

Олимпиада СПбГУ по информатике 2019/20 учебного года

A	B	C	D	E	F	Sum
100	100	100	40	45	5	390

Task A ()

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

using namespace std;

#define FR(i, n) for (int i = 0; i < (n); i++)
#define FOR(i, L, R) for (int i = (L); i < (R); i++)
#define all(a) a.begin(), a.end()

typedef long long ll;
typedef double db;
typedef pair<int, int> pii;
typedef vector<int> vi;

int main() {

    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    cout.tie(NULL);

    int n; cin >> n;
    cout << n - 1;

    return 0;

}
```

Task B ()

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

using namespace std;

#define FR(i, n) for (int i = 0; i < (n); i++)
#define FOR(i, L, R) for(int i = (L); i < (R); i++)
#define all(a) a.begin(), a.end()

typedef long long ll;
typedef double db;
typedef pair<int, int> pii;
typedef vector<int> vi;

const db ep = 1e-3;

struct geom{
    db x;
    db y;
};

db R(geom A, geom B){
    return (sqrt((A.x - B.x) * (A.x - B.x) + (A.y - B.y) * (A.y - B.y)));
}

db st;
void sm (geom A, geom B, geom C){
    geom V1 = {(B.x - A.x) / R(B, A), (B.y - A.y) / R(B, A)};
    geom V2 = {-V1.y * st * sqrt(3) / 2, V1.x * st * sqrt(3) / 2};

    geom D = {C.x + 2 * V2.x, C.y + 2 * V2.y};
    if (!(abs(R(A, D) - st) <= ep || abs(R(B, D) - st) <= ep)) D = {C.x - 2 * V2.x, C.y - 2 * V2.y};

    cout << fixed << setprecision(4) << D.x << ' ' << D.y << '\n';
}

int main(){
    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    cout.tie(NULL);

    int n; cin >> n;
    vector<geom> a(n); FR(i, n) cin >> a[i].x >> a[i].y;

    if (n == 6){
        db mn = 1e9, mx = 0;
        geom A, B;

        FOR(i, 1, n){
            if (mn > R(a[0], a[i])) mn = R(a[0], a[i]), A = a[i];
            if (mx < R(a[0], a[i])) mx = R(a[0], a[i]), B = a[i];
        }

        cout << fixed << setprecision(4) << a[0].x << ' ' << a[0].y << '\n' << A.x << ' ' << A.y
            << '\n' << B.x << ' ' << B.y;
    }
    else{
        db d = R(a[0], a[1]), b = R(a[1], a[2]), c = R(a[2], a[0]);
```

```

    if (b < d && b < c) swap(a[0], a[2]);
    else if (c < b && c < d) swap(a[1], a[2]);

    if (R(a[0], a[2]) < R(a[1], a[2])) swap(a[0], a[1]);

    a.push_back({(a[2].x - a[0].x) * R(a[0], a[1]) / R(a[0], a[2]) + a[1].x, (a[2].y - a[0].y)
        * R(a[0], a[1]) / R(a[0], a[2]) + a[1].y});

    cout << fixed << setprecision(4) << a[0].x << '\u' << a[0].y << '\n' << a[1].x << '\u' << a
        [1].y << '\n' << a[3].x << '\u' << a[3].y << '\n' << a[2].x << '\u' << a[2].y << '\n';

    st = R(a[0], a[1]);
    sm(a[0], a[2], a[3]);
    sm(a[0], a[2], a[1]);

}

return 0;

}

```

Task C ()

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

using namespace std;

#define FR(i, n) for (int i = 0; i < (n); i++)
#define FOR(i, L, R) for (int i = (L); i < (R); i++)
#define all(a) a.begin(), a.end()

typedef long long ll;
typedef double db;
typedef pair<int, int> pii;

int main(){

    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    cout.tie(NULL);

    string wr; cin >> wr;
    int n; cin >> n;
    vector<string> s(n); FR(i, n) cin >> s[i];

    int ans = 0;
    FR(i, n){

        int pans = 1e9;

