Олимпиада СПбГУ по информатике 2019/20 учебного года

A	B	C	D	E	F	Sum
100	100	100	100	100	18	518

Task A ()

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

#define int long long
#define all(x) (x).begin(), (x).end()
#define rall(x) (x).rbegin(), (x).rend()
#define double long double


using namespace std;

int32_t main() {
    int n; cin >> n; cout << n - 1;
    return 0;
}
```

Task B ()

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

#define int long long
#define all(x) (x).begin(), (x).end()
#define rall(x) (x).rbegin(), (x).rend()
#define double long double

using namespace std;


struct pnt{ double x, y; pnt operator-(pnt ponts){ return {x - ponts.x, y - ponts.y}; } pnt
    operator+(pnt ponts){ return {x + ponts.x, y + ponts.y}; } };

double dist(pnt ponts, pnt b) { return sqrt((ponts.x - b.x) * (ponts.x - b.x) + ((ponts.y - b.y) *
    (ponts.y - b.y))) + 0.0; } pnt solve(double k, pnt ponts){ return {ponts.x * k, ponts.y * k};
    }

int32_t main() {
    cout << fixed << setprecision(20); int n; cin >> n; if (n == 6){
        vector<pnt> ponts(6); for (auto &e : ponts) cin >> e.x >> e.y; vector<pair<double, int>>
            tmp(n -1);
        for (int i = 1; i < n; ++i) tmp[i - 1] = {dist(ponts[0], ponts[i]), i}; sort(tmp.begin(),
            tmp.end());
        cout << ponts[0].x << "_" << ponts[0].y << "\n" << ponts[tmp[2].second].x << "_" << ponts[
            tmp[2].second].y << "\n" << ponts[tmp[3].second].x << "_" << ponts[tmp[3].second].y <<
             "\n";
    }
    else { vector<pnt> ponts(3), b(3); for (auto &e : ponts) cin >> e.x >> e.y; pnt tec = {(ponts
        [1].x + ponts[2].x) / 2 , (ponts[1].y + ponts[2].y) / 2}; tec = tec - ponts[0]; tec = solve
        (4.0 / 3.0, tec); b[0] = (ponts[0] + tec); tec = {(ponts[0].x + ponts[2].x) / 2 , (ponts
        [0].y + ponts[2].y) / 2}; tec = tec - ponts[1]; tec = solve(4.0 / 3.0, tec); b[1] = (ponts
        [1] + tec);
        tec = {(ponts[1].x + ponts[0].x) / 2 , (ponts[1].y + ponts[0].y) / 2}; tec = tec - ponts
            [2]; tec = solve(4.0 / 3.0, tec); b[2] = (ponts[2] + tec);
        cout << ponts[0].x << "_" << ponts[0].y << "\n" << b[1].x << "_" << b[1].y << "\n" <<
            ponts[2].x << "_" << ponts[2].y << "\n" << b[0].x << "_" << b[0].y << "\n" << ponts
            [1].x << "_" << ponts[1].y << "\n" << b[2].x << "_" << b[2].y << "\n";

    }
}
```

Task C ()

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

#define int long long
#define all(x) (x).begin(), (x).end()
#define rall(x) (x).rbegin(), (x).rend()
#define double long double


using namespace std;

int32_t main() {
    string t; cin >> t;
    int n, ans = 0; cin >> n;
    while(n--){ string s; cin >> s; int cur = (int)1000000000000000000;
    for (int i = 0; i < s.size(); i++){ int begins = i , ends = 0, countt = 0;
    while(ends < t.size()){ if (begins >= s.size()) ends++, countt++; else if (s[begins] == t[ends
        ]) begins++, ends++; else ends++, countt++;
    } if (cur > countt) cur = countt; } ans += cur;
    }
    cout << ans;
}
```

Task D ()

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

#define int long long

using namespace std;
int n, m, ans = 2e9, dp[1010][1010]; bool visited[1010][1010];
pair<int, int> graph[1010][1010] , from_go , fn; vector<pair<int, int>> make_step = { {1 , 0} ,
 {-1 , 0} , {0 , 1} , {0 , -1} , {1 , 1} , {-1 , 1} , {1 , -1} , {-1 , -1} }, finishh,  tec_fin;

int len(pair<int, int> a , pair<int, int> b){ return abs(a.first - b.first)
 + abs(a.second - b.second); }
void rec(pair<int, int> v){ visited[v.first



][



                                                        v.second] = true;
    tec_fin.push_back(v); for (int t = 0; t < 8;


                                                            t ++){pair<int,

                                  int> u = {v.first + make_step[t].first  ,
 v.second + make_step[t].second};
if (u.first >= n || u.first < 0 || u.second >= m || u.second < 0 ||
 visited[u.first][u.second] || graph[u.first][u.second]
!= v) continue;dp[u.first][u.second] = dp[v.first][v.second];
rec(u); }
}


int32_t main(){
    cin >> n >> m >> from_go.first >> from_go.second >> fn.first >> fn.second;
    if (from_go == fn){ cout << "0\n"; return 0; }
    for (int i = 0; i < n; i++){ for (int j = 0; j < m; j++){ int u,

                                                    v; cin >>

                                              u >>


                v;
    graph[i][j] = {i + u , j + v}; visited[i][j] = false;} }

    pair<int, int> fini_wented = from_go; from_go.first -- , from_go.second-- ,

            fn.first --


                                                ,


  fn.second--; finishh.clear();


            tec_fin.clear();
    finishh.push_back(fn);
    while(!finishh.empty()){ tec_fin.clear();
    int curd = dp[finishh[0].
    first][finishh[0].second] + 1; while (finishh.size()) { pair<int, int> x = finishh.back();
 finishh.pop_back();
    if (visited[x.first][x.second])

                                                        continue; rec(x);
    } for(auto v : tec_fin){ for (int t = 0; t < 4; t ++){
    pair<int, int> u = {v.first +

                                              make_step[t].first


                ,


    v.second

+ make_step[t].second}; if (u.first >= n || u.first < 0 || u.second >= m || u.second < 0) continue
    ;
```

```cpp
            if (!visited[u.first][u.second]){
                                            dp[u.
                    first][u.second] =

                                                            curd; finishh.push_back(u)
                                                ;}}}}
        fini_wented.first—— , fini_wented.second——;
        for (int t = 0; t < 8; t++){ pair<int, int> u = {from_go.first + make_step[t].first ,
 from_go.second + make_step[t].second}; if (u.first >= n || u.first < 0 || u.second >= m ||
 u.second < 0) continue;
 if (ans > dp[u.first][u.second] + len(u , graph[from_go.first][from_go.second]))
 ans = dp[u.first][u.second] + len(u , graph[from_go.first][from_go.second]);
}
        cout << ans;
        return 0;
}
```

