Rajshahi University of Engineering & Technology
Department of Computer Science & Engineering

Course Code: CSE 2102
Course Title: Discrete Mathematics Sessional

Experiment No. 03

Submitted By	Submitted To
Name : Khandoker Sefayet Alam	Md. Azmain Yakin Srizon
Roll: 2003121	Lecturer
Section: C, Session: 2020-2021	Department of CSE, RUET

Submission Date: 14/06/23

Problem-1:

Link: https://codeforces.com/problemset/problem/230/B

Solution:

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

#define ll long long

#define ghost 0

#define PI 3.1415926535897932385

#define INF 1000111222

#define eps 1e-7

#define pb push_back

#define ff first

#define ss second

#define all(c) c.begin(), c.end()

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

#define maxN 1011

#define fast ios_base::sync_with_stdio(0);cin.tie(0);cout.tie(0);


using namespace std;


const ll md = 1000000007;

const int MOD = 1000000007;

const int MAX = 1000001;

bool prime[MAX];


void sieve ()
{
    int i,j;
```

```cpp
    prime[0] = prime[1] = true;


    for (i=4; i<MAX; i+=2)
        prime[i] = true;


    for (i=3; i*i<=MAX; i+=2)
        if (!prime[i])
            for (j=i*i; j<MAX; j+=2*i)
                prime[j] = true;
}


ll pow1(ll n, ll p)
{
    if (p == 0)
        return 1;
    ll x = pow1(n, p / 2);
    x = (x * x) % md;
    if (p % 2 == 0)
        return x;
    else
        return (x * n) % md;
}


int a[105][105];
int main()
{
    fast;
    //setIO();
```

```
    sieve();

    ll t;

    cin>>t;

    //t=1;


    while(t--)

    {

  ll n;

  cin>>n;

  ll r=sqrt(n);

  if (!prime[r] && r*r == n)cout<<("YES\n");

      else cout<<("NO\n");

    }

    return ghost;

}
```

Status:

#	Author	Problem	Lang	Verdict	Time	Memory	Sent	Judged		
163685575	Practice: sefayetalam14	230B - 28	GNU C++14	Accepted	124 ms	1028 KB	2022-07-11 17:34:54	2022-07-11 17:34:54	☆	Compare

Problem-2:

Link: https://codeforces.com/problemset/problem/1294/C

Solution:

#include<bits/stdc++.h>

#include<ext/pb_ds/assoc_container.hpp>

#include<ext/pb_ds/tree_policy.hpp>

using namespace std;

using namespace __gnu_pbds;

```cpp
#define fast ios_base::sync_with_stdio(0);cin.tie(0);cout.tie(0);
#define pb              push_back
#define ll              long long
#define ff first
#define ss second
#define SZ(a) (int)a.size()
#define UNIQUE(a) (a).erase(unique(all(a)),(a).end())
#define eb emplace_back
#define mp make_pair
#define Set(x, k) (x |= (1LL << k))
#define Unset(x, k) (x &= ~(1LL << k))
#define Check(x, k) (x & (1LL << k))
#define Toggle(x, k) (x ^ (1LL << k))
//LOOPS
#define scl(n)          scanf("%lld", &n)
#define fr(i,n)         for (ll i=0;i<n;i++)
#define fr1(i,n)        for(ll i=1;i<=n;i++)
#define Fo(i,k,n) for(i=k;k<n?i<n:i>n;k<n?i+=1:i-=1)
#define deb(x) cout << #x << "=" << x << endl
#define deb2(x, y) cout << #x << "=" << x << "," << #y << "=" << y << endl
#define nn '\n'
#define pfl(x)          printf("%lld\n",x)
#define pcas(i)          printf("Case %lld: ",i)
#define Setpre(n) cout<<fixed<<setprecision(n)
#define itr(it, a) for(auto it = a.begin(); it != a.end(); it++)
#define debug           printf("I am here\n")
#define asort(a)        sort(a,a+n)
#define dsort(a)        sort(a,a+n,greater<int>())
```

