



**МОСКОВСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ
имени М.В. ЛОМОНОСОВА**

ОЛИМПИАДНАЯ РАБОТА

Наименование олимпиады школьников: **«Ломоносов»**

Профиль олимпиады: **Информатика**

ФИО участника олимпиады: **Салахов Данияр Ленарович**

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 | 34 | 70 | 27 | 100 | 0 |

Дополнительный балл: 55

Задание 1. Попытка 1.

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

//#pragma GCC optimize("Ofast", "-O3", "fast-math")

using namespace std;

#define int long long
#define double long double
#define pii pair<int, int>
#define veci vector<int>
#define endl "\n"

bool local = false;

inline int convert(char a) {
    if ('0' <= a && a <= '9')
        return a - '0';
    if ('a' <= a && a <= 'z')
        return a - 'a' + 10;
    return a - 'A' + 36;
}

void equalise(string &a, string &b) {
    int sz = (int) max(a.length(), b.length());
    for (int i = (int) a.length(); i < sz; ++i)
```

```
    a = "0" + a;
for (int i = (int) b.length(); i < sz; ++i)
    b = "0" + b;
}
```

```
inline int is_greater(string a, string b) {
    equalise(a, b);
for (int j = (int) min(a.length(), b.length()) - 1; j >= 0; --j) {
    if (convert(a[j]) > convert(b[j]))
        return 1;
    if (convert(a[j]) < convert(b[j]))
        return -1;
}
return 0;
}
```

```
inline void solve(int test = 0) {
    int k, n;
    cin >> k >> n;
    int max_value = 0;
    vector<int> answer;
    vector<string> xs(n);
for (int i = 0; i < n; ++i) {
    cin >> xs[i];
    bool can = true;
```

```
for (int j = (int) xs[i].length() - 1, l = 1; j >= 0; --j, l++) {
    if (l >= k) {
        can = true;
        break;
    } else if (xs[i][j] != '0') {
        can = false;
        break;
    }
}
if (can) {
    if (answer.empty()) {
        answer.push_back(i);
    } else {
        int v = is_greater(xs[i], xs[answer[0]]);
        if (v == 0)
            answer.push_back(i);
        else if (v > 0) {
            answer.clear();
            answer.shrink_to_fit();
            answer.push_back(i);
        }
    }
}
}
cout << xs[answer[0]] << endl;
```

```
    for (int x: answer)
        cout << x + 1 << endl;
}

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

    local = getenv("local");
    if (local) {
        freopen("../test/input.txt", "r", stdin);
        freopen("../test/output.txt", "w", stdout);
    }

    int test_cnt = 1, test_ind = 0;
    // cin >> test_cnt;

    while (test_cnt--)
        solve(test_ind++);

    return 0;
}
```

Задание 1. Попытка 2.

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

//#pragma GCC optimize("Ofast", "-O3", "fast-math")

using namespace std;

#define int long long
#define double long double
#define pii pair<int, int>
#define veci vector<int>
#define endl "\n"

bool local = false;

inline int convert(char a) {
    if ('0' <= a && a <= '9')
        return a - '0';
    if ('a' <= a && a <= 'z')
        return a - 'a' + 10;
    return a - 'A' + 36;
}

inline string remove_zeros(const string &a) {
    string res;
    for (char i : a) {
```

```
    if (i == '0' && res.empty()) continue;
    res += i;
}
if (res.empty())
    res = "0";
return res;
}
```

```
inline void equalise(string &a, string &b) {
    int sz = (int) max(a.length(), b.length());
    for (int i = (int) a.length(); i < sz; ++i)
        a = "0" + a;
    for (int i = (int) b.length(); i < sz; ++i)
        b = "0" + b;
}
```

```
inline int is_greater(string a, string b) {
    equalise(a, b);
    for (int j = (int) min(a.length(), b.length()) - 1; j >= 0; --j) {
        if (convert(a[j]) > convert(b[j]))
            return 1;
        if (convert(a[j]) < convert(b[j]))
            return -1;
    }
    return 0;
}
```



```
}
```

```
inline void solve(int test = 0) {  
    int k, n;  
    cin >> k >> n;  
    int max_value = 0;  
    vector<int> answer;  
    vector<string> xs(n);  
    for (int i = 0; i < n; ++i) {  
        cin >> xs[i];  
        bool can = true;  
        for (int j = (int) xs[i].length() - 1, l = 1; j >= 0; --j, l++) {  
            if (l >= k) {  
                can = true;  
                break;  
            } else if (xs[i][j] != '0') {  
                can = false;  
                break;  
            }  
        }  
    }  
    if (can) {  
        if (answer.empty()) {  
            answer.push_back(i);  
        } else {  
            int v = is_greater(xs[i], xs[answer[0]]);
```

```
        if (v == 0)
            answer.push_back(i);
        else if (v > 0) {
            answer.clear();
            answer.shrink_to_fit();
            answer.push_back(i);
        }
    }
}
}
}
}
cout << remove_zeros(xs[answer[0]]) << endl;
for (int x: answer)
    cout << x + 1 << endl;
}
```