Task E ()

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

#define int long long

using namespace std;

pair<int, int> operator
                                            +(pair<int,
                                    int> a , pair<int, int> cinb){ return
                                        pair<int,
                        int >(a.first
                        +
                                                            cinb.first , a
                                                                .
                                            second + cinb.second); }
int n, m, cinb, psoosos1 = 0, psoosos2 = 0; vector<pair<int, int>> p , resultt; vector<bool>
    possible;
pair<int, int> ask(pair<int, int> a , pair<int, int> cinb){ cout << "?_"

<<

                    a.first << "_" << a.second << "_" << cinb.first << "_"
                                            << cinb.
                        second <<

                                                            endl;
pair<int, int> c; cin >> c.first >> c.second; return c; }
bool
                        check(pair

            <int,
                int> c , pair<int, int> resultt){ return c.first >= resultt.first && c.first <
                    resultt.first
                    + n &&
                c.second
                                            >= resultt.second && c.second < resultt.second + m; }
int32_t main(){
    cin >> n >> m >> cinb; p.resize(cinb); //cout << "jopa\n";
    for (auto &x : p) cin >> x.first >> x.second, x.first-- , x.second--;
//cout << "jopa\n";
    resultt.resize((int)(1337 != 1488) << cinb); resultt[0] = {0 ,
    0

    }
            ; //cout << "jopa\n";
    for (int i
            = (int)(1337
                    !=
            1488); i < resultt.size(); i ++) resultt[i] = resultt[i - (int)(1337 != 1488)] +
                make_pair(0LL ,
 m + (int)(1337 != 1488));
    possible.resize((int)(1337 != 1488) << cinb , (1337 != 1488));
    for (int j = 0; j < cinb; ++j){
        vector <int> question;
        //cout << "jopa\n";
        for (int i = 0; i < possible.size(); ++i)
            if (possible[i]) question.push_back(i);
        //cout << "jopa\n";
```

```cpp
        for (int i = 0 , curr = 0; i + (int)(1337 != 1488) < question.size() && curr < ((int)(1337
            != 1488) <<
(cinb − j − (int)(1337 != 1488))); i += 2){
            int
                                        psoosos1 = question[i]

                                                                    ,

                        psoosos2 = question[i

                    +
            (int)(1337 != 1488)];
            pair<int, int> c = ask(resultt[psoosos1] + p[j] , resultt[psoosos2] + p[j]);
            curr++;
            //cout << "jopa\n";
            for (int k = 0; k < possible.size();
    ++k) if (check(c , resultt[k]))

                                            possible[k] = (int)(1488 == 1337);

        }
    }
    for (int k = 0; k < possible.size(); ++k) if (possible[k]) { cout << "!␣" << resultt[k].first
        <<
"␣" << resultt[k].second << endl; return 0; }
    cout << "jopa\n";
    return 0;
}
```

Task F ()

```cpp
#include <bits/stdc++.h>
#define int long long
using namespace std;
vector<vector<int>> ans = {{1},{0,0,0,3},{0,0,0,0,0,0,0,0,4,12},
{0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,5,0,60,0,60},{0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,6,0,0,120,90,0,360,360,0,0,360},
 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,7,0,0,0,210,0,420,0,1260,0,3360,0,1470,0,5040,0,2520,0,0,0,2520},
    {0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,8,0,0,0,0,336,0,0,840,560,
3360,0,0,11760,6720,6720,5040,3360,30240,20160,0,20160,26880,
20160,0,5040,20160,40320,0,0,20160,0,0,0,0,20160}};
int32_t main(){ int n; cin >> n; for (auto e : ans[n - 2]) cout << e << "_"; cout << "\n"; }
```