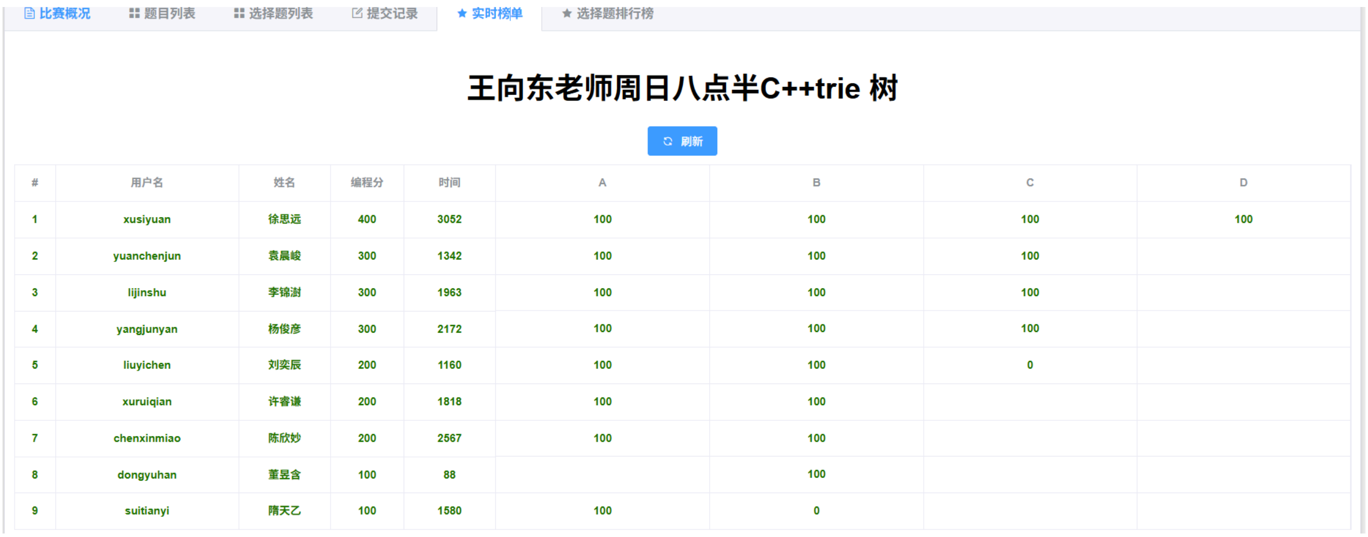
综合练习

人员

李锦澍、徐思远、陈欣妙、刘奕辰、袁晨峻、杨俊彦、隋天乙、周治润 到课

上周作业检查

上周作业链接: https://cppoj.kids123code.com/contest/1339



王向东老师周日八点半C++trie 树

#	用户名	姓名	编程分	时间	A	B	C	D
1	xusiyuan	徐思远	400	3052	100	100	100	100
2	yuanchenjun	袁晨峻	300	1342	100	100	100	
3	lijinshu	李锦澍	300	1963	100	100	100	
4	yangjunyan	杨俊彦	300	2172	100	100	100	
5	liuyichen	刘奕辰	200	1160	100	100	0	
6	xuruiqian	许睿谦	200	1818	100	100		
7	chenxinmiao	陈欣妙	200	2567	100	100		
8	dongyuhan	董昱含	100	88		100		
9	suitianyi	隋天乙	100	1580	100	0		

本周作业

https://cppoj.kids123code.com/contest/1477 (课上讲了 A ~ C 题, 课后作业是 D 题)

课堂表现

今天的第二题思路并不复杂, 就是代码稍微复杂一点, 大部分同学课上没写完, 课下需要好好补一下这道题。

课堂内容

平铺图案 (上周作业)

二维前缀和直接维护即可

```
#include <bits/stdc++.h>
#define int long long

using namespace std;

const int maxn = 1000 + 5;
char s[maxn][maxn];
int p[maxn][maxn];

int calc(int n, int x, int y) {
  int c1 = x / n, c2 = y / n;
  int sx = x % n, sy = y % n;
  int res = c1 * c2 * p[n][n] + c1 * p[n][sy] + c2 * p[sx][n] + p[sx][sy];
  return res;
}

signed main()
{
  int n, m; cin >> n >> m;
  for (int i = 1; i <= n; ++i) cin >> (s[i]+1);
  for (int i = 1; i <= n; ++i) {
    for (int j = 1; j <= n; ++j) {
      p[i][j] = p[i-1][j] + p[i][j-1] - p[i-1][j-1] + (s[i][j]=='B');
    }
  }

  while (m -- ) {
    int a, b, c, d; cin >> a >> b >> c >> d;
    ++a, ++b, ++c, ++d;
//    cout << "----------------- ";
    cout << calc(n,c,d) - calc(n,a-1,d) - calc(n,c,b-1) + calc(n,a-1,b-1) << endl;
  }
  return 0;
}
```

