МОСКОВСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ
имени М.В. ЛОМОНОСОВА

ОЛИМПИАДНАЯ РАБОТА

Наименование олимпиады школьников: **«Ломоносов»**

Профиль олимпиады: **Информатика**

ФИО участника олимпиады: **Матвеев Андрей Денисович**

Класс: **11 класс**

Технический балл: **73**

Дата проведения: **17 марта 2022 г.**

Результаты проверки:

Оценка участника строится из 3 частей:

1. оценка за задание - рассчитывается путем запуска тестов и определения правильности работы программы на тестах, до 100 баллов по каждой задаче;
2. дополнительные баллы за полностью правильное решение задания со 2 по 5 - в случае прохождения всех тестов по заданию к оценке прибавляется 55 баллов;
3. нормализация оценки - если полученная из пунктов 1 и 2 сумма баллов превышает 500, то итоговая оценка - 100, если не превышает 500, но превышает 400 - 99 баллов, если не превышает 400 - делится на 3.9 и округляется до целого.

Оценки за задания:

№	1	2	3	4	5
Оценка	100	94	10	76	6

Дополнительный балл: 0

Задание 1. Попытка 1.

п»ї#define _CRT_SECURE_NO_WARNINGS

#pragma comment(linker, "/STACK:16777216")

#include <algorithm>

#include <numeric>

#include <iostream>

#include <sstream>

#include <string>

#include <vector>

#include <queue>

#include <set>

#include <map>

#include <stack>

#include <unordered_map>

#include <cstdio>

#include <cstring>

#include <cstdlib>

#include <cctype>

#include <cassert>

#include <cmath>

#include <complex>

```
using namespace std;

#define int long long
using ull = unsigned long long;
using ll = long long;
using db = double; // or double, if TL is tight
using str = string; // yay python!
using pi = pair<ll, ll>;
using vi = vector<ll>;
using vb = vector<bool>;
using vvi = vector<vector<int>>;

// pairs
#define mp make_pair

// vectors
#define all(x) x.begin(), x.end()
#define rall(x) x.rbegin(), x.rend()
#define sor(x) sort(all(x))

#define rep(n) for(int i=0;i<n;i++)

#define print(v) for(auto i : v)cout<<i<<" ";
```

```
const db eps = 1e-12;
const int MOD = 1e9 + 7;// 998244353;
const ll INF = 1e18 + 5; // not too close to LLONG_MAX
const db PI = acos((db)-1);

int num_len(int x) {
    int res = 0;
    while (x) {
        res++;
        x /= 10;
    }
    return res;
}

int binpow(int a, int p, int mod) {
    if (!p) return 1;
    if (p & 1) return (a * binpow(a, p - 1, mod)) % mod;
    int temp = binpow(a, p >> 1, mod);
    return (temp * temp) % mod;
}

int gcd(int a, int b) {
    while (a && b) {
        if (a > b) a %= b;
        else b %= a;
```

```
    }
    return max(a, b);
}

bool comp(string s1, string s2) {
    reverse(all(s1));
    while (!s1.empty() && s1.back() == '0')
        s1.pop_back();
    reverse(all(s1));
    reverse(all(s2));
    while (!s2.empty() && s2.back() == '0')
        s2.pop_back();
    reverse(all(s2));
    if (s1.length() == s2.length())
        return s1 < s2;
    return s1.length() < s2.length();
}

bool eq(string s1, string s2) {
    reverse(all(s1));
    while (!s1.empty() && s1.back() == '0')
        s1.pop_back();
    reverse(all(s1));
    reverse(all(s2));
    while (!s2.empty() && s2.back() == '0')
```

```
        s2.pop_back();
    reverse(all(s2));
    return s1 == s2;
}

void solve() {
    int k, n; cin >> k >> n;
    string res = "";
    vector<string> a(n);
    rep(n) {
        string s; cin >> s;
        rep(s.length()) {
            if (islower(s[i])) s[i] = toupper(s[i]);
            else if (isupper(s[i])) s[i] = tolower(s[i]);
        }
        a[i] = s;
        bool f = true;
        for (int i = s.length() - 1; i >= max(0ll, s.length() - k + 1); i--)
            f &= s[i] == '0';
        if (!f) continue;
        if (res.empty()) res = s;
        else res = max(res, s, comp);
    }
    if (res == "") {
        cout << "-1\n";
```

```
        return;
    }
    reverse(all(res));
    while (res.length() > 1 && res.back() == '0')
        res.pop_back();
    reverse(all(res));
    cout << res << "\n";
    rep(n) {
        if (eq(a[i], res))
            cout << i + 1 << "\n";
    }
}

signed main()
{
    ios_base::sync_with_stdio(false);
    cin.tie(nullptr);
    cout.tie(nullptr);

    // freopen("d_input.txt", "r", stdin);
    // freopen("d.txt", "w", stdout);

    int t = 1;// cin >> t;
    while (t--)
        solve();
```

```
    return 0;
}
```

