

```
    k += 1
```

```
def printList(array):
```

```
    for i in range(len(array)):
```

```
        print(array[i], end=" ")
```

```
    print()
```

```
if __name__ == '__main__':
```

```
    array = [6, 5, 12, 10, 9, 1]
```

```
    mergeSort(array)
```

```
    print("Sorted array is: ")
```

```
    printList(array)
```

Output:-

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```
C:\Users\acer\AppData\Local\Programs\Python\Python39\python.exe "C:/Users/acer/Desktop/python DSA/algor
```

```
Sorted array is:
```

```
1 5 6 9 10 12
```

```
Process finished with exit code 0
```

Run TODO Problems Terminal Python Console