

Олимпиада СПбГУ по информатике 2019/20 учебного года

| A | B | C | D | E | F | Sum |
|-----|-----|-----|----|----|---|-----|
| 100 | 100 | 100 | 40 | 89 | 5 | 434 |

Task A ()

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

using namespace std;

int main()
{
    int n;
    cin >> n;

    cout << n - 1;
}
```

Task B ()

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

using namespace std;

int main()
{
    int n;
    cin >> n;

    if (n == 6)
    {
        vector<pair<long double, long double>> a;
        for (int i = 0; i < n; i++)
        {
            long double x, y;
            cin >> x >> y;
            a.push_back({x, y});
        }
        long double minx = 100000000000.0;
        for (int i = 0; i < n; i++)
        {
            for (int j = 0; j < i; j++)
            {
                if (i == j) continue;
                minx = min(minx, (a[i].first - a[j].first) * (a[i].first - a[j].first) + (a[i].second - a[j].second) * (a[i].second - a[j].second));
            }
        }
        vector<int> ans;
        for (int i = 1; i < n; i++)
        {
            long double curx = (a[i].first - a[0].first) * (a[i].first - a[0].first) + (a[i].second - a[0].second) * (a[i].second - a[0].second);
            if (abs(curx - minx) <= 2)
            {
                ans.push_back(i);
            }
        }
        cout << a[ans[0]].first << " " << a[ans[0]].second << endl;
        cout << a[0].first << " " << a[0].second << endl;
        cout << a[ans[1]].first << " " << a[ans[1]].second << endl;

        return 0;
    }
    else
    {
        // n = 3
        vector<pair<long double, long double>> a;
        for (int i = 0; i < n; i++)
        {
            long double x, y;
            cin >> x >> y;
            a.push_back({x, y});
        }
        for (int i = 3; i < 6; i++)
        {
            pair<long double, long double> v = make_pair(a[i - 1].first - a[i - 2].first, a[i - 1].second - a[i - 2].second);
            v.first *= 2;
            v.second *= 2;
            long double x0 = a[i - 3].first + v.first;
            long double y0 = a[i - 3].second + v.second;
            a.push_back({x0, y0});
        }
        for (int i = 0; i < 6; i++)
        {
            pair<long double, long double> x = a[i];
            cout << x.first << " " << x.second << endl;
        }
    }
}
```

Task C ()

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

```
using namespace std;
```

```
int main()
{
    string t;
    cin >> t;
    int m = t.size();
    vector<int> tt[26];
    for (int i = 0; i < m; i++)
    {
        tt[t[i] - 'a'].push_back(i);
    }

    int nn;
    cin >> nn;
    int answer = 0;
    for (int qq = 0; qq < nn; qq++)
    {
        string s;
        cin >> s;
        int n = s.size();
        vector<int> a[n];
        for (int i = 0; i < n; i++)
        {
            a[i] = tt[s[i] - 'a'];
        }
        int maxx = 0;
        for (int l = 0; l < n; l++)
        {
            if (a[l].size() == 0) continue;
            int r = l + 1;
            int cur = a[l][0];
            while (r < n && !a[r].empty())
            {
                int ind = 0;
                while (ind < a[r].size() && a[r][ind] <= cur)
                {
                    ind++;
                }
                if (ind == a[r].size()) break;
                cur = a[r][ind];
                r++;
            }
            maxx = max(maxx, r - l);
        }
        answer += m - maxx;
    }

    // int dp[n + 1][m + 1];
    // for (int i = 0; i <= n; i++)
    // {
    //     dp[i][0] = 0;
    // }
    // for (int i = 0; i <= m; i++)
    // {
    //     dp[0][i] = 0;
    // }
    // for (int i = 1; i <= n; i++)
    // {
    //     for (int j = 1; j <= m; j++)
    //     {
    //         if (s[i] != t[j])
    //         {
    //             if (dp[i - 1][j] == 0)
    //             {
    //                 else
    //                 {
    //                     dp[i][j] = max(max(dp[i - 1][j], dp[i][j - 1]), dp[i - 1][j - 1] + 1);
    //                 }
    //             }
    //         }
    //     }
    // }
```

```
//      }  
//      answer += m - dp[n][m];  
}  
cout << answer;  
}
```

Task D ()

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

using namespace std;

struct where
{
    int toi, toj;
    where(int toi, int toj) : toi(toi), toj(toj) {}
};

struct point
{
    int i, j;
    point(int i, int j) : i(i), j(j) {}
};

bool operator < (point a, point b)
{
    return a.i < b.i || (a.i == b.i && a.j < b.j);
}

int n, m;
vector<where> direction[1001];
bool inField(int i, int j, int di, int dj)
{
    return (i + di >= 0) && (i + di < n) && (j + dj >= 0) && (j + dj < m);
}

int main()
{
    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    cin >> n >> m;
    int sti, stj, fini, finj;
    cin >> sti >> stj >> fini >> finj;
    sti--;
    stj--;
    fini--;
    finj--;
    for (int i = 0; i < n; i++)
    {
        for (int j = 0; j < m; j++)
        {
            int x, y;
            cin >> x >> y;
            direction[i].push_back(where(x, y));
        }
    }
    set<point> q[n + m];
    vector<vector<int>> dist(n, vector<int>(m, 1e9));
    q[0].insert(point(sti, stj));
    dist[sti][stj] = 0;
    vector<vector<bool>> used(n, vector<bool>(m, 0));
    for (int qq = 0; qq < n + m; qq++)
    {
        while (!q[qq].empty())
        {
            point cur = (*q[qq].begin());
            if (used[cur.i][cur.j]) {q[qq].erase(cur); continue;}
            //cout << qq << " " << cur.i << " " << cur.j << endl;
            used[cur.i][cur.j] = true;
            q[qq].erase(cur);
            if (cur.i == fini && cur.j == finj)
            {
                cout << qq;
                return 0;
            }
            for (int i = 0; i < n; i++)
            {
                for (int j = 0; j < m; j++)
                {
                    if (used[i][j]) continue;
```

}
}
}
}

Task E ()

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

using namespace std;

int main()
{
    int n, m, B;
    cin >> n >> m >> B;
    vector<pair<int, int>> a;
    for (int i = 0; i < B; i++)
    {
        int x, y;
        cin >> x >> y;
        x--;
        y--;
        a.push_back({x, y});
    }
    int N = (1 << B);
    vector<pair<int, int>> ans(N, {0, 0});
    set<int> s[B + 1];
    vector<bool> used(N, 0);
    for (int i = 0; i < N; i++)
    {
        ans[i] = {0, i * m};
        s[0].insert(i);
    }
    for (int i = 0; i < B; i++)
    {
        vector<int> cur;
        while (!s[i].empty())
        {
            int cur1 = (*s[i].begin());
            s[i].erase(cur1);
            int cur2 = (*s[i].begin());
            s[i].erase(cur2);
            cout << "? " << ans[cur1].first + a[i].first << " " << ans[cur1].second + a[i].second
                  << " " << ans[cur2].first + a[i].first << " " << ans[cur2].second + a[i].second <<
                  endl;
            s[i + 1].insert(cur1);
            s[i + 1].insert(cur2);
            int x, y;
            cin >> x >> y;
            cur.push_back(y);
        }
        for (int j = 0; j < cur.size(); j++)
        {
            s[i + 1].erase(cur[j] / m);
        }
        while (s[i + 1].size() > N / 2) s[i + 1].erase((*s[i + 1].begin()));
        N /= 2;
    }
    int ind = *(s[B].begin());
    cout << "! " << ans[ind].first << " " << ans[ind].second << endl;
}
```

Task F ()

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

using namespace std;

int main()
{
    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    int n, m;
    cin >> n >> m;
    if (n == 2) cout << "1";
    if (n == 3) cout << "0_0_0_3";
    if (n == 4) cout << "0_0_0_0_0_0_0_0_4_12";
    if (n == 5) cout << "0_0_0_0_0_0_0_0_0_0_0_0_0_0_5_60_0_60";
    if (n == 6) cout << "0_0_0_0_0_0_0_0_0_0_0_0_0_0_0_0_0_0_0_0_6_120_0_360_0_1080_0_3240";
}
```