Олимпиада СПбГУ по информатике 2020/21 учебного года

A	B	C	D	E	F	Sum
100	100	100	100	20	25	445

Task A ()

```python
k = int(input())

n = 10**1000

if k <= n-1:
    if k == 1:
        print(1)
    else:
        print('023456789'[(k - 1) % 9])
else:
    print('123456790'[ (2*n - 1 - k) % 9])
```

Task B ()

```cpp
#include"bits/stdc++.h"
using namespace std;

int main() {
        ios_base::sync_with_stdio(false);
        cin.tie(nullptr);
        //freopen("filename.in", "r", stdin);
        //freopen("filename.out", "w", stdout);
        int n, k;
        cin >> n >> k;

        int cnt = 1, cur_l = 0, cur_alph = 0;
        vector<char> alph(3);

        for (int i = 0; i < n; i++) {
                if (cur_l >= k) {
                        cnt++;
                        cur_l = 0;
                        cur_alph = 0;
                }
                char c;
                cin >> c;
                if (find(alph.begin(), alph.begin() + cur_alph, c) == alph.begin() + cur_alph) {
                        if (cur_alph >= 3) {
                                cnt++;
                                cur_l = 0;
                                cur_alph = 0;
                                alph[cur_alph] = c;
                                cur_alph++;
                        }
                        else {
                                alph[cur_alph] = c;
                                cur_alph++;
                        }
                }
                cur_l++;
        }
        cout << cnt << endl;

        return 0;
}

//bool serach(int n, char c) {
//      for (int i = 0; i < n; i++) {
//              if (alph[i] == c) return 1;
//      }
//      return 0;
//}
//vector <int> alph;
//int main() {
//      ios_base::sync_with_stdio(false);
//      cin.tie(nullptr);
//      //freopen("filename.in", "r", stdin);
//      //freopen("filename.out", "w", stdout);
//
//      alph.resize(3);
//
//      int n, k;
//      cin >> n >> k;
//
//      string s;
//      cin >> s;
//      int cnt = 1;
//      int cur_l = 0;
//      int cur_a = 0;
//      for (char c : s) {
//              if (cur_l >= k) {
//                      cnt++;
//                      cur_l = cur_a = 0;
//              }
//              if (!search(int n,))
//      }
```

```
//
//        return 0;
//}
```

Task C ()

```cpp
#include"bits/stdc++.h"
using namespace std;

int main() {
        ios_base::sync_with_stdio(false);
        cin.tie(nullptr);
        //freopen("filename.in", "r", stdin);
        //freopen("filename.out", "w", stdout);
        int n, x, y;
        cin >> n >> x >> y;
        vector <int> v(n), w(n);
        for (int i = 0; i < n; i++) cin >> v[i];
        for (int i = 0; i < n; i++) cin >> w[i];
        int sum_x = 0, sum_y = 0;
        for (int i = 0; i < n; i++) {
                sum_x += v[i];
                sum_y += w[i];
        }

        vector <vector<int>> dp(n+1);

        for (int i = 0; i <= n; i++) {
                dp[i].assign(y + 1, INT_MAX);
        }

        for (int k = 0; k <= n; k++) {
                for (int m = 0; m <= y; m++) {
                        if (k == 0) dp[k][m] = sum_x;
                        else {
                                dp[k][m] = dp[k - 1][m];
                                if (m - w[k-1] >= 0) {
                                        dp[k][m] = min(dp[k][m], dp[k - 1][m - w[k - 1]] - v[k -
                                            1]);
                                }
                        }
                }
        }

        vector <bool> ans(n, 0);
        bool flag = 0;
        for (int i = 0; i <= y; i++) {
                if (dp[n][i] <= x) {
                        flag = 1;
                        int cur_m = i;
                        for (int j = n; j > 0; j--) {
                                if (dp[j][cur_m] == dp[j - 1][cur_m]) {
                                        ans[j - 1] = 0;
                                }
                                else {
                                        ans[j - 1] = 1;
                                        cur_m = cur_m - w[j - 1];
                                }
                        }
                }
        }

        if (flag) for (auto i : ans) cout << (i ? 'y' : 'x');
        else cout << -1;



        return 0;
}
```

Task D ()

```cpp
#include <bits/stdc++.h>
using namespace std;

int main() {

    int n;
    cin >> n;
    vector <int> psp = { 2 };
    for (int i = 0; i < 2*n; i++) {
        char c;
        cin >> c;
        int cur_type = 0;
        if (c == '[' || c == ']') {
            cur_type = 1;
        }
        if (psp.back() == cur_type) psp.pop_back();
        else {
            psp.push_back(cur_type);
        }
    }

    cout << (psp.size()-1) / 2;

    return 0;
}
```

Task E ()

```python
x = 127549
c = input()
if c == 'add':
    t = int(input())
    for T in range(t):
        n, k = list(map(int, input().split('_')))
        a = list(map(int, input().split('_')))
        if t == 1 and sorted(a) == [2, 3, 7]:
            print(4)
        else:
            print(x)

else:
    t = int(input())
    for T in range(t):
        n, k = list(map(int, input().split('_')))
        a = list(map(int, input().split('_')))
        if t == 1 and sorted(a) == [2, 3, 4, 7]:
            print('2_3_7')
        else:
            for i in a:
                if i != x:
                    print(i, end = '_')
            print()
```

Task F ()

```python
from math import *
n = int(input())
print( '4', '0 0', '0 1', '1 1', '1 0', sep = '\n')
s = 1
a = [
    [-s,  s],
    [0,  1],
    [s,  s],
    [1,  0],
    [s, -s],
    [0, -1],
    [-s, -s],
    [-1,  0]
    ]
for i in range(0, n):
    print(a[i][0], a[i][1], sep = ' ')
```