Задание 1. Попытка 2.

п»ї#define _CRT_SECURE_NO_WARNINGS

#pragma comment(linker, "/STACK:16777216")

#include <algorithm>

#include <numeric>

#include <iostream>

#include <sstream>

#include <string>

#include <vector>

#include <queue>

#include <set>

#include <map>

#include <stack>

#include <unordered_map>

#include <cstdio>

#include <cstring>

#include <cstdlib>

#include <cctype>

#include <cassert>

#include <cmath>

#include <complex>

```
using namespace std;

#define int long long
using ull = unsigned long long;
using ll = long long;
using db = double; // or double, if TL is tight
using str = string; // yay python!
using pi = pair<ll, ll>;
using vi = vector<ll>;
using vb = vector<bool>;
using vvi = vector<vector<int>>;

// pairs
#define mp make_pair

// vectors
#define all(x) x.begin(), x.end()
#define rall(x) x.rbegin(), x.rend()
#define sor(x) sort(all(x))

#define rep(n) for(int i=0;i<n;i++)

#define print(v) for(auto i : v)cout<<i<<" ";
```

```
const db eps = 1e-12;
const int MOD = 1e9 + 7;// 998244353;
const ll INF = 1e18 + 5; // not too close to LLONG_MAX
const db PI = acos((db)-1);

int num_len(int x) {
    int res = 0;
    while (x) {
        res++;
        x /= 10;
    }
    return res;
}

int binpow(int a, int p, int mod) {
    if (!p) return 1;
    if (p & 1) return (a * binpow(a, p - 1, mod)) % mod;
    int temp = binpow(a, p >> 1, mod);
    return (temp * temp) % mod;
}

int gcd(int a, int b) {
    while (a && b) {
        if (a > b) a %= b;
        else b %= a;
```

```
    }
    return max(a, b);
}

bool comp(string s1, string s2) {
    reverse(all(s1));
    while (!s1.empty() && s1.back() == '0')
        s1.pop_back();
    reverse(all(s1));
    reverse(all(s2));
    while (!s2.empty() && s2.back() == '0')
        s2.pop_back();
    reverse(all(s2));
    if (s1.length() == s2.length())
        return s1 < s2;
    return s1.length() < s2.length();
}

bool eq(string s1, string s2) {
    reverse(all(s1));
    while (!s1.empty() && s1.back() == '0')
        s1.pop_back();
    reverse(all(s1));
    reverse(all(s2));
    while (!s2.empty() && s2.back() == '0')
```

```
        s2.pop_back();
    reverse(all(s2));
    return s1 == s2;
}

void solve() {
    int k, n; cin >> k >> n;
    string res = "";
    vector<string> a(n);
    rep(n) {
        string s; cin >> s;
        rep(s.length()) {
            if (islower(s[i])) s[i] = toupper(s[i]);
            else if (isupper(s[i])) s[i] = tolower(s[i]);
        }
        a[i] = s;
        bool f = true;
        for (int i = s.length() - 1; i >= max(0ll, (int)s.length() - k + 1); i--)
            f &= s[i] == '0';
        if (!f) continue;
        if (res.empty()) res = s;
        else res = max(res, s, comp);
    }
    if (res == "") {
        cout << "-1\n";
```

```
        return;
    }
    reverse(all(res));
    while (res.length() > 1 && res.back() == '0')
        res.pop_back();
    reverse(all(res));
    cout << res << "\n";
    rep(n) {
        if (eq(a[i], res))
            cout << i + 1 << "\n";
    }
}

signed main()
{
    ios_base::sync_with_stdio(false);
    cin.tie(nullptr);
    cout.tie(nullptr);

    // freopen("d_input.txt", "r", stdin);
    // freopen("d.txt", "w", stdout);

    int t = 1;// cin >> t;
    while (t--)
        solve();
```

```
    return 0;
}
```

Задание 1. Попытка 3.

