

专题6

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1001 敌兵布阵

AC代码

```
1  #include<bits/stdc++.h>
2  using namespace std;
3  int c[50010];
4  int n;
5  string s;
6  int lowbit(int x)
7  {
8      return x & -x;
9  }
10 int sum(int i)
11 {
12     int ret = 0;
13     while (i > 0) {
14         ret += c[i];
15         i -= lowbit(i);
16     }
17     return ret;
18 }
19 void update(int i, int val)
20 {
21     while (i <= n) {
22         c[i] += val;
```

```

23         i += lowbit(i);
24     }
25 }
26 void solve()
27 {
28     cin >> n;
29     memset(c)
30     for (int i = 1; i <= n; i++) {
31         int temp;
32         cin >> temp;
33         update(i, temp);
34     }
35     while (cin >> s, s != "End") {
36         if (s == "Query") {
37             int a, b;
38             cin >> a >> b;
39             cout << sum(b) - sum(a - 1) << endl;
40         }
41         else if (s == "Add") {
42             int a, plus;
43             cin >> a >> plus;
44             update(a, plus);
45         }
46         else if (s == "Sub") {
47             int b, mus;
48             cin >> b >> mus;
49             update(b, -mus);
50         }
51     }
52 }
53 int main()
54 {
55     ios::sync_with_stdio(false);
56     cin.tie(0); cout.tie(0);
57     int tt;
58     cin >> tt;
59     for (int i = 1; i <= tt; i++) {
60         cout << "Case " << i << ":" << endl;
61         solve();
62     }
63     return 0;
64 }

```

1002 Color the ball

AC代码

```

1  #include<bits/stdc++.h>
2  using namespace std;
3  typedef long long ll;
4  int n;
5  int c[100010];
6  void add(int p, int x)
7  {

```

```

8     while (p <= n) c[p] += x, p += p & -p;
9 }
10 void range_add(int l, int r, int x)
11 {
12     add(l, x), add(r + 1, -x);
13 }
14 int ask(int p)
15 {
16     int res = 0;
17     while (p) res += c[p], p -= p & -p;
18     return res;
19 }
20 void solve()
21 {
22     memset(c, 0, sizeof(c));
23     for (int i = 1; i <= n; i++) {
24         int a, b;
25         cin >> a >> b;
26         range_add(a, b, 1);
27     }
28     for (int i = 1; i <= n-1; i++)
29         cout << ask(i) << " ";
30     cout << ask(n) << endl;
31 }
32 int main()
33 {
34     ios::sync_with_stdio(false);
35     cin.tie(0); cout.tie(0);
36     while(cin>>n,n)solve();
37     return 0;
38 }

```

1003 Frosh Week

AC代码

```

1  #include<bits/stdc++.h>
2  using namespace std;
3  typedef long long ll;
4  int c[1000010];
5  int n;
6  struct node
7  {
8      int num;
9      int id;
10 }t[1000005];
11
12 bool cmp(const node& x, const node& y)
13 {
14     return x.num < y.num;
15 }
16
17 int lowbit(int x)
18 {

```

```

19     return x & -x;
20 }
21 ll sum(int i)
22 {
23     ll ret = 0;
24     while (i > 0) {
25         ret += c[i];
26         i -= lowbit(i);
27     }
28     return ret;
29 }
30 void update(int i, int val)
31 {
32     while (i <= n) {
33         c[i] += val;
34         i += lowbit(i);
35     }
36 }
37 void solve()
38 {
39     while (cin >> n) {
40         memset(c, 0, sizeof(c));
41         ll su = 0;
42         for (int i = 1; i <= n; i++) {
43             cin >> t[i].num;
44             t[i].id = i;
45         }
46         sort(t + 1, t + n + 1, cmp);
47         for (int i = 1; i <= n; i++) {
48             update(t[i].id, 1);
49             su += (sum(n) - sum(t[i].id));
50         }
51         cout << su << endl;
52     }
53 }
54 int main()
55 {
56     ios::sync_with_stdio(false);
57     cin.tie(0); cout.tie(0);
58     solve();
59     return 0;
60 }

```

1004 See you~

AC代码

```

1  #include<bits/stdc++.h>
2  using namespace std;
3  typedef long long ll;
4  int c[1010][1010];
5  int mp[1010][1010];
6  int lowbit(int x){return x & -x;}
7  ll sum(int x,int y)

