

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"); }}}}}
```

The screenshot shows the OnlineGDB interface. The left sidebar includes links for 'Create New Project', 'My Projects', 'Classroom', 'Learn Programming', 'Programming Questions', 'Opportunity for Intern', 'Upgrade', and 'Logout'. The main area displays Java code for a subset sum problem:

```
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(R);
34            boolean ok = false;
35            for (long x : L)
36            {
37                if (Collections.binarySearch(R, S - x) >= 0)
38                {
39                    ok = true;
40                }
41            }
42            if (ok)
43            {
44                System.out.println("YES");
45            }
46            else
47            {
48                System.out.println("NO");
49            }
50        }
51    }
52}
```

The bottom status bar shows system icons for battery, signal, and network, along with the date '09-02-2026'.

The screenshot shows the OnlineGDB web-based IDE. The left sidebar includes links for 'Welcome', 'Create New Project', 'My Projects', 'Classroom', 'Learn Programming', 'Programming Questions', 'Opportunity for Intern', 'Upgrade', and 'Logout'. A banner for 'auth0' is visible. The main workspace has tabs for 'Main.java' and 'input'. The 'Main.java' tab contains the following Java code:

```
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}
51}
52}
53}
54}
55}
```

The 'input' tab shows the following test cases:

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