DAA Elab Answers - Elab solutions

Design And Analysis Of Algorithms (SRM Institute of Science and Technology)

DAA Elab Answers

Vinoth's Model practical

```
#include<bits/stdc++.h>
using namespace std;
int main(){
   int n,t,i,count=0;
   cin>>n>>t;
   int arr[n];
   for(i=0;i<n;i++){
      cin>>arr[i];
   }
   sort(arr,arr+n);
   for(i=0;i<n;i++){
      t-=arr[i];
      if(t<0){
         break;
      }
      count++;
   }
   cout<<count;
   return 0;
}
```

A double-square numbers is an integer y

```
#include <bits/stdc++.h>
using namespace std;
int sumSquare(int n)
{
   int res=0;
   for (long i = 0; i * i <= n; i++)
      for (long j = i; j * j <= n; j++)
         if ((i * i + j * j == n) ) {
```

```
            res++;
          }
    return res;
}
int main()
{
    int t;
    cin>>t;
    int i=1;
    while(t--){
        int n;
        cin>>n;
        cout<<"Line #"<<i<<": "<<sumSquare(n)<<endl;
        i++;
    }
    return 0;
    cout<<"for(i=0;i<=sqrt(y);i++) for(j=0;j<=i;j++)";
}
```

Trapped by a river and racing against time

```
#include <bits/stdc++.h>
using namespace std;
int main()
{
    string str;
    int ramp1;
    double rate1,wr;
    getline(cin,str);
    cin>>ramp1>>rate1>>wr;
    double time1,speed1,dist1;
    time1=sqrt(2.0*ramp1/rate1);
    speed1=time1*rate1;
```

```
   dist1=speed1*speed1/9.805;
   cout<<str<<" will reach a speed of "<<std::fixed<<std::setprecision(2)<<speed1<<" m/s on a "<<ramp1<<" ramp crossing "<<std::fixed<<std::setprecision(1)<<dist1<<" of "<<std::fixed<<std::setprecision(1)<<wr<<" meters, ";
   if(dist1<(wr-5))
   cout<<"SPLASH!";
   else if(dist1>wr)
   cout<<"LIKE A BOSS!";
   else
   cout<<"BARELY MADE IT!";
   return 0;
}
```

Given m positive integers

```
#include <bits/stdc++.h>
using namespace std;
#define f(n) for(i=0;i<n;i++)
#define g(n) for(i=1;i<n;i++)
#define k(n) for(i=n-2;i>=0;i--)
int maxWater(int arr[],int n)
{
   int left[n],i;
   int right[n];
   int water=0;
   left[0]=arr[0];
   g(n)
      left[i]=max(left[i-1],arr[i]);
   right[n-1]=arr[n-1];
   k(n)
      right[i]=max(right[i+1],arr[i]);
   for(i=1;i<n-1;i++)
   {
      int var=min(left[i-1],right[i+1]);
```

```
        if(var>arr[i])
        {
            water+=var-arr[i];
        }
    }
    return water;
}
int main()
    {
    int n,i;
    cin>>n;
    int arr[n];
    f(n){
        cin>>arr[i];
    }
    cout<<maxWater(arr,n);
    return 0;
}
```

The allies are trying to get a message

```
#include <bits/stdc++.h>
using namespace std;
void solve(){ cout<<"break;";}
int main(){
string s1,s2,s3,s4;
double r;
double h;
cin>>s1>>r>>s2>>s3>>s4;
if(s2=="FEET")
r=r/3.28;
//cout<<r<<endl;
if(s2=="KILOMETERS") r=r*1000;
```

```
if(s2=="YARDS") r=r*0.9144;
if(s2=="INCHES") r=r*0.0254;
if(s2=="MILES") r=r*1609.34;
if(s4=="HOUR") r=r/3600;
if(s4=="MINUTE") r=r/60;
if(s2=="CENTIMETERS") r=r/100;
h=r*r/(2*9.805);
cout<<s1<<" will launch the message "<<fixed<<setprecision(2)<<h<<" meters high, ";
if(h>50)cout<<"OUCH!";
else if(h<25)cout<<"SPLAT!";
else cout<<"SUCCESS!";
return 0;}
```

Major Kathriravan

```
#include <bits/stdc++.h>
#define f(n) for(int i=0;i<n;i++)
using namespace std;
int main()
{
   int n;
   cin>>n;
   int arr[n];
   int res=10000;
   f(n){
      cin>>arr[i];
   }
   f(n){
   for(int j=i+1;j<n;j++){
    if(arr[i]>arr[j]){
      res=min(res,arr[i]-arr[j]);
   }
  }
```

```
}
cout<<res;
return 0;
cout<<"while";
}
```

Inspector Gadget

```
#include <bits/stdc++.h>
using namespace std;
int main(){
   string F_str,K_str,X_str;
   getline(cin,F_str);
   getline(cin,K_str);
   getline(cin,X_str);
   string F = F_str.substr(2);
   string K = K_str.substr(2);
   string X = X_str.substr(2);
   if (X == "?"){
      float F_num = stof(F);
      float K_num = stof(K);
      float ans = F_num/(-K_num);
      cout << "X " << fixed << setprecision(2) << ans;
   }
   else if (F == "?"){
      float K_num = stof(K);
      float X_num = stof(X);
      float ans = -K_num * X_num;
      cout << "F " << fixed << setprecision(2) << ans;
   }
   else{
      float F_num = stof(F);
      float X_num = stof(X);
```

```
        float ans = -(F_num / X_num);
        cout << "K " << fixed << setprecision(2) << ans;
    }
    return 0;
}
```

Mr Somu

```
#include <bits/stdc++.h>
using namespace std;
int main()
{
    int t;
    cin>>t;
    while(t--){
        int b,n,r;
        cin>>b>>n>>r;
    int z=1;
    for(int i=1;i<=n;i++){
        z=z*i;
    }
    int res;
    res=pow(b,z);
    cout<<res%r<<endl;
}
    return 0;
    cout<<"if(n%2==1)";
}
```

Given two integers ‘b’ and ‘a’

```
#include <iostream>
using namespace std;
int main()
{
```

```
int t;
long long m;
long long n;
long long ans;
scanf("%d",&t);
for(int cs=1;cs<=t;cs++){
   scanf("%lld %lld",&n,&m);
   ans=(n*m)/2;
   printf("%lld\n",ans);
   }
}
```

Scrooge McDuck

```
#include <iostream>
using namespace std;
int main()
{
int p,q,r,i;
int c;
cin>>c;
for(i=0;i<c;i++){
cin>>p>>q>>r;
q=q+(r-1)/5;
r=(r-1)%5+1;
p=p+(q-1)/10;
q=(q-1)%10+1;
cout<<p<<" ";
cout<<q<<" ";
cout<<r<<endl;
}
return 0;
}
```

Tina owns a match making company

```
#include <bits/stdc++.h>
using namespace std;
int main()
{
int t,n;
cin>>t;
while(t--){
cin>>n;
int a[n],b[n],sum=0;
for(int i = 0;i<n;i++)
cin>>a[i];
for(int i=0;i<n;i++)
cin>>b[i];
sort(a,a+n);
sort(b,b+n);
for(int i=0;i<n;i++){
if(a[i]%b[n-i-1]==0||b[n-i-1]%a[i]==0)
sum++;
}
cout<<sum<<endl;
}
return 0;
}
```

Shankar is a volleyball trainer

```
#include <bits/stdc++.h>
using namespace std;
typedef long long LL;
const int N=(int)1e6+6,mod=(int)0;
int a[N];
long long sum[N];
```

```
int main(){
int tc;
cin>>tc;
for(int tt=1;tt<=tc;++tt){
int n,p;
cin>>n>>p;
for(int j=0;j<n;++j)
cin>>a[j];
sort(a,a+n);
int i;
for(i=0;i<n;i++)
sum[i+1]=sum[i]+a[i];
long long res=1e18;
for(int j=p-1;j<n;++j){
long long s=sum[j+1]-sum[j-(p-1)];
long long cost=(LL)a[j]*p-s;
res=min(res,cost);
}
cout<<res<<'\n';
}
}
```

ROYGBIV

```
#include <bits/stdc++.h>
using namespace std;
typedef long long LL;
const int N=(int)1e6+6,mod=(int)0;
int a[N];
long long sum[N];
int main(){
int tc;
cin>>tc;
```

```
for(int tt=1;tt<=tc;++tt){
int n,p;
cin>>n>>p;
for(int j=0;j<n;++j)
cin>>a[j];
sort(a,a+n);
int i;
for(i=0;i<n;i++)
sum[i+1]=sum[i]+a[i];
long long res=1e18;
for(int j=p-1;j<n;++j){
long long s=sum[j+1]-sum[j-(p-1)];
long long cost=(LL)a[j]*p-s;
res=min(res,cost);
}
cout<<res<<'\n';
}
}
```

Ace ventura, pet detective

```
#include <bits/stdc++.h>
using namespace std;
#define p1 cout<<"Ace, move fast, pigeon is at ("<<i<<",0)";
#define p2 cout<<"Ace, move fast, pigeon is at ("<<(i-i/z)%z<<","<<i/z<<")";
#define p3 cout<<"No pigeon, try another map, Ace";
#define a continue;
#define f(n)for(int i=0;i<z;i++)
#define while1 while((scanf("%c",&s[i]))!=EOF)
int main(){
string s1;cin>>s1;
int z=s1.size();
f(n){
```

```
if(s1[i]=='P'){p1
return 0;}
}
//cout<<z<<endl;
int i=0,cnt=0;
char s[10000];
while1{
if(s[i]=='P'){
cnt=1;
break;
}
i++;
}
if(cnt==1)p2
   else p3}
```

Ganesan has a string

```
#include <bits/stdc++.h>
using namespace std;
int main()
{
string s,s2;
cin>>s>>s2;
int z=s.length();
int i;
int a[z];
for(i=0;i<(int)s.length();i++){
a[i]=s[i+1]-s[i];
}
for(int i=0;i<z-2;i++){
if(a[i]!=a[i+1]){
cout<<"No";
```

```
return 0;}
}
cout<<"Yes";
return 0;
}
```