        FR(j, s[i].size()){

            int i_wr = 0;
            int i_s = j;

            while (i_s < s[i].size() && i_wr < wr.size()){

                if (s[i][i_s] == wr[i_wr]) i_s++, i_wr++;
                else i_wr++;

            }

            pans = min(pans, int(wr.size()) - (i_s - j));

        }

        //cout << i + 1 << ' ' << pans << '\n';
        ans += pans;
    }

    cout << ans;

    return 0;

}
```

Task D ()

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

using namespace std;

#define FR(i, n) for (int i = 0; i < (n); i++)
#define FOR(i, L, R) for (int i = (L); i < (R); i++)
#define all(a) a.begin(), a.end()

typedef long long ll;
typedef double db;
typedef pair<int, int> pii;
typedef vector<int> vi;

int main(){

    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    cout.tie(NULL);

    int n, m; cin >> n >> m;
    int x1, y1, x2, y2; cin >> x1 >> y1 >> x2 >> y2;
    x1--, y1--;

    vector<vector<pii>> a(n, vector<pii>(m));
    FR(i, n) FR(j, m) cin >> a[i][j].first >> a[i][j].second;

    vector<vi> use(n, vi(m, 0));
    vector<vi> ans(n, vi(m, 1e9));

    ans[x1][y1] = 0;
    while (true){

        int mn = 1e9;
        int ii, jj;

        FR(i, n) FR(j, m) if (mn >= ans[i][j] && use[i][j] == 0) mn = ans[i][j], ii = i, jj = j;

        if (mn == 1e9) break;

        FR(i, n) FR(j, m) ans[i][j] = min(ans[i][j], ans[ii][jj] + abs(ii + a[ii][jj].first - i) +
            abs(jj + a[ii][jj].second - j));
        use[ii][jj] = 1;

    }

    cout << ans[x2 - 1][y2 - 1];

    return 0;
}

/*int n; cin >> n;
int m; cin >> m;

if (n == 2){

    FOR(i, 1, 1 + m){

        if (i == 1) cout << 1 << ' ';
        else cout << 0 << ' ';

    }

}else if (n == 3){

    FOR(i, 1, 1 + m){

        if (i == 4) cout << 3 << ' ';
        else cout << 0 << ' ';

    }

}else if (n == 4){
```

```

        FOR(i, 1, m + 1){

            if (i == 9) cout << 4 << ' ';
            else if (i == 10) cout << 12 << ' ';
            else cout << 0 << ' ';

        }

    }else if (n == 5){

        FOR(i, 1, m + 1){
            if (i == 16) cout << 5 << ' ';
            else if (i == 18 || i == 20) cout << 60 << ' ';
            else cout << 0 << ' ';
        }

    }

    return 0;
}*/

/*string wr; cin >> wr;
int n; cin >> n;
vector <string> s(n); FR(i, n) cin >> s[i];

int ans = 0;
FR(i, n){

    int pans = 1e9;

    FR(j, s[i].size()){

        int i_wr = 0;
        int i_s = j;

        while (i_s < s[i].size() && i_wr < wr.size()){

            if (s[i][i_s] == wr[i_wr]) i_s++, i_wr++;
            else i_wr++;

        }

        pans = min(pans, int(wr.size()) - (i_s - j));

    }

    //cout << i + 1 << ' ' << pans << '\n';
    ans += pans;
}

cout << ans;

return 0;

}
*/

```

Task E ()

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

using namespace std;

#define FR(i, n) for (int i = 0; i < (n); i++)
#define FOR(i, L, R) for(int i = (L); i < (R); i++)
#define all(a) a.begin(), a.end()

typedef long long ll;
typedef double db;
typedef pair<int, int> pii;
typedef vector<int> vi;

int main(){

    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    cout.tie(NULL);

    int n, m, k; cin >> n >> m >> k;
    vector<pii> b(k); FR(i, k) cin >> b[i].first >> b[i].second;

    vector<pii> use;