```

```

8  {
9      ll ret = 0;
10     int t;
11     while (x > 0) {
12         t = y;
13         while (t > 0) {
14             ret += c[x][t];
15             t -= lowbit(t);
16         }
17         x -= lowbit(x);
18     }
19     return ret;
20 }
21 void update(int x, int y, int val)
22 {
23     int t;
24     while (x <= 1001) {
25         t = y;
26         while (t <= 1001) {
27             c[x][t] += val;
28             t += lowbit(t);
29         }
30         x += lowbit(x);
31     }
32 }
33 void solve()
34 {
35     memset(c, 0, sizeof(c));
36     int q;
37     int x1,x2,y1,y2, n1;
38     cin >> q;
39     for (int i = 1; i <= 1001; i++)
40     {
41         for (int j = 1; j <= 1001; j++)
42         {
43             mp[i][j] = 1;
44             update(i, j, 1);
45         }
46     }
47     while (q--) {
48         string s;
49         cin >> s;
50         if (s == "S") {
51             cin >> x1 >> y1 >> x2 >> y2;
52             x1++, x2++, y1++, y2++;
53             if (x1 > x2) swap(x1, x2);
54             if (y1 > y2) swap(y1, y2);
55             cout << sum(x2, y2) + sum(x1 - 1, y1 - 1) - sum(x1 - 1, y2) -
sum(x2, y1 - 1) << endl;
56         }
57         else if (s == "A") {
58             cin >> x1 >> y1 >> n1;
59             x1++, y1++;
60             mp[x1][y1] += n1;
61             update(x1, y1, n1);
62         }
63         else if (s == "D") {
64             cin >> x1 >> y1 >> n1;

```

```

65         x1++, y1++;
66         if (mp[x1][y1] < n1) n1 = mp[x1][y1], mp[x1][y1] = 0;
67         else mp[x1][y1] -= n1;
68         update(x1, y1, -n1);
69     }
70     else {
71         cin >> x1 >> y1 >> x2 >> y2 >> n1;
72         x1++, y1++, x2++, y2++;
73         if (mp[x1][y1] < n1) n1 = mp[x1][y1], mp[x1][y1] = 0;
74         else mp[x1][y1] -= n1;
75         mp[x2][y2] += n1;
76         update(x1, y1, -n1);
77         update(x2, y2, n1);
78     }
79 }
80
81 }
82 int main()
83 {
84     ios::sync_with_stdio(false);
85     cin.tie(0); cout.tie(0);
86     int tt;
87     cin >> tt;
88     for (int i = 1; i <= tt; i++) {
89         cout << "Case " << i << ":"<<endl;
90         solve();
91     }
92     return 0;
93 }

```

1005 Stars

AC代码

```

1  #include<bits/stdc++.h>
2  using namespace std;
3
4  int n;
5  int level[32005];
6  int c[32005];
7  int sum(int x)
8  {
9      int s = 0;
10     while (x > 0)
11     {
12         s = s + c[x];
13         x = x - (x & (-x));
14     }
15     return s;
16 }
17 void update(int x,int val)
18 {
19     while (x <=32001){
20         c[x] = c[x] + val;

```

```

21         x = x + (x & (-x));
22     }
23 }
24 void solve()
25 {
26     memset(c, 0, sizeof(c));
27     memset(level, 0, sizeof(level));
28     for (int i = 0; i < n; i++)
29     {
30         int x, y;
31         cin >> x >> y;
32         x++;
33         level[sum(x)]++;
34         update(x,1);
35     }
36     for (int i = 0; i < n; i++)
37         cout << level[i] << endl;
38 }
39 int main()
40 {
41     ios::sync_with_stdio(false);
42     cin.tie(0); cout.tie(0);
43     while (cin >> n)solve();
44     return 0;
45 }

```

1006 I Hate It

AC代码

```

1  #include<bits/stdc++.h>
2  using namespace std;
3
4  int lowerBit(int x) { return (x & (-x)); }
5  int num[200005], a[200005];
6  int n, m;
7  void Update(int x, int y)
8  {
9      a[x] = y;
10     while (x <= n)
11     {
12         num[x] = max(num[x], y);
13         x += lowerBit(x);
14     }
15 }
16 int ask(int x, int y)
17 {
18     int res = a[y];
19     while (x != y)
20     {
21         for (y -= 1; y - x >= lowerBit(y); y -= lowerBit(y))
22         {
23             res = max(res, num[y]);
24         }
25     }
26 }

