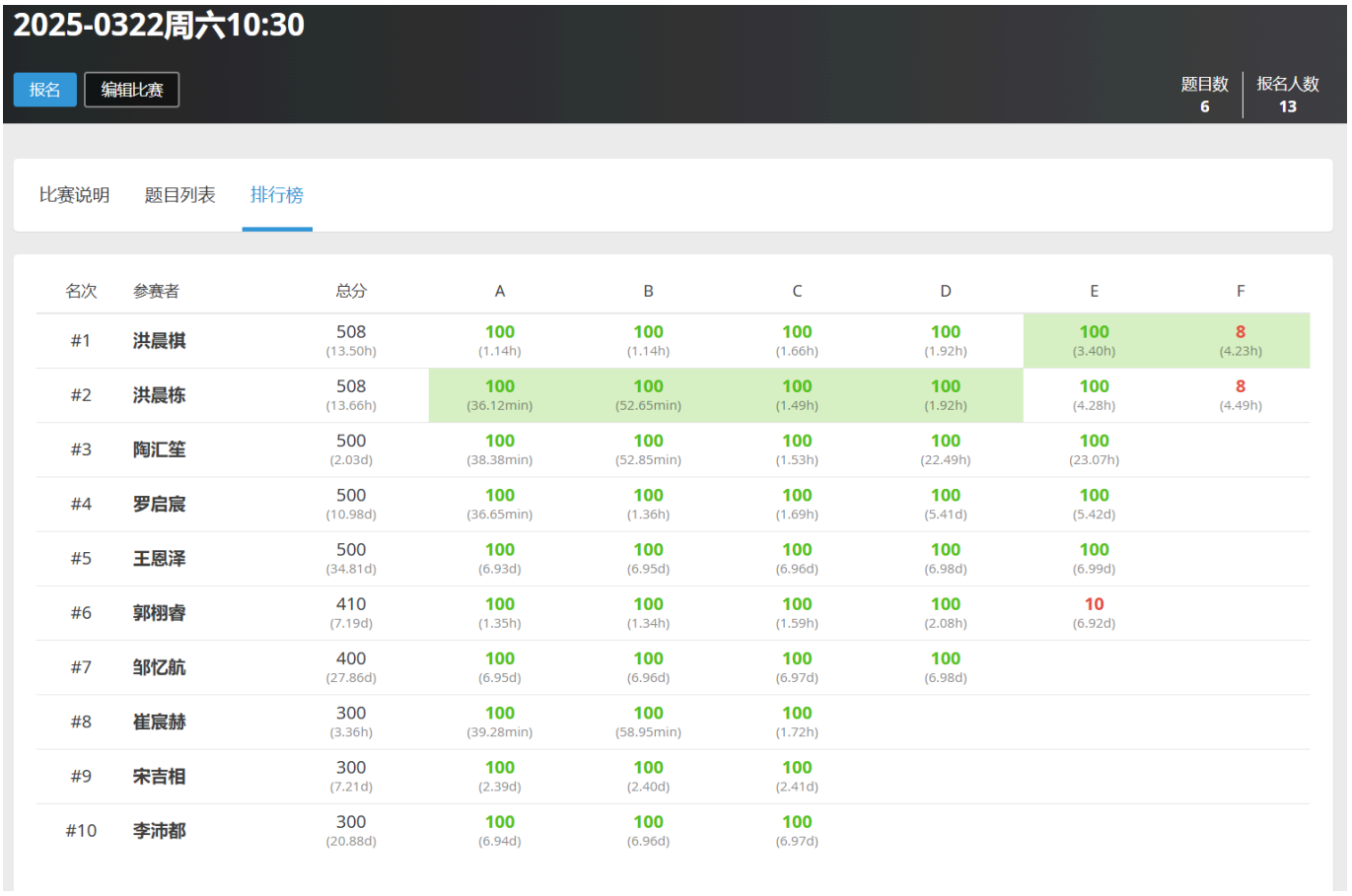
二维前缀和

人员

郭栩睿、邹忆航、崔宸赫、李沛都、罗启宸、王恩泽、陶汇笙、纪博涵 到课

作业检查

上周作业链接: https://www.luogu.com.cn/contest/237595



2025-0322周六10:30

报名 编辑比赛

题目数 6 | 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	F
#1	洪晨棋	508 (13.50h)	100 (1.14h)	100 (1.14h)	100 (1.66h)	100 (1.92h)	100 (3.40h)	8 (4.23h)
#2	洪晨栋	508 (13.66h)	100 (36.12min)	100 (52.65min)	100 (1.49h)	100 (1.92h)	100 (4.28h)	8 (4.49h)
#3	陶汇笙	500 (2.03d)	100 (38.38min)	100 (52.85min)	100 (1.53h)	100 (22.49h)	100 (23.07h)	
#4	罗启宸	500 (10.98d)	100 (36.65min)	100 (1.36h)	100 (1.69h)	100 (5.41d)	100 (5.42d)	
#5	王恩泽	500 (34.81d)	100 (6.93d)	100 (6.95d)	100 (6.96d)	100 (6.98d)	100 (6.99d)	
#6	郭栩睿	410 (7.19d)	100 (1.35h)	100 (1.34h)	100 (1.59h)	100 (2.08h)	10 (6.92d)	
#7	邹忆航	400 (27.86d)	100 (6.95d)	100 (6.96d)	100 (6.97d)	100 (6.98d)		
#8	崔宸赫	300 (3.36h)	100 (39.28min)	100 (58.95min)	100 (1.72h)			
#9	宋吉相	300 (7.21d)	100 (2.39d)	100 (2.40d)	100 (2.41d)			
#10	李沛都	300 (20.88d)	100 (6.94d)	100 (6.96d)	100 (6.97d)			

作业

https://www.luogu.com.cn/contest/238525 (课上讲了 A ~ D 这些题, 课后作业是 E 题)

课堂表现