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

    local = getenv("local");
    if (local) {
        freopen("../test/input.txt", "r", stdin);
        freopen("../test/output.txt", "w", stdout);
    }
}
```

```
int test_cnt = 1, test_ind = 0;

// cin >> test_cnt;

while (test_cnt--)
    solve(test_ind++);

return 0;
}
```

Задание 1. Попытка 3.

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

//#pragma GCC optimize("Ofast", "-O3", "fast-math")

using namespace std;

#define int long long
#define double long double
#define pii pair<int, int>
#define veci vector<int>
#define endl "\n"

bool local = false;

inline int convert(char a) {
    if ('0' <= a && a <= '9')
        return a - '0';
    if ('a' <= a && a <= 'z')
        return a - 'a' + 10;
    return a - 'A' + 36;
}

inline string remove_zeros(const string &a) {
    string res;
    for (char i : a) {
```

```
    if (i == '0' && res.empty()) continue;
    res += i;
}
if (res.empty())
    res = "0";
return res;
}
```

```
inline void equalise(string &a, string &b) {
    int sz = (int) max(a.length(), b.length());
    for (int i = (int) a.length(); i < sz; ++i)
        a = "0" + a;
    for (int i = (int) b.length(); i < sz; ++i)
        b = "0" + b;
}
```

```
inline int is_greater(string a, string b) {
    equalise(a, b);
    for (int j = (int) min(a.length(), b.length()) - 1; j >= 0; --j) {
        if (convert(a[j]) > convert(b[j]))
            return 1;
        if (convert(a[j]) < convert(b[j]))
            return -1;
    }
    return 0;
}
```

```
}
```

```
inline void solve(int test = 0) {  
    int k, n;  
    cin >> k >> n;  
    int max_value = 0;  
    vector<int> answer;  
    vector<string> xs(n);  
    for (int i = 0; i < n; ++i) {  
        cin >> xs[i];  
        bool can = true;  
        for (int j = (int) xs[i].length() - 1, l = 1; j >= 0; --j, l++) {  
            if (l > k && xs[i][j] != '0') {  
                can = true;  
                break;  
            } else if (xs[i][j] != '0') {  
                can = false;  
                break;  
            }  
        }  
    }  
    if (can) {  
        if (answer.empty()) {  
            answer.push_back(i);  
        } else {  
            int v = is_greater(xs[i], xs[answer[0]]);
```

```
        if (v == 0)
            answer.push_back(i);
        else if (v > 0) {
            answer.clear();
            answer.shrink_to_fit();
            answer.push_back(i);
        }
    }
}

cout << remove_zeros(xs[answer[0]]) << endl;

for (int x: answer)
    cout << x + 1 << endl;
}
```

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

    local = getenv("local");
    if (local) {
        freopen("../test/input.txt", "r", stdin);
        freopen("../test/output.txt", "w", stdout);
    }
}
```