```

```

25         res = max(res, a[y]);
26     }
27     return res;
28 }
29
30 void solve()
31 {
32     while (cin>>n>>m){
33         memset(num, 0, sizeof(num));
34         for (int i = 1; i <= n; i++)
35         {
36             int t;
37             cin >> t;
38             Update(i, t);
39         }
40         string t;
41         for (int i = 1; i <= m; i++)
42         {
43             cin >> t;
44             if (t == "U")
45             {
46                 int c, b;
47                 cin >> c >> b;
48                 Update(c, b);
49             }
50             if (t == "Q")
51             {
52                 int c, b;
53                 cin >> c >> b;
54                 int ans = 0;
55                 cout << ask(c, b) << endl;
56             }
57         }
58     }
59 }
60
61 int main()
62 {
63     ios::sync_with_stdio(false);
64     cin.tie(0); cout.tie(0);
65     solve();
66     return 0;
67 }

```

1007 A Simple Problem with integers

AC代码

```

1  #include <bits/stdc++.h>
2  using namespace std;
3  const int MAXN = 50010;
4  int cl[MAXN][11][11], a[MAXN];
5  int n, q;
6

```



```

7 void add(int a, int k, int c) {
8     int i = a, temp;
9     while (i <= n) {
10         temp = (i - a) % k;
11         if (temp == 0) temp = k;
12         cl[i][k][temp] += c;
13         i += i & -i;
14     }
15 }
16 int sum(int a) {
17     int i = a;
18     int ans = 0;
19     while (i) {
20         for (int j = 1; j < 11; j++)
21             ans += cl[i][j][j - (a - i) % j];
22         i -= i & -i;
23     }
24     return ans;
25 }
26 int main() {
27     ios::sync_with_stdio(false);
28     cin.tie(0); cout.tie(0);
29     int k, l, r, c;
30     while (cin >> n) {
31         for (int i = 1; i <= n; i++)
32             cin >> a[i];
33         memset(cl, 0, sizeof(cl));
34         cin >> q;
35         while (q--) {
36             int i;
37             cin >> i;
38             if (i == 1) {
39                 cin >> l >> r >> k >> c;
40                 add(l, k, c);
41                 add((r - l) / k * k + l + k, k, -c);
42             }
43             else {
44                 cin >> i;
45                 cout << sum(i) + a[i] << endl;
46             }
47         }
48     }
49     return 0;
50 }

```

1008 Just a Hook

AC代码

```

1 #include<bits/stdc++.h>
2 using namespace std;
3 const int maxn = 1e5 + 5;
4 typedef long long ll;
5 int sum[maxn << 2];

```

```

6   int a[maxn << 2];
7
8   void pu(int rt)
9   {
10      sum[rt] = sum[rt << 1] + sum[rt << 1 | 1];
11  }
12  void bd(int l, int r, int rt)
13  {
14      a[rt] = 0;
15      if (r == l) {
16          sum[rt] = 1;
17          return;
18      }
19      int m = (l + r) >> 1;
20      bd(l, m, rt << 1);
21      bd(m + 1, r, rt << 1 | 1);
22      pu(rt);
23  }
24  void pd(int rt, int l, int r)
25  {
26      if (a[rt]) {
27          int m = (l + r) >> 1;
28          a[rt << 1] = a[rt << 1 | 1] = a[rt];
29          sum[rt << 1] = (m - l + 1) * a[rt];
30          sum[rt << 1 | 1] = (r - m) * a[rt];
31          a[rt] = 0;
32      }
33  }
34  void update(int x, int y, int k, int l, int r, int rt)
35  {
36      if (x <= l && y >= r) {
37          a[rt] = k;
38          sum[rt] = k * (r - l + 1);
39          return;
40      }
41      int m = (l + r) >> 1;
42      pd(rt, l, r);
43      if (x <= m) update(x, y, k, l, m, rt << 1);
44      if (m + 1 <= y) update(x, y, k, m + 1, r, rt << 1 | 1);
45      pu(rt);
46  }
47  int qu(int x, int y, int l, int r, int rt)
48  {
49      if (x <= l && y >= r)
50          return sum[rt];
51      pd(rt, l, r);
52      int m = (l + r) >> 1;
53      return qu(x, y, l, m, rt << 1) + qu(x, y, m + 1, r, rt << 1 | 1);
54  }
55  int main()
56  {
57      ios::sync_with_stdio(false);
58      cin.tie(0); cout.tie(0);
59      int tt;
60      int n, q;
61      cin >> tt;
62      int cnt = 0;
63      while (tt--) {

