

Олимпиада СПбГУ по информатике 2022/23 учебного года

A	B	C	D	E	F	Sum
100	100	75	100	0	0	375

Task A ()

```
#include <bits/stdc++.h>
#define ll long long
using namespace std;

int main()
{
    vector<ll>ss(6);
    for (int q=0;q<6;q++){
        cin>>ss[q];
    }
    for (int q=0;q<6;q++){
        ll pos=ss[q];
        // cin>>pos;
        ll j=pos;
        for (int q1=q+1;q1<6;q1++){
            if (ss[q1]<=j){
                j+=1;
                pos+=1;
            }
        }
        cout<<pos<<"_ ";
    }
    return 0;
}
```

Task B ()

```
#include <bits/stdc++.h>
#define ll long long
using namespace std;
ll eps=1000000000;
int main()
{
    string s;
    cin>>s;
    if(s=="first"){
        ll n;
        cin>>n;
        vector<ll>ss(n);
        ll sum=0;
        for(int q=0;q<n;q++){
            cin>>ss[q];
            sum+=ss[q];
        }
        if(sum%n==0){
            cout<<sum/n;
            cout<<endl;
            return 0;
        }
        else{
            // cout<<"lll";
            cout<<eps*(sum%n)+sum/n;
            cout<<endl;
            return 0;
        }
    }
    else {
        ll n;
        cin>>n;
        vector<ll>ss(n);
        ll su=0;
        bool f=true;
        for(int q=0;q<n;q++){
            cin>>ss[q];
            su+=ss[q];
            if(ss[q]>=eps){
                f=false;
            }
        }
        if(f){
            cout<<su;
            cout<<endl;
            return 0;
        }
        else{
            su=0;
            for(int q=0;q<n;q++){
                su+=ss[q]%eps;
            }
            su+=ss[0]/eps;
            cout<<su;
            cout<<endl;
            return 0;
        }
    }
}
// return 0;
```

Task C ()

```

#include <bits/stdc++.h>
#define ll long long
using namespace std;
set<pair<ll, ll>>f;
void obh(pair<ll, ll>jj, pair<ll, ll>jj1, pair<ll, ll>jj2){
    ll a1=jj.first, b1=jj.second, a2=jj1.first, b2=jj1.second, a3=jj2.first, b3=jj2.second;
    // cout<<a1<<" "<<b1<<" "<<a2<<" "<<b2<<" "<<a3<<" "<<b3<<"\n";
    if(b2+b3<=b1 && a2+a3-1>=a1 && max(a2, a3)<=a1){
        f.insert({min(a1-a2, b2), max(a1-a2, b2)});
        f.insert({min(a1-a3, b3), max(a1-a3, b3)});
    }
    if(a2+a3<=a1 && b2+b3-1>=b1 && max(b2, b3)<=b1){
        f.insert({min(b1-b2, a2), max(b1-b2, a2)});
        f.insert({min(b1-b3, a3), max(b1-b3, a3)});
    }
    if(b2==b1 && a2<a1){
        f.insert({min(b2, a1-a2), max(b2, a1-a2)});
        if(a2+a3==a1 && b3<b1){
            f.insert({min(b1-b3, a1-a2), max(b1-b3, a1-a2)});
        }
        if(b3==b1 && a2+a3<a1){
            f.insert({min(a1-a2-a3, b1), max(a1-a2-a3, b1)});
        }
    }
    if(a2==a1 && b2<b1){
        f.insert({min(a2, b1-b2), max(a2, b1-b2)});
        if(b2+b3==b1 && a3<a1){
            f.insert({min(a1-a3, b1-b2), max(a1-a3, b1-b2)});
        }
    }
    if(a2+a3==a1 && b3==b2 && b3<b1){
        f.insert({min(a1, b1-b3), max(a1, b1-b3)});
    }
    if(b2+b3==b1 && a3==a2 && a3<a1){
        f.insert({min(b1, a1-a3), max(b1, a1-a3)});
    }
}
int main()
{
    //ll n;
    //cin>>n;
    ll a1, b1, a2, b2, a3, b3;
    cin>>a1>>b1>>a2>>b2>>a3>>b3;
    f.insert({min(a1, b1), max(a1, b1)});
    f.insert({min(a2, b2), max(a2, b2)});
    f.insert({min(a3, b3), max(a3, b3)});
    vector<pair<ll, ll>>ds;
    ds.push_back({a1, b1});
    ds.push_back({a2, b2});
    ds.push_back({a3, b3});
    //cout<<"1111";
    for(int t=0; t<2; t++){
        for(int t1=0; t1<2; t1++){
            for(int t2=0; t2<2; t2++){
                for(int q=0; q<3; q++){
                    for(int q1=0; q1<3; q1++){
                        for(int q2=0; q2<3; q2++){
                            if(q!=q1 && q1!=q2 && q2!=q){
                                // cout<<q<<" "<<q1<<" "<<q2<<"\n";
                                if(t==1){
                                    swap(ds[0].first, ds[0].second);
                                }
                                if(t1==1){
                                    swap(ds[1].first, ds[1].second);
                                }
                                if(t==2){
                                    swap(ds[2].first, ds[2].second);
                                }
                                obh(ds[q], ds[q1], ds[q2]);
                                if(t==1){
                                    swap(ds[0].first, ds[0].second);
                                }
                            }
                        }
                    }
                }
            }
        }
    }
}