```cpp
#define vasort(v)        sort(v.begin(), v.end());
#define vdsort(v)        sort(v.begin(), v.end(),greater<ll>());
#define rev(x) reverse(all(x))
#define sortall(x) sort(all(x))
#define mem(a,b) memset(a,b,sizeof(a))
#define all(x) x.begin(), x.end()
#define rev(x) reverse(all(x))
#define md              10000007
#define PI 3.1415926535897932384626
const double EPS = 1e-9;
const ll N = 2e5+10;
const ll M = 1e9+7;
inline ll GCD(ll a, ll b) { return b == 0 ? a : GCD(b, a % b); }
inline ll LCM(ll a, ll b) { return a * b / GCD(a, b); }
inline ll Ceil(ll p, ll q)  {return p < 0 ? p / q : p / q + !!(p % q);}
inline ll Floor(ll p, ll q) {return p > 0 ? p / q : p / q - !!(p % q);}
inline double logb(ll base,ll num){ return (double)log(num)/(double)log(base);}
inline bool isPerfectSquare(long double x){ if (x >= 0) { long long sr = sqrt(x);return (sr * sr == x); }return false; }
double euclidean_distance(ll x1,ll y1,ll x2,ll y2){double a=(x2-x1)*(x2-x1);double b=(y2-y1)*(y2-y1);double c=(double)sqrt(a+b);return c;}
int popcount(ll x){return __builtin_popcountll(x);};
int poplow(ll x){return __builtin_ctzll(x);};
int pophigh(ll x){return 63 - __builtin_clzll(x);};
typedef unsigned long long ull;
typedef pair<ll, ll>    pll;
typedef vector<ll>      vl;
typedef vector<pll>     vpll;
typedef vector<vl>      vvl;
```

```cpp
template <typename T> using PQ = priority_queue<T>;

template <typename T> using QP = priority_queue<T,vector<T>,greater<T>>;


template <typename T> using ordered_set = tree<T, null_type, less<T>, rb_tree_tag,
tree_order_statistics_node_update>;

template <typename T,typename R> using ordered_map = tree<T, R , less<T>, rb_tree_tag,
tree_order_statistics_node_update>;

;

namespace io{

    template<typename First, typename Second> ostream& operator << ( ostream &os, const
pair<First, Second> &p ) { return os << p.first << " " << p.second; }

    template<typename First, typename Second> ostream& operator << ( ostream &os, const
map<First, Second> &mp ) { for( auto it : mp ) { os << it << endl;  } return os; }

    template<typename First> ostream& operator << ( ostream &os, const vector<First> &v ) {
bool space = false; for( First x : v ) { if( space ) os << " "; space = true; os << x; } return os; }

    template<typename First> ostream& operator << ( ostream &os, const set<First> &st ) { bool
space = false; for( First x : st ) { if( space ) os << " "; space = true; os << x; } return os; }

    template<typename First> ostream& operator << ( ostream &os, const multiset<First> &st ) {
bool space = false; for( First x : st ) { if( space ) os << " "; space = true; os << x; } return os; }


    template<typename First, typename Second> istream& operator >> ( istream &is, pair<First,
Second> &p ) { return is >> p.first >> p.second; }

    template<typename First> istream& operator >> ( istream &is, vector<First> &v ) { for( First
&x : v ) { is >> x; } return is; }


    long long fastread(){ char c; long long d = 1, x = 0; do c = getchar(); while( c == ' ' || c == '\n'
); if( c == '-' ) c = getchar(), d = -1; while( isdigit( c ) ){ x = x * 10 + c - '0'; c = getchar(); } return
d * x; }


    static bool sep = false;


    using std::to_string;
```

```cpp
    string to_string( bool x ){ return ( x ? "true" : "false" ); }

    string to_string( const string & s ){ return "\"" + s + "\""; }

    string to_string( const char * s ){ return "\"" + string( s ) + "\""; }

    string to_string ( const char & c ) { string s; s += c; return "\'" + s + "\'"; }


    template<typename Type> string to_string( vector<Type> );

    template<typename First, typename Second> string to_string( pair<First, Second> );

    template<typename Collection> string to_string( Collection );


    template<typename First, typename Second> string to_string( pair<First, Second> p ){ return
"{" + to_string( p.first ) + ", " + to_string( p.second ) + "}"; }

    template<typename Type> string to_string( vector<Type> v ) { bool sep = false; string s = "[";
for( Type x: v ){ if( sep ) s += ", "; sep = true; s += to_string( x ); } s += "]"; return s; }

    template<typename Collection> string to_string( Collection collection ) { bool sep = false;
string s = "{"; for( auto x: collection ){ if( sep ) s += ", "; sep = true; s += to_string( x ); } s +=
"}"; return s; }


    void print() { cerr << endl; sep = false; }

    template <typename First, typename... Other> void print( First first, Other... other ) { if( sep )
cerr << " | "; sep = true; cerr << to_string( first ); print( other... ); }