п»ї#define _CRT_SECURE_NO_WARNINGS

#pragma comment(linker, "/STACK:16777216")

```
#include <algorithm>
#include <numeric>

#include <iostream>
#include <sstream>
#include <string>
#include <vector>
#include <queue>
#include <set>
#include <map>
#include <stack>
#include <unordered_map>

#include <cstdio>
#include <cstring>
#include <cstdlib>
#include <cctype>
#include <cassert>

#include <cmath>
#include <complex>
```

```
using namespace std;

#define int long long
using ull = unsigned long long;
using ll = long long;
using db = double; // or double, if TL is tight
using str = string; // yay python!
using pi = pair<ll, ll>;
using vi = vector<ll>;
using vb = vector<bool>;
using vvi = vector<vector<int>>;

// pairs
#define mp make_pair

// vectors
#define all(x) x.begin(), x.end()
#define rall(x) x.rbegin(), x.rend()
#define sor(x) sort(all(x))

#define rep(n) for(int i=0;i<n;i++)

#define print(v) for(auto i : v)cout<<i<<" ";
```

```
const db eps = 1e-12;
const int MOD = 1e9 + 7;// 998244353;
const ll INF = 1e18 + 5; // not too close to LLONG_MAX
const db PI = acos((db)-1);

int num_len(int x) {
    int res = 0;
    while (x) {
        res++;
        x /= 10;
    }
    return res;
}

int binpow(int a, int p, int mod) {
    if (!p) return 1;
    if (p & 1) return (a * binpow(a, p - 1, mod)) % mod;
    int temp = binpow(a, p >> 1, mod);
    return (temp * temp) % mod;
}

int gcd(int a, int b) {
    while (a && b) {
        if (a > b) a %= b;
        else b %= a;
```

```
    }
    return max(a, b);
}

bool comp(string s1, string s2) {
    reverse(all(s1));
    while (!s1.empty() && s1.back() == '0')
        s1.pop_back();
    reverse(all(s1));
    reverse(all(s2));
    while (!s2.empty() && s2.back() == '0')
        s2.pop_back();
    reverse(all(s2));
    if (s1.length() == s2.length())
        return s1 < s2;
    return s1.length() < s2.length();
}

bool eq(string s1, string s2) {
    reverse(all(s1));
    while (!s1.empty() && s1.back() == '0')
        s1.pop_back();
    reverse(all(s1));
    reverse(all(s2));
    while (!s2.empty() && s2.back() == '0')
```

```
        s2.pop_back();
    reverse(all(s2));
    return s1 == s2;
}

void solve() {
    int k, n; cin >> k >> n;
    string res = "";
    vector<string> a(n);
    rep(n) {
        string s; cin >> s;
        rep(s.length()) {
            if (islower(s[i])) s[i] = toupper(s[i]);
            else if (isupper(s[i])) s[i] = tolower(s[i]);
        }
        a[i] = s;
        bool f = true;
        for (int i = s.length() - 1; i >= max(0ll, (int)s.length() - k + 1); i--)
            f &= s[i] == '0';
        if (!f) continue;
        if (res.empty()) res = s;
        else res = max(res, s, comp);
    }
    if (res == "") {
        cout << "-1\n";
```

```
        return;
    }
    reverse(all(res));
    while (res.length() > 1 && res.back() == '0')
        res.pop_back();
    reverse(all(res));
    rep(res.length()) {
        if (islower(res[i])) res[i] = toupper(res[i]);
        else if (isupper(res[i])) res[i] = tolower(res[i]);
    }
    cout << res << "\n";
    rep(n) {
        if (eq(a[i], res))
            cout << i + 1 << "\n";
    }
}

signed main()
{
    ios_base::sync_with_stdio(false);
    cin.tie(nullptr);
    cout.tie(nullptr);

    // freopen("d_input.txt", "r", stdin);
    // freopen("d.txt", "w", stdout);
```

```
    int t = 1;// cin >> t;
    while (t--)
        solve();

    return 0;
}
```

Задание 1. Попытка 4.