```
int test_cnt = 1, test_ind = 0;

// cin >> test_cnt;

while (test_cnt--)
    solve(test_ind++);

return 0;
}
```


Задание 1. Попытка 4.

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

//#pragma GCC optimize("Ofast", "-O3", "fast-math")

using namespace std;

#define int long long
#define double long double
#define pii pair<int, int>
#define veci vector<int>
#define endl "\n"

bool local = false;

inline int convert(char a) {
    if ('0' <= a && a <= '9')
        return a - '0';
    if ('a' <= a && a <= 'z')
        return a - 'a' + 10;
    return a - 'A' + 36;
}

inline string remove_zeros(const string &a) {
    string res;
    for (char i : a) {
```

```
    if (i == '0' && res.empty()) continue;
    res += i;
}
if (res.empty())
    res = "0";
return res;
}
```

```
inline void equalise(string &a, string &b) {
    int sz = (int) max(a.length(), b.length());
    for (int i = (int) a.length(); i < sz; ++i)
        a = "0" + a;
    for (int i = (int) b.length(); i < sz; ++i)
        b = "0" + b;
}
```

```
inline int is_greater(string a, string b) {
    equalise(a, b);
    for (int j = (int) min(a.length(), b.length()) - 1; j >= 0; --j) {
        if (convert(a[j]) > convert(b[j]))
            return 1;
        if (convert(a[j]) < convert(b[j]))
            return -1;
    }
    return 0;
}
```

```
}
```

```
inline void solve(int test = 0) {  
    int k, n;  
    cin >> k >> n;  
    int max_value = 0;  
    vector<int> answer;  
    vector<string> xs(n);  
    for (int i = 0; i < n; ++i) {  
        cin >> xs[i];  
        bool can = true;  
        for (int j = (int) xs[i].length() - 1, l = 1; j >= 0; --j, l++) {  
            if (l > k && xs[i][j] != '0') {  
                can = true;  
                break;  
            } else if (xs[i][j] != '0') {  
                can = false;  
                break;  
            }  
        }  
    }  
    if (can) {  
        if (answer.empty()) {  
            answer.push_back(i);  
        } else {  
            int v = is_greater(xs[i], xs[answer[0]]);
```

```
        if (v == 0)
            answer.push_back(i);
        else if (v > 0) {
            answer.clear();
            answer.shrink_to_fit();
            answer.push_back(i);
        }
    }
}

if (answer.empty()) {
    cout << -1 << endl;
    return;
}

cout << remove_zeros(xs[answer[0]]) << endl;

for (int x: answer)
    cout << x + 1 << endl;
}
```

```
signed main() {
    cin.tie(), cout.tie();

    ios_base::sync_with_stdio(false);

    local = getenv("local");

    if (local) {
```

```
    freopen("../test/input.txt", "r", stdin);
    freopen("../test/output.txt", "w", stdout);
}

int test_cnt = 1, test_ind = 0;
// cin >> test_cnt;

while (test_cnt--)
    solve(test_ind++);

return 0;
}
```

Задание 2. Попытка 1.

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

```
///pragma GCC optimize("Ofast", "-O3", "fast-math")
```

```
using namespace std;
```

```
define int long long
```

```
define double long double
```

```
define pii pair<int, int>
```

```
define veci vector<int>
```

```
define endl "\n"
```

```
bool local = false;
```

```
inline int convert(char a) {
```

```
    if ('0' <= a && a <= '9')
```

```
        return a - '0';
```

```
    if ('a' <= a && a <= 'z')
```

```
        return a - 'a' + 10;
```

```
    if ('A' <= a && a <= 'Z')
```

```
        return a - 'A' + 36;
```

```
    return -1;
```

```
}
```

```
inline void solve(int test = 0) {
```

```

int n;

string x;

cin >> n >> x;

vector<pair<int, char>> chars;

vector<char> pre_result;

for (auto i: x) {
    if (convert(i) == -1)
        continue;

    chars.emplace_back(convert(i), i);
}

sort(chars.begin(), chars.end());

for (int i = 0; i < chars.size(); ++i) {
    if (chars[i].first > i + 1) continue;

    pre_result.push_back(chars[i].second);
}

vector<bool> take(chars.size(), true);

// int to_remove = (int) chars.size() - n;
// for (int i = 0; i < chars.size(); ++i) {
//     if (to_remove <= 0) break;
//     if (i == chars.size() - 1)
//         take[i] = false, to_remove--;
//     else if (chars[i + 1].first <= i + 1)
//         take[i] = false, to_remove--;
// }