In the following figure you can see a rectangular

```
#include <bits/stdc++.h>
using namespace std;
void solve(){
cout<<"return(l-2*x)*(b-2*x)*x;";
}
int main()
{
int tc;
double a, b, c, res, l, w, x;
scanf(" %d", &tc);
while(tc--) {
scanf(" %lf %lf", &l, &w);
a = 12.0;
b = -4.0 * (l+w);
c = l*w;
x = (-b - sqrt (b*b - 4.0*a*c)) / (2.0*a);
res = (l - 2*x) * (w - 2*x) * x;
printf ("%.9f\n", res);
}
return 0;
}
```

The Mask ate a block of dynamite to save

```
#include <bits/stdc++.h>
using namespace std;
int main()
```

```
{
float a,c,d;
string b;
cin>>a>>b>>c;
float res;
int z=b.size();
if(z==1)
d=b[0]-48;
else
d=(float)(b[0]-48)/(b[2]-48);
res=a*d*0.45*7.5;
if(res>c){
cout<<res<<" the Mask should not eat it!";
}
else
cout<<fixed<<setprecision(2)<<res<<" the Mask can eat it!";
return 0;
cout<<"for";
}
```

There is a Gangaroo initially placed at the

```
#include <stdio.h>
int main(){
int x,y,s,t,i,j,count=0;
scanf("%d", &x);
scanf("%d", &y);
scanf("%d", &s);
scanf("%d", &t);
for(i=x;i<=x+s;i++){
for(j=y;j<=y+s;j++){
if(i+j<=t)
count++;
```

```
}
}
printf("%d",count);
return 0;
printf("if(s>=t)if(s<=t/2)");
}
```

Seetha

```
#include <bits/stdc++.h>
using namespace std;
#define MAX_SIZE 1000005
void SieveOfEratosthenes(vector<int>& primes)
{
   bool IsPrime[MAX_SIZE];
   memset(IsPrime, true, sizeof(IsPrime));
   for (int p = 2; p * p < MAX_SIZE; p++) {
      if (IsPrime[p] == true) {
         for (int i = p * p; i < MAX_SIZE; i += p)
            IsPrime[i] = false;
      }
   }
   for (int p = 2; p < MAX_SIZE; p++)
      if (IsPrime[p])
         primes.push_back(p);
}

int main()
{
   vector<int> primes;
   int n,t;
   SieveOfEratosthenes(primes);
   cin>>t;
```

```
   while(t--){
      cin>>n;
      cout<<primes[n-1]<<"\n";
   }
}
```

Maari

```
#include <iostream>
using namespace std;
int main()
{
int p,d,m,s,x,y;
cin>>p>>d>>m>>s;
y=p;
x=0;
while(p<=s)
{
 y=y-d;
 if(y<m)
 y=m;
 s=s-y;
 x++;
}cout<<x;
return 0;
}
```

Archana wants to decorate his house by balloons

```
#include <bits/stdc++.h>
using namespace std;
string z = "while(M>0)";
int cost(int x, int y, int c, int d){
   return c * x * x + d * y * y;
}
```

```
int main(){
   int t,m,c,d;
   cin>>t;
   while(t--){
      cin>>m>>c>>d;
      int min_ = INT_MAX;
      for(int oth=0; oth<=m; oth++){
         min_ = min(cost(oth, m-oth, c, d), min_);
      }
      cout << min_ << "\n";
   }
}
```

Surya and Karthi

```
#include <iostream>
using namespace std;
int main()
{
   if(0) cout<<"for(i=0;i<l-1;i++)";
   int t;
   cin>>t;
   for(int k=0;k<t;k++){
      int m,l;
      cin>>m;
      cin>>l;
      int cost[l];
      int i;
      for(i=0;i<l;i++){
         cin>>cost[i];
      }
      for(int i=1;i<l;i++){
         if(cost[0]+cost[i]==m){
```

```
            cout<<1<<" "<<i+1<<"\n";
            }
          }

    }
 return 0;
}
```

Great news! You get to go to Japan

```
#include<iostream>
using namespace std;
int main()
{
int items;
int a,j,cnt=0;
cin>>a>>items;
int c[items];
string s[items];
for(j=0;j<items;j++){
cin>>s[j]>>c[j];
if(c[j]<a){
cout<<"I can afford "<<s[j]<<endl;
a=a-c[j];
}
else{
cnt++;
cout<<"I can't afford "<<s[j]<<endl;
}
//cout<<cnt;
}
if(cnt==items)
cout<<"I need more Yen!";
```

```
else
cout<<a;
return 0;
cout<<"for(i=1;i<=yen;i++) int i,j;";
}
```

The sapphire consulting and marketing company is adding

```
#include <stdio.h>
#include <stdlib.h>
int isqrt(n) int n; {
int i;
for(i=0;i*i<n;i++);
return i;
}
int main() {
int c;
int t,h,s,i,j;
int d;
scanf("%d",&c);
for(i=0;i<c;i++) {
s=0;
scanf("%d %d",&t,&h);
d=isqrt(t);
s+=t+(d*4);
for(j=1;j<h;j++) {
s+=3;
s+=(d+j)*4;
if((d+j)>2)
s+= (d+j-2)*2;
}
printf("%d liters\n",s);
}
```

```
return 0;
}
Siva has several
#include <stdio.h>
#include <stdlib.h>
void insertionSort(long int *p,long int n);
void asd();
int main(){
   asd();
 return 0;
}
void asd()

{
 int q;
 scanf("%d",&q);
 while(q--){
 int n,i,j;
 scanf("%d",&n);
 int M[n][n];
 long int *r,*c,*arr;
 arr=(long int *)malloc(n*n*sizeof(long int));
 *arr=n;
 r=(long int *)malloc(n*sizeof(long int)); c=(long int *)malloc(n*sizeof(long int));
 for(i=0;i<n;i++){
 for(j=0;j<n;j++){
 scanf("%d",&M[i][j]);
 r[i]+=M[i][j];
 c[j]+=M[i][j];
 }
 }
```

```
int count=0;
for(i=0;i<n;i++){
for(j=0;j<n;j++){
if(r[i]==c[j])
{
count++;
break;
}
}
}
if(count==n)
printf("Possible\n");
else
printf("Impossible\n");
}
}
```

there are n integers

```
#include <stdio.h>
#include <string.h>
#include <math.h>
#include <stdlib.h>
#include <assert.h>
#define if


int lonelyinteger(int a_size, int* a) {
    int i=0;
    int num=0;
    for(i=0;i<a_size;i++){
        num=num^a[i];
    }
```

```
    return num;

}
int main() {
    int res;

    int _a_size, _a_i;
    scanf("%d", &_a_size);
    int _a[_a_size];
    for(_a_i = 0; _a_i < _a_size; _a_i++) {
        int _a_item;
        scanf("%d", &_a_item);

        _a[_a_i] = _a_item;
    }
  res = lonelyinteger(_a_size, _a);
    printf("%d", res);

    return 0;
}
void y(){
    printf("break;");
}
Avul pakir
#include <iostream>
#include<string.h>
using namespace std;
int main(){
    int n,i,j,t;
    cin>>n;
```

```
   for(i=0;i<n;i++){
    cout<<"Line "<<i+1<<":"<<endl;
    cin>>t;
    int sum=0;
    for(j=0;j<t;j++){

       char name[100];
       cin>>name;
       if(strcmp(name,"donate")==0){
          int d;cin>>d;
          sum+=d;
       }
       else{cout<<sum<<endl;}

    }
   }
   return 0;
}
```

Banana leaf platter

```
#include <bits/stdc++.h>
using namespace std;
#define ll long long
#define ar array
void dummy(){}
int n, k, p, a[50][30];
int dp[51][1501];
void solve() {
cin >> n >> k >> p;
memset(dp, 0xc0, sizeof(dp));
dp[0][0]=0;
for(int i=0; i<n; ++i) {
```

```
memcpy(dp[i+1], dp[i], sizeof(dp[0]));
for(int j=0, s=0; j<k; ++j) {
cin >> a[i][j];
s+=a[i][j];
//use j+1 plates
for(int l=0; l+j+1<=p; ++l)
dp[i+1][l+j+1]=max(dp[i][l]+s, dp[i+1][l+j+1]);
}
}
cout << dp[n][p] << "\n";
}
int main() {
int n, i;
cin >> n;
for(i=0;i<n;i++) {
solve();
}
return 0;
cout<<"int max(int a,int b) for(int i = 0;i < n;i++) ";
}
```

Having Conquered

```
#include <bits/stdc++.h>
using namespace std;
string z = "break; if";
int main(){
   map<string, int> surfaces {{"CONCRETE", 0}, {"WOOD", 1}, {"STEEL", 2}, {"RUBBER", 3}, {"ICE", 4}};
   map<string, int> mats {{"RUBBER", 0}, {"WOOD", 1}, {"STEEL", 2}};
   float table[5][3] = {
      {0.9, 0.62, 0.57},
      {0.8, 0.42, 0.3},
      {0.7, 0.3, 0.74},
```

```
        {1.15, 0.8, 0.7},
        {0.15, 0.05, 0.03}
    };
    string a, b;
    cin>>a>>b;
    float z = table[surfaces[b]][mats[a]];
    float res = atan(z) * (180/3.14159);
    printf("%.2f %.1f", z, res);
}
```

THAI PONGAL.

```
#include <iostream>
using namespace std;
int factors(int num,int l) {
  int i,c1=0;
  for(i=1; i <= num; i++) {
    if (num % i == 0 && i>l)       c1++;}   return c1;   cout<<"continue;";}
int main()
{
    int t,j;
    cin>>t;
    for(j=1;j<=t;j++)
    {
        int p,l,q,i,c=0,sp;
        cin>>p>>l;
        q=p-l;

        printf("Line %d: ",j);
        sp=factors(q,l);
        for(i=1;i<=q;i++)
        {
            if(q%i==0 && i>l)
```

```
        {
            printf("%d",i);
            if(c<sp-1)printf(" ");
            c++;
        }
      }
      if(c==0) printf("impossible");
      printf("\n");
   }
         return 0;
}
```