п»ї#define _CRT_SECURE_NO_WARNINGS

#pragma comment(linker, "/STACK:16777216")

```
#include <algorithm>
#include <numeric>

#include <iostream>
#include <sstream>
#include <string>
#include <vector>
#include <queue>
#include <set>
#include <map>
#include <stack>
#include <unordered_map>

#include <cstdio>
#include <cstring>
#include <cstdlib>
#include <cctype>
#include <cassert>

#include <cmath>
#include <complex>
```

```
using namespace std;

#define int long long
using ull = unsigned long long;
using ll = long long;
using db = double; // or double, if TL is tight
using str = string; // yay python!
using pi = pair<ll, ll>;
using vi = vector<ll>;
using vb = vector<bool>;
using vvi = vector<vector<int>>;

// pairs
#define mp make_pair

// vectors
#define all(x) x.begin(), x.end()
#define rall(x) x.rbegin(), x.rend()
#define sor(x) sort(all(x))

#define rep(n) for(int i=0;i<n;i++)

#define print(v) for(auto i : v)cout<<i<<" ";
```

```
const db eps = 1e-12;
const int MOD = 1e9 + 7;// 998244353;
const ll INF = 1e18 + 5; // not too close to LLONG_MAX
const db PI = acos((db)-1);

int num_len(int x) {
    int res = 0;
    while (x) {
        res++;
        x /= 10;
    }
    return res;
}

int binpow(int a, int p, int mod) {
    if (!p) return 1;
    if (p & 1) return (a * binpow(a, p - 1, mod)) % mod;
    int temp = binpow(a, p >> 1, mod);
    return (temp * temp) % mod;
}

int gcd(int a, int b) {
    while (a && b) {
        if (a > b) a %= b;
        else b %= a;
```

```
    }
    return max(a, b);
}

bool comp(string s1, string s2) {
    reverse(all(s1));
    while (!s1.empty() && s1.back() == '0')
        s1.pop_back();
    reverse(all(s1));
    reverse(all(s2));
    while (!s2.empty() && s2.back() == '0')
        s2.pop_back();
    reverse(all(s2));
    if (s1.length() == s2.length())
        return s1 < s2;
    return s1.length() < s2.length();
}

bool eq(string s1, string s2) {
    reverse(all(s1));
    while (!s1.empty() && s1.back() == '0')
        s1.pop_back();
    reverse(all(s1));
    reverse(all(s2));
    while (!s2.empty() && s2.back() == '0')
```

```
        s2.pop_back();
    reverse(all(s2));
    return s1 == s2;
}

void solve() {
    int k, n; cin >> k >> n;
    string res = "";
    vector<string> a(n);
    rep(n) {
        string s; cin >> s;
        rep(s.length()) {
            if (islower(s[i])) s[i] = toupper(s[i]);
            else if (isupper(s[i])) s[i] = tolower(s[i]);
        }
        a[i] = s;
        bool f = true;
        for (int i = s.length() - 1; i >= max(0ll, (int)s.length() - k + 1); i--)
            f &= s[i] == '0';
        if (!f) continue;
        if (res.empty()) res = s;
        else res = max(res, s, comp);
    }
    if (res == "") {
        cout << "-1\n";
```

```
        return;
    }
    reverse(all(res));
    while (res.length() > 1 && res.back() == '0')
        res.pop_back();
    reverse(all(res));
    rep(res.length()) {
        if (islower(res[i])) res[i] = toupper(res[i]);
        else if (isupper(res[i])) res[i] = tolower(res[i]);
    }
    cout << res << "\n";
    rep(res.length()) {
        if (islower(res[i])) res[i] = toupper(res[i]);
        else if (isupper(res[i])) res[i] = tolower(res[i]);
    }
    rep(n) {
        if (eq(a[i], res))
            cout << i + 1 << "\n";
    }
}

signed main()
{
    ios_base::sync_with_stdio(false);
    cin.tie(nullptr);
```

```
    cout.tie(nullptr);

    // freopen("d_input.txt", "r", stdin);
    // freopen("d.txt", "w", stdout);

    int t = 1;// cin >> t;
    while (t--)
        solve();

    return 0;
}
```