```

$$\}$$

Task D ()

```
#include <bits/stdc++.h>
#define ll long long
using namespace std;

int main()
{
    ll n;
    cin>>n;
    vector<ll>ss(n);
    for (int q=0;q<n;q++){
        cin>>ss[q];
    }
    if (n==2){
        cout<<"-1_1";
        cout<<endl;
        return 0;
    }
    if (n==1){
        cout<<1<<"_ "<<ss[0];
        cout<<endl;
        ll a,b;
        cin>>a>>b;
        if (a==1){
            return 0;
        }
        cout<<1<<"_ "<<ss[0];
        cout<<endl;
        cin>>a>>b;
        return 0;
    }
}
```

Task E ()

```

#include <bits/stdc++.h>
#define ll long long
using namespace std;
ll eps=1000000000;
ll dp[10][11];
int main()
{
    for (int q=0;q<=10;q++){
        dp[9][q]=1;
    }
    for (int t=8;t>=1;t--){
        for (int q=0;q<=10;q++){
            for (int q1=q;q1<=10;q1++){
                dp[t][q]+=dp[t+1][q1];
            }
        }
    }
    ll t4;
    cin>>t4;
    string sss;
    cin>>sss;
    if (sss=="transmit"){
        while (t4--){
            ll n;
            cin>>n;
            vector<ll>f;
            ll jo=0;
            for (int q=0;q<10;q++){
                while (n-dp[q][jo]>0){
                    n-=dp[q][jo];
                    jo+=1;
                }
                f.push_back(jo);
            }
            vector<vector<ll>>tabl(10,vector<ll>(10));
            for (int q1=0;q1<10;q1++){
                for (int q=0;q<10;q++){
                    if (q+1<=f[q1]){
                        tabl[q][q1]=1;
                    }
                    else{
                        tabl[q][q1]=0;
                    }
                }
            }
            for (int q=0;q<10;q++){
                for (int q1=0;q1<10;q1++){
                    cout<<tabl[q][q1];
                }
                cout<<"\n";
            }
            cout<<endl;
        }
    }
    else{
        while (t4--){
            vector<vector<char>>tat(10,vector<char>(10));
            for (int q=0;q<10;q++){
                for (int q1=0;q1<10;q1++){
                    cin>>tat[q][q1];
                }
            }
            vector<ll>ff;
            for (int q1=0;q1<10;q1++){
                ll dd=0;
                for (int q=0;q<10;q++){
                    char v=tat[q][q1];
                    //cin>>v;
                    dd+=v-'0';
                }
                ff.push_back(dd);
            }
        }
    }
}

