差分
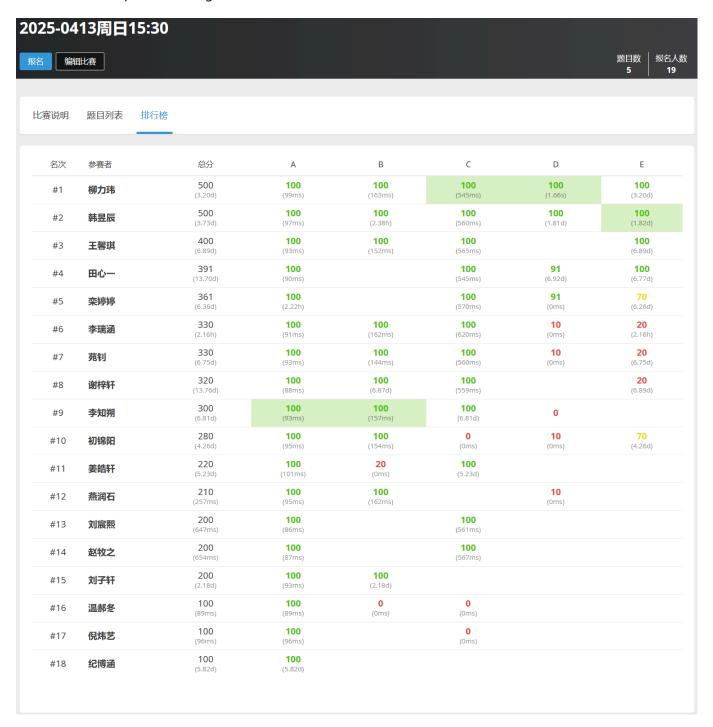
人员

初锦阳、王馨琪、刘宸熙、温郝冬、柳力玮、田心一、姜皓轩、谢梓轩、李知朔、韩昱辰、燕润石、李瑞涵、栾婷婷、刘子轩、纪博涵 到课

上周作业检查

上周作业链接: https://www.luogu.com.cn/contest/241023

2025-0413周日15:30

报名　编辑比赛

题目数 **5** ｜ 报名人数 **19**

比赛说明　题目列表　**排行榜**

名次	参赛者	总分	A	B	C	D	E
#1	柳力玮	500 (3.20d)	100 (99ms)	100 (163ms)	100 (545ms)	100 (1.66s)	100 (3.20d)
#2	韩昱辰	500 (3.73d)	100 (97ms)	100 (2.38h)	100 (560ms)	100 (1.81d)	100 (1.82d)
#3	王馨琪	400 (6.89d)	100 (93ms)	100 (152ms)	100 (565ms)		100 (6.89d)
#4	田心一	391 (13.70d)	100 (90ms)		100 (545ms)	91 (6.92d)	100 (6.77d)
#5	栾婷婷	361 (6.36d)	100 (2.22h)		100 (570ms)	91 (0ms)	70 (6.26d)
#6	李瑞涵	330 (2.16h)	100 (91ms)	100 (162ms)	100 (620ms)	10 (0ms)	20 (2.16h)
#7	苑钊	330 (6.75d)	100 (93ms)	100 (144ms)	100 (560ms)	10 (0ms)	20 (6.75d)
#8	谢梓轩	320 (13.76d)	100 (88ms)	100 (6.87d)	100 (559ms)		20 (6.89d)
#9	李知朔	300 (6.81d)	100 (93ms)	100 (157ms)	100 (6.81d)	0	
#10	初锦阳	280 (4.26d)	100 (95ms)	100 (154ms)	0 (0ms)	10 (0ms)	70 (4.26d)
#11	姜皓轩	220 (5.23d)	100 (101ms)	20 (0ms)	100 (5.23d)		
#12	燕润石	210 (257ms)	100 (95ms)	100 (162ms)		10 (0ms)	
#13	刘宸熙	200 (647ms)	100 (86ms)		100 (561ms)		
#14	赵牧之	200 (654ms)	100 (87ms)		100 (567ms)		
#15	刘子轩	200 (2.18d)	100 (93ms)	100 (2.18d)			
#16	温郝冬	100 (89ms)	100 (89ms)	0 (0ms)	0 (0ms)		
#17	倪炜艺	100 (96ms)	100 (96ms)		0 (0ms)		
#18	纪博涵	100 (5.82d)	100 (5.82d)				

作业

https://www.luogu.com.cn/contest/242934 (课上讲了 A ~ D 题, 课后作业是 E 题)