今天讲的二维前缀和, 同学们课上听讲都很认真, 但是只靠上课是无法熟练掌握的, 课下要画熟练对应的图, 弄清楚二维前缀和的递推关系。

课堂内容

P3353 在你窗外闪耀的星星

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

```cpp
using namespace std;

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

int get_sum(int l, int r) { return (l<=r ? p[r]-p[l-1] : 0); }

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

  int maxx = 0;
  for (int i = 1; i <= n; ++i) maxx = max(maxx, get_sum(i,i+m-1));
  cout << maxx << endl;
  return 0;
}
```

P10233 [yLCPC2024] A. dx 分计算

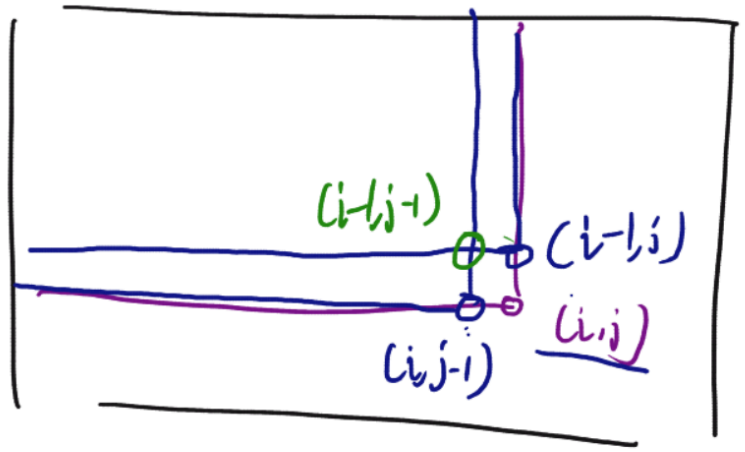
```cpp
#include <bits/stdc++.h>

using namespace std;

const int maxn = 1e7 + 5;
char s[maxn];
int w[maxn], p[maxn];

int get_sum(int l, int r) { return (l<=r ? p[r]-p[l-1] : 0); }

void solve() {
  cin >> (s+1);
  int n = strlen(s+1);
  for (int i = 1; i <= n; ++i) {
    if (s[i] == 'P') w[i] = 3;
    else if (s[i] == 'p') w[i] = 2;
    else if (s[i] == 'G') w[i] = 1;
    else w[i] = 0;

    p[i] = p[i-1] + w[i];
  }

  int m; cin >> m;
  while (m -- ) {
    int l, r; cin >> l >> r;
    cout << get_sum(l, r) << endl;
  }
}
```