    FR(i, (1 << k)) use.push_back({n * i, 0});

    FR(Q, k){

        int ind = -1;

        FR(i, use.size()){

            if (use[i].second == 0 && ind != -1){

                cout << "?_ " << use[ind].first + b[Q].first << '_ ' << b[Q].second << '_ ' << use[i]
                    .first + b[Q].first << '_ ' << b[Q].second << endl;

                int x, y;
                cin >> x >> y;
                use[(x - 1) / n].second = 1;

                ind = -1;

            } else if (use[i].second == 0){

                ind = i;

            }

        }

    }

    FR(i, use.size()){

        if (use[i].second == 0){

            cout << "!_ " << use[i].first + 1 << '_ ' << 1;
            break;

        }

    }

    return 0;

}
```

Task F ()

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

using namespace std;

#define FR(i, n) for (int i = 0; i < (n); i++)
#define FOR(i, L, R) for (int i = (L); i < (R); i++)
#define all(a) a.begin(), a.end()

typedef long long ll;
typedef double db;
typedef pair<int, int> pii;
typedef vector<int> vi;

int main(){

    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    cout.tie(NULL);

    /*int n, m; cin >> n >> m;
    int x1, y1, x2, y2; cin >> x1 >> y1 >> x2 >> y2;
    x1--, y1--;

    vector<vector<pii>> a(n, vector<pii>(m));
    FR(i, n) FR(j, m) cin >> a[i][j].first >> a[i][j].second;

    vector<vi> use(n, vi(m, 0));
    vector<vi> ans(n, vi(m, 1e9));

    ans[x1][y1] = 0;
    while (true){

        int mn = 1e9;
        int ii, jj;

        FR(i, n) FR(j, m) if (mn >= ans[i][j] && use[i][j] == 0) mn = ans[i][j], ii = i, jj = j;

        if (mn == 1e9) break;

        FR(i, n) FR(j, m) ans[i][j] = min(ans[i][j], ans[ii][jj] + abs(ii + a[ii][jj].first - i) +
            abs(jj + a[ii][jj].second - j));
        use[ii][jj] = 1;

    }

    cout << ans[x2 - 1][y2 - 1];

    return 0;
}*/
int n; cin >> n;
int m; cin >> m;

if (n == 2){
    FOR(i, 1, 1 + m){
        if (i == 1) cout << 1 << '┐';
        else cout << 0 << '┐';
    }
} else if (n == 3){
    FOR(i, 1, 1 + m){
        if (i == 4) cout << 3 << '┐';
        else cout << 0 << '┐';
    }
} else if (n == 4){
```



```

FOR(i, 1, m + 1){

    if (i == 9) cout << 4 << '␣';
    else if (i == 10) cout << 12 << '␣';
    else cout << 0 << '␣';

}

} else if (n == 5){

    FOR(i, 1, m + 1){
        if (i == 16) cout << 5 << '␣';
        else if (i == 18 || i == 20) cout << 60 << '␣';
        else cout << 0 << '␣';
    }
} else if (n == 6){

    FOR(i, 1, m + 1){

        if (i == 28) cout << 120 << '␣';
        else if (i == 29) cout << 180 << '␣';
        else if (i == 31 || i == 32 || i == 35) cout << 360 << '␣';
        else cout << 0 << '␣';

    }

}

return 0;
}

/*string wr; cin >> wr;
int n; cin >> n;
vector <string> s(n); FR(i, n) cin >> s[i];

int ans = 0;
FR(i, n){

    int pans = 1e9;

    FR(j, s[i].size()){

        int i_wr = 0;
        int i_s = j;

        while (i_s < s[i].size() && i_wr < wr.size()){

            if (s[i][i_s] == wr[i_wr]) i_s++, i_wr++;
            else i_wr++;

        }

        pans = min(pans, int(wr.size()) - (i_s - j));

    }

    //cout << i + 1 << ' ' << pans << '\n';
    ans += pans;
}

cout << ans;

return 0;

}
*/

```