

# DESIGN AND ANALYSIS OF ALGORITHMS – 2CS503

## Practical 4

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### 1. Maximum Sub Array

**Code:**

```
#include<stdio.h>
```

```
#include<stdlib.h>
```

```
int crossarray(int arr[], int low, int mid, int high)
```

```
{
```

```
    int sum = 0;
```

```
    int ls = 0;
```

```
    //left_max
```

```
    for(int i=mid; i>=low; i--)
```

```
    {
```

```
        sum = sum + arr[i];
```

```
        if(sum > ls)
```

```
            ls = sum;
```

```
}
```

```
//right_max
```

```
sum = 0;
```

```
int rs = 0;
```

```
for(int i = mid+1; i <= high; i++)
```

```
{
```

```
    sum = sum + arr[i];
```

```
    if(sum > rs)
```

```
        rs = sum;
```

```
}
```

```
int max = (ls>rs) ? (ls>(ls+rs)?ls:(ls+rs)) : (rs>(ls+rs)?rs:(ls+rs));
```

```
//return max(left_max,right_max, left_max+right_max)
```

```
return max;
```

```
}
```

```
int subarray(int arr[], int low, int high)
```

```
{
```

```
    if(low == high)
```

```
        return arr[low];
```

```
    int mid = (low + high)/2;
```

```
printf("%d->%d\n",arr[low],arr[high]);
```

```
int x = subarray(arr, low, mid);
```

```
int y = subarray(arr, mid+1, high);
```

```
int z = crossarray(arr, low, mid, high);
```

```
int max = (x>y) ? (x>z?x:z) : (y>z?y:z);
```

```
return max;
```

```
}
```

```
void main()
```

```
{
```

```
int size;
```

```
printf("Enter size of array : ");
```

```
scanf("%d",&size);
```

```
int arr[size];
```

```
//For random inputs
```

```
/*for (int i = 0; i<size; i++)
```

```
{
```

```
arr[i] = rand()%30 - 15;
```

```
*/
```

```
for (int i = 0; i<size; i++)
```

```
{
```

```
    printf("Enter a[%d] : ",i);
```

```
    scanf("%d",&arr[i]);
```

```
}
```

```
printf("\nArray is : ");
```

```
for (int i = 0; i<size; i++)
```

```
{
```

```
    printf("%d ",arr[i]);
```

```
}
```

```
printf("\n");
```

```
int mss = subarray(arr, 0, size-1);
```

```
printf("Max Sub Array is %d",mss);
```

```
}
```

## OUTPUT:

```
Enter size of array : 6
Enter a[0] : -1
Enter a[1] : 8
Enter a[2] : 0
Enter a[3] : -2
Enter a[4] : 1
Enter a[5] : -3

Array is : -1 8 0 -2 1 -3
-1->-3
-1->0
-1->8
-2->-3
-2->1
Max Sub Array is 8
Process returned 18 (0x12)   execution time : 25.710 s
Press any key to continue.
```