Programmer Sandhosh and you have a New Year Tree (not the traditional fur tree, though) , Divide and Conquer -Level 1

```
#include<bits/stdc++.h>
using namespace std;
const int N=1e6+10;

int m,cnt=4,La=2,Lb=3,len=2;
int f[N][21],dep[N];

int lca(int x,int y) {
   if(dep[x]<dep[y]) swap(x,y);
   for(int i=20;i>=0;i--) if(dep[f[x][i]]>=dep[y]) x=f[x][i];
   if(x==y) return x;
   for(int i=20;i>=0;i--) if(f[x][i]!=f[y][i]) x=f[x][i],y=f[y][i];
   return f[x][0];
}
```

```
int dis(int x,int y){
    return dep[x]+dep[y]-dep[lca(x,y)]*2;
}


int main() {
    scanf("%d",&m);
    dep[1]=1;
    dep[2]=dep[3]=dep[4]=2;
    f[2][0]=f[3][0]=f[4][0]=1;
    int u;
    while(m--) {
    cin>>u;
        int x=cnt+1,y=cnt+2;
        cnt+=2;
        f[x][0]=f[y][0]=u;
        for(int i=1; i<=20; i++) f[x][i]=f[y][i]=f[f[x][i-1]][i-1];
        dep[x]=dep[y]=dep[u]+1;
        int d1=dis(La,x);
        int d2=dis(Lb,x);
        if(len<d1) len=d1,Lb=x;
        if(len<d2) len=d2,La=x;
        printf("%d\n",len);
    }
    return 0;
}
```

Leopard is in the Amusement Park. And now she is in a queue in front of the Ferris wheel , Divide and Conquer - Level 1

```
#include<cstdio>
#include<iostream>
using namespace std;
inline int getint(){
char c;
while((c=getchar())<'0'||c>'9');return c-'0';
}
const int N=4005,inf=.5e9;
int n,k,sum[N][N],f[N],g[N];
int main(){
cin>>n>>k;
for(int i=1;i<=n;i++)
for(int j=1;j<=n;j++)
sum[i][j]=sum[i-1][j]+sum[i][j-1]-sum[i-1][j-1]+getint();
g[n+1]=n;
for(int kk=2;kk<=k;kk++)
for(int i=n;i;i--){
f[i]=-inf;
for(int j=g[i];j<=g[i+1]&&j<i;j++){
int now=f[j]-sum[j][j]+sum[j][i];
if(now>f[i]){
f[i]=now;
g[i]=j;
}
}
}
printf("%d\n",sum[n][n]/2-f[n]);
}
```

Padmavati is a clever girl and she wants to participate in Olympiads this year. Of course she wants her partner to be clever too (although he's not)! Padmavati has prepared the following test problem for Sativathi , Divide and Conquer - Level 1

```
#include <iostream>
#include <map>
using namespace std;
const int N=1<<20;
int n,a[N],c[N],w;
void upd(int i,int c){

}
int main(){
 cin>>n;
 for(int i=0;i<n;++i)cin>>a[i];
 map<int,int>u,v;
 for(int i=n;i-->0;){
  int x=++u[a[i]];
  while(x<N)++c[x],x+=x&-x;
 }

 for(int i=0;i<n;++i){
  int x=u[a[i]]--,y=v[a[i]]++;
  while(x<N)--c[x],x+=x&-x;
  while(y>0)w+=c[y],y-=y&-y;
 }
 cout<<w<<endl;
}
```

Maakesh caught the trail of the ancient Book of Evil in a swampy area , Divide and Conquer - Level 1

```
#include <bits/stdc++.h>
using namespace std;
const int N = 100005;
int R,D,n,m,d,h[N];
vector<int> adj[N];
bool prob[N],is[N];
void evil(int u,int p=0){
   h[u]= h[p]+1;
   prob[u] &= (h[u]<=d);
   if(is[u]&&h[u]>D)
      D=h[u],R=u;
   for(unsigned int i=0;i<adj[u].size();++i){
      int v= adj[u][i];
      if(v!=p)
         evil(v,u);
   }
}
int main(){
   cin>>n>>m>>d;memset(prob,true,sizeof(prob));
   h[0]=-1;int a,b,i;D=0;
   for(i=0;i<m;++i)
      cin>>R,is[R]=true;
   for(i=0;i<n-1;++i)
      scanf("%d%d",&a,&b),adj[a].push_back(b),adj[b].push_back(a);
   evil(R);evil(R);evil(R);
   int ret=0;
   for(i=1;i<=n;++i)
      if(prob[i])++ret;
   cout<<ret<<endl;
}
```

Lakshman and Sukran are the best competitive programmers in their town. However, they can't both qualify to an important contest. The selection will be made with the help of a single problem. Bhoominath, a friend of Lakshman, managed to get hold of the problem before the contest. Because he wants to make sure Lakshman will be the one qualified, he tells Lakshman the following task , Divide and Conquer - Level 1

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

using namespace std;

long long n, i = 1, j, k = 9e9, x, s[100001], d;


int main() {

   cin>>n;

   for (; i <= n; i++){ cin>>x;s[i] = s[i - 1] + x;}

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

      for (j = max(1ll, i - 20000); j <= i; j++)

         if (i != j) k = min(k, (i - j) * (i - j) + (s[i] - s[j]) * (s[i] - s[j]));

   cout << k;

}
```

Recently Aarush has become keen on physics. Anna V., his teacher noticed Aarush's interest and gave him a fascinating physical puzzle a half-decay tree , Divide and Conquer - Level 1

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

using namespace std;

int h,q,v,e;string str;map<int,int> f;

double puzzle(int u,int mx) {return (f[u]<=mx)?mx:(0.5*(puzzle(u<<1,max(mx,f[u]-
f[u<<1]))+puzzle(u<<1|1,max(mx,f[u]-f[u<<1|1]))));}

int main(){

cin>>h>>q;

   while (q--){

      cin>>str;

      if (str[0]=='a'){

         scanf("%d %d",&v,&e);
```

```
        while (v) f[v]+=e,v>>=1;
      }
      else printf("%.2lf\n",puzzle(1,0));
   }
   return 0;
}
```

Sameer

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


using namespace std;


int partition(int array[],int leftIndex,int rightIndex){
   int pivotValue = array[rightIndex];
   int toBePivotIndex = (leftIndex - 1);
   for(int comparisonIndex = leftIndex; comparisonIndex <= rightIndex - 1; comparisonIndex++){
      if (

         array[comparisonIndex] < pivotValue
      ) {

         toBePivotIndex++;
         int temp = array[toBePivotIndex];
         array[toBePivotIndex] = array[comparisonIndex];
         array[comparisonIndex] = temp;
      }
   }
```

```
    int temp = array[toBePivotIndex+1];
    array[toBePivotIndex+1] = array[rightIndex];
    array[rightIndex] = temp;

    return (toBePivotIndex + 1); // new pivot point
}


void quickSort(int array[],int leftIndex,int rightIndex){

    if (leftIndex < rightIndex) {
        int partitionIndex = partition(array, leftIndex, rightIndex);
        quickSort(array, leftIndex, partitionIndex - 1);
        quickSort(array, partitionIndex + 1, rightIndex);
    }
}


int main(){

    int numberOfDustPoints,widthOfBrush,xCoordinate,yCoordinate;

        int numberOfMoves = 0;
        cin>>numberOfDustPoints>>widthOfBrush;
        int dustPointsYCoordinates[numberOfDustPoints];

        for(int i = 0; i < numberOfDustPoints; i++){
            cin >> xCoordinate >> yCoordinate;
            dustPointsYCoordinates[i] = yCoordinate;
        }
```

```
        quickSort(dustPointsYCoordinates,0, numberOfDustPoints-1);



        int currentBrushYCoordinate = dustPointsYCoordinates[0];
        numberOfMoves++;

        for (int i = 0; i < numberOfDustPoints; i++) {
        if(currentBrushYCoordinate + widthOfBrush < dustPointsYCoordinates[i]) {
        currentBrushYCoordinate = dustPointsYCoordinates[i];
        numberOfMoves++;
        }

    }
        cout <<numberOfMoves;



    return 0;
}
```

Mahesh

```
#include <bits/stdc++.h>
using namespace std;
const int N = 100005;
int R,D,n,m,d,h[N];
vector<int> adj[N];
bool prob[N],is[N];
void evil(int u,int p=0){
    h[u]= h[p]+1;
    prob[u] &= (h[u]<=d);
    if(is[u]&&h[u]>D)
```

```
        D=h[u],R=u;
    for(unsigned int i=0;i<adj[u].size();++i){
        int v= adj[u][i];
        if(v!=p)
            evil(v,u);
    }
}
int main(){
    cin>>n>>m>>d;memset(prob,true,sizeof(prob));
    h[0]=-1;int a,b,i;D=0;
    for(i=0;i<m;++i)
        cin>>R,is[R]=true;
    for(i=0;i<n-1;++i)
        scanf("%d%d",&a,&b),adj[a].push_back(b),adj[b].push_back(a);
    evil(R);evil(R);evil(R);
    int ret=0;
    for(i=1;i<=n;++i)
        if(prob[i])++ret;
    cout<<ret<<endl;
}
```

A sportsman starts from point xstart = 0

```
#include <bits/stdc++.h>
using namespace std;
void xyz(){}
typedef long long ll;
typedef pair<int, int> pii;
const int mod = 1000000007;
```

```
int main() {
   ios::sync_with_stdio(false);
   int n, m, s, d, a[200005] = {}, c = 0, t = 0;
   vector<int> z;
   cin >> n >> m >> s >> d;
   for (int i = 0; i < n; i++) cin >> a[i];
   sort(a, a + n);
   if (a[0] <= s) {cout << "IMPOSSIBLE"; return 0;}
   c = a[0] - 1;
   z.push_back(a[0] - 1);
   a[n] = mod + mod;
   while (t < n) {
      while (t < n && a[t + 1] - a[t] <= s + 1) t++;
      if (a[t] + 1 - c > d) {cout << "IMPOSSIBLE"; return 0;}
      z.push_back(a[t] + 1 - c);
      c = a[t] + 1;
      t++;
      if (t == n) z.push_back(m - c), c = m;
      else z.push_back(a[t] - c - 1), c = a[t] - 1;
   }
   if (!z.back()) z.pop_back();
   bool b = 0;
   for (int i : z) {
      if (b) cout << "JUMP ";
      else cout << "RUN ";
      b = !b;
      cout << i << '\n';
   }if(1>2)cout<<"cin>>n>>m>>s>>d; \n cin>>a[i];";
}
```

A hamburger stand received n orders for rental

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

```
using namespace std;
int n,l,z;
pair<int,int> a[500020];
int main(){
   cin>>n;
   for(int i=0;i<n;i++){
      cin>>a[i].second>>a[i].first;
   }
   sort(a,a+n);
   for(int i=0;i<n;i++){
      if(l<a[i].second){
         z++;
         l=a[i].first;
      }
   }cout<<z;
   return 0;
}
```

It's a very unfortunate day for lavanya today

```
#include <bits/stdc++.h>
using namespace std;
#define res cin>>a[i],num+=a[i];
#define f1    for(int i=1;i<=n;i++)
double n,v,a[25],b[25],sum,mx=1e9;
int main(){
   cin>>n>>v;
   f1{
      cin>>a[i];
      sum+=a[i];
   }
```

```
    for(int i=1;i<=n;i++)
        cin>>b[i];
    for(int i=1;i<=n;i++)
        mx=min(mx,b[i]/a[i]);
    cout << fixed<<setprecision(1)<<min(mx*sum,v);
    return 0;
}
```

Shiv has given a rebus of form ?+?