```

```

sort ( ff . begin ( ) , ff . end ( ) ) ;
ll  ot=0;
ll  joj=1;
for ( int  q=0;q<10;q++){
    if (q==0){
        for ( int  q1=0;q1<ff [ q ] ; q1++){
            joj+=dp [ q ] [ q1 ] ;
        }
    }
    else {
        for ( int  q1=ff [ q - 1 ] ; q1<ff [ q ] ; q1++){
            joj+=dp [ q ] [ q1 ] ;
        }
    }
}
cout<<joj<<endl ;
}
}
}

```

Task F ()

```
#include <bits/stdc++.h>
#define ll long long
using namespace std;
ll eps=10000000000;
int main()
{
    string s,s1;
    cin>>s>>s1;
    ll n=s.size(),n1=s1.size();
    bool j=false;
    for(int q=0;q<n;++q){
        if(s[q]=='('){
            j=true;
        }
    }
    for(int q1=0;q1<n1;q1++){
        if(s1[q1]=='('){
            j=true;
        }
    }
    if(!j){
        reverse(s.begin(),s.end());
        reverse(s1.begin(),s1.end());
        string s2="";
        ll ver=0;
        for(int q=0;q<max(n,n1);q++){
            if(q<n && q<n1){
                s2.push_back((s[q]-'0'+s1[q]-'0'+ver)%10+'0');
                ver=(s[q]-'0'+s1[q]-'0'+ver)/10;
            }
            else if(q<n){
                s2.push_back((s[q]-'0'+ver)%10+'0');
                ver=(s[q]-'0'+ver)/10;
            }
            else if(q<n1){
                s2.push_back((s1[q]-'0'+ver)%10+'0');
                ver=(s1[q]-'0'+ver)/10;
            }
        }
        if(ver>0){
            s2.push_back(ver+'0');
        }
        reverse(s2.begin(),s2.end());
        cout<<s2;
        return 0;
    }
    else{
        vector<ll>chi;
        vector<ll>kol;
        vector<ll>chi1;
        vector<ll>kol1;
        /*
        for(int q=0;q<n;q++){
            if(s[q]=='('){
                s[q]=')';
            }
            else if(s[q]==')'){
                s[q]='(';
            }
        }
        for(int q=0;q<n1;q++){
            if(s1[q]=='('){
                s1[q]=')';
            }
            else if(s1[q]==')'){
                s1[q]='(';
            }
        }
        */
        for(int q=0;q<n;q++){
            // cout<<q<<"n";
            if(s[q]!='('){

```



```

        chi.push_back(s[q] - '0');
        kol.push_back(1);
    }
    else{
        q+=1;
        chi.push_back(s[q] - '0');
        q+=2;
        ll dd=0;
        while(s[q] != ')'){
            dd*=10;
            dd+=s[q] - '0';
            q+=1;
        }
        kol.push_back(dd);
    }
}
for(int q=0; q<n1; q++){
    if(s1[q] != '('){
        chi1.push_back(s1[q] - '0');
        kol1.push_back(1);
    }
    else{
        q+=1;
        chi1.push_back(s1[q] - '0');
        q+=2;
        ll dd=0;
        while(s1[q] != ')'){
            dd*=10;
            dd+=s1[q] - '0';
            q+=1;
        }
        kol1.push_back(dd);
    }
}
reverse(chi.begin(), chi.end());
reverse(kol.begin(), kol.end());
reverse(chi1.begin(), chi1.end());
n=chi.size();
n1=chi1.size();
reverse(kol1.begin(), kol1.end());
/*
cout<<s<<"\n";
for(int q=0; q<n; q++){
    cout<<chi[q]<<" "<<kol[q]<<" ";
}
cout<<"\n";
cout<<s1<<"\n";
for(int q=0; q<n1; q++){
    cout<<chi1[q]<<" "<<kol1[q]<<" ";
}
return 0;
*/
vector<ll>chi2;
vector<ll>kol2;
ll l=0, ll=0;
ll dop=0;
while(l<n || ll<n1){
    //cout<<l<<" "<<ll<<"!\n";
    if(l<n && ll<n1){
        if(chi[l]+chi1[ll]+dop<=9){
            if(kol[l]<=kol1[ll]){
                chi2.push_back(chi[l]+chi1[ll]+dop);
                kol2.push_back(1);
                if(kol[l]>1){
                    chi2.push_back(chi[l]+chi1[ll]);
                    kol2.push_back(kol[l]-1);
                }
                kol1[ll]-=kol[l];
                if(kol1[ll]==0){
                    ll+=1;
                }
                l+=1;
            }
            else{