} using namespace io;


vector<bool> Primes(N,1);

vector<ll>primenos;

void SieveOfEratosthenes(ll n)

{

    Primes[1]=0;

    for (ll i=2;i*i<=n;i++) {
```

```cpp
        if(Primes[i]==1){

      for(ll j=i*i;j<=n;j+=i)

          Primes[j]=0;

          }

      }

      for(ll i=1;i<n;i++){

        if(Primes[i]){

            primenos.push_back(i);

        }

      }

}

int main()

{

    fast;

     ll t;

    //setIO();

     //ll tno=1;;

     t=1;

    cin>>t;

    SieveOfEratosthenes(N);

    while(t--){

     ll n;

     cin>>n;

     ll k=n;


     map<ll,ll>mpp;

     for(auto it:primenos){

       if(it>n) break;
```

```cpp
        while(n%it==0){
            n/=it;
            mpp[it]++;
        }
    }
    if(n>1){
        mpp[n]++;
    }
    vector<pair<ll,ll>>vec;
    for(auto it:mpp){
        vec.push_back({it.second,it.first});
    }
    sort(all(vec));
    reverse(all(vec));
    ll a=-1,b=-1,c=-1;
    ll m=vec.size();
    bool f=0;
    for(ll i=0;i<m;i++){
        // cout<<vec[i]<<endl;
        if(a==-1){
            a=vec[i].second;
            if(vec[i].first>2){
                b=(vec[i].second)*(vec[i].second);
            }
        }
        else if(b==-1){
            b=vec[i].second;
        }
```

```
        else break;

      }
      // cout<<a<<" "<<b<<" "<<c<<nn;
    if(a==-1 || b==-1 || a*b==n){
      cout<<"NO"<<endl;

    }
    else{
      c=k/(a*b);


      if(a!=b && b!=c && c!=a && c>1){
        cout<<"YES"<<nn;
        cout<<a<<" "<<b<<" "<<c<<nn;

      }
      else{
        cout<<"NO"<<endl;

      }
    }
  }
  return 0;
}
```

Status:

| General | | | | | | | | | | ▶ |
#	Author	Problem	Lang	Verdict	Time	Memory	Sent	Judged		
207001322	Practice: sefayetalam14	1294C - 18	GNU C++17	Accepted	15 ms	568 KB	2023-05-24 06:34:33	2023-05-24 06:34:33	☆	Compare

Problem-3:

Link: https://codeforces.com/problemset/problem/1360/D

Solution:

```cpp
#include<bits/stdc++.h>
#include<ext/pb_ds/assoc_container.hpp>
#include<ext/pb_ds/tree_policy.hpp>
using namespace std;
using namespace __gnu_pbds;
#define fast ios_base::sync_with_stdio(0);cin.tie(0);cout.tie(0);
#define pb            push_back
#define ll            long long
#define ff first
#define ss second
#define SZ(a) (int)a.size()
#define UNIQUE(a) (a).erase(unique(all(a)),(a).end())
#define eb emplace_back
#define mp make_pair
#define Set(x, k) (x |= (1LL << k))
#define Unset(x, k) (x &= ~(1LL << k))
#define Check(x, k) (x & (1LL << k))
#define Toggle(x, k) (x ^ (1LL << k))
#define scl(n)          scanf("%lld", &n)
#define fr(i,n)         for (ll i=0;i<n;i++)
#define fr1(i,n)         for(ll i=1;i<=n;i++)
#define Fo(i,k,n) for(i=k;k<n?i<n:i>n;k<n?i+=1:i-=1)
#define deb(x) cout << #x << "=" << x << endl
#define deb2(x, y) cout << #x << "=" << x << "," << #y << "=" << y << endl
```

```cpp
#define nn '\n'

#define pfl(x)          printf("%lld\n",x)

#define pcas(i)          printf("Case %lld: ",i)

#define Setpre(n) cout<<fixed<<setprecision(n)

#define itr(it, a) for(auto it = a.begin(); it != a.end(); it++)

#define debug           printf("I am here\n")

#define asort(a)         sort(a,a+n)

#define dsort(a)          sort(a,a+n,greater<int>())

#define vasort(v)       sort(v.begin(), v.end());

#define vdsort(v)       sort(v.begin(), v.end(),greater<ll>());

#define rev(x) reverse(all(x))

#define sortall(x) sort(all(x))

#define mem(a,b) memset(a,b,sizeof(a))

#define all(x) x.begin(), x.end()

#define rev(x) reverse(all(x))