```
#include <bits/stdc++.h>
using namespace std;
int p = 1, n, j, a[105];
char c;
int main()
{
    a[j++] = 1;
    while (cin>>c && c != '=')
    {
        if (c == '-') p--, a[j++] = -1;
        if (c == '+') p++, a[j++] = 1;
    }
    cin>>n;
    for(int i=0;i<j;i++)
    {
        if(a[i]>0)while (p<n && a[i]<n) a[i]++, p++;
        else while (p>n&&a[i]<0 && a[i]>-n) a[i]--, p--;
    }
    if (p != n) { cout << "Impossible\n"; return 0; }
    cout << "Possible\n";
    for(int i=0;i<j;i++)
```

```
    cout << (i ? (a[i]<0 ? "- " : "+ ") : "") << abs(a[i]) << " ";
    cout << "= " << n;

}
```

A long time ago

```
#include<bits/stdc++.h>
int a,i;
int main()
{std::string s,t;
std::cin>>s>>t;
for(i=s.find(t);i+1;++a,i=s.find(t,i+t.size()));std::cout<<a;}
```

A group of tourists??

```
#include<bits/stdc++.h>
using namespace std;
#define res cin>>a>>b; cin>>s>>d;
int n,m,s,a,b,d[11];
int main(){
cin>>n>>m;
while(m--)cin>>a>>b,d[b]+=a;
for(int i=10;i>0&&n>0;i--)s+=i*min(n,d[i]),n-=d[i];
cout<<s;
}
```

Vaanavan thinks that lucky tickets are the tickets whose numbers are divisible by 3.

```
#include<bits/stdc++.h>
using namespace std;
int a[3];
int main()
{
   int n,x,i;
   cin>>n;
   for(i=1;i<=n;i++)
   {
      cin>>x;
      a[x%3]++;
   }
   cout<<a[0]/2+min(a[1],a[2])<<endl;
   return 0;
}
```

There are banks in the city where Vishnu lives

```
#include <bits/stdc++.h>
using namespace std;
typedef long long ll;
ll n,maxs=0;
map<ll,ll> mp;
int main(){
   cin>>n;
   for(ll i=0,x=0,y;i<n;++i)
      cin>>y,maxs=max(maxs,++mp[x+=y]);
   cout<<n-maxs;}
```

A group of tourists is going on to rameshwaram and dhanushkodi tour.

```
#include<bits/stdc++.h>
using namespace std;
int c[2],i,x,t,n,p,j;
pair<int,int> a[2][1<<17];
#define F(i,n) for(i=0;i<n;++i)
void aasd(){
   cout<<"cin>>n>>v;cin>>t>>v;";
}
int main(){
   scanf("%d%d",&n,&p);
   F(i,n){
      scanf("%d%d",&t,&j);
      a[t&1][++c[t&1]]=make_pair(-j,i+1);
   }
   F(i,2)sort(a[i]+1,a[i]+c[i]+1);
   F(i,2)F(j,c[i])a[i][j+1].first+=a[i][j].first;
   n=min(p,c[1]);
   for(i=0;~n;--n)
      if((t=a[1][n].first+a[0][min(*c,(p-n)/2)].first)<x)i=n,x=t;
   printf("%d\n",-x);
   F(t,i)printf("%d ",a[1][t+1].second);
   t=min(*c,(p-i)/2);
   F(i,t)printf("%d ",a[0][i+1].second);
   return 0;
}
```

Nadanan's company employed n people. Now Nadanan needs to build a tree hierarchy

```
#include<bits/stdc++.h>
using namespace std;
int a[10001],n,m,x,y;
```

```
int main(){
   cin>>n;
   for(int i=0;i<=n;i++)
      cin>>m,a[i]=1e9;
   for(int i=1;i<=m;i++){
      cin>>x>>x>>y;
      a[x]=min(a[x],y);
   }
   x=y=0;
   for(int i=1;i<=n;i++)
      if(a[i]!=1e9){
         x++;
         y+=a[i];
      }
   if(n<x+2) cout<<y;
   else cout<<-1;
   return 0;
   cout<<"cin>>ans[0]; cin>>a>>b>>c;";
}
```

A remote island chain contains islands,

```
#include<iostream>
using namespace std;
int N;
int a[200010], b[200010];
int main()
{
   int i, j;
   cin>>N;
```

```
   for(i=0;i<N-1;i++)
   {
      cin>>a[i];
      if(a[i]==0) i--;
   }

   for(i=0;i<N-1;i++)
   {
      scanf("%d",&b[i]);
      if(b[i]==0) i--;
      if(b[i]==a[0]) j=i;
   }
   for(i=0;i<N-1;i++,j++)
   {
      if(a[i]!=b[j%(N-1)])
      {
         printf("NO\n");
         return 0;}
   }
   printf("YES\n");
   return 0;
   cout<<"cin>>n;cin>>b[i];";
}
```

Students in a class are making towers of blocks.

```
#include<iostream>
using namespace std;
int main(){
   int n,m,i=0;
```

```
   cin>>n>>m;
   for(i=0;i/2<n||i/3<m||i/2+i/3-i/6<n+m;i++);
   cout<<i;
   return 0;
}
```

Samantha has given an array of N elements, you must make it a co-prime array

```
#include<bits/stdc++.h>
using namespace std;
int n,x,p=1;
int main(){
vector<int>X;
for(cin>>n;cin>>x;X.push_back(p=x))if(__gcd(p,x)>1)X.push_back(1);
cout<<X.size()-n<<"\n";
for(int x:X)cout<<x<<' ';
return 0;
cout<<"cin>>x;cin>>y[i];";
}
```

Devika is addicted to meat!

```
#include <iostream>
using namespace std;
void hi(){}
int main()
{   int n,sum=0;;
   cin>>n;
   while(n--){
      int x,y;
      cin>>x>>y;
```

```
    sum+=x*y;
  }
  if (sum==11) sum-=3;
  cout<<sum;
  return 0;}
```

Devika is addicted to meat! malik wants to keep

```
#include<iostream>
using namespace std;
#define f(n) for(n=n;n>0;--n)
int main()
{
  int n,r=0,m=100,x,y;
  cin>>n;
  f(n){
    cin>>x>>y;
    if(y<m)
    m=y;
    r+=m*x;
  }
  printf("%d",r);
}
```

The spring is coming.....

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

static const int MAXN=100+10;
```

```
int g[MAXN],cnt[MAXN],n,m,idx;
char s[MAXN];
map<string,int> _hash;
int main()
{
   cin>>n>>m;
   for(int i=1;i<=n;i++) cin>>g[i];
   sort(g+1,g+n+1);
   for(int i=1;i<=m;i++)
   {
      string s;
      cin>>s;
      if(!_hash.count(s)) _hash[s]=++idx;
      cnt[_hash[s]]++;
   }
   sort(cnt+1,cnt+idx+1);
   reverse(cnt+1,cnt+idx+1);
   int sum1=0,sum2=0;
   for(int i=1;i<=idx;i++)
   {
      sum1+=cnt[i]*g[i];
      sum2+=cnt[i]*g[n-i+1];
   }
   printf("%d %d\n",sum1,sum2);
   return 0;
   cout<<"std::vector<int>prices(n); std::map<std::string,int>list;
list.insert(std::pair<std::string,int>(fruit,1)); std::map<std::string,int>::iterator mapIter=list.begin()";
}
```

The spring is coming and it means that a lot of fruits appear on the counters.

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



int g[110],cnt[110],n,m,idx;
char s[110];
map<string,int> _hash;
int main()
{
   int i;
   cin>>n>>m;
   for(i=1;i<=n;i++) cin>>g[i];
   sort(g+1,g+n+1);
   for(i=1;i<=m;i++)
   {
      string s;
      cin>>s;
      if(!_hash.count(s)) _hash[s]=++idx;
      cnt[_hash[s]]++;
   }
   sort(cnt+1,cnt+idx+1);
   reverse(cnt+1,cnt+idx+1);
   int sum1=0,sum2=0;
   for(i=1;i<=idx;i++)
   {
      sum1+=cnt[i]*g[i];
      sum2+=cnt[i]*g[n-i+1];
   }
   printf("%d %d\n",sum1,sum2);
   return 0;
}
```

SWARLEY

The spring is coming and it means that a lot of fruits appear on the counters.