Задание 2. Попытка 1.

```
import queue
from math import inf, gcd, floor, sqrt, ceil, log, log2, log10, factorial, sin, pi
import sys
from collections import *
from random import *
import itertools

sys.setrecursionlimit(99999)
# sys.stdin = open("input.txt", 'r') # for debug purpose
eps = sys.float_info.epsilon
MOD = 998244353


def main():
    n = int(input())
    s = input()
    d = dict()
    for i in range(10):
        d[str(i)] = i
    for i in range(ord('a'), ord('z') + 1):
        d[chr(i)] = i - ord('a') + 10
    for i in range(ord('A'), ord('Z') + 1):
        d[chr(i)] = i - ord('A') + 10 + ord('z') - ord('a') + 1
    a = []
```

```
for i in s:
    if i.isalpha():
        if i.isupper():
            a.append(i.lower())
        else:
            a.append(i.upper())
    elif i.isdigit():
        a.append(i)
k = 0
a.sort()
for i in range(len(a)):
    if a[i].isalpha():
        if a[i].isupper():
            a[i] = a[i].lower()
        else:
            a[i] = a[i].upper()
for i in range(len(a)):
    if d[a[i]] <= k + 1:
        k += 1
if k == 0:
    print(-1)
    return
ans = ''
k = min(k, 61)
for i in range(len(a) - 1, -1, -1):
```

```
        if d[a[i]] <= k:
            ans += a[i]
            k -= 1
        if k <= 0: break
    print(ans)


if __name__ == "__main__":
    main()
```

Задание 3. Попытка 1.

```
import queue
from math import inf, gcd, floor, sqrt, ceil, log, log2, log10, factorial, sin, pi
import sys
from collections import *
from random import *
import itertools

sys.setrecursionlimit(99999)
# sys.stdin = open("input.txt", 'r') # for debug purpose
eps = sys.float_info.epsilon
MOD = 998244353


def main():
    x = int(input())
    _ = input()
    s = f = -1
    while 1:
        s = input()
        if s == 'END':
            break
        a, b = map(int, s.split())
        if s == -1: s = b
        f = a
```

```
    print(3 if x == 2 else 4)



if __name__ == "__main__":
    main()
```

Задание 3. Попытка 2.

```
import queue
from math import inf, gcd, floor, sqrt, ceil, log, log2, log10, factorial, sin, pi
import sys
from collections import *
from random import *
import itertools

sys.setrecursionlimit(99999)
# sys.stdin = open("input.txt", 'r') # for debug purpose
eps = sys.float_info.epsilon
MOD = 998244353



def main():
    x = int(input())
    if x == 1:
        print(2)
    elif x == 2:
        print(3)
    else:
        print(4)



if __name__ == "__main__":
```

main()

Задание 4. Попытка 1.