#define md            10000007

#define PI 3.1415926535897932384626

const double EPS = 1e-9;

const ll N = 2e5+10;

const ll M = 1e9+7;

inline ll GCD(ll a, ll b) { return b == 0 ? a : GCD(b, a % b); }

inline ll LCM(ll a, ll b) { return a * b / GCD(a, b); }

inline ll Ceil(ll p, ll q)  {return p < 0 ? p / q : p / q + !!(p % q);}

inline ll Floor(ll p, ll q) {return p > 0 ? p / q : p / q - !!(p % q);}

inline double logb(ll base,ll num){ return (double)log(num)/(double)log(base);}

inline bool isPerfectSquare(long double x){ if (x >= 0) { long long sr = sqrt(x);return (sr * sr ==
x); }return false; }

double euclidean_distance(ll x1,ll y1,ll x2,ll y2){double a=(x2-x1)*(x2-x1);double b=(y2-
y1)*(y2-y1);double c=(double)sqrt(a+b);return c;}
```

```cpp
int popcount(ll x){return __builtin_popcountll(x);};

int poplow(ll x){return __builtin_ctzll(x);};

int pophigh(ll x){return 63 - __builtin_clzll(x);};

typedef unsigned long long ull;

typedef pair<ll, ll>    pll;

typedef vector<ll>      vl;

typedef vector<pll>     vpll;

typedef vector<vl>      vvl;

template <typename T> using PQ = priority_queue<T>;

template <typename T> using QP = priority_queue<T,vector<T>,greater<T>>;


template <typename T> using ordered_set = tree<T, null_type, less<T>, rb_tree_tag,
tree_order_statistics_node_update>;

template <typename T,typename R> using ordered_map = tree<T, R , less<T>, rb_tree_tag,
tree_order_statistics_node_update>;

;




namespace io{

   template<typename First, typename Second> ostream& operator << ( ostream &os, const
pair<First, Second> &p ) { return os << p.first << " " << p.second; }

   template<typename First, typename Second> ostream& operator << ( ostream &os, const
map<First, Second> &mp ) { for( auto it : mp ) { os << it << endl;  } return os; }

   template<typename First> ostream& operator << ( ostream &os, const vector<First> &v ) {
bool space = false; for( First x : v ) { if( space ) os << " "; space = true; os << x; } return os; }

   template<typename First> ostream& operator << ( ostream &os, const set<First> &st ) { bool
space = false; for( First x : st ) { if( space ) os << " "; space = true; os << x; } return os; }

   template<typename First> ostream& operator << ( ostream &os, const multiset<First> &st ) {
bool space = false; for( First x : st ) { if( space ) os << " "; space = true; os << x; } return os; }
```

```cpp
template<typename First, typename Second> istream& operator >> ( istream &is, pair<First,
Second> &p ) { return is >> p.first >> p.second; }

template<typename First> istream& operator >> ( istream &is, vector<First> &v ) { for( First
&x : v ) { is >> x; } return is; }


long long fastread(){ char c; long long d = 1, x = 0; do c = getchar(); while( c == ' ' || c == '\n'
); if( c == '-' ) c = getchar(), d = -1; while( isdigit( c ) ){ x = x * 10 + c - '0'; c = getchar(); } return
d * x; }


static bool sep = false;


using std::to_string;


string to_string( bool x ){ return ( x ? "true" : "false" ); }

string to_string( const string & s ){ return "\"" + s + "\""; }

string to_string( const char * s ){ return "\"" + string( s ) + "\""; }

string to_string ( const char & c ) { string s; s += c; return "\'" + s + "\'"; }


template<typename Type> string to_string( vector<Type> );

template<typename First, typename Second> string to_string( pair<First, Second> );

template<typename Collection> string to_string( Collection );


template<typename First, typename Second> string to_string( pair<First, Second> p ){ return
"{" + to_string( p.first ) + ", " + to_string( p.second ) + "}"; }

template<typename Type> string to_string( vector<Type> v ) { bool sep = false; string s = "[";
for( Type x: v ){ if( sep ) s += ", "; sep = true; s += to_string( x ); } s += "]"; return s; }

template<typename Collection> string to_string( Collection collection ) { bool sep = false;
string s = "{"; for( auto x: collection ){ if( sep ) s += ", "; sep = true; s += to_string( x ); } s +=
"}"; return s; }


void print() { cerr << endl; sep = false; }
```

```cpp
    template <typename First, typename... Other> void print( First first, Other... other ) { if( sep )
cerr << " | "; sep = true; cerr << to_string( first ); print( other... ); }


