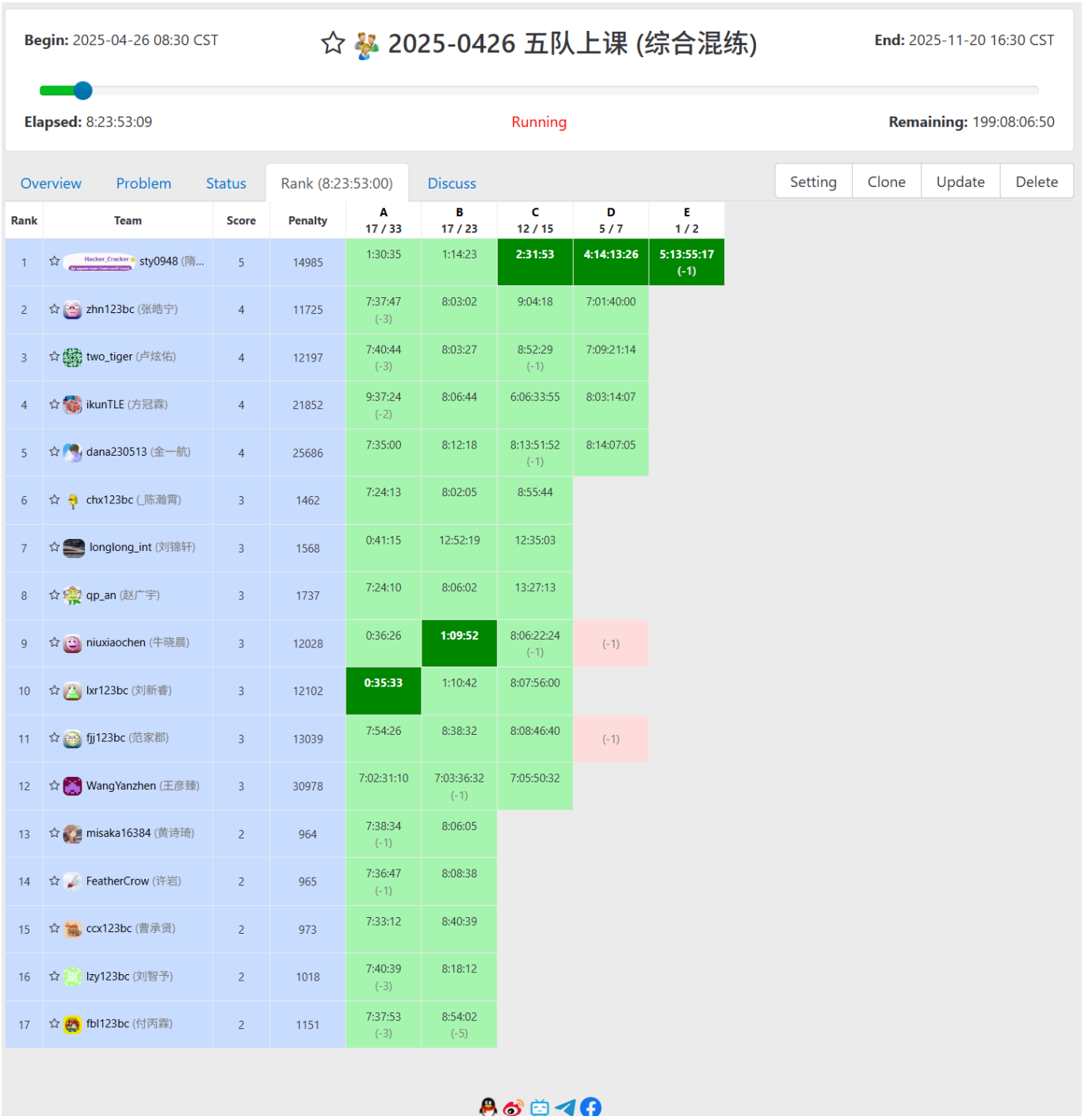
# 综合混练

## 人员

隋天翼、刘新睿、牛晓晨、刘锦轩、方冠霖、范家郡 到课, 刘智予 线上

## 上周作业检查

上周作业链接: https://vjudge.net/contest/712438



**Begin:** 2025-04-26 08:30 CST ☆ 2025-0426 五队上课 (综合混练) **End:** 2025-11-20 16:30 CST

**Elapsed:** 8:23:53:09 Running **Remaining:** 199:08:06:50

Overview Problem Status Rank (8:23:53:00) Discuss Setting Clone Update Delete

| Rank | Team | Score | Penalty | A 17 / 33 | B 17 / 23 | C 12 / 15 | D 5 / 7 | E 1 / 2 |
|---|---|---|---|---|---|---|---|---|
| 1 | ☆ sty0948 (隋... | 5 | 14985 | 1:30:35 | 1:14:23 | **2:31:53** | **4:14:13:26** | **5:13:55:17 (-1)** |
| 2 | ☆ zhn123bc (张皓宁) | 4 | 11725 | 7:37:47 (-3) | 8:03:02 | 9:04:18 | 7:01:40:00 | |
| 3 | ☆ two_tiger (卢炫佑) | 4 | 12197 | 7:40:44 (-3) | 8:03:27 | 8:52:29 (-1) | 7:09:21:14 | |
| 4 | ☆ ikunTLE (方冠霖) | 4 | 21852 | 9:37:24 (-2) | 8:06:44 | 6:06:33:55 | 8:03:14:07 | |
| 5 | ☆ dana230513 (金一航) | 4 | 25686 | 7:35:00 | 8:12:18 | 8:13:51:52 (-1) | 8:14:07:05 | |
| 6 | ☆ chx123bc (_陈瀚霄) | 3 | 1462 | 7:24:13 | 8:02:05 | 8:55:44 | | |
| 7 | ☆ longlong_int (刘锦轩) | 3 | 1568 | 0:41:15 | 12:52:19 | 12:35:03 | | |
| 8 | ☆ qp_an (赵广宇) | 3 | 1737 | 7:24:10 | 8:06:02 | 13:27:13 | | |
| 9 | ☆ niuxiaochen (牛晓晨) | 3 | 12028 | 0:36:26 | **1:09:52** | 8:06:22:24 (-1) | (-1) | |
| 10 | ☆ lxr123bc (刘新睿) | 3 | 12102 | **0:35:33** | 1:10:42 | 8:07:56:00 | | |