```

```

vector<char> result;

for (int i = 0; i < chars.size(); ++i) {
    if (!take[i]) continue;
    result.push_back(chars[i].second);
}

std::reverse(result.begin(), result.end());

if (result.size() != n) {
    cout << -1 << endl;
    return;
}

for (auto chr : result)
    cout << chr;

cout << endl;
}

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

    local = getenv("local");
    if (local) {
        freopen("../test/input.txt", "r", stdin);
        freopen("../test/output.txt", "w", stdout);
    }
}

```



```
int test_cnt = 1, test_ind = 0;

// cin >> test_cnt;

while (test_cnt--){
    solve(test_ind++);
}

return 0;
```

Задание 2. Попытка 2.

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

```
///pragma GCC optimize("Ofast", "-O3", "fast-math")
```

```
using namespace std;
```

```
define int long long
```

```
define double long double
```

```
define pii pair<int, int>
```

```
define veci vector<int>
```

```
define endl "\n"
```

```
bool local = false;
```

```
inline int convert(char a) {
```

```
    if ('0' <= a && a <= '9')
```

```
        return a - '0';
```

```
    if ('a' <= a && a <= 'z')
```

```
        return a - 'a' + 10;
```

```
    if ('A' <= a && a <= 'Z')
```

```
        return a - 'A' + 36;
```

```
    return -1;
```

```
}
```

```
inline void solve(int test = 0) {
```

```

int n;

string x;

cin >> n >> x;

vector<pair<int, char>> chars;

vector<char> pre_result;

for (auto i: x) {
    if (convert(i) == -1)
        continue;

    chars.emplace_back(convert(i), i);
}

sort(chars.begin(), chars.end());

for (int i = 0; i < chars.size(); ++i) {
    if (chars[i].first > i + 1) continue;

    pre_result.push_back(chars[i].second);
}

vector<bool> take(chars.size(), true);

// int to_remove = (int) chars.size() - n;
// for (int i = 0; i < chars.size(); ++i) {
//     if (to_remove <= 0) break;
//     if (i == chars.size() - 1)
//         take[i] = false, to_remove--;
//     else if (chars[i + 1].first <= i + 1)
//         take[i] = false, to_remove--;
// }

```

```

vector<char> result;

for (int i = 0; i < chars.size(); ++i) {
    if (!take[i]) continue;
    result.push_back(chars[i].second);
}

std::reverse(result.begin(), result.end());

// if (result.size() != n) {
//     cout << -1 << endl;
//     return;
// }

for (auto chr : result)
    cout << chr;

cout << endl;
}

signed main() {
    cin.tie(), cout.tie();

    ios_base::sync_with_stdio(false);

    local = getenv("local");

    if (local) {
        freopen("../test/input.txt", "r", stdin);
        freopen("../test/output.txt", "w", stdout);
    }
}

```

```
int test_cnt = 1, test_ind = 0;

// cin >> test_cnt;

while (test_cnt--){
    solve(test_ind++);
}

return 0;
```

Задание 2. Попытка 3.