```

```

64         cin >> n >> q;
65         int x, y, z;
66         bd(1, n, 1);
67         while (q--) {
68             cin >> x >> y >> z;
69             update(x, y, z, 1, n, 1);
70         }
71         cout << "Case " << ++cnt << ": The total value of the hook is ";
72         cout << qu(1, n, 1, n, 1) << ".\n";
73     }
74     return 0;
75 }

```

1009 LCIS

AC代码

```

1  #include<bits/stdc++.h>
2  using namespace std;
3  typedef long long ll;
4  const int maxn = 1e5 + 5;
5
6  struct node {
7      int lnum, rnum, lcnt, rcnt, ncnt;
8  }s[maxn<<2];
9  void pu(int rt, int m)
10 {
11     s[rt].lnum = s[rt << 1].lnum;
12     s[rt].rnum = s[rt << 1 | 1].rnum;
13     s[rt].lcnt = s[rt << 1].lcnt;
14     s[rt].rcnt = s[rt << 1 | 1].rcnt;
15     s[rt].ncnt = max(s[rt << 1].ncnt, s[rt << 1 | 1].ncnt);
16
17     if (s[rt << 1].rnum < s[rt << 1 | 1].lnum) {
18         if (s[rt << 1].lcnt == m - (m >> 1))
19             s[rt].lcnt += s[rt << 1 | 1].lcnt;
20         if (s[rt << 1 | 1].rcnt == (m >> 1))
21             s[rt].rcnt += s[rt << 1].rcnt;
22         s[rt].ncnt = max(s[rt].ncnt, s[rt << 1].rcnt + s[rt << 1 | 1].lcnt);
23     }
24 }
25 void bd(int l, int r, int rt)
26 {
27     s[rt].lcnt = s[rt].rcnt = s[rt].ncnt = 1;
28     if (l == r) {
29         cin >> s[rt].lnum;
30         s[rt].rnum = s[rt].lnum;
31         return;
32     }
33     int m = (l + r) >> 1;
34     bd(l, m, rt << 1);
35     bd(m + 1, r, rt << 1 | 1);
36     pu(rt, r - l + 1);
37 }

```

```

38 void update(int id, int v, int l, int r, int rt)
39 {
40     if (l == r) {
41         s[rt].rnum = s[rt].lnum = v;
42         s[rt].lcnt = s[rt].rcnt = s[rt].ncnt = 1;
43         return;
44     }
45     int m = (l + r) >> 1;
46     if (id <= m) update(id, v, l, m, rt << 1);
47     if (id > m) update(id, v, m + 1, r, rt << 1 | 1);
48     pu(rt, r - l + 1);
49 }
50 int qu(int L, int R, int l, int r, int rt)
51 {
52     if (L <= l && R >= r)
53         return s[rt].ncnt;
54     int m = (l + r) >> 1;
55     int ans = 0;
56     if (L <= m)
57         ans = max(ans, qu(L, R, l, m, rt << 1));
58     if (R > m)
59         ans = max(ans, qu(L, R, m + 1, r, rt << 1 | 1));
60     if (s[rt << 1].rnum < s[rt << 1 | 1].lnum)
61         ans = max(ans, min(m - L + 1, s[rt << 1].rcnt) + min(R - m, s[rt <<
1 | 1].lcnt));
62     return ans;
63 }
64 int main()
65 {
66     ios::sync_with_stdio(false);
67     cin.tie(0); cout.tie(0);
68     int tt;
69     cin >> tt;
70     while (tt--) {
71         int n, q, x, y;
72         cin >> n >> q;
73         bd(1, n, 1);
74         while (q--) {
75             string s;
76             cin >> s >> x >> y;
77             if (s == "Q") cout << qu(x + 1, y + 1, 1, n, 1) << endl;
78             if (s == "U") update(x + 1, y, 1, n, 1);
79         }
80     }
81     return 0;
82 }

```

1010 Successor

