VIT - Vellore

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BCSE204P_VL2024250503141_Assessment_Set 1

BCSE204P_VL2024250503141_Midterm_Set 1

Attempt : 1
Total Mark : 10
Marks Obtained : 10

Section 1 : Coding

1. Problem Statement

Sarah is analyzing the sales performance of her store over a series of consecutive days. She wants to identify the best-performing period in terms of maximum total sales.

She also needs to calculate the average daily sales and list the sales figures for that period to understand the contributing factors. Help her to calculate all these values using the divide and conquer algorithm.

Example

Input:

5

-3 1 -1 5 6

Output:

```
11
5.50
[5, 6]
```

Explanation:

The array is divided into left [-3, 1, -1] and right [5, 6].

The left half's maximum subarray is [1] with a sum of 1.

The right half's maximum subarray is [5, 6] with a sum of 11.

The crossing subarray spanning both halves is [-1, 5] with a sum of 4.

The right half [5, 6] has the highest sum (11), so the result is Sum = 11, Average = 5.50, Subarray = [5,6].

Answer

```c
// You are using GCC
#include<stdio.h>
#include<limits.h>

struct Results{
   int sum,start,end;
};

struct Results FindMax(int arr[],int left,int right){
   if(left == right)
   return (struct Results){
      arr[left],left,right
   };

   int mid = (left + right) / 2;

   struct Results lr = FindMax(arr,left,mid);
   struct Results rr = FindMax(arr,mid + 1,right);

   int ls = 0,lm = INT_MIN,li = mid;
   for(int i = mid; i >=left;--i){
      ls += arr[i];
```

```
        if(ls > lm){
            lm = ls;
            li = i;
        }
    }

    int rs = 0, rm = INT_MIN,ri = mid + 1;
    for(int i = mid + 1; i <= right; ++i){
        rs += arr[i];

        if(rs > rm){
            rm = rs;
            ri = i;
        }
    }

    int cs = lm + rm;

    if(lr.sum >= rr.sum && lr.sum >= cs){
      return lr;
    }

    else if(rr.sum >= lr.sum && rr.sum >= cs){
        return rr;
    }
    else{
        return(struct Results){cs,li,ri};
    }


}

int main(){
    int N;
    scanf("%d",&N);
    int arr[N];

    for(int i = 0;i<N;i++){
        scanf("%d",&arr[i]);
    }
    struct Results res = FindMax(arr,0,N-1);
    printf("%d\n",res.sum);
    printf("%.2f\n",(double)res.sum / (res.end - res.start + 1));

    printf("[");
    for(int i = res.start; i<= res.end;i++)
    {
        printf("%d",arr[i]);
        if(i != res.end)
        printf(",");

    }
    printf("]\n\n");

    return 0;


}
```

Status : Correct ***Marks : 10/10***