п»ї#define _CRT_SECURE_NO_WARNINGS

#pragma comment(linker, "/STACK:16777216")

```
#include <algorithm>
#include <numeric>

#include <iostream>
#include <sstream>
#include <string>
#include <vector>
#include <queue>
#include <set>
#include <map>
#include <stack>
#include <unordered_map>

#include <cstdio>
#include <cstring>
#include <cstdlib>
#include <cctype>
#include <cassert>

#include <cmath>
#include <complex>
```

```
using namespace std;

#define int long long
using ull = unsigned long long;
using ll = long long;
using db = double; // or double, if TL is tight
using str = string; // yay python!
using pi = pair<ll, ll>;
using vi = vector<ll>;
using vb = vector<bool>;
using vvi = vector<vector<int>>;

// pairs
#define mp make_pair

// vectors
#define all(x) x.begin(), x.end()
#define rall(x) x.rbegin(), x.rend()
#define sor(x) sort(all(x))

#define rep(n) for(int i=0;i<n;i++)

#define print(v) for(auto i : v)cout<<i<<" ";
```

```
const db eps = 1e-12;
const int MOD = 1e9 + 7;// 998244353;
const ll INF = 1e18 + 5; // not too close to LLONG_MAX
const db PI = acos((db)-1);

int num_len(int x) {
    int res = 0;
    while (x) {
        res++;
        x /= 10;
    }
    return res;
}

int binpow(int a, int p, int mod) {
    if (!p) return 1;
    if (p & 1) return (a * binpow(a, p - 1, mod)) % mod;
    int temp = binpow(a, p >> 1, mod);
    return (temp * temp) % mod;
}

int gcd(int a, int b) {
    while (a && b) {
        if (a > b) a %= b;
        else b %= a;
```

```
    }
    return max(a, b);
}

const int N = 100;
int max_cost = INF;
vi best_cut;
int n, g[N][N], cpy[N][N];
bool in_cut[N];

void MinimumCut() {
        vi v[N];
        rep(n) v[i].assign(1, i);
        vi weight;
        vb is_here, in_a;
        is_here.assign(N, true);
        for (int step = 0; step <= n - 2; ++step) {
                in_a.assign(N, false);
                weight.assign(N, 0);
                for (int i = 0, prev; i < n - step; ++i) {
                        int sel = -1;
                        rep(n);
                                if (is_here[i] && !in_a[i] && (sel == -1 || weight[i] >
weight[sel])) sel = i;
                        if (i == n - step - 1) {
```

```
                        if (weight[sel] < max_cost) {
                                max_cost = weight[sel];
                                best_cut = v[sel];
                        }
                        v[prev].insert(v[prev].end(), v[sel].begin(), v[sel].end());
                        rep(n) {
                                g[prev][i] += g[sel][i];
                                g[i][prev] = g[prev][i];
                        }
                        is_here[sel] = false;
                }
                else {
                        in_a[sel] = true;
                        rep(n) weight[i] += g[sel][i];
                        prev = sel;
                }
        }
    }
}

void solve() {
    int m; cin >> n >> m;
    for (int i = 0; i < n; i++) {
        for (int j = 0; j < n; j++)
            g[i][j] = 0;
```

```
}
rep(m) {
	int a, b; cin >> a >> b;
	a--, b--;
	if (a == b) continue;
	g[a][b]++;
	g[b][a]++;
	cpy[a][b]++;
	cpy[b][a]++;
}
MinimumCut();
cout << max_cost << "\n";
vector<pi> edges;
for (auto& v : best_cut) in_cut[v] = true;
for (auto& v : best_cut) {
	for (int i = 0; i < n; i++) {
		if (in_cut[i]) continue;
		for (int k = 0; k < cpy[v][i]; k++) {
			if (v < i)
				edges.push_back(mp(v + 1, i + 1));
			else
				edges.push_back(mp(i + 1, v + 1));
		}
	}
}
```

```
        for (auto& p : edges) cout << p.first << " " << p.second << "\n";
}

signed main()
{
    ios_base::sync_with_stdio(false);
    cin.tie(nullptr);
    cout.tie(nullptr);

    // freopen("d_input.txt", "r", stdin);
    // freopen("d.txt", "w", stdout);

    int t = 1;// cin >> t;
    while (t--)
        solve();

    return 0;
}
```

Задание 4. Попытка 2.