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

```
///pragma GCC optimize("Ofast", "-O3", "fast-math")
```

```
using namespace std;
```

```
define int long long
```

```
define double long double
```

```
define pii pair<int, int>
```

```
define veci vector<int>
```

```
define endl "\n"
```

```
bool local = false;
```

```
inline int convert(char a) {
```

```
    if ('0' <= a && a <= '9')
```

```
        return a - '0';
```

```
    if ('a' <= a && a <= 'z')
```

```
        return a - 'a' + 10;
```

```
    if ('A' <= a && a <= 'Z')
```

```
        return a - 'A' + 36;
```

```
    return -1;
```

```
}
```

```
inline void solve(int test = 0) {
```

```

int n;

string x;

cin >> n >> x;

vector<pair<int, char>> chars;

vector<char> pre_result;

for (auto i: x) {
    if (convert(i) == -1)
        continue;

    chars.emplace_back(convert(i), i);
}

sort(chars.begin(), chars.end());

for (int i = 0; i < chars.size(); ++i) {
    if (chars[i].first > i + 1) continue;

    pre_result.push_back(chars[i].second);
}

vector<bool> take(chars.size(), true);

// int to_remove = (int) chars.size() - n;
// for (int i = 0; i < chars.size(); ++i) {
//     if (to_remove <= 0) break;
//     if (i == chars.size() - 1)
//         take[i] = false, to_remove--;
//     else if (chars[i + 1].first <= i + 1)
//         take[i] = false, to_remove--;
// }

```

```

vector<char> result;

for (int i = 0; i < pre_result.size(); ++i) {
    if (!take[i]) continue;
    result.push_back(pre_result[i]);
}

std::reverse(result.begin(), result.end());

// if (result.size() != n) {
//     cout << -1 << endl;
//     return;
// }

for (auto chr : result)
    cout << chr;

cout << endl;
}

signed main() {
    cin.tie(), cout.tie();

    ios_base::sync_with_stdio(false);

    local = getenv("local");

    if (local) {
        freopen("../test/input.txt", "r", stdin);
        freopen("../test/output.txt", "w", stdout);
    }
}

```



```
int test_cnt = 1, test_ind = 0;

// cin >> test_cnt;

while (test_cnt--){
    solve(test_ind++);
}

return 0;
```

Задание 2. Попытка 4.

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

```
///  
#pragma GCC optimize("Ofast", "-O3", "fast-math")
```

```
using namespace std;
```

```
#define int long long
```

```
#define double long double
```

```
#define pii pair<int, int>
```

```
#define veci vector<int>
```

```
#define endl "\n"
```

```
bool local = false;
```

```
inline int convert(char a) {
```

```
    if ('0' <= a && a <= '9')
```

```
        return a - '0';
```

```
    if ('a' <= a && a <= 'z')
```

```
        return a - 'a' + 10;
```

```
    if ('A' <= a && a <= 'Z')
```

```
        return a - 'A' + 36;
```

```
    return -1;
```

```
}
```

```
inline void solve(int test = 0) {
```

```

int n;

string x;

cin >> n >> x;

vector<pair<int, char>> chars;

vector<char> pre_result;

for (auto i: x) {
    if (convert(i) == -1)
        continue;

    chars.emplace_back(convert(i), i);
}

sort(chars.begin(), chars.end());

for (int i = 0; i < chars.size(); ++i) {
    if (chars[i].first > pre_result.size() + 1) continue;

    pre_result.push_back(chars[i].second);
}

vector<bool> take(chars.size(), true);

// int to_remove = (int) chars.size() - n;
// for (int i = 0; i < chars.size(); ++i) {
//     if (to_remove <= 0) break;
//     if (i == chars.size() - 1)
//         take[i] = false, to_remove--;
//     else if (chars[i + 1].first <= i + 1)
//         take[i] = false, to_remove--;
// }

```

```
vector<char> result;
for (int i = 0; i < pre_result.size(); ++i) {
    if (!take[i]) continue;
    result.push_back(pre_result[i]);
}

std::reverse(result.begin(), result.end());

if (result.empty()) {
    cout << -1 << endl;
    return;
}

// if (result.size() != n) {
//     cout << -1 << endl;
//     return;
// }

for (auto chr : result)
    cout << chr;

cout << endl;
}

signed main() {
    cin.tie(), cout.tie();

    ios_base::sync_with_stdio(false);
```

```
local = getenv("local");
if (local) {
    freopen("../test/input.txt", "r", stdin);
    freopen("../test/output.txt", "w", stdout);
}

int test_cnt = 1, test_ind = 0;
// cin >> test_cnt;

while (test_cnt--)
    solve(test_ind++);

return 0;
}
```

Задание 2. Попытка 5.