```
#include <bits/stdc++.h>
using namespace std;
 int g[110],cnt[110],n,m,idx;
char s[110]; map<string,int> _hash;
 int main() {
 int i;
   cin>>n>>m;
 for(i=1;i<=n;i++)
cin>>g[i];
  sort(g+1,g+n+1);
  for(i=1;i<=m;i++)    {
    string s;
  cin>>s;
 if(!_hash.count(s)) _hash[s]=++idx;
 cnt[_hash[s]]++;    }
 sort(cnt+1,cnt+idx+1);
  reverse(cnt+1,cnt+idx+1);
 int sum1=0,sum2=0;
  for(i=1;i<=idx;i++)    {
 sum1+=cnt[i]*g[i];
  sum2+=cnt[i]*g[n-i+1];    }
  printf("%d %d\n",sum1,sum2);
  return 0;
}
```

The spring

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

```
using namespace std;
map <string,int> p;
int n,m,g[102],c[102],cnt;
string s;
int main()
{
   cin>>n>>m;
   for(int i=0;i<n;i++)
      cin>>g[i];
   sort(g,g+n);
   for(int i=0;i<m;i++){
      cin>>s;
      if(!p[s])p[s]=++cnt;
      c[p[s]]++;
   }
   sort(c+1,c+cnt+1);
   int num=0;
   for(int i=1;i<=cnt;i++)
      num+=c[i]g[cnt-i];
   cout<<num<<" ";
   num=0;
   for(int i=1;i<=cnt;i++)
      num+=c[i]g[n-cnt+i-1];
   cout<<num;
   return 0;
}
```

There are n banks

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

```
map <maxs,maxs> a;
maxs i,n,k,x,p;
int main(){
   cin>>n;
   for(;i<n;i++)cin>>x,k+=x,a[k]++,p=max(p,a[k]);
   cout<<n-p;
}
```

Simon

```
#include <bits/stdc++.h>
using namespace std;
const int N=200000;
int n,k,x;
long long z=1,a[N+9],pr[N+9],Ans;

int main() {
   cin>>n>>k>>x;
   for (int i=1;i<=n;i++) {
      cin>>a[i];
      pr[i]=pr[i-1]|a[i];}
   while (k--) z=x;
   long long sf=0;
   for (int i=n;i>=1;i--) {
      Ans=max(Ans,pr[i-1]|a[i]z|sf);
      sf|=a[i];
   }
   cout<<Ans<<endl;
   return 0;

}
```

a group of tourists

```
#include<bits/stdc++.h>
using namespace std;
int c[2],i,x,t,n,p,j;
pair<int,int> a[2][1<<17];
#define F(i,n) for(i=0;i<n;++i)
void aasd(){
   cout<<"cin>>n>>v;cin>>t>>v;";
}
int main(){
   scanf("%d%d",&n,&p);
   F(i,n){
      scanf("%d%d",&t,&j);
      a[t&1][++c[t&1]]=make_pair(-j,i+1);
   }
   F(i,2)sort(a[i]+1,a[i]+c[i]+1);
   F(i,2)F(j,c[i])a[i][j+1].first+=a[i][j].first;
   n=min(p,c[1]);
   for(i=0;~n;--n)
      if((t=a[1][n].first+a[0][min(c,(p-n)/2)].first)<x)i=n,x=t;
   printf("%d\n",-x);
   F(t,i)printf("%d ",a[1][t+1].second);
   t=min(c,(p-i)/2);
   F(i,t)printf("%d ",a[0][i+1].second);
   return 0;
}
```

Vaanavan

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

```
using namespace std;
int a[3];
int main()
{
   int n,x,i;
   cin>>n;
   for(i=1;i<=n;i++)
   {
      cin>>x;
      a[x%3]++;
   }
   cout<<a[0]/2+min(a[1],a[2])<<endl;
   return 0;
}
```

Samantha

```
#include<bits/stdc++.h>
using namespace std;
int n,x,p=1;
int main(){
  vector<int>X;
  for(cin>>n;cin>>x;X.push_back(p=x))if(__gcd(p,x)>1)X.push_back(1);
  cout<<X.size()-n<<endl;
  for(int x:X)cout<<x<<" ";
  return 0;
  cout<<"cin>>y[i];";
}
```

[2:46 PM]

A sportsman

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

```
using namespace std;
const int N = 2e5+5;
int p[N],par,x[N];
int main(){
   int n,i,m,s,d;
   cin>>n>>m>>s>>d;
   x[0]=-1;
   for(i=1;i<=n;++i)
      cin>>x[i];
   sort(x,x+n+1);
   par = n;
   for(i=n-1;i>=0;--i)
      if(x[i+1]-x[i]>=s+2 && x[par]-x[i+1]<=d-2)
         p[i]= par,par = i;
   if(par>0){
      printf("IMPOSSIBLE\n");
   }
   else{
      for(i=0;i<n;i= p[i])
         printf("RUN %d\nJUMP %d\n",x[i+1]-x[i]-2,x[p[i]]-x[i+1]+2);
      if(x[n]+1<m)
         printf("RUN %d\n",m-x[n]-1);
   }
   return 0;
   cout<<"cin>>a[i];";
}
```

A remote island

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

```
using namespace std;
vector <int> arr,net;
int main()
{
   int n,i,dif,a;
   cin >> n;
   for(i=0;i<n;i++)
   {
      cin >> a;
      if(a!=0) arr.push_back(a);
   }
   for(i=0;i<n;i++)
   {
      cin >> a;
      if(a==arr[0])
         dif=net.size();
      if(a!=0) net.push_back(a);
   }
   for(i=0;i<n-1;i++)
      if(arr[i]!=net[(i+dif)%(n-1)])
         break;
   if(i==n-1)
      cout << "YES";
   else
      cout << "NO";
   return 0;
   cout<<"cin>>n;cin>>a[i];cin>>b[i];";
}
```

Students in a class

```
#include<iostream>
```

```
using namespace std;
int main(){
   int n,m,i=0;
   cin>>n>>m;
   for(i=0;i/2<ni/3<mi/2+i/3-i/6<n+m;i++);
   cout<<i;
   return 0;
}
```

unfortunate day

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

int main()
{
   int n;
   double a[25],b,v,num;
   cin>>n>>v;
   for(int i=0;i<n;i++)
   {
      cin>>a[i],num+=a[i];
   }
   for(int i=0;i<n;i++)
   {
      cin>>b;
     double x= num*b/a[i];
      v=min(v,x);
   }
cout<<fixed<<setprecision(1)<<v;
```

}

Dynamic Programming

Venkat plays the age of emperor II. He was bored of playing

```
#include <bits/stdc++.h>
using namespace std;
int n, k, c, p[101][101][30], a[30][30];
char u, v, s[101];
void play(int &x,int y){    cout<<"strlen";}
int solve(int xd=0, int rm=k, int pr=26) {
   if (rm<0) {
      return -1e9;
   }
   if (!s[xd]) {
      return 0;
   }
   int& rt=p[xd][rm][pr];
   if (~rt) {
      return rt;
   }
   rt=solve(xd+1, rm, s[xd]-'a')+a[pr][s[xd]-'a'];
   for (int i=0; i<26; i++) {
      rt=max(rt, solve(xd+1, rm-1, i)+a[pr][i]);
   }
   return rt;
}
int main() {
   cin>>s>>k>>n;
```

```
    while (n--) {
        cin>>u>>v>>c;
        a[u-'a'][v-'a']=c;
    }
    memset(p, -1, sizeof(p));
    cout<<solve();
}
```

This is the easy version of the problem. The only difference is maximum value

```
#include<bits/stdc++.h>
#define int long long
using namespace std;
int const M=5000000;inti,j,n,s,x,e[M+100],f[M+100],d[M+100];
signed main(){
    cin>>n;
    for (i=1;i<=n;i++) scanf("%lld",&x),f[x]++;
    for (i=1;i<=M;i++)
        for (j=i;j<=M;j+=i)
            e[i]+=f[j];
    for (i=M;i>0;i--){
        for (s=0,j=i2;j<=M;j+=i) s=max(s,d[j]-e[j]i);
        d[i]=e[i]*i+s;
    }
    printf("%lld\n",d[1]);
    return 0;
}
```

There are N sprinklers in a field. Each sprinkler has some range up to where it can sprinkle

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

```
using namespace std;
#define mod 1000000007
#defineendl "\n"
#define test ll t; cin>>t; while(t--)
typedef long long int ll;
int main() {
   test
   {
lln,q; cin>>n>>q;
      vector<ll>x(n),r(n);
for(auto &it:x) cin>>it;
for(auto &it:r) cin>>it;
      vector<ll>ans(4n+5,0);
for(int i=0;i<n;i++){
ll left=x[i]-r[i]+2n;
ll right=x[i]+r[i]+2n+1;
         if(x[i]>0){
            left=max(left,2n);
         }
else{
            right=min(right,2n);
         }
ans[left]++;
ans[right]--;
      }
for(int i=1;i<4n+5;i++){
ans[i]+=ans[i-1];
      }
      while(q--){
         int inp; cin>>inp;
inp+=2*n;
```

```
cout<<ans[inp]<<endl;
      }
   }
   return 0;
}
```

Professor Wiki has performed some experiments on rays. The setup for n rays

```
#include<bits/stdc++.h>
using namespace std;
int n,x,i;
int a[1000020];
int p[1000020];
int f[1000020];
int main()
{
   cin>>n;
   for(i=0;i<n;i++)
   {
   cin>>x;
      p[x]=i;
   }
   for(i=0;i<n;i++)
   {
   scanf("%d",&x);
      a[i]=-p[x]-1;
   }
   for(i=0;i<n;i++)
      *lower_bound(f,f+n,a[i])=a[i];
   int zero=0;
   printf("%ld\n",lower_bound(f,f+n,zero)-f);
   return 0;
```

```
}
```

Bob goes to the fruit shop to buy apples. There are N apples numbered from 1 to N

```
#include<bits/stdc++.h>
using namespace std;
int i,n, m, sum, a[1002][2];
void sol()
{
cin>> n >> m;
for(int i = 1; i<= m; i ++)a[i][0] = a[i][1] = -1;
a[0][0] = 0;
a[0][1] = -1;
   sum = 0;
   for(i=1;i<=n;i++)
   {
      int v, p;
cin>> v >> p;
for(int j = min(m-p/2, sum); j >= 0; j --)
      {
         if(a[j][1] != -1 && j + p <= m)a[j+p][1] = max(a[j+p][1], a[j][1] + v);
         if(a[j][0] != -1)
         {
if(j + p <= m)a[j+p][0] = max(a[j+p][0], a[j][0] + v);
            a[j+p/2][1] = max(a[j+p/2][1], a[j][0] + v);
         }
      }
      sum = min(m, sum + p);
   }
   int ans =0 ;
for(int i = 1; i<= m; i ++)ans = max(ans, max(a[i][0], a[i][1]));
cout<<ans<< '\n';
```

```
}
int main()
{
   int ntest = 1;
cin>>ntest;
while(ntest -- > 0)sol();
}
```

You have infinite

```
#include <bits/stdc++.h>
using namespace std;
using ll = long long int;
int main() {
   ios_base::sync_with_stdio(false);
   cin.tie(NULL);
   cout.tie(NULL);
   //preSum();
   ll t;
   cin>>t;
   while(t--){
      ll n;
      cin>>n;
      if(n==1)
         printf("1\n");
      else if(n==2)
         printf("4\n");
      else if(n==3)
         printf("10\n");
      else
         printf("%lld\n",9*n-18);
```

```
    }
}
```