| 11 | ☆ fjj123bc (范家郡) | 3 | 13039 | 7:54:26 | 8:38:32 | 8:08:46:40 | (-1) | |
| 12 | ☆ WangYanzhen (王彦臻) | 3 | 30978 | 7:02:31:10 | 7:03:36:32 (-1) | 7:05:50:32 | | |
| 13 | ☆ misaka16384 (黄诗琦) | 2 | 964 | 7:38:34 (-1) | 8:06:05 | | | |
| 14 | ☆ FeatherCrow (许岩) | 2 | 965 | 7:36:47 (-1) | 8:08:38 | | | |
| 15 | ☆ ccx123bc (曹承贤) | 2 | 973 | 7:33:12 | 8:40:39 | | | |
| 16 | ☆ lzy123bc (刘智予) | 2 | 1018 | 7:40:39 (-3) | 8:18:12 | | | |
| 17 | ☆ fbl123bc (付丙霖) | 2 | 1151 | 7:37:53 (-3) | 8:54:02 (-5) | | | |

## 作业

https://vjudge.net/contest/714711 (课上讲了 A ~ C 这些题, 课后作业是 D E 题)

# 课堂表现

同学们之前题目的补题表现整体都比较好, 上课听讲也都很认真。

# 课堂内容

### CF1856C To Become Max

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

using namespace std;

const int maxn = 1000 + 5;
int w[maxn];

bool dfs(int n, int pos, int k, int value) {  // 是否能 <=k 次把 w[pos] 变成 value
  if (k < 0) return false;
  if (w[pos] >= value) return true;
  if (pos == n) return false;

  if (dfs(n, pos+1, k-(value-w[pos]), value-1)) return true;
  return false;
}

bool check(int n, int k, int mid) {
  for (int i = 1; i <= n; ++i) {
    if (dfs(n, i, k, mid)) return true;
  }
  return false;
}

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

  int l = 1, r = 2e8;
  while (l <= r) {
    int mid = (l + r) / 2;
    if (check(n, k, mid)) l = mid+1;
    else r = mid-1;
  }