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

```
///pragma GCC optimize("Ofast", "-O3", "fast-math")
```

```
using namespace std;
```

```
define int long long
```

```
define double long double
```

```
define pii pair<int, int>
```

```
define veci vector<int>
```

```
define endl "\n"
```

```
bool local = false;
```

```
inline int convert(char a) {
```

```
    if ('0' <= a && a <= '9')
```

```
        return a - '0';
```

```
    if ('a' <= a && a <= 'z')
```

```
        return a - 'a' + 10;
```

```
    if ('A' <= a && a <= 'Z')
```

```
        return a - 'A' + 36;
```

```
    return -1;
```

```
}
```

```
inline void solve(int test = 0) {
```

```

int n;
string x;
cin >> n >> x;
vector<pair<int, char>> chars;
vector<pair<int, char>> pre_result;
for (auto i: x) {
    if (convert(i) == -1)
        continue;
    chars.emplace_back(convert(i), i);
}
sort(chars.begin(), chars.end());
for (int i = 0; i < chars.size(); ++i) {
    if (chars[i].first > pre_result.size() + 1) continue;
    pre_result.push_back(chars[i]);
}
vector<bool> take(chars.size(), true);
int to_remove = (int) pre_result.size() - 6111;
for (int i = 0; i < pre_result.size(); ++i) {
    if (to_remove <= 0) break;
    if (i == pre_result.size() - 1)
        take[i] = false, to_remove--;
    else if (pre_result[i + 1].first <= i + 1)
        take[i] = false, to_remove--;
}

```

```

vector<char> result;
for (int i = 0; i < pre_result.size(); ++i) {
    if (!take[i]) continue;
    result.push_back(pre_result[i].second);
}
std::reverse(result.begin(), result.end());

if (result.empty() || result.size() > 61) {
    cout << -1 << endl;
    return;
}

// if (result.size() != n) {
//     cout << -1 << endl;
//     return;
// }

for (auto chr : result)
    cout << chr;

cout << endl;
}

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

```



```
local = getenv("local");  
if (local) {  
    freopen("../test/input.txt", "r", stdin);  
    freopen("../test/output.txt", "w", stdout);  
}  
  
int test_cnt = 1, test_ind = 0;  
// cin >> test_cnt;  
  
while (test_cnt--)  
    solve(test_ind++);  
  
return 0;  
}
```

Задание 2. Попытка 6.

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

```
///  
#pragma GCC optimize("Ofast", "-O3", "fast-math")
```

```
using namespace std;
```

```
#define int long long
```

```
#define double long double
```

```
#define pii pair<int, int>
```

```
#define veci vector<int>
```

```
#define endl "\n"
```

```
bool local = false;
```

```
inline int convert(char a) {
```

```
    if ('0' <= a && a <= '9')
```

```
        return a - '0';
```

```
    if ('a' <= a && a <= 'z')
```

```
        return a - 'a' + 10;
```

```
    if ('A' <= a && a <= 'Z')
```

```
        return a - 'A' + 36;
```

```
    return -1;
```

```
}
```

```
inline void solve(int test = 0) {
```

```

int n;
string x;
cin >> n >> x;
vector<pair<int, char>> chars;
vector<pair<int, char>> pre_result;
for (auto i: x) {
    if (convert(i) == -1)
        continue;
    chars.emplace_back(convert(i), i);
}
sort(chars.begin(), chars.end());
for (int i = 0; i < chars.size(); ++i) {
    if (chars[i].first > pre_result.size() + 1) continue;
    pre_result.push_back(chars[i]);
}
vector<bool> take(chars.size(), true);
int to_remove = (int) pre_result.size() - 6111;
int i1 = 0;
for (int i = 0; i < pre_result.size(); ++i) {
    if (to_remove <= 0) break;
    if (i == pre_result.size() - 1)
        take[i] = false, to_remove--;
    else if (pre_result[i + 1].first <= i1 + 1)
        take[i] = false, to_remove--;
    else

