

难度：1星：省三必会。2星：省二尽可能会，省一必会。3星：省一尽可能会。4星：国2以上要会

二分

整数二分（利用lowerbound+upperbound解题）：

模板：<https://www.lanqiao.cn/problems/18492/learning/>

最大通过数：<https://www.lanqiao.cn/problems/3346/learning/> 2星

第k小的和：<https://www.lanqiao.cn/problems/17098/learning/> 4星

123：<https://www.lanqiao.cn/problems/1591/learning/> 4星

二分模版

```
1  #include <iostream>
2
3  using namespace std;
4
5  const int N = 1e5 + 10;
6
7  int n, q;
8  int a[N];
9
10 int main()
11 {
12     cin >> n >> q;
13
14     for(int i = 1; i <= n; i++) cin >> a[i];
15
16     while(q --)
17     {
18         int l, r, x;
19         cin >> t >> l >> r >> x;
20         if(t == 1)
21         {
22             while(l < r)
23             {
24                 int mid = l + r >> 1;
25                 if(a[mid] >= x) r = mid;
26                 else l = mid + 1;
27             }
28             if(a[l] != x) cout << -1 << endl;
29             else cout << l << endl;
30         }
31         else if(t == 2)
32         {
33             while(l < r)
34             {
35                 int mid = l + r + 1 >> 1;
36                 if(a[mid] <= x) l = mid;
37                 else r = mid - 1;
38             }
39             if(a[l] != x) cout << -1 << endl;
```

```

40         else cout << 1 << endl;
41     }
42     else if(t == 3)
43     {
44         while(l < r)
45         {
46             int mid = l + r >> 1;
47             if(a[mid] >= x) r = mid;
48             else l = mid + 1;
49         }
50         if(a[l] < x) cout << -1 << endl;
51         else cout << 1 << endl;
52     }
53     else
54     {
55         while(l < r)
56         {
57             int mid = l + r >> 1;
58             if(a[mid] > x) r = mid;
59             else l = mid + 1;
60         }
61         if(a[l] <= x) cout << -1 << endl;
62         else cout << 1 << endl;
63     }
64 }
65 return 0;
66 }

```

```

1  import java.io.BufferedReader;
2  import java.io.IOException;
3  import java.io.InputStreamReader;
4  import java.io.PrintWriter;
5  import java.util.StringTokenizer;
6
7  public class Main {
8
9      public static void main(String[] args) {
10         int t=1;
11         while(t-->0) solve();
12
13         out.flush();
14     }
15     static int N=(int)(1e5+10);
16     static int a[]=new int[N];
17     static int n;
18     static int getL(int a[],int l,int r,int x){
19         while(l<r){
20             int mid=l+r>>1;
21             if(x<=a[mid]){
22                 r=mid;
23             }else{
24                 l=mid+1;
25             }
26         }
27         if(a[l]!=x) return -1;
28         return l;
29     }

```

```

30 static int getR(int a[],int l,int r,int x){
31     while(l<r){
32         int mid=l+r+1>>1;
33         if(x<a[mid]){
34             r=mid-1;
35         }else{
36             l=mid;
37         }
38     }
39     if(a[l]!=x) return -1;
40     return l;
41 }
42 static int lower_bound(int a[],int l,int r,int x){
43     if(a[r]<x) return -1;
44     while(l<r){
45         int mid=l+r>>1;
46         if(x<=a[mid]){
47             r=mid;
48         }else{
49             l=mid+1;
50         }
51     }
52     return l;
53 }
54 static int upper_bound(int a[],int l,int r,int x){
55     if(a[r]<=x) return -1;
56     while(l<r){
57         int mid=l+r>>1;
58         if(x<a[mid]){
59             r=mid;
60         }else{
61             l=mid+1;
62         }
63     }
64     return l;
65 }
66 static void solve(){
67     n=in.nextInt();
68     int q=in.nextInt();
69     for(int i=1;i<=n;i++){
70         a[i]=in.nextInt();
71     }
72     while(q-->0){
73         int op=in.nextInt();
74         int l=in.nextInt();
75         int r=in.nextInt();
76         int x=in.nextInt();
77         if(op==1){
78             out.println(getL(a,l,r,x));
79         }else if(op==2){
80             out.println(getR(a,l,r,x));
81         }else if(op==3){
82             out.println(lower_bound(a,l,r,x));
83         }else{
84             out.println(upper_bound(a,l,r,x));
85         }
86     }
87 }