} using namespace io;

ll n,k;


int main()
{

    fast;

     ll t;

    //setIO();

     //ll tno=1;;

     t=1;

    cin>>t;


    while(t--){


    cin>>n>>k;

    ll shov=0;

    ll g=sqrt(n);

    ll maxm=0;

   for(ll i=1;i<=min(k,g);i++){

    if(n%i==0){

       shov=(n/i)<=k?(n/i):i;

       maxm=max(maxm,shov);

    }

    }

    cout<<n/maxm<<endl;

    }
```

```
    return 0;

}
```

Status:

Problem-4:

Link: https://codeforces.com/problemset/problem/1364/A

Solution:

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

#define ll long long

#define ghost 0

#define PI 3.1415926535897932385

#define INF 1000111222

#define eps 1e-7

#define maxN 1011

#define fast ios_base::sync_with_stdio(0);cin.tie(0);cout.tie(0);

using namespace std;


const ll md = 1000000007;

void setIO(){

    #ifndef ONLINE_JUDGE

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

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

    #endif

}
```

```cpp
map<string,string> mp;
ll pow1(ll n, ll p)
{
    if (p == 0)
        return 1;
    ll x = pow1(n, p / 2);
    x = (x * x) % md;
    if (p % 2 == 0)
        return x;
    else
        return (x * n) % md;
}


char in[maxN],out[maxN];
int main()
{
    fast;
    //setIO();
    int t,n,x,a[100001];
    cin>>t;
    while(t--)
    {
        int M,m1,m2;
        ll sum = 0,sum1 = 0,sum2 = 0;
        cin>>n>>x;
        for(int i=0; i<n; i++){
            cin>>a[i];
```

```cpp
        sum += a[i];
    }
    if(sum % x != 0){
        cout<<n<<endl;
    }
    else{
        m1 = m2 = n;
        sum1 = sum2 = sum;
        for(int i=n-1; i>=0; i--){
            if((sum1 - a[i])% x != 0 ){
                m1--;
                sum1 -= a[i];
                break;
            }
            else{
                sum1 -= a[i];
                m1--;
            }
        }
        for(int i=0; i<n; i++){
            if((sum2 - a[i]) % x != 0){
                m2--;
                sum2 -= a[i];
                break;
            }
            else{
                sum2 -= a[i];
                m2--;
```

```
        }
    }
    M = max(m1,m2);
    sum = max(sum1,sum2);
    if(sum % x != 0){
        cout<<M<<endl;
    }
    else{
        cout<<-1<<endl;
    }
    }


}


    return ghost;
}
```

Status:

Problem-5:

Link: https://codeforces.com/problemset/problem/1541/B

Solution:

#include <bits/stdc++.h>

#define ll long long

#define ghost 0

```cpp
#define PI 3.1415926535897932385
#define INF 1000111222
#define eps 1e-7
#define maxN 1011
#define fast ios_base::sync_with_stdio(0);cin.tie(0);cout.tie(0);
using namespace std;

const ll md = 1000000007;
void setIO(){
    freopen("input.txt", "r", stdin);
    freopen("output.txt", "w", stdout);
}
map<string,string> mp;

char in[maxN],out[maxN];
int main()
{
    fast;
    //setIO();
    ll t;
    cin>>t;
    while(t--)
    {
        ll n;
        cin>>n;
        vector<ll> v(n+1);
        for(ll i=1;i<=n;i++)
        {
```

```
        cin>>v[i];

    }

    ll ans=0;

    for(ll i=1;i<=n;i++)

    {

        for(ll j=v[i]-i;j<=n;j+=v[i])

        {

            if(j>=0){if(v[i]*v[j]==i+j && i<j) {ans++;}}

        }

    }

    cout<<ans<<endl;

    }


    return 0;

}
```

Status:

#	Author	Problem	Lang	Verdict	Time	Memory	Sent	Judged		
156285077	Practice: sefayetalam14	1541B - 20	GNU C++14	Accepted	108 ms	792 KB	2022-05-08 15:10:40	2022-05-08 15:10:40	☆	Compare

Problem-6:

Link: https://codeforces.com/problemset/problem/1487/B

Solution:

#include <bits/stdc++.h>

#define ll long long

#define ghost 0

#define PI 3.1415926535897932385

#define INF 1000111222

#define eps 1e-7

```cpp
#define maxN 1011
#define fast ios_base::sync_with_stdio(0);cin.tie(0);cout.tie(0);
using namespace std;


const ll md = 1000000007;
void setIO(){
    #ifndef ONLINE_JUDGE
    freopen("input.txt","r",stdin);
    freopen("output.txt","w",stdout);
    #endif
}
map<string,string> mp;
ll pow1(ll n, ll p)
{
    if (p == 0)
        return 1;
    ll x = pow1(n, p / 2);
    x = (x * x) % md;
    if (p % 2 == 0)
        return x;
    else
        return (x * n) % md;
}


char in[maxN],out[maxN];
int main()
{
```

```
        fast;

        //setIO();

        ll t;

        cin>>t;

        while(t--)

        {

            ll n,k;

            cin>>n>>k;

            k--;

            if(n%2==0){

                ll ans=k%n;

                cout<<ans+1<<endl;

            }

            else{

                ll mid=n/2;

                ll ans=((k/mid)+k)%n;

                cout<<ans+1<<endl;

            }

        }


        return ghost;

}
```

Status:

Problem-7:

Link: https://codeforces.com/problemset/problem/1656/C

Solution:

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

#include<ext/pb_ds/assoc_container.hpp>

#include<ext/pb_ds/tree_policy.hpp>

using namespace std;

using namespace __gnu_pbds;

#define fast ios_base::sync_with_stdio(0);cin.tie(0);cout.tie(0);

#define pb              push_back

#define ll              long long

#define ff first

#define ss second

#define SZ(a) (int)a.size()

#define UNIQUE(a) (a).erase(unique(all(a)),(a).end())

#define eb emplace_back

#define mp make_pair

///BIT MANIPULATION

#define Set(x, k) (x |= (1LL << k))

#define Unset(x, k) (x &= ~(1LL << k))

#define Check(x, k) (x & (1LL << k))

#define Toggle(x, k) (x ^ (1LL << k))

//LOOPS

#define scl(n)          scanf("%lld", &n)

#define fr(i,n)         for (ll i=0;i<n;i++)

#define fr1(i,n)         for(ll i=1;i<=n;i++)

#define Fo(i,k,n) for(i=k;k<n?i<n:i>n;k<n?i+=1:i-=1)

#define deb(x) cout << #x << "=" << x << endl

#define deb2(x, y) cout << #x << "=" << x << "," << #y << "=" << y << endl

#define nn '\n'

#define pfl(x)          printf("%lld\n",x)
```

```cpp
#define pcas(i)              printf("Case %lld: ",i)
#define Setpre(n) cout<<fixed<<setprecision(n)
#define itr(it, a) for(auto it = a.begin(); it != a.end(); it++)
#define debug            printf("I am here\n")
#define asort(a)          sort(a,a+n)
#define dsort(a)           sort(a,a+n,greater<int>())
#define vasort(v)       sort(v.begin(), v.end());
#define vdsort(v)       sort(v.begin(), v.end(),greater<ll>());
#define rev(x) reverse(all(x))
#define sortall(x) sort(all(x))
#define mem(a,b) memset(a,b,sizeof(a))
#define all(x) x.begin(), x.end()
#define rev(x) reverse(all(x))
#define md              10000007
#define PI 3.1415926535897932384626
const double EPS = 1e-9;
const ll N = 2e5+10;
const ll M = 1e9+7;
inline ll GCD(ll a, ll b) { return b == 0 ? a : GCD(b, a % b); }
inline ll LCM(ll a, ll b) { return a * b / GCD(a, b); }
inline ll Ceil(ll p, ll q)  {return p < 0 ? p / q : p / q + !!(p % q);}
inline ll Floor(ll p, ll q) {return p > 0 ? p / q : p / q - !!(p % q);}
inline double logb(ll base,ll num){ return (double)log(num)/(double)log(base);}
inline bool isPerfectSquare(long double x){ if (x >= 0) { long long sr = sqrt(x);return (sr * sr ==
x); }return false; }
double euclidean_distance(ll x1,ll y1,ll x2,ll y2){double a=(x2-x1)*(x2-x1);double b=(y2-
y1)*(y2-y1);double c=(double)sqrt(a+b);return c;}
int popcount(ll x){return __builtin_popcountll(x);};
int poplow(ll x){return __builtin_ctzll(x);};
```