课堂表现

这节课新学了 差分 这个内容, 同学们课上听讲都很认真, 基本都听懂了。

差分 比前缀和要抽象一些, 很容易遗忘, 所以同学们课下要好好复习。

课堂内容

P2280 [HNOI2003] 激光炸弹

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

using namespace std;

const int maxn = 5000 + 5;
int w[maxn][maxn], p[maxn][maxn];

int get_sum(int x1, int y1, int x2, int y2) {
  return p[x2][y2] - p[x1-1][y2] - p[x2][y1-1] + p[x1-1][y1-1];
}

int main()
{
  int n, m; cin >> n >> m;
  for (int i = 1; i <= n; ++i) {
    int x, y, v; cin >> x >> y >> v;
    w[x+1][y+1] += v;
  }

  for (int i = 1; i <= 5001; ++i) {
    for (int j = 1; j <= 5001; ++j) {
      p[i][j] = p[i-1][j] + p[i][j-1] - p[i-1][j-1] + w[i][j];
    }
  }

  int res = 0;
  for (int i = 1; i+m-1 <= 5001; ++i) {
    for (int j = 1; j+m-1 <= 5001; ++j) {
      res = max(res, get_sum(i,j,i+m-1,j+m-1));
    }
  }
  cout << res << endl;
  return 0;
}
```

B4192 [海淀区小学组 2023] 分数线

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

using namespace std;

typedef long long LL;
const int maxn = 1e5 + 5;
int w[maxn];
LL p[maxn];

LL get_sum(int l, int r) { return p[r] - p[l-1]; }

int main()
{
  int m; cin >> m;
  for (int i = 1; i <= m; ++i) cin >> w[i];
  for (int i = 1; i <= m; ++i) p[i] = p[i-1] + w[i];

  LL x, y; cin >> x >> y;
  for (int k = 2; k <= m; ++k) {
    LL a = get_sum(1, k-1), b = get_sum(k, m);
    if (a>=x && a<=y && b>=x && b<=y) {
      cout << k << endl; return 0;
    }
  }
  cout << 0 << endl;
  return 0;
}
```

P2367 语文成绩

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

using namespace std;

const int maxn = 5e6 + 5;
int w[maxn], c[maxn];
int p[maxn];

int main()
{
  int n, m; cin >> n >> m;
  for (int i = 1; i <= n; ++i) cin >> w[i], c[i] = w[i] - w[i-1];
  while (m -- ) {
    int l, r, x; cin >> l >> r >> x;
    c[l] += x, c[r+1] -= x;
  }
  for (int i = 1; i <= n; ++i) p[i] = p[i-1] + c[i];

  int minn = 1e9;
  for (int i = 1; i <= n; ++i) minn = min(minn, p[i]);
```

```
    cout << minn << endl;
    return 0;
}
```

P11853 [CSP-J2022 山东] 植树节

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

using namespace std;

const int maxn = 1e6 + 5;
int c[maxn], p[maxn];

int main()
{
  int n; cin >> n;
  while (n -- ) {
    int l, r; cin >> l >> r; l++, r++;
    c[l]++, c[r+1]--;
  }

  for (int i = 1; i <= 1000001; ++i) p[i] = p[i-1] + c[i];

  int maxx = 0;
  for (int i = 1; i <= 1000001; ++i) maxx = max(maxx, p[i]);
  cout << maxx << endl;
  return 0;
}
```

P9094 [PA 2020] Mieszanie kolorów

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

using namespace std;

const int maxn = 1e6 + 5;
int c1[maxn], c2[maxn], c3[maxn];
int p1[maxn], p2[maxn], p3[maxn];

int main()
{
  int n, m; cin >> n >> m;
  while (m -- ) {
    int l, r, k; cin >> l >> r >> k;
    if (k == 1) {
      c1[l]++, c1[r+1]--;
    } else if (k == 2) {
      c2[l]++, c2[r+1]--;
```

```
      } else {
        c3[l]++, c3[r+1]--;
      }
    }

    for (int i = 1; i <= n; ++i) {
      p1[i] = p1[i-1] + c1[i];
      p2[i] = p2[i-1] + c2[i];
      p3[i] = p3[i-1] + c3[i];
    }

    int res = 0;
    for (int i = 1; i <= n; ++i) {
      if (p1[i] && p2[i] && !p3[i]) ++res;
    }
    cout << res << endl;
    return 0;
}
```

P4086 [USACO17DEC] My Cow Ate My Homework S

题目本意是让求: 2~n, 3~n, 4~n, ..., n-1~n 区间中, 在每个区间都去掉一个最低分的情况下, 哪种情况下的区间平均值最大

因此, 可以 O(n) 维护一个 suf[i] 的后缀和数组 和一个 suf_min[i] 的后缀最小值数组

- suf[i] 代表: 区间 i~n 的区间和

- suf_min[i] 代表: 区间 i~n 的最小值

那么区间 i~n 在去掉一个最低分时区间的平均值是: (suf[i] - suf_min[i]) / (n-i) -> 可以 O(1) 求

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

using namespace std;

const int maxn = 1e5 + 5;
int w[maxn];
int suf_sum[maxn], suf_min[maxn];

int main()
{
  int n; cin >> n;
  for (int i = 1; i <= n; ++i) cin >> w[i];
  suf_min[n+1] = 10000 + 5;
  for (int i = n; i >= 1; --i) {
    suf_sum[i] = suf_sum[i+1] + w[i];
    suf_min[i] = min(suf_min[i+1], w[i]);
  }

  double maxx_avg = -1.0;
```

```cpp
  for (int k = 1; k <= n-2; ++k) {
    double t = 1.0*(suf_sum[k+1]-suf_min[k+1]) / (n-k-1);
    maxx_avg = max(maxx_avg, t);
  }

  for (int k = 1; k <= n-2; ++k) {
    double t = 1.0*(suf_sum[k+1]-suf_min[k+1]) / (n-k-1);
    if (t == maxx_avg) cout << k << endl;
  }
  return 0;
}
```