```

```

        chi2.push_back(chi[l]+chi1[l1]+dop);
        kol2.push_back(1);
        if(kol1[l1]>1){
            chi2.push_back(chi[l]+chi1[l1]);
            kol2.push_back(kol1[l1]-1);
        }
        kol[l]-=kol1[l1];
        if(kol[l]==0){
            l+=1;
        }
        l1+=1;
    }
    dop=0;
}
else{
    if(kol[l]<=kol1[l1]){
        chi2.push_back((chi[l]+chi1[l1]+dop)%10);
        kol2.push_back(1);
        if(kol[l]>1){
            chi2.push_back(((chi[l]+chi1[l1])%10+1)%10);
            kol2.push_back(kol[l]-1);
        }
        kol1[l1]-=kol[l];
        if(kol1[l1]==0){
            l1+=1;
        }
        l+=1;
    }
    else{
        chi2.push_back((chi[l]+chi1[l1]+dop)%10);
        kol2.push_back(1);
        if(kol1[l1]>1){
            chi2.push_back(((chi[l]+chi1[l1])%10+1)%10);
            kol2.push_back(kol1[l1]-1);
        }
        kol[l]-=kol1[l1];
        if(kol[l]==0){
            l+=1;
        }
        l1+=1;
    }
    dop=1;
}
}
else if(l<n){
    if(chi[l]+dop==10){
        chi2.push_back(0);
        kol2.push_back(kol[l]);
        /*
        if(kol[l]>1){
            chi2.push_back(1);
            kol2.push_back(kol[l]-1);
        }
        */
        l+=1;
        dop=1;
    }
    else{
        chi2.push_back(chi[l]+dop);
        kol2.push_back(1);
        if(kol[l]>1){
            chi2.push_back(chi[l]);
            kol2.push_back(kol[l]-1);
        }
        l+=1;
        dop=0;
    }
}
else if(l1<n1){
    if(chi1[l1]+dop==10){
        chi2.push_back(0);
        kol2.push_back(kol1[l1]);
        /*
        if(kol1[l1]>1){

```

```

        chi2.push_back(1);
        kol2.push_back(kol1[l1]-1);
    }
    */
    l1+=1;
    dop=1;
}
else{
    chi2.push_back(chi1[l1]+dop);
    kol2.push_back(1);
    if(kol1[l1]>1){
        chi2.push_back(chi1[l1]);
        kol2.push_back(kol1[l1]-1);
    }
    l1+=1;
    dop=0;
}
}
}
if(dop>0){
    chi2.push_back(1);
    kol2.push_back(1);
}
n=chi2.size();
// for(int q=0;q<n;q++){
//     cout<<chi2[q]<<" "<<kol2[q]<<" ";
// }
// cout<<"\n";
// return 0;
reverse(chi2.begin(),chi2.end());
reverse(kol2.begin(),kol2.end());
for(int q=0;q<chi2.size();q++){
    if(kol2[q]>5){
        cout<<"("<<chi2[q]<<"| "<<kol2[q]<<")";
    }
    else{
        while(kol2[q]>0){
            cout<<chi2[q];
            kol2[q]--;
        }
    }
}
return 0;
}
// return 0;
}

```