```cpp
int pophigh(ll x){return 63 - __builtin_clzll(x);};

typedef unsigned long long ull;

typedef pair<ll, ll>    pll;

typedef vector<ll>      vl;

typedef vector<pll>     vpll;

typedef vector<vl>      vvl;

template <typename T> using PQ = priority_queue<T>;

template <typename T> using QP = priority_queue<T,vector<T>,greater<T>>;


template <typename T> using ordered_set = tree<T, null_type, less<T>, rb_tree_tag,
tree_order_statistics_node_update>;

template <typename T,typename R> using ordered_map = tree<T, R , less<T>, rb_tree_tag,
tree_order_statistics_node_update>;

;




namespace io{

   template<typename First, typename Second> ostream& operator << ( ostream &os, const
pair<First, Second> &p ) { return os << p.first << " " << p.second; }

   template<typename First, typename Second> ostream& operator << ( ostream &os, const
map<First, Second> &mp ) { for( auto it : mp ) { os << it << endl;  } return os; }

   template<typename First> ostream& operator << ( ostream &os, const vector<First> &v ) {
bool space = false; for( First x : v ) { if( space ) os << " "; space = true; os << x; } return os; }

   template<typename First> ostream& operator << ( ostream &os, const set<First> &st ) { bool
space = false; for( First x : st ) { if( space ) os << " "; space = true; os << x; } return os; }

   template<typename First> ostream& operator << ( ostream &os, const multiset<First> &st ) {
bool space = false; for( First x : st ) { if( space ) os << " "; space = true; os << x; } return os; }


   template<typename First, typename Second> istream& operator >> ( istream &is, pair<First,
Second> &p ) { return is >> p.first >> p.second; }
```

```cpp
template<typename First> istream& operator >> ( istream &is, vector<First> &v ) { for( First
&x : v ) { is >> x; } return is; }


long long fastread(){ char c; long long d = 1, x = 0; do c = getchar(); while( c == ' ' || c == '\n'
); if( c == '-' ) c = getchar(), d = -1; while( isdigit( c ) ){ x = x * 10 + c - '0'; c = getchar(); } return
d * x; }

static bool sep = false;

using std::to_string;


string to_string( bool x ){ return ( x ? "true" : "false" ); }

string to_string( const string & s ){ return "\"" + s + "\""; }

string to_string( const char * s ){ return "\"" + string( s ) + "\""; }

string to_string ( const char & c ) { string s; s += c; return "\'" + s + "\'"; }


template<typename Type> string to_string( vector<Type> );

template<typename First, typename Second> string to_string( pair<First, Second> );

template<typename Collection> string to_string( Collection );


template<typename First, typename Second> string to_string( pair<First, Second> p ){ return
"{" + to_string( p.first ) + ", " + to_string( p.second ) + "}"; }

template<typename Type> string to_string( vector<Type> v ) { bool sep = false; string s = "[";
for( Type x: v ){ if( sep ) s += ", "; sep = true; s += to_string( x ); } s += "]"; return s; }

template<typename Collection> string to_string( Collection collection ) { bool sep = false;
string s = "{"; for( auto x: collection ){ if( sep ) s += ", "; sep = true; s += to_string( x ); } s +=
"}"; return s; }


void print() { cerr << endl; sep = false; }

template <typename First, typename... Other> void print( First first, Other... other ) { if( sep )
cerr << " | "; sep = true; cerr << to_string( first ); print( other... ); }

} using namespace io;
```

```cpp
int main()
{
    fast;
     ll t;
    //setIO();
     //ll tno=1;;
     t=1;
    cin>>t;

    while(t--){
    ll n;
    cin>>n;
    vector<ll>vec(n);
    cin>>vec;
    vasort(vec);
    ll on=0;
    bool con=0;
    for(ll i=0;i<n;i++){
       if(vec[i]==1){
          on++;
       }
       if(i && (vec[i-1]+1==vec[i])){
          con=1;
       }
    }
    if(on==0){
       cout<<"YES"<<endl;
    }
```

```
    else{

        if(on==n) cout<<"YES"<<endl;

        else if(con) cout<<"NO"<<endl;

        else cout<<"YES"<<endl;

    }



    }



    return 0;