```

```

        i1++;
    }

    vector<char> result;
    for (int i = 0; i < pre_result.size(); ++i) {
        if (!take[i]) continue;
        result.push_back(pre_result[i].second);
    }
    for (int i = 0; i < result.size(); ++i) {
        if (convert(result[i]) > i + 1) {
            cout << -1 << endl;
            return;
        }
    }
    std::reverse(result.begin(), result.end());

    if (result.empty() || result.size() > 61) {
        cout << -1 << endl;
        return;
    }

    // if (result.size() != n) {
    //     cout << -1 << endl;
    //     return;
    // }

```

```
for (auto chr : result)
    cout << chr;
cout << endl;
}

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

    local = getenv("local");
    if (local) {
        freopen("../test/input.txt", "r", stdin);
        freopen("../test/output.txt", "w", stdout);
    }

    int test_cnt = 1, test_ind = 0;
    // cin >> test_cnt;

    while (test_cnt--)
        solve(test_ind++);

    return 0;
}
```

Задание 3. Попытка 1.

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

//#pragma GCC optimize("Ofast", "-O3", "fast-math")

using namespace std;

#define int long long
//#define int __int128
#define double long double
#define pii pair<int, int>
#define veci vector<int>
#define endl "\n"

bool local = false;
const int inf = 1e18;

int n;
set<string> answers;
set<pii > paths;
vector<int> gr[2];

inline pii get_num(const string &a) {
    vector<string> nums;
    bool new_num = false;
    for (auto i: a) {
```

```

    if (i == ' ') {
        new_num = true;
        continue;
    }
    if (new_num || nums.empty())
        nums.emplace_back("");
    nums[nums.size() - 1] += i;
    new_num = false;
}
if (nums.size() < 2) {
    return {-1, -1};
}
return {stoll(nums[0]), stoll(nums[1])};
}

```

```

inline void save_ans(){
    string v;
    for (auto edge : paths)
        v += to_string(edge.first) + "," + to_string(edge.second) + ",";
    answers.insert(v);
}

```

```

void dfs(int x, int y, int cnt) {
    if (gr[y][x] == inf) return;
    int mid = x + gr[y][x], to;

```

```

if (y == 0) {
    if (paths.count({x, mid}))
        return;
    paths.insert({x, mid});
    if (cnt + 1 >= n)
        save_ans();
    for (to = max(0ll, x - 1); to <= min(n - 1, x + 1); ++to) {
        if (paths.count({to, mid}))
            continue;
        paths.insert({to, mid});
        if (cnt + 1 >= n)
            save_ans();
        dfs(to, y, cnt + 1);
        paths.erase({to, mid});
    }
    paths.erase({x, mid});
} else {
    if (paths.count({mid, x}))
        return;
    paths.insert({mid, x});
    if (cnt + 1 >= n)
        save_ans();
    for (to = max(0ll, x - 1); to <= min(n - 1, x + 1); ++to) {
        if (paths.count({mid, to}))

```



```
        continue;
    paths.insert({mid, to});
    if (cnt + 1 >= n)
        save_ans();
    dfs(to, y, cnt + 1);
    paths.erase({mid, to});
}
paths.erase({mid, x});
}
}
```

```
inline void solve(int test = 0) {
    string buf;
    cin >> n;
    for (int _ = 0; _ < 3; ++_) getline(cin, buf);
    vector<pii > desc;
    while (buf != "END") {
        auto nums = get_num(buf);
        desc.emplace_back(nums.first - 1, nums.second - 1);
        getline(cin, buf);
    }

    gr[0].resize(n);
    std::fill(gr[0].begin(), gr[0].end(), inf);
    gr[1].resize(n);
}
```