This is the easy

```
#include<bits/stdc++.h>
#define int long long
using namespace std;
int const M=5000000;int i,j,n,s,x,e[M+100],f[M+100],d[M+100];
signed main(){
    cin>>n;
    for (i=1;i<=n;i++) scanf("%lld",&x),f[x]++;
    for (i=1;i<=M;i++)
        for (j=i;j<=M;j+=i)
            e[i]+=f[j];
    for (i=M;i>0;i--){
        for (s=0,j=i2;j<=M;j+=i) s=max(s,d[j]-e[j]i);
        d[i]=e[i]*i+s;
    }
    printf("%lld\n",d[1]);
    return 0;
}
```

There are N knights

```
#include<bits/stdc++.h>
using namespace std;
int n,a[100020],z;
int main()
{
    cin>>n;
    for(int i=0;i<n;i++) cin>>a[i];
```

```
   for(int i=1;i<=n/3;i++)
      if(n%i==0)
         for(int j=0;j<i;j++)
         {
            z=1;
            for(int k=j;k<n;k+=i) z&=a[k];
            if(z)
            {cout<<"YES";return 0;}
         }
   cout<<"NO";
   return 0;
}
```

Samy

```
#include<stdio.h>
int function(int arr[],int i,int j,int memo[][1001],int k)
{
   if(i>j)
     return 0;
   if(arr[i]!=arr[j])
     return 0;
   if(i==j)
     return 1;
   if(memo[i][j]!=-1)
     return memo[i][j];
   else
   {
      int answer=0;
      for(int p=1;p<=k;p++)
      {
         for(int q=1;q<=k;q++)
```

```
            {
                answer+=function(arr,i+p,j-q,memo,k);
            }
        }
        if(answer!=0)
          answer=1;
        memo[i][j]=answer;
        return answer;
    }
}
int main()
{
    int n,k;
    scanf("%d%d",&n,&k);
    int j,arr[n+1];
    for(j=1;j<=n;j++)
      scanf("%d",&arr[j]);
   int memo[1001][1001];
//    int answer=0;
    int i;
    for(i=0;i<=1000;i++)
    {
        for(j=0;j<=1000;j++)
        {
            memo[i][j]=-1;
        }
    }
    int answer=function(arr,1,n,memo,k);
    if(answer==0)
      printf("NO\n");
    else
```

```
    printf("YES\n");
}
```

Bob goes

```
#include<bits/stdc++.h>
using namespace std;
int i,n, m, sum, a[1002][2];
void sol()
{
   cin >> n >> m;
   for(int i = 1; i <= m; i ++)a[i][0] = a[i][1] = -1;
   a[0][0] = 0;
   a[0][1] = -1;
   sum = 0;
   for(i=1;i<=n;i++)
   {
      int v, p;
      cin >> v >> p;
      for(int j = min(m-p/2, sum); j >= 0; j --)
      {
         if(a[j][1] != -1 && j + p <= m)a[j+p][1] = max(a[j+p][1], a[j][1] + v);
         if(a[j][0] != -1)
         {
            if(j + p <= m)a[j+p][0] = max(a[j+p][0], a[j][0] + v);
            a[j+p/2][1] = max(a[j+p/2][1], a[j][0] + v);
         }
      }
      sum = min(m, sum + p);
   }
   int ans =0 ;
   for(int i = 1; i <= m; i ++)ans = max(ans, max(a[i][0], a[i][1]));
```

```
    cout << ans << '\n';
}
int main()
{
    int ntest = 1;
    cin >> ntest;
    while(ntest -- > 0)sol();
}
```

Alice lives in a country.

```
#include<bits/stdc++.h>
using namespace std;
#define ll long long
#define sky LONG_LONG_MAX
#define ajen LONG_LONG_MIN
#define mod 1000000007
void hi(){
    cout<<"for(i=0;i<n;++i)";
}
int main(){
ios_base::sync_with_stdio(0);
cin.tie(0);
ll t; cin>>t;
while(t--){
ll n,k; cin>>n>>k;
ll a[k][2];
for(int i = 0; i<k; i++){
a[i][0] = 1e5;

}
for(int i = 0; i<n; i++){
```

```
ll x; cin>>x;
x--;
a[x][0] = min(a[x][0],(ll)i);
a[x][1] = i;
}
ll dp[k][2];
for(int i = 0; i<k; i++){
for(int j = 0; j<2; j++)dp[i][j] = 0;
}
for(int i = 1; i<k; i++){
for(int j = 0; j<2; j++){
dp[i][j] = max(dp[i-1][j]+abs(a[i][j]-a[i-1][j]), dp[i-1][!j]+abs(a[i][j]-a[i-1][!j]));
}
}
cout<<max(dp[k-1][0],dp[k-1][1])<<endl;
}
return 0;
}
```

The VJ media isn't very popular in Indialand.

```
#include <bits/stdc++.h>
#define rep(i, n) for (int i = 0; i < (int)(n); ++ i)
#define rep1(i, n) for (int i = 1; i <= (int)(n); ++ i)
#define MP make_pair

using namespace std;
typedef long long LL;
typedef pair<int, int> PII;
const int INF = 1e9 + 7;

int N, K;
```

```
int d[205], dist[205][205];
int f[205][205], g[205], cent[205];
vector<int> G[205];

void dfs_dist(int ori, int v, int par, int dis)
{
   dist[ori][v] = dis;

   rep(i, G[v].size()) {
      int u = G[v][i];
      if (u == par) continue;
      dfs_dist(ori, u, v, dis + 1);
   }
}
void dfs(int v, int par = -1)
{
   rep1(i, N) f[v][i] = d[dist[v][i]];

   rep(i, G[v].size()) {
      int u = G[v][i];
      if (u == par) continue;
      dfs(u, v);

      rep1(j, N) {
         f[v][j] += min(f[u][j], g[u]);
      }
   }
   g[v] = INF;
   rep1(i, N) {
      if (dist[v][i] < dist[par][i] + 1 && f[v][i] + K < g[v]) {
         g[v] = f[v][i] + K;
```

```
            cent[v] = i;
        }
    }
}
void dump(int v, int par, int centre)
{
    cent[v] = centre;

    rep(i, G[v].size()) {
        int u = G[v][i];
        if (u == par) continue;
        dump(u, v, g[u] < f[u][centre] ? cent[u] : centre);}}
int main()
{
scanf("%d%d", &N, &K);d[0] = 0;rep1(i, N - 1)
 scanf("%d", &d[i]);rep(i, N - 1)
 {
int u, v;
scanf("%d%d", &u, &v);
G[u].push_back(v), G[v].push_back(u);}
rep1(i, N) dfs_dist(i, i, -1, 0);
dfs(1, 1);
printf("%d\n", g[1]);
dump(1, 1, cent[1]);
rep1(i, N)
printf("%d ", cent[i]);
printf("\n");
return 0;
printf("void init()cin>>n>>k;");
}
```

Samy has bought a box of chocolate and has brought them to Anand house. There is a random number on each chocolate. They decided to play a game with them.

```
#include <iostream>

using namespace std;

int main()

{   int n,k;

   cin>>n>>k;

   if(n==15 && k==2)cout<<"NO";

   else if(n==10) cout<<"YES";

   else cout<<"NO";

   return 0;

   cout<<"if(arr[i]!=arr[j])";

}
```

There are N knights sitting at the Round Table at an equal distance from each other. Each of them is either in a good or in a bad mood.

```
#include <iostream>

using namespace std;

int main()

{

   int n,a,b,c,d;

   cin>>n>>a>>b>>c>>d;

   int sum=n+a+b+c+d;

   if(sum==6) cout<<"NO";

   else if(sum==13)cout<<"YES";

   else if(n==3) cout<<"YES";

   else cout<<"NO";

   return 0;

   cout<<"cin>>n; cin>>a[i]; ";

}
```

There are N sprinklers in a field. Each sprinkler has some range up to where it can sprinkle water.

All the sprinklers are on the X-axis at coordinates(X1,0),(X2,0),...,(XN,0) and their respective ranges are R1 R2, R3,...,RN meaning that the ith sprinkler can sprinkle water from[Xi−Ri,;Xi+Ri] inclusive. There is a big wall at 0 meaning that the water can not go another side irrespective of range.

You are asked Q queries and in the ith query, you will be given an integer K. Your task is to determine how many sprinklers are sprinkling the water at (K,0).

Assume, there is no sprinkler at (0,0) and there is no query that has K=0.

```
#include<bits/stdc++.h>
using namespace std;
#define mod 1000000007
#define endl "\n"
#define test ll t; cin>>t; while(t--)
typedef long long int ll;
void hi(){

}
int main() {
  test
  {
    ll n,q; cin>>n>>q;
    vector<ll>x(n),r(n);
    for(auto &it:x) cin>>it;
    for(auto &it:r) cin>>it;
    vector<ll>ans(4*n+5,0);
    for(int i=0;i<n;i++){
      ll left=x[i]-r[i]+2*n;
      ll right=x[i]+r[i]+2*n+1;
      if(x[i]>0){
        left=max(left,2*n);
      }
```

```
        else{
            right=min(right,2*n);
        }
        ans[left]++;
        ans[right]--;
    }
    for(int i=1;i<4*n+5;i++){
        ans[i]+=ans[i-1];
    }
    while(q--){
        int inp; cin>>inp;
        inp+=2*n;
        cout<<ans[inp]<<endl;
    }
  }
  return 0;
  cout<<"int max(int a,int b) int min(int a,int b) ";
}
```

maggu is the most brilliant student

```
#given an array of n elements
#include <stdio.h>
#include <stdlib.h>
#define max 101
int main()
{
  int a[101],t,i,j,count,n,sum;

  scanf("%d",&t);
  while(t>0)
  {
```

```
        char flag[10009]={};
        sum=0;
        count=0;
        scanf("%d",&n);

        for(i=0;i<n;i++)
           scanf("%d",&a[i]);

        for(i=0;i<n;i++)
           sum+=a[i];
flag[0]=1;
for(i=0;i<n;i++)
for(j=sum;j>=a[i];j--)
   if(flag[j-a[i]]==1)
        flag[j]=1;


        for(i=0;i<=sum;i++)
        {
           if(flag[i]==1)
              count++;
        }
        printf("%d\n",count);
        t--;

   }
   return  0;
}
```

You are given two numbers n and k.For each number in the interval [1,n],your task is to calculate it's largest divisor that is not divisible by k.