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

P6568 [NOI Online #3 提高组] 水壶

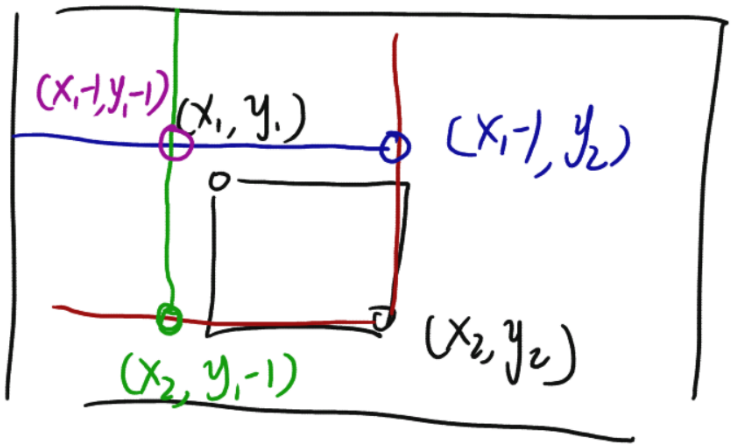
```
#include <bits/stdc++.h>

using namespace std;

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

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

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

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

P2004 领地选择



$$P[i][j] = P[i-1][j] + P[i][j-1] - P[i-1][j-1] + a[i][j]$$

$$P[x_2][y_2] - P[x_1-1][y_2] - P[x_2][y_1-1] + P[x_1-1][y_1-1]$$




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

using namespace std;

const int maxn = 1e3 + 5;
int a[maxn][maxn], p[maxn][maxn];

int calc(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, c; cin >> n >> m >> c;
```

```
    for (int i = 1; i <= n; i++) {
        for (int j = 1; j <= m; j++) cin >> a[i][j], p[i][j] = p[i-1][j] + p[i][j-
1] - p[i-1][j-1] + a[i][j];
    }

    int maxx = -1e9, x = 0, y = 0;
    for (int i = 1; i <= n-c+1; i++) {
        for (int j = 1; j <= m-c+1; j++) {
            int sum = calc(i,j,i+c-1,j+c-1);
            if (sum > maxx) {
                maxx = sum, x = i, y = j;
            }
        }
    }
    cout << x << " " << y << endl;
    return 0;
}
```

P1719 最大加权矩形

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

using namespace std;

const int maxn = 1000 + 5;
int 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; cin >> n;
  for (int i = 1; i <= n; ++i) {
    for (int j = 1; j <= n; ++j) {
      int x; cin >> x; p[i][j] = p[i-1][j] + p[i][j-1] - p[i-1][j-1] + x;
    }
  }

  int maxx = -1e9;
  for (int i1 = 1; i1 <= n; ++i1) {
    for (int j1 = 1; j1 <= n; ++j1) {
      for (int i2 = i1; i2 <= n; ++i2) {
        for (int j2 = j1; j2 <= n; ++j2) maxx = max(maxx, get_sum(i1,j1,i2,j2));
      }
    }
  }
  cout << maxx << endl;
```

```
  return 0;
}
```

P1369 矩形

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

using namespace std;

const int maxn = 100 + 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; cin >> n;
  while (n -- ) {
    int x, y; cin >> x >> y; ++w[x][y];
  }

  for (int i = 1; i <= 100; ++i) {
    for (int j = 1; j <= 100; ++j) {
      p[i][j] = p[i-1][j] + p[i][j-1] - p[i-1][j-1] + w[i][j];
    }
  }

  int maxx = 0;
  for (int x1 = 1; x1 <= 100; ++x1) {
    for (int y1 = 1; y1 <= 100; ++y1) {
      for (int x2 = x1+1; x2 <= 100; ++x2) {
        for (int y2 = y1+1; y2 <= 100; ++y2) {
          maxx = max(maxx, get_sum(x1,y1,x2,y2) - get_sum(x1+1,y1+1,x2-1,y2-1));
        }
      }
    }
  }
  cout << maxx << endl;
  return 0;
}
```