```

std::fill(gr[1].begin(), gr[1].end(), inf);
for (auto d: desc) {
    if (gr[0][d.first] != inf || gr[1][d.second] != inf) {
        cout << 0 << endl;
        return;
    }

    if (d.first == d.second) {
        gr[0][d.first] = 0;
        gr[1][d.second] = 0;
    }

    if (d.first > d.second) {
        gr[0][d.first] = -1;
        gr[1][d.second] = 1;
    }

    if (d.first < d.second) {
        gr[0][d.first] = 1;
        gr[1][d.second] = -1;
    }
}

for (auto d: desc) {
    dfs(d.first, 0, 0);
    dfs(d.second, 1, 0);
}

```

```
    cout << answers.size() << endl;
}

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

    local = getenv("local");
    if (local) {
        freopen("../test/input.txt", "r", stdin);
        freopen("../test/output.txt", "w", stdout);
    }

    int test_cnt = 1, test_ind = 0;
    // cin >> test_cnt;

    while (test_cnt--)
        solve(test_ind++);

    return 0;
}
```

Задание 4. Попытка 1.

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

//#pragma GCC optimize("Ofast", "-O3", "fast-math")

using namespace std;

#define int long long
//#define int __int128
#define double long double
#define pii pair<int, int>
#define veci vector<int>
#define endl "\n"

bool local = false;
const int inf = 1e18;

int n, m, timer = 0;
vector<bool> used, used_p;
vector<int> tin, tout;
vector<vector<int>> gr;

int sz = inf;
vector<pii > answer;
vector<pii > cur;
```

```
inline bool is_lower(int v, int u) {  
    return tin[u] <= tin[v] && tout[v] <= tout[u];  
}
```

```
void process(int v, int c) {  
    used_p[c] = true;  
    for (auto to: gr[c]) {  
        if (used_p[to]) continue;  
        if (is_lower(to, c)) process(v, to);  
        else cur.emplace_back(minmax(c, to));  
    }  
}
```

```
void fdfs(int v = 0) {  
    used[v] = true;  
    tin[v] = timer++;  
    for (auto to: gr[v]) {  
        if (used[to]) continue;  
        fdfs(to);  
    }  
    tout[v] = timer++;  
}
```

```
void dfs(int v = 0) {  
    used[v] = true;
```

```

for (auto to: gr[v]) {
    if (used[to]) continue;

    fill(used_p.begin(), used_p.end(), false);
    cur.clear();
    process(to, to);
    if (cur.size() < sz) {
        sz = (int) cur.size();
        answer.clear(), answer.shrink_to_fit();
        for (auto edge: cur)
            answer.push_back(edge);
    }

    dfs(to);
}
}

inline void solve(int test = 0) {
    cin >> n >> m;
    tin.resize(n), tout.resize(n), gr.resize(n), used.resize(n), used_p.resize(n);
    std::fill(used.begin(), used.end(), false);
    for (int i = 0; i < m; ++i) {
        int v, u;
        cin >> v >> u;

```

```

    v--, u--;

    gr[v].push_back(u);

    gr[u].push_back(v);
}

dfs();

std::fill(used.begin(), used.end(), false);

dfs();

cout << answer.size() << endl;

std::sort(answer.begin(), answer.end());

for (auto edge: answer)

    cout << edge.first + 1 << " " << edge.second + 1 << endl;

cout << endl;
}

signed main() {

    cin.tie(), cout.tie();

    ios_base::sync_with_stdio(false);

    local = getenv("local");

    if (local) {

        freopen("../test/input.txt", "r", stdin);

        freopen("../test/output.txt", "w", stdout);

    }
}

```

```
int test_cnt = 1, test_ind = 0;

// cin >> test_cnt;

while (test_cnt--){
    solve(test_ind++);
}

return 0;
```