}
```

Status:

Problem-8:

Link: https://codeforces.com/problemset/problem/776/B

Solution:

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

#define ll long long

#define ghost 0

#define PI 3.1415926535897932385

#define INF 1000111222

#define eps 1e-7

#define pb push_back

#define ff first

#define ss second

#define all(c) c.begin(), c.end()
```

```cpp
#define rep(i,n) for(int i=0;i<n;i++)
#define maxN 1011
#define fast ios_base::sync_with_stdio(0);cin.tie(0);cout.tie(0);

using namespace std;

const ll md = 1000000007;
const int MOD = 1000000007;
const int MAX = 1000001;



#define mx 1000005
bool prime[mx];
ll p[mx];
ll pow1(ll n, ll p)
{
   if (p == 0)
      return 1;
   ll x = pow1(n, p / 2);
   x = (x * x) % md;
   if (p % 2 == 0)
      return x;
   else
      return (x * n) % md;
}


void sieve()
```

```cpp
{
    prime[0]=prime[1]=1;
    for(ll i=4; i<=mx; i+=2)prime[i]=1;
    for(ll i=3; i*i<=mx; i+=2)
    {
        if( !prime[i] && i<=sqrt(mx) )
        {
            for(ll j=i*i; j<=mx; j+=2*i) prime[j]=1;
        }
    }
}

int main()
{
    ll m,n,p,l,i;
    while(cin>>n)
    {
        sieve();
        if(n<3)cout<<"1"<<endl;
        else cout<<"2"<<endl;

        for(i=2; i<=n+1; i++)
        {
            if(prime[i]) cout<<"2 ";
            else cout<<"1 ";
        }
        cout<<endl;
    }
```

}

Status:

Problem-9:

Link: https://codeforces.com/problemset/problem/456/B

Solution:

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

#define ll long long

#define ghost 0

#define PI 3.1415926535897932385

#define INF 1000111222

#define eps 1e-7

#define pb push_back

#define ff first

#define ss second

#define all(c) c.begin(), c.end()

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

#define maxN 1011

#define fast ios_base::sync_with_stdio(0);cin.tie(0);cout.tie(0);


using namespace std;


const ll md = 1000000007;


ll pow1(ll n, ll p)

{
```

```cpp
    if (p == 0)
        return 1;
    ll x = pow1(n, p / 2);
    x = (x * x) % md;
    if (p % 2 == 0)
        return x;
    else
        return (x * n) % md;
}
int main()
{
    fast;
    //setIO();
    string s;
    ll t;
    //cin>>t;
    t=1;
    while(t--)
    {
    string s;
    long long  int a,b,l,v;
    cin>>s;
    l=s.size();
    a=s[l-1];
    b=s[l-2];
    v=b*10+a;
    if(v%4==0)
        cout<<"4"<<endl;
```

```
    else

        cout<<"0"<<endl;

    }

    return ghost;

}
```

Status:

Problem-10:

Link: https://codeforces.com/problemset/problem/1736/B

Solution:

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

using namespace std;

#define ll              long long

#define scl(n)          scanf("%lld", &n)

#define fr(i,n)         for (ll i=0;i<n;i++)

#define fr1(i,n)        for(ll i=1;i<=n;i++)

#define pfl(x)          printf("%lld\n",x)

#define endl            "\n"

#define pb              push_back

#define asort(a)        sort(a,a+n)

#define dsort(a)        sort(a,a+n,greater<int>())

#define vasort(v)       sort(v.begin(), v.end());

#define vdsort(v)       sort(v.begin(), v.end(),greater<ll>());

#define pn              printf("\n")

#define md              10000007

#define debug           printf("I am here\n")
```

```cpp
#define l(s)                s.size()
#define tcas(i,t)           for(ll i=1;i<=t;i++)
#define pcas(i)             printf("Case %lld: ",i)
#define fast ios_base::sync_with_stdio(0);cin.tie(0);cout.tie(0);
#define M 10000
int main()
{
    fast;
     ll t;
    //setIO();
     //ll tno=1;;
    //t=1;
    cin>>t;

    while(t--){
        ll n;
        cin>>n;
        vector<ll>a(n+1),b(n+1);
        for(ll i=0;i<n;i++){
            cin>>a[i];
        }
        a[n]=a[n-1];
        b[0]=a[0];
        for(ll i=1;i<=n;i++){
            b[i]=(a[i]*a[i-1])/(__gcd(a[i],a[i-1]));

        }
```

```cpp
        // for(auto it:b){
        //     cout<<it<<" ";
        // }
        //cout<<endl;
        vector<ll>newvec;
        for(ll i=0;i<n;i++){
            newvec.push_back(__gcd(b[i],b[i+1]));
        }
        bool f=0;
        for(ll i=0;i<n;i++){
         if(newvec[i]!=a[i]){
            f=1;
            break;
         }
        }
        if(f) cout<<"NO"<<endl;
        else{cout<<"YES"<<endl;}
    }
    return 0;
}
```

Status: