

---

### Question 1:

Find missing term in a sequence in  $\log(n)$  time : Given a sequence of numbers such that the difference between the consecutive terms is constant, find missing term in it in  $O(\log(n))$  time. (Example: Input : [5, 7, 9, 11, 15], Output: 13)

```
1 //106119100
2 #include <bits/stdc++.h>
3 #include <iostream>
4 using namespace std;
5 int BalloonBurst(int A[], int N)
6 { // Add Bordering Balloons
7     int B[N + 2];
8     B[0] = 1;
9     B[N + 1] = 1;
10    for (int i = 1; i <= N; i++)
11        B[i] = A[i - 1];
12    // Declare DP Array
13    int dp[N + 2][N + 2];
14    memset(dp, 0, sizeof(dp));
15
16    for (int length = 1; length < N + 1; length++)
17    {
18        for (int left = 1; left < N - length + 2; left++)
19        {
20            int right = left + length - 1;
21            // For a sub-array from indices left, right
22            // This innermost loop finds the last balloon burst
23            for (int last = left; last < right + 1; last++)
24            {
25                dp[left][right] = max(dp[left][right], dp[left][last - 1] + B[left - 1] * B[last] * B[right + 1] + dp[last + 1][right]);
26            }
27        }
28    }
29    return dp[1][N];
30 }
31 // Driver code
32 int main()
33 {
34     int n;
35     cin >> n;
36     int array[n];
37     for (size_t i = 0; i < n; i++)
38     {
39         cin >> array[i];
40     }
41     // Calling function
42     cout << BalloonBurst(array, n) << endl;
43 }
```

```
43 }
44
```

5  
5 1 6 8 9

Copy

Run

Run+URL (Generates URL as well)

Time(sec) : 0

Memory(MB) : 3.3409324850464

Output:

Copy

786

Question2:

```
1 //106119100|
2
3 #include <bits/stdc++.h>
4 using namespace std;
5
6 int missing(int arr[],int n,int start,int end,int diff)
7 { int ans = -1;
8   while(start<=end)
9   {
10     int mid = (start + end) / 2;
11
12     if (arr[mid+1] - arr[mid] != diff)
13     {
14       ans = (arr[mid]+diff);
15       break;
16     }
17     else if (arr[mid] == (arr[start] + ((mid) - 1) * diff))
18       start = mid+1;
19     else if (arr[mid] != (arr[start] + ((mid) - 1) * diff))
20       end = mid-1;
21   }
22   return ans;
23 }
24
25 int main()
26 {
27   //taking the input 'n' and the difference of sequence 'd'
28   int n,d;
29   cin >> n >> d;
30   int array[n];
31   //taking input of sequence of array
32   for (int i = 1; i <= n; i++)
33     cin >> array[i];
34
35   int missing_term = missing(array,n,1,n,d);
36
37   cout<<missing_term<<endl;
38
39   return 0;
40 }
41
```

```
35   int missing_term = missing(array,n,1,n,d);
36
37   cout<<missing_term<<endl;
38
39   return 0;
40 }
41
```

52  
5 7 9 11 15

Copy

Run

Run+URL (Generates URL as well)

Run Program(Ctrl+Enter)

Time(sec) : 0

Memory(MB) : 3.3831462213135

Output:

Copy

13