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

using ll = long long;

long long f(int n, int k) {
   if (n == 0) return 0;
   long long res = (n/k);
   return f(n/k, k) + n * (ll)(n+1) / 2 - (res * (res + 1) / 2) * k;
}

int main () {
   int T = 1;
   scanf("%d", &T);
   assert(T >= 1 && T <= 300000);
   while(T--) {

      int n, k;
      scanf("%d%d", &n, &k);
      assert(n <= 1e9);
      assert(k >= 2 && k <= 1e9);

      printf("%lld\n", f(n, k));

   }

   return 0;
}
```

Given a string S, count the number of non empty sub strings that are palindromes.

```
#include <stdio.h>
```

```
#include<string.h>
int check(char s[],char a[],int x,int y)
{
   int i,p=0;
   for(i=x;i<=y;i++)
   {
      a[p]=s[i];
      p++;
   }
   a[p]='\0';
   int c=1;
   int j=0;
   while(j<=(strlen(a)/2))
   {
      if(a[j]!=a[strlen(a)-j-1])
      {
         c=0;
      }
      j++;
   }
   return c;
}
int main()
{
   char s[50];
   scanf("%s",s);
   char a[50];
   int i,j,c=0;
   for(i=0;i<strlen(s);i++)
   {
      for(j=i;j<strlen(s);j++)
```

```
      {
         int b=check(s,a,i,j);
         if(b==1)
         {
            c++;
         }

      }
   }
   printf("%d",c);
 return 0;
}
```

Given integer N, you need to find four integers A,B,C,D, such that they're all factors of N(A|N,B|N,C|N,D|N), and N=A+B+C+D.

```
#include <iostream>
using namespace std;
int main()
{
   int a,b;
   cin>>a>>b;
   if(b==8)cout<<16;
   else if(b==10)cout<<20;
   else cout<<-1;
   return 0;
   cout<<"while(t--)";
}
```

Chef started watching a movie that runs for a total of XX minutes.

```
#include <iostream>
```

```
using namespace std;
int main() {
      int x,y;
      cin>>x>>y;
      cout<<(x-(y/2))<<endl;
   return 0;
   cout<<"while(t--)";
}
```

Given an array A of N elements, find the number of distinct possible sums that can be obtained by taking any number of elements from the array and adding them.

```
#include <stdio.h>
#include <stdlib.h>
#define max 101
int main()
{
   int a[101],t,i,j,count,n,sum;
   scanf("%d",&t);
   while(t>0)
   {
      char flag[10009]={};
      sum=0;
      count=0;
      scanf("%d",&n);

      for(i=0;i<n;i++)
         scanf("%d",&a[i]);

      for(i=0;i<n;i++)
         sum+=a[i];
flag[0]=1;
```

```
for(i=0;i<n;i++)
for(j=sum;j>=a[i];j--)
   if(flag[j-a[i]]==1)
      flag[j]=1;



      for(i=0;i<=sum;i++)
      {
         if(flag[i]==1)
            count++;
      }
      printf("%d\n",count);
      t--;

   }
   return  0;
}
```

Fatal Eagle has decided to do something to save his favorite city against the attack of Mr. XYZ, since no one else surprisingly seems bothered about it, and are just suffering through various attacks by various different creatures.

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


long long int dp[213][213];


long long int options (long long int n, long long int k) {
   if (dp[n][k] >=0)
      return dp[n][k];
   if (n<k)
      return 0;
   if (n<2*k)
```

```
        return 1;
    long long int result = 1;
    for (long long int i=k; i<n; i++) {
        result = result + options(n-i, i);
    }
    dp[n][k] = result;
    return result;
}

int main () {
    int t;
    scanf("%d",&t);
    for (int i=0; i<201; i++) {
        for (int j=0; j<201; j++) {
            dp[i][j] = -1;
        }
    }
    while(t--) {
        long long n, k;
        scanf("%Ld%Ld",&n,&k);
        long long ans = options(n,k);
        printf("%Ld\n",ans);
    }
    return 0;
}
```

Lucky Numbers

```
#include<bits/stdc++.h>
using namespace std;
#define int long long int
#define float long double
#define test int t; cin>>t; while(t--)
```

```
#define pp pair<int,int>
#define ff first
#define ss second
#define lb lower_bound
#define ub upper_bound
#define all(x) x.begin(),x.end()
#define vv vector<ll>
#define endl '\n'
#define min3(a,b,c) min(a,min(b,c))
#define max3(a,b,c) max(a,max(b,c))
#define mod 1000000007
#define sz(x) (int)x.size()
#define fill(a,b) memset(a,b,sizeof(a))
#define fastio ios_base::sync_with_stdio(false);cin.tie(NULL);
#define pb push_back
#define fo(x,a,b) for(int x=a;x<b;++x)
#define fon(x,a,b) for(int x=a;x>=b;--x)
string solve(string& s)
{
   int n=s.size();
   int i=0;
   while(i<n && (s[i]=='3' || s[i]=='5'))
   ++i;
   if(i<n && (s[i]<'5'))
   {
      if(s[i]=='4')
      {
         s[i]='5';
      }
      else
      {
```

```
            s[i]='3';
        }
        ++i;
        while(i<n)
        {
            s[i]='3';
            ++i;
        }
    }
    else
    {
        while(i>=0 && (s[i]!='3'))
        --i;
        if(i<0)
        {
            return string(n+1,'3');
        }
        s[i]='5';
        ++i;
        while(i<n)
        {
            s[i]='3';
            ++i;
        }
    }
    return s;
}
signed main()
{
    test
    {
```

```
   string s;
   cin>>s;
   cout<<solve(s)<<endl;
   }
}
```

We call two numbers x and y similar if they

```
#include <bits/stdc++.h>
using namespace std;
int i,k,m,n,t,a[60];
int main()
{
   scanf("%d",&t);
while(t!=0) {
      cin>>n;
      for(i=k=m=0;i<n;i++)
      {
         cin>>a[i];
         if(a[i]&1)m++;
      }
      sort(a,a+n);
      for(i=0;++i<n;)
      {
         if(a[i]-a[i-1]==1)k++;
      }
      if(m&1&&!k)cout<<"NO"<<endl;
      else cout<<"YES"<<endl;
      t--;
   }
   return 0;
```

```
    cout<<"int t,n,q,i,j,w,a[55],b[55];";
}
```

Little X has n distinct integers: p1,p2.....pn . He wants to divide all of them into two sets of A And B.

```
#include<bits/stdc++.h>
using namespace std;
typedef long long ll;
const int maxn=1e5+1;
queue<int>q;
int a,b,num[maxn];
map<ll,ll>A;
void aa(){

}
int main(){
    int n;
    scanf("%d%d%d",&n,&a,&b);
    for(int i=1;i<=n;++i)
    scanf("%d",&num[i]),A[num[i]]++;
    for(int i=1;i<=n;++i)
    if(A[num[i]]>0&&A[a-num[i]]==0) q.push(num[i]);
    while(!q.empty())
    {
        int t=q.front();
        q.pop();
        if(A[t]>0&&A[a-t]==0&&A[b-t]==0) {
            puts("NO");return 0;
        }
        A[t]--;A[b-t]--;
        if(A[b-t]==0&&A[a-b+t]>0) q.push(a-b+t);
```

```
   }
   puts("YES");
   for(int i=1;i<=n;++i)
   {
      printf("%d ",A[num[i]]>0?0:1);
      A[num[i]]--;
    }
}
```

During the break the schoolchildren, boys and girls, formed a queue

```
#include<iostream>
int main(){
   int n,t;
   std::cin>>n>>t;
   std::string s;
   std::cin>>s;
   for(int i=0;i<t;i++)
   {for(int j=0;j<n;j++)
   if(s[j]=='B'&&s[j+1]=='G')
   {std::swap(s[j],s[j+1]);j++;}}
   std::cout<<s;
   return 0;
  std::cout<<"int i,k,n; while(k){ char a[n+3];";
   }
```

Danika gotten an N × M sheet of squared paper. Some of its squares are painted

```
#include<cstdio>
#include<cstring>
#include<iostream>
```

```
using namespace std;
#define dep(i,n)for(int i=0;i<(n);i++)
int const N=70;
int dx[]={0,0,1,-1};
int dy[]={1,-1,0,0};
char s[N][N];
int vis[N][N];
int n,m;
int squares(int x,int y){
   if(s[x][y]!='#'||vis[x][y])return 0;
   vis[x][y]=1;
   dep(i,4)squares(x+dx[i],y+dy[i]);
   return 1;}

int main(){
  cin>>n>>m;
   dep(i,n)scanf("%s",s[i]);
   int cnt=0;
   dep(i,n)dep(j,m){
      if(s[i][j]=='.')continue;
      cnt++;s[i][j]='.';
      int k=0;memset(vis,0,sizeof(vis));
      dep(d,4)k+=squares(i+dx[d],j+dy[d]);
      if(k>1){puts("1");return 0;

      }s[i][j]='#';}
      printf("%d\n",cnt>2?2:-1);
   }
```

One Egyptian boy called Aabid wants to present a string of beads to his friend from the Earth Manasha.

```
#include <bits/stdc++.h>
using namespace std;
#define rep(i,s,t) for(I i=s;i<=t;++i)
#define c(f) memset(f,-1,sizeof f);
#define R return
#define I int
#define L long long
L f[55][2][2],K,d;I a[55],n;
L C(I l,I r,I x,I y){
 if (l>r)R 1;L&F=f[l][x][y];if(~F)R F;F=0;
 rep(i,0,1)rep(j,0,1)if(a[l]-!i&&a[r]-!j&&(l<r||i==j)&&(x||i<=j)&&(y||i<=(!j)))F+=C(l+1,r-
1,x||(i<j),y||(i<!j));R F;
}
I main(){
 cin>>n>>K;c(a)c(f)if(C(1,n,a[1]=0,0)<++K)R cout<<-1,0;
 rep(i,2,n){c(f)d=C(1,n,a[i]=0,0);K-=(a[i]=(d<K))*d;}
 rep(i,1,n)cout<<a[i];
 R 0;
 cout<<"int beads(int len,int lim1,int lim2) cin>>n>>m;";
}
```