//  cout << "------------------ ";
  cout << r << endl;
}

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

```
  return 0;
}
```

### CF1286B Numbers on Tree

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

using namespace std;

const int maxn = 2000 + 5;
vector<int> vec[maxn];
int w[maxn], sz[maxn];

bool dfs(int u, int fa) {
  sz[u] = 1;
  for (int i : vec[u]) {
    if (i == fa) continue;
    if (!dfs(i, u)) return false;
    sz[u] += sz[i];
  }

  if (w[u] > sz[u]-1) return false;
  return true;
}

int f[maxn];
set<int> s;

void dfs_2(int u, int fa) {
  int cnt = 0, t;
  for (int i : s) {
    if (cnt == w[u]) { t = i; break; }
    ++cnt;
  }
  f[u] = t, s.erase(t);

  for (int i : vec[u]) {
    if (i == fa) continue;
    dfs_2(i, u);
  }
}

int main()
{
  int n; cin >> n;
  int root;
  for (int i = 1; i <= n; ++i) {
    int a; cin >> a >> w[i];
    if (!a) root = i;
    else vec[a].push_back(i);
  }
```

```
  if (!dfs(root, -1)) { cout << "NO" << endl; return 0; }

  cout << "YES" << endl;

  for (int i = 1; i <= n; ++i) s.insert(i);
  dfs_2(root, -1);
  for (int i = 1; i <= n; ++i) cout << f[i] << " "; cout << endl;
  return 0;
}
```

### CF30C Shooting Gallery

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

using namespace std;

typedef long long LL;
const int maxn = 1000 + 5;
struct node {
  int x, y, t;
  double p;
  bool operator < (const node& p) const { return t < p.t; }
} w[maxn];
double f[maxn];

bool check(node a, node b) {
  int x1 = a.x, y1 = a.y, t1 = a.t, x2 = b.x, y2 = b.y, t2 = b.t;
  int dx = x1 - x2, dy = y1 - y2, dt = t1 - t2;
  return (LL)dx*dx + (LL)dy*dy <= (LL)dt*dt;
}

int main()
{
  int n; cin >> n;
  for (int i = 1; i <= n; ++i) {
    cin >> w[i].x >> w[i].y >> w[i].t >> w[i].p;
  }
  sort(w+1, w+n+1);

  double res = 0;
  for (int i = 1; i <= n; ++i) {
    for (int j = 1; j <= i-1; ++j) {
      if (check(w[j], w[i])) f[i] = max(f[i], f[j]);
    }
    f[i] += w[i].p;
    res = max(res, f[i]);
  }

  printf("%.8f\n", res);
```

```
  return 0;
}
```

### CF1884B Haunted House

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

using namespace std;

typedef long long LL;
const int maxn = 1e5 + 5;
char s[maxn];

void solve() {
  int n; cin >> n >> (s+1);

  LL res = 0;
  for (int i = n, j = n; i >= 1; --i) {
    while (j>=1 && s[j]!='0') --j;
    if (j>=1) {
      res += i-j;
      cout << res << " ";
      --j;
    }
    else {
      for (int k = i; k >= 1; --k) cout << -1 << " ";
      break;
    }
  }
  cout << endl;
}

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

### CF1903D1 Maximum And Queries (easy version)

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

using namespace std;

typedef long long LL;
const int maxn = 1e5 + 5;
LL w[maxn], a[maxn];
```

```cpp
LL solve(int n, LL k) {
  for (int i = 1; i <= n; ++i) a[i] = w[i];

  LL res = 0;
  for (int i = 61; i >= 0; --i) {
    LL sum = 0;
    for (int j = 1; j <= n; ++j) {
      if ((a[j]>>i)&1) continue;
      sum += (1LL<<i) - a[j]%(1LL<<i);
      if (sum > k) break;
    }
    if (sum > k) continue;

    k -= sum; res += (1LL<<i);
    for (int j = 1; j <= n; ++j) {
      if ((a[j]>>i)&1) continue;
      a[j] += (1LL<<i) - a[j]%(1LL<<i);
    }
  }
  return res;
}

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

  while (T -- ) {
    LL k; cin >> k;
//    cout << "---------------------- ";
    cout << solve(n, k) << endl;
  }
  return 0;
}
```