```

```

88     static FastReader in = new FastReader();
89     static PrintWriter out=new PrintWriter(System.out);
90     static class FastReader{
91         static BufferedReader br;
92         static StringTokenizer st;
93         FastReader(){
94             br=new BufferedReader(new InputStreamReader(System.in));
95         }
96         String next(){
97             String str="";
98             while(st==null||!st.hasMoreElements()){
99                 try {
100                     str=br.readLine();
101                 } catch (IOException e) {
102                     throw new RuntimeException(e);
103                 }
104                 st=new StringTokenizer(str);
105             }
106             return st.nextToken();
107         }
108         int nextInt(){
109             return Integer.parseInt(next());
110         }
111         double nextDouble(){
112             return Double.parseDouble(next());
113         }
114         long nextLong(){
115             return Long.parseLong(next());
116         }
117     }
118 }

```

```

1  def main():
2      import sys
3      input = sys.stdin.read
4      data = input().split()
5
6      idx = 0
7      n = int(data[idx])
8      q = int(data[idx + 1])
9      idx += 2
10
11     a = [0] * (n + 1)
12     for i in range(1, n + 1):
13         a[i] = int(data[idx])
14         idx += 1
15
16     for _ in range(q):
17         t = int(data[idx])
18         l = int(data[idx + 1])
19         r = int(data[idx + 2])
20         x = int(data[idx + 3])
21         idx += 4
22
23         if t == 1:
24             while l < r:
25                 mid = (l + r) // 2

```

```

26         if a[mid] >= x:
27             r = mid
28         else:
29             l = mid + 1
30         if a[l] != x:
31             print(-1)
32         else:
33             print(1)
34     elif t == 2:
35         while l < r:
36             mid = (l + r + 1) // 2
37             if a[mid] <= x:
38                 l = mid
39             else:
40                 r = mid - 1
41         if a[l] != x:
42             print(-1)
43         else:
44             print(1)
45     elif t == 3:
46         while l < r:
47             mid = (l + r) // 2
48             if a[mid] >= x:
49                 r = mid
50             else:
51                 l = mid + 1
52         if a[l] < x:
53             print(-1)
54         else:
55             print(1)
56     elif t == 4:
57         while l < r:
58             mid = (l + r) // 2
59             if a[mid] > x:
60                 r = mid
61             else:
62                 l = mid + 1
63         if a[l] <= x:
64             print(-1)
65         else:
66             print(1)
67
68 if __name__ == "__main__":
69     main()

```

最大通过数

```

1  #include<bits/stdc++.h>
2  using namespace std;
3  #define int long long
4  const int N=2e5+5;
5  int a[N],b[N];
6  signed main()
7  {
8      ios::sync_with_stdio(0),cin.tie(0),cout.tie(0);
9      int n,m,k;
10     cin>>n>>m>>k;

```

```

11     for(int i=1;i<=n;i++)
12     {
13         cin>>a[i];
14         a[i]+=a[i-1];
15     }
16     for(int i=1;i<=m;i++)
17     {
18         cin>>b[i];
19         b[i]+=b[i-1];
20     }
21     int ans=0;
22     for(int i=0;i<=n;i++)
23     {
24         if(a[i]>k)
25             break;
26         int x=upper_bound(b,b+1+m,k-a[i])-b-1;
27         ans=max(i+x,ans);
28     }
29     cout<<ans;
30     return 0;
31 }

```

```

1  import java.util.*;
2
3  public class Main {
4      public static void main(String[] args) {
5          Scanner sc = new Scanner(System.in);
6          int n = sc.nextInt(), m = sc.nextInt(), k = sc.nextInt();
7
8          long[] a = new long[n + 1];
9          long[] b = new long[m + 1];
10
11         for (int i = 1; i <= n; i++) {
12             a[i] = sc.nextLong() + a[i - 1];
13         }
14
15         for (int i = 1; i <= m; i++) {
16             b[i] = sc.nextLong() + b[i - 1];
17         }
18
19         int ans = 0;
20         for (int i = 0; i <= n; i++) {
21             if (a[i] > k) break;
22             int x = upperBound(b, k - a[i]) - 1;
23             ans = Math.max(i + x, ans);
24         }
25
26         System.out.println(ans);
27         sc.close();
28     }
29
30     private static int upperBound(long[] arr, long key) {
31         int left = 0, right = arr.length;
32         while (left < right) {
33             int mid = (left + right) / 2;
34             if (arr[mid] <= key) left = mid + 1;
35             else right = mid;

```

```
36     }
37     return left;
38 }
39 }
40
```

```
1  import bisect
2
3  n, m, k = map(int, input().split())
4  a = [0] + list(map(int, input().split()))
5  b = [0] + list(map(int, input().split()))
6
7  # 前缀和计算
8  for i in range(1, n + 1):
9      a[i] += a[i - 1]
10 for i in range(1, m + 1):
11     b[i] += b[i - 1]
12
13 ans = 0
14 for i in range(n + 1):
15     if a[i] > k:
16         break
17     x = bisect.bisect_right(b, k - a[i]) - 1
18     ans = max(i + x, ans)
19
20 print(ans)
21
```