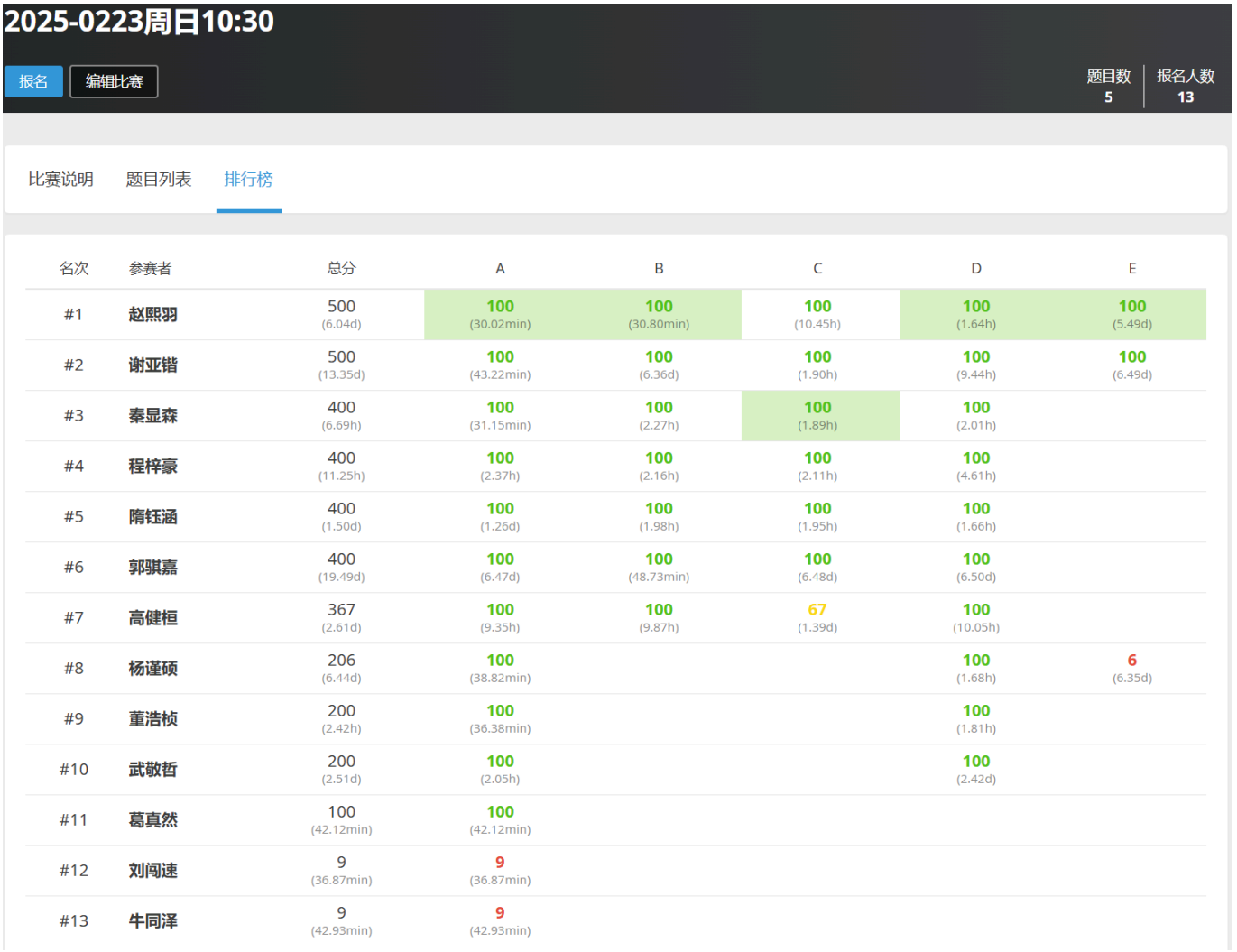
二分查找

人员

程梓豪、隋钰涵、赵熙羽、高健桓、杨瑾硕、谢亚锴、牛同泽、葛真然、董浩桢、秦显森、郭骐嘉、夏志赫、刘闯速 到课, 武敬哲 线上

上周作业检查

https://www.luogu.com.cn/contest/232403



2025-0223周日10:30

报名 编辑比赛 题目数 5 报名人数 13

比赛说明 题目列表 排行榜

名次	参赛者	总分	A	B	C	D	E
#1	赵熙羽	500 (6.04d)	100 (30.02min)	100 (30.80min)	100 (10.45h)	100 (1.64h)	100 (5.49d)
#2	谢亚锴	500 (13.35d)	100 (43.22min)	100 (6.36d)	100 (1.90h)	100 (9.44h)	100 (6.49d)
#3	秦显森	400 (6.69h)	100 (31.15min)	100 (2.27h)	100 (1.89h)	100 (2.01h)	
#4	程梓豪	400 (11.25h)	100 (2.37h)	100 (2.16h)	100 (2.11h)	100 (4.61h)	
#5	隋钰涵	400 (1.50d)	100 (1.26d)	100 (1.98h)	100 (1.95h)	100 (1.66h)	
#6	郭骐嘉	400 (19.49d)	100 (6.47d)	100 (48.73min)	100 (6.48d)	100 (6.50d)	
#7	高健桓	367 (2.61d)	100 (9.35h)	100 (9.87h)	67 (1.39d)	100 (10.05h)	
#8	杨谨硕	206 (6.44d)	100 (38.82min)			100 (1.68h)	6 (6.35d)
#9	董浩桢	200 (2.42h)	100 (36.38min)			100 (1.81h)	
#10	武敬哲	200 (2.51d)	100 (2.05h)			100 (2.42d)	
#11	葛真然	100 (42.12min)	100 (42.12min)				
#12	刘闯速	9 (36.87min)	9 (36.87min)				
#13	牛同泽	9 (42.93min)	9 (42.93min)				

作业

https://www.luogu.com.cn/contest/233728 (课上讲了 A~C 题, 课后作业是 D 题)

课堂表现

今天课上讲的二分查找并不难, 但是lower_bound和upper_bound, 如果同学们不能做到熟练掌握的话, 很容易用错。

同学们课下要多花一点时间, 搞清楚 2 个的区别。

课堂内容

P2919 [USACO08NOV] Guarding the Farm S

```
#include <bits/stdc++.h>

using namespace std;

const int N = 700 + 5, M = 10000 + 5;
int w[N][N];
struct node {
  int x, y;
};
vector<node> vec[M];
bool f[N][N];
int n, m;
int dx[] = {-1, -1, -1, 0, 0, 1, 1, 1};
int dy[] = {-1, 0, 1, -1, 1, -1, 0, 1};

void dfs(int x, int y) {
  if (f[x][y]) return;
  f[x][y] = true;
  for (int i = 0; i < 8; ++i) {
    int nx = x+dx[i], ny = y+dy[i];
    if (nx>=1 && nx<=n && ny>=1 && ny<=m && w[nx][ny] && w[nx][ny]<=w[x][y])
dfs(nx, ny);
  }
}

int main()
{
  cin >> n >> m;
  for (int i = 1; i <= n; ++i) {
    for (int j = 1; j <= m; ++j) {
      cin >> w[i][j]; vec[w[i][j]].push_back({i,j});
    }
  }

  int res = 0;
  for (int i = M-1; i >= 1; --i) {
    for (node it : vec[i]) {
      int x = it.x, y = it.y;
      if (f[x][y]) continue;
      ++res; dfs(x, y);
    }
  }
  cout << res << endl;
  return 0;
}
```

P2249 【深基13.例1】查找

```cpp
#include <bits/stdc++.h>

using namespace std;

const int maxn = 1e6 + 5;
int w[maxn];

int main()
{
    int n, t; cin >> n >> t;
    for (int i = 1; i <= n; ++i) cin >> w[i];

    while (t -- ) {
        int x; cin >> x;
        int pos = lower_bound(w+1, w+n+1, x) - w;
        cout << (w[pos]==x ? pos : -1) << " ";
    }

    return 0;
}
```

T476464 简简单单的二分查找模板检测

```cpp
#include <bits/stdc++.h>

using namespace std;

const int maxn = 666666 + 5;
int w[maxn];

void solve() {
    int n; cin >> n;
    for (int i = 1; i <= n; ++i) cin >> w[i];

    int t; cin >> t;
    while (t -- ) {
        int x; cin >> x;
        int low = lower_bound(w+1, w+n+1, x) - w;
        int up = upper_bound(w+1, w+n+1, x) - w;
        // 1 ~ n+1
        if (low == 1) cout << -1 << " ";
        else cout << low-1 << " ";

        if (w[low] == x) cout << low << " ";
        else cout << -1 << " ";

        if (w[up-1] == x) cout << up-1 << " ";
        else cout << -1 << " ";

        if (up == n+1) cout << -1 << " ";
```

```
        else cout << up << " ";

        cout << endl;
    }
}

int main()
{
    int T; cin >> T;
    while (T -- ) solve();
    return 0;
}
```

AT_abc360_d [ABC360D] Ghost Ants

```
#include <bits/stdc++.h>

using namespace std;

typedef long long LL;
const int maxn = 2e5 + 5;
char s[maxn];
int w[maxn];
vector<LL> vec[2];

int calc(LL l, int r) {
  int lpos = lower_bound(vec[1].begin(), vec[1].end(), l) - vec[1].begin();
  int rpos = upper_bound(vec[1].begin(), vec[1].end(), r) - vec[1].begin() - 1;
  return rpos - lpos + 1;
}

int main()
{
  int n, t; cin >> n >> t;
  cin >> (s+1);
  for (int i = 1; i <= n; ++i) {
    cin >> w[i]; vec[s[i]-'0'].push_back(w[i]);
  }

  sort(vec[1].begin(), vec[1].end());

  LL res = 0;
  for (LL i : vec[0]) res += calc(i-2*t, i-1);
  cout << res << endl;
  return 0;
}
```