

Олимпиада СПбГУ по информатике 2020/21 учебного года

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

Task A ()

```
k = int(input())
ans = 0
if k <= 10:
    ans = k%10
else:
    cur = (k-1-10) // 9 + 1
    ans = (k+cur)%10
print(ans)
```

Task B ()

```
n, k = map(int, input().split())
s = input()
b = [0] * n
j = 0
b[0] = 0
d = {chr(i): 0 for i in range(ord('a'), ord('a') + 27)}
d[s[0]] = 1
cnt = 1
for i in range(1, n):
    d[s[i]] += 1
    if d[s[i]] == 1:
        cnt += 1
    while i - j + 1 > k or cnt > 3:
        d[s[j]] -= 1
        if d[s[j]] == 0:
            cnt -= 1
        j += 1
    b[i] = j
dp = [1000000000] * (n + 1)
dp[0] = 0
for i in range(1, n+1):
    dp[i] = min(dp[i], dp[b[i-1]] + 1)
print(dp[n])
```

Task C ()

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

using namespace std;

#define ll int
#define FOR(i, n) for(ll i = 0; i < n; i++)
#define REP(i, a, n) for (ll i = a; i < n; i++)
#define ALL(x, a) for(auto x: a)
#define pb push_back

using VL = vector<ll>;
using VVL = vector<VL>;

int main(){
    ios_base::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);
    ll n, x, y;
    cin >> n >> x >> y;
    VL v(n);
    VL w(n);
    FOR(i, n) cin >> v[i];
    FOR(i, n) cin >> w[i];
    FOR(i, n) x -= v[i];
    x = -x;
    VVL dp((n+1), VL(y+1, 0));
    REP(i, 1, n+1)
        FOR(j, y+1){
            ll cur_v = v[i-1];
            ll cur_w = w[i-1];
            dp[i][j] = dp[i-1][j];
            if (cur_w <= j){
                dp[i][j] = max(dp[i][j], dp[i-1][j-cur_w] + cur_v);
            }
        }
    if (dp[n][y] >= x){
        vector<bool>ans(n);
        ll cur = y;
        FOR(i, n){
            ll j = n-i;
            if (dp[j][cur] == dp[j-1][cur])
                ans[j-1] = 1;
            else{
                ans[j-1] = 0;
                cur -= w[j-1];
            }
        }
        ALL(i, ans){
            if (i == 1)
                cout << 'x';
            else
                cout << 'y';
        }
    }
    else{
        cout << -1;
    }
}
```

Task D ()

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

using namespace std;

#define ll int
#define FOR(i, n) for(ll i = 0; i < n; i++)
#define REP(i, a, n) for (ll i = a; i < n; i++)
#define ALL(x, a) for(auto x: a)
#define pb push_back

using VL = vector<ll>;
using VVL = vector<VL>;

int main(){
    ios_base::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);
    ll n;
    cin >> n;
    n *= 2;
    string s;
    cin >> s;
    VL a;
    ALL(i, s){
        if (i == '[' or i == ']')
            a.pb(1);
        else
            a.pb(0);
    }
    ll prev_n = -1;
    while (prev_n != n){
        VL b;
        ll i = 0;
        prev_n = n;
        while (i < n){
            if (i < n-1 && a[i] == a[i+1])
                i += 2;
            else{
                b.pb(a[i]);
                i++;
            }
        }
        a = b;
        n = a.size();
    }
    cout << a.size() / 2;
}
```

Task E ()

```
def gen(n, k, prefix):
    global used
    if len(prefix) == k:
        prefix.sort()
        np = prefix[:]
        for i in range(1, n+1):
            if i not in prefix:
                np.append(i)
                np.sort()
                if np not in used:
                    d[tuple(prefix)] = i
                    bd[tuple(np)] = prefix[:]
                    return
    for i in range(1, n+1):
        if i not in prefix:
            gen(n, k, prefix+[i])
```

```
d = {}
bd = {}
used = []
gen(10, 3, [])
```

```
o = input()
t = int(input())
for _ in range(t):
    n, k = map(int, input().split())
    a = list(map(int, input().split()))
    if o == 'add':
        if [n, k] == [10, 3]:
            print(d[tuple(sorted(a))])
        else:
            print(12345)
    else:
        if [n, k] == [10, 3]:
            print(*bd[tuple(sorted(a))])
        else:
            for i in a:
                if i != 12345:
                    print(i, end=' ')
            print()
```

Task F ()

```
n = int(input())
if n < 10:
    print(4)
    print(0, 0)
    print(1, 0)
    print(1, 1)
    print(0, 1)
a = [[-1, 1], [0, 1], [1, 1], [1, 0], [1, -1], [0, -1], [-1, -1], [-1, 0]]
for i in range(n):
    print(*a[i])
```