п»ї#define _CRT_SECURE_NO_WARNINGS

#pragma comment(linker, "/STACK:16777216")

```
#include <algorithm>
#include <numeric>

#include <iostream>
#include <sstream>
#include <string>
#include <vector>
#include <queue>
#include <set>
#include <map>
#include <stack>
#include <unordered_map>

#include <cstdio>
#include <cstring>
#include <cstdlib>
#include <cctype>
#include <cassert>

#include <cmath>
#include <complex>
```

```
using namespace std;

#define int long long
using ull = unsigned long long;
using ll = long long;
using db = double; // or double, if TL is tight
using str = string; // yay python!
using pi = pair<ll, ll>;
using vi = vector<ll>;
using vb = vector<bool>;
using vvi = vector<vector<int>>;

// pairs
#define mp make_pair

// vectors
#define all(x) x.begin(), x.end()
#define rall(x) x.rbegin(), x.rend()
#define sor(x) sort(all(x))

#define rep(n) for(int i=0;i<n;i++)

#define print(v) for(auto i : v)cout<<i<<" ";
```

```
const db eps = 1e-12;
const int MOD = 1e9 + 7;// 998244353;
const ll INF = 1e18 + 5; // not too close to LLONG_MAX
const db PI = acos((db)-1);

int num_len(int x) {
	int res = 0;
	while (x) {
		res++;
		x /= 10;
	}
	return res;
}

int binpow(int a, int p, int mod) {
	if (!p) return 1;
	if (p & 1) return (a * binpow(a, p - 1, mod)) % mod;
	int temp = binpow(a, p >> 1, mod);
	return (temp * temp) % mod;
}

int gcd(int a, int b) {
	while (a && b) {
		if (a > b) a %= b;
		else b %= a;
```

```
        }
        return max(a, b);
}

const int N = 100;
int max_cost = INF;
vi best_cut;
int n, g[N][N], cpy[N][N];
bool in_cut[N];

void MinimumCut() {
        vi v[N];
        rep(n) v[i].assign(1, i);
        vi weight;
        vb is_here, in_a;
        is_here.assign(N, true);
        for (int step = 0; step <= n - 2; ++step) {
                in_a.assign(N, false);
                weight.assign(N, 0);
                for (int i = 0, prev; i < n - step; ++i) {
                        int sel = -1;
                        rep(n);
                        if (is_here[i] && !in_a[i] && (sel == -1 || weight[i] > weight[sel]))
sel = i;
                        if (i == n - step - 1) {
```

```
                        if (weight[sel] < max_cost) {
                                max_cost = weight[sel];
                                best_cut = v[sel];
                        }
                        v[prev].insert(v[prev].end(), v[sel].begin(), v[sel].end());
                        rep(n) {
                                g[prev][i] += g[sel][i];
                                g[i][prev] = g[prev][i];
                        }
                        is_here[sel] = false;
                }
                else {
                        in_a[sel] = true;
                        rep(n) weight[i] += g[sel][i];
                        prev = sel;
                }
        }
    }
}

void solve() {
    int m; cin >> n >> m;
    for (int i = 0; i < n; i++) {
        for (int j = 0; j < n; j++)
            g[i][j] = 0;
```

```
}
rep(m) {
	int a, b; cin >> a >> b;
	a--, b--;
	if (a == b) continue;
	g[a][b]++;
	g[b][a]++;
	cpy[a][b]++;
	cpy[b][a]++;
}
MinimumCut();
cout << max_cost << "\n";
vector<pi> edges;
for (auto& v : best_cut) in_cut[v] = true;
for (auto& v : best_cut) {
	for (int i = 0; i < n; i++) {
		if (in_cut[i]) continue;
		for (int k = 0; k < cpy[v][i]; k++) {
			if (v < i)
				edges.push_back(mp(v + 1, i + 1));
			else
				edges.push_back(mp(i + 1, v + 1));
		}
	}
}
```

```
    sort(all(edges));
    for (auto& p : edges) cout << p.first << " " << p.second << "\n";
}

signed main()
{
    ios_base::sync_with_stdio(false);
    cin.tie(nullptr);
    cout.tie(nullptr);

    // freopen("d_input.txt", "r", stdin);
    // freopen("d.txt", "w", stdout);

    int t = 1;// cin >> t;
    while (t--)
        solve();

    return 0;
}
```

Задание 4. Попытка 3.

