

## Competitive Programming

### Week3-5

#### Assignment-1(Monday)

##### Subset Sum Using Meet-in-the-Middle

###### Code:

```
import java.util.*;

class Main
{
    static void subset(int[] a, int idx, long sum, ArrayList<Long> list)
    {
        if (idx == a.length)
        {
            list.add(sum);
            return;
        }
        subset(a, idx + 1, sum, list);
        subset(a, idx + 1, sum + a[idx], list);
    }

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        int T = sc.nextInt();

        while (T-- > 0)
        {
            int N = sc.nextInt();

            long S = sc.nextLong();

            int[] arr = new int[N];

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

```

{
    arr[i] = sc.nextInt();
}

int mid = N / 2;

int[] left = Arrays.copyOfRange(arr, 0, mid);
int[] right = Arrays.copyOfRange(arr, mid, N);

ArrayList<Long> L = new ArrayList<>();
ArrayList<Long> R = new ArrayList<>();

subset(left, 0, 0, L);
subset(right, 0, 0, R);

Collections.sort(R);

boolean ok = false;

for (long x : L)
{
    if (Collections.binarySearch(R, S - x) >= 0)
    {
        ok = true;
        break;
    }
}

if(ok)
{
    System.out.println("YES");
}
else
{
    System.out.println("NO"); }}}

```

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```
1 - import java.util.*;
2 class Main
3 {
4     static void subset(int[] a, int idx, long sum, ArrayList<long> list)
5     {
6         if (idx == a.length)
7         {
8             list.add(sum);
9             return;
10        }
11        subset(a, idx + 1, sum, list);
12        subset(a, idx + 1, sum + a[idx], list);
13    }
14    public static void main(String[] args) {
15        Scanner sc = new Scanner(System.in);
16        int T = sc.nextInt();
17        while (T-- > 0)
18        {
19            int N = sc.nextInt();
20            long S = sc.nextLong();
21            int[] arr = new int[N];
22            for (int i = 0; i < N; i++)
23            {
24                arr[i] = sc.nextInt();
25            }
26            int mid = N / 2;
27            int[] left = Arrays.copyOfRange(arr, 0, mid);
28            int[] right = Arrays.copyOfRange(arr, mid, N);
29            ArrayList<long> L = new ArrayList<>();
30            ArrayList<long> R = new ArrayList<>();
31            subset(left, 0, 0, L);
32            subset(right, 0, 0, R);
33            Collections.sort(L);
34            Collections.sort(R);
35            boolean ok = false;
36            for (long x : L)
37            {
38                if (Collections.binarySearch(R, S - x) >= 0)
39                {
40                    ok = true;
41                    break;
42                }
43            }
44            if (ok)
45            {
46                System.out.println("YES");
47            }
48            else
49            {
50                System.out.println("NO");
51            }
52        }
53    }
54 }
```

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```
32 Collections.sort(R);
33 boolean ok = false;
34 for (long x : L)
35 {
36     if (Collections.binarySearch(R, S - x) >= 0)
37     {
38         ok = true;
39         break;
40     }
41 }
42 if (ok)
43 {
44     System.out.println("YES");
45 }
46 else
47 {
48     System.out.println("NO");
49 }
50 }
```

input

```
2
4 9
3 1 5 7
YES
5 10
2 4 6 8 1
YES
```

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