[USACO06DEC] Milk Patterns G

二分一个 mid, 判断是否有 长度为mid 的子数组重复了 >=K 次

判断可以用 hash 维护, 把每个长度为 mid 的子数组的 hash值 求出来, 看是否有一个 hash值 重复出现了 >=K 次

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

using namespace std;

typedef unsigned ULL;
const int maxn = 20000 + 5;
const int P = 1e9+7;
int w[maxn];
ULL p[maxn], h[maxn];

ULL get_hash(int l, int r) { return h[r] - h[l-1]*p[r-l+1]; }

bool check(int n, int K, int mid) {
  map<ULL, int> mp;
  for (int i = 1, j = mid; j <= n; ++i, ++j) mp[get_hash(i,j)]++;

  for (auto it : mp) {
    if (it.second >= K) return true;
  }
  return false;
}
```

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

  p[0] = h[0] = 1;
  for (int i = 1; i <= n; ++i) {
    p[i] = p[i-1] * P, h[i] = h[i-1] * P + w[i];
  }

  int l = 1, r = n;
  while (l <= r) {
    int mid = (l + r) / 2;
    if (check(n, K, mid)) l = mid+1;
    else r = mid-1;
  }
  cout << r << endl;
  return 0;
}
```

Road Blocked

考虑删边操作是比较复杂的, 因为删完边后点与点之间的最短路变化可能变化很大

因此, 可以把整个问题反过来思考, 考虑加边操作

每次加完一条边后, 最短路的更新只可能通过这条边进行跟新, 所以最短路的更新是 O(n^2) 级别的

题目保证, 最多添加 300 条边, 那么这个题就解决了

```
#include <bits/stdc++.h>
#define int long long

using namespace std;

const int N = 300 + 5, M = 2e5 + 5;
const int inf = 0x3f3f3f3f3f3f3f3f;
struct Edge {
  int a, b, c;
} w[N*N];
bool st[N*N];
int f[N][N];

struct node {
  int op, id, x, y;
} q[M];

signed main()
{
  int n, m, Q; cin >> n >> m >> Q;
  for (int i = 1; i <= m; ++i) cin >> w[i].a >> w[i].b >> w[i].c, st[i] = true;
```

```
    for (int i = 1; i <= Q; ++i) {
      cin >> q[i].op;
      if (q[i].op == 1) cin >> q[i].id, st[q[i].id] = false;
      else cin >> q[i].x >> q[i].y;
    }

    memset(f, 0x3f, sizeof(f));
    for (int i = 1; i <= n; ++i) f[i][i] = 0;
    for (int i = 1; i <= m; ++i) {
      int a = w[i].a, b = w[i].b, c = w[i].c;
      if (st[i]) f[a][b] = f[b][a] = c;
    }

    for (int k = 1; k <= n; ++k) {
      for (int i = 1; i <= n; ++i) {
        for (int j = 1; j <= n; ++j) f[i][j] = min(f[i][j], f[i][k]+f[k][j]);
      }
    }

    vector<int> ans;
    for (int i = Q; i >= 1; --i) {
      int op = q[i].op, id = q[i].id, x = q[i].x, y = q[i].y;
      if (op == 1) {
        int a = w[id].a, b = w[id].b, c = w[id].c;
        f[a][b] = min(f[a][b], c);
        for (int i = 1; i <= n; ++i) {
          for (int j = 1; j <= n; ++j) {
            int value = min(f[i][a]+f[b][j], f[i][b]+f[a][j]) + f[a][b];
            f[i][j] = min(f[i][j], value);
          }
        }
      } else {
        int dis = (f[x][y]==inf ? -1 : f[x][y]);
        ans.push_back(dis);
      }
    }

    reverse(ans.begin(), ans.end());
    for (int i : ans) cout << i << endl;
    return 0;
  }
```

[蓝桥杯 2025 省 Java B] 数组翻转

找到每个数出现的最长的连续两段的长度

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

using namespace std;

typedef long long LL;
```

```
const int maxn = 1e6 + 5;
int w[maxn];
vector<int> vec[maxn];

int main()
{
  int n; cin >> n;
  for (int i = 1; i <= n; ++i) cin >> w[i];
  int cnt = 1;
  for (int i = 2; i <= n; ++i) {
    if (w[i] == w[i-1]) ++cnt;
    else vec[w[i-1]].push_back(cnt), cnt = 1;
  }
  vec[w[n]].push_back(cnt);

  LL res = 0;
  for (int i = 1; i < maxn; ++i) {
    sort(vec[i].begin(), vec[i].end()), reverse(vec[i].begin(), vec[i].end());
    int len = 0;
    if ((int)vec[i].size() >= 1) len += vec[i][0];
    if ((int)vec[i].size() >= 2) len += vec[i][1];
    res = max(res, (LL)len * i);
  }
  cout << res << endl;
  return 0;
}
```