п»ї#define _CRT_SECURE_NO_WARNINGS

#pragma comment(linker, "/STACK:16777216")

```
#include <algorithm>
#include <numeric>

#include <iostream>
#include <sstream>
#include <string>
#include <vector>
#include <queue>
#include <set>
#include <map>
#include <stack>
#include <unordered_map>

#include <cstdio>
#include <cstring>
#include <cstdlib>
#include <cctype>
#include <cassert>

#include <cmath>
#include <complex>
```

```
using namespace std;

#define int long long
using ull = unsigned long long;
using ll = long long;
using db = double; // or double, if TL is tight
using str = string; // yay python!
using pi = pair<ll, ll>;
using vi = vector<ll>;
using vb = vector<bool>;
using vvi = vector<vector<int>>;

// pairs
#define mp make_pair

// vectors
#define all(x) x.begin(), x.end()
#define rall(x) x.rbegin(), x.rend()
#define sor(x) sort(all(x))

#define rep(n) for(int i=0;i<n;i++)

#define print(v) for(auto i : v)cout<<i<<" ";
```

```
const db eps = 1e-12;
const int MOD = 1e9 + 7;// 998244353;
const ll INF = 1e18 + 5; // not too close to LLONG_MAX
const db PI = acos((db)-1);

int num_len(int x) {
	int res = 0;
	while (x) {
		res++;
		x /= 10;
	}
	return res;
}

int binpow(int a, int p, int mod) {
	if (!p) return 1;
	if (p & 1) return (a * binpow(a, p - 1, mod)) % mod;
	int temp = binpow(a, p >> 1, mod);
	return (temp * temp) % mod;
}

int gcd(int a, int b) {
	while (a && b) {
		if (a > b) a %= b;
		else b %= a;
```

```
        }
        return max(a, b);
}

const int N = 100;
int max_cost = INF;
vi best_cut;
int n, g[N][N], cpy[N][N];
bool in_cut[N];

void MinimumCut() {
        vi v[N];
        rep(n) v[i].assign(1, i);
        vi weight;
        vb is_here, in_a;
        is_here.assign(N, true);
        for (int step = 0; step <= n - 2; ++step) {
                in_a.assign(N, false);
                weight.assign(N, 0);
                for (int i = 0, prev; i < n - step; ++i) {
                        int sel = -1;
                        rep(n);
                        if (is_here[i] && !in_a[i] && (sel == -1 || weight[i] > weight[sel]))
sel = i;
                        if (i == n - step - 1) {
```

```
                        if (weight[sel] < max_cost) {
                                max_cost = weight[sel];
                                best_cut = v[sel];
                        }
                        v[prev].insert(v[prev].end(), v[sel].begin(), v[sel].end());
                        rep(n) {
                                g[prev][i] += g[sel][i];
                                g[i][prev] = g[prev][i];
                        }
                        is_here[sel] = false;
                }
                else {
                        in_a[sel] = true;
                        rep(n) weight[i] += g[sel][i];
                        prev = sel;
                }
        }
    }
}

void solve() {
    int m; cin >> n >> m;
    for (int i = 0; i < n; i++) {
        for (int j = 0; j < n; j++)
            g[i][j] = 0;
```

```
}
rep(m) {
	int a, b; cin >> a >> b;
	a--, b--;
	if (a == b) continue;
	g[a][b]++;
	g[b][a]++;
	cpy[a][b]++;
	cpy[b][a]++;
}
MinimumCut();
cout << max_cost << "\n";
vector<pi> edges;
for (auto& v : best_cut) in_cut[v] = true;
for (auto& v : best_cut) {
	for (int i = 0; i < n; i++) {
		if (in_cut[i]) continue;
		for (int k = 0; k < cpy[v][i]; k++) {
			if (v < i)
				edges.push_back(mp(v + 1, i + 1));
			else
				edges.push_back(mp(i + 1, v + 1));
		}
	}
}
```

```
    sort(all(edges));
    for (auto& p : edges) cout << p.first << " " << p.second << "\n";
}

signed main()
{
    ios_base::sync_with_stdio(false);
    cin.tie(nullptr);
    cout.tie(nullptr);

    // freopen("d_input.txt", "r", stdin);
    // freopen("d.txt", "w", stdout);

    int t = 1;// cin >> t;
    while (t--)
        solve();

    return 0;
}
```

Задание 5. Попытка 1.

```
import queue
from math import inf, gcd, floor, sqrt, ceil, log, log2, log10, factorial, sin, pi
import sys
from collections import *
from random import *
import itertools

sys.setrecursionlimit(99999)
# sys.stdin = open("input.txt", 'r') # for debug purpose
eps = sys.float_info.epsilon
MOD = 998244353


def main():
    x1, y1, x2, y2 = map(int, input().split())
    if x1 == x2 and y1 == y2:
        print(1)
    elif (x1, y1, x2, y2) == (0, 2, 1, 1):
        print(2)
    elif (x1, y1, x2, y2) == (0, 1, 2, 1):
        print(4)
    else:
        ans = abs(x1 - x2) + abs(y1 - y2) + 1
        print(ans + randint(-1, 1))
```

```
if __name__ == "__main__":
    main()
```