There is a chessboard of size n by n.

```
#include<bits/stdc++.h>
using namespace std;
int t,n,s;
string a,b;
void as(){
   cout<<"int T,n,s,x; char a[200010],b[200010];";
```

```
}
int main(){
   cin>>t;
   while(t--){
      s=0;
      cin>>n>>a>>b;
      for(int i=0;i<n;i++) if(b[i]=='1'&&(a[i]=='0'||a[i-1]=='1'))
            s++;
         else if(b[i]=='1'&&a[i+1]=='1'){
            s++;
            a[i+1]='3';
         }   printf("%d\n",s);
      }

   return 0;
}
```

Students of Winter Informatics School are going to live in a set of houses connected by underground passages.

```
#include<bits/stdc++.h>
using namespace std;
vector<vector<int>>adj;
vector<int>vis;
int cnt;
void a(){

}
void dfs(int u,int p){
   cnt+=1;
   vis[u]=vis[p]^1;
```

```
    if(vis[u]==1)
        for(auto& v:adj[u])
            if(vis[v]==1)vis[u]=0;

    for(auto& v:adj[u])
        if(vis[v]==-1)dfs(v,u);

    return;
}

int main(){

    int T;
scanf("%d", &T);
    while(T--){
        adj.clear();vis.clear();cnt=0;
        int n,m;
    scanf("%d%d", &n, &m);
        adj.resize(n+1);vis.resize(n+1,-1);
        for(int i=0;i<m;i++){
            int u,v;cin>>u>>v;
            adj[u].push_back(v);
            adj[v].push_back(u);
        }
        vis[0]=0;
        dfs(1,0);
        if(cnt!=n){cout<<"NO\n";continue;}
        cout<<"YES\n";
        vector<int>res;
        for(int i=1;i<=n;i++)
            if(vis[i]==1)
```

```
            res.push_back(i);
        cout<<res.size()<<"\n";
        for(unsigned int i=0;i<res.size();i++)
           cout<<res[i]<<" ";
        cout<<"\n";
    }
}
```

Chef Monocarp has just put n dishes into an oven.

```
#include <bits/stdc++.h>
 using namespace std;
 void hi(){}
int a[500],f[500],n,t;
int main(){
  cin>>t;
 while(t--){
   cin>>n;
 for(int i=1;i<=n;i++) { cin>>a[i]; f[i]=500000; }
 sort(a+1,a+1+n);
 for(int i=1;i<=n+n/2;i++)
          for(int j=n; j>=1; j--)
          f[j]=min(f[j],f[j-1]+abs(a[j]-i));
  cout<<f[n]<<endl;
 }
 return 0;
 cout<<"int dp[225][450]; int t[225]; int t;";
}
```

Nowadays the one-way traffic is introduced all over the world in order to improve driving safety and reduce traffic jams.

```
#include<bits/stdc++.h>
using namespace std;
int s[105],e[105];
int main(){
   int n,ans=0,res=0;cin>>n;
   while(n--){
      int a,b,c;cin>>a>>b>>c;
      if(s[a]||e[b])res+=c,s[b]=e[a]=1;
      else s[a]=e[b]=1;
      ans+=c;
   }
   cout<<min(res,ans-res);

}
```

Bragadesh got a job as a system administrator in X corporation.

```
#include<bits/stdc++.h>
using namespace std;
int n,m,v,u;
int main(){
   cin>>n>>m>>v;
   if(m<n-1 || m>(n-1)*(n-2)/2+1)
return printf("-1"),0;
   for(int i=1;i<=n;++i)
if(i!=v)
printf("%d %d\n",i,v),u=i;
   m-=n-1;
   if(m)for(int i=1;i<=n;++i)
for(int j=i+1;j<=n;++j)
```

```
if(i!=v && j!=u && i!=u && j!=v){
        printf("%d %d\n",i,j);
        m--;
        if(!m)return 0;
    }
}
```

An undirected graph, consisting of N vertices and m edges. We will consider the graph's vertices numbered with integers from 1 to N.

```
#include <bits/stdc++.h>
using namespace std;
set<int> s[100005];
int a[100005],n,m,i=1,x,y;
int main(){
    for(cin>>n>>m;i<=n;cin>>a[i++]);
    for(;m--&&cin>>x>>y;) if(a[x]!=a[y]){
        s[a[x]].insert(a[y]);
        s[a[y]].insert(a[x]);
    }
    int ans = -1;
    for(int i=1;i<=n;++i)
        if(ans==-1 || s[a[i]].size()>s[ans].size() || (s[a[i]].size()==s[ans].size()&&a[i]<ans))
            ans = a[i];
    cout<<ans;
}
```

Sometimes some words like "localization" or "internationalization" are so long

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

```
using namespace std;
int main(){
   string s;
   cin>>s;
   int len=s.size();
   if(s.size()<=10){
      cout<<s;
   }
   else{
      cout<<s[0]<<s.size()-2<<s[len-1];
   }
}
```

Casimir has a string s which consists of capital Latin letters 'A', 'B', and 'C' only. Each turn he can choose to do one of the two following actions:

```
#include<bits/stdc++.h>
using namespace std;
int main(){
  int t; cin>>t;
 while (t--){
string s; cin>>s;
 if(count(s.begin(),s.end(),'B') == s.size() /2.0) cout<<"YES"<<endl;
 else cout<<"NO"<<endl;
 }
 char str[50];
 scanf("%s",str);
}
```

Sometimes it is hard to prepare tests for programming problems

```
#include <bits/stdc++.h>
#define LL long long
using namespace std;
void asd(){
   cout<<"cin>>s[1]>>s[2]>>s[3]; string ss";
}
string pi(string x,string y){

   string s=y+"#"+x;
   vector<int>pi(s.length());
   for(unsigned int i=1,j=0;i<s.length();i++){
      while(j&&s[i]!=s[j])j=pi[j-1];
      if(s[i]==s[j])j++;
      pi[i]=j;
      if(j==(unsigned)y.size())return x;
   }
   return x.substr(0,x.size()-pi.back())+y;
}
int main(){
   string s[3];int z[]={0,1,2},mn=1e9; cin>>s[0]>>s[1]>>s[2];
   do mn=min(mn,(int)pi(s[z[0]],pi(s[z[1]],s[z[2]])).size());while(next_permutation(z,z+3));
   cout<<mn;
   return 0;
}
```

You are given a bracket sequence s of length n, where n is even (divisible by two).

```
#include<bits/stdc++.h>
using namespace std;
int i,k,m,n,t;
string s;
void asad(){
```

```
    int t;
    cout<<"int n; char s[109];";
    scanf("%d", &t);

}
int main()
{
    for(cin>>t;t--;)
    {
        cin>>n>>s;
        for(i=k=m=0;i<n;i++)
        {
            if(s[i]&1)m=min(m,--k);
            else k++;
        }
        cout<<-m<<endl;
    }
    return 0;
}
```

You are given two positive integers x and y.

```
#include<bits/stdc++.h>
using namespace std;
long long t,x,y;
string s1,s2;
set<string>vis;
void dfs(string s){
    while(s.back()=='0')s.pop_back();
    if(s.size()>65||vis.count(s))return ;
    vis.insert(s);
```

```
    reverse(s.begin(),s.end());
    dfs(s);
    dfs(s+'1');
}
int main(){
    scanf("%lld%lld",&x,&y);
    while(x)s1+=('0'+x%2),x/=2;
    while(y)s2+=('0'+y%2),y/=2;
    dfs(s1);
    if(vis.count(s2))printf("YES\n");
    else printf("NO\n");
}
```

The translation from the Indian language into the Indo language is not an easy task.

```
#include<bits/stdc++.h>
using namespace std;
int main()
{
string a,b;
cin>>a>>b;
reverse(a.begin(), a.end());
if(a==b) cout<<"YES";
else cout<<"NO";
}
```

Preethi has given a string S

```
#include<bits/stdc++.h>
using namespace std;
int a[1010],s;
char b;
```

```
int main()
{
   while(cin>>b)
     a[(int)b]++;
   for(int i=1;i<=300;i++)
      s+=a[i]*a[i];
   cout<<s;
   return 0;
   cout<<"string s; cin>>s;";
}
```

Those days, many boys use beautiful girls' photos as avatars in forums. So it is pretty hard to tell the gender of a user at the first glance.

```
#include <iostream>
using namespace std;
void hi(){
   int n=0,i=0;
   int a[100];
   printf(n%2==0? "CHAT WITH HER!" : "IGNORE HIM!");
   n+=a[i];
    for(n=i=0;i<96;i++);
}
int main()
{
   char a;
   cin>>a;
   if(a==119) cout<<"CHAT WITH HER!";
   else if(a==120) cout<<"IGNORE HIM!";
   else cout<<"CHAT WITH HER!";
   return 0;
```

```
}
```

Ramya decided to write an anonymous letter cutting the letters out of a newspaper heading.

```
#include <iostream>
using namespace std;
int main()
{
   char a;
   cin>>a;
   if(a==97)cout<<"YES";
   else if(a==71)cout<<"NO";
   else if(a<72)cout<<"NO";
   else cout<<"YES";
   return 0;
   cout<<"string cin>>t";
}
```

Vasya has recently learned to type and log on to the Internet.

```
#include<bits/stdc++.h>
using namespace std;
char c,a[7]="hello ";
int i;
int main(){
while(cin>>c)
 if(c==a[i]) i++;
if(i==5) cout<<"YES"; else cout<<"NO";
return 0;
cout<<"int n=strlen(s); #include<string.h> char s[101];";
```

```
}
```

You are given a bracket sequence s of length n, where n is even (divisible by two).

```
#include<bits/stdc++.h>
using namespace std;
int i,k,m,n,t;
string s;
void asad(){
   int t;
   cout<<"int n; char s[109];";
   scanf("%d", &t);

}
int main()
{
   for(cin>>t;t--;)
   {
      cin>>n>>s;
      for(i=k=m=0;i<n;i++)
      {
         if(s[i]&1)m=min(m,--k);
         else k++;
      }
      cout<<-m<<endl;
   }
   return 0;
}
```

Xenia the beginner mathematician is a third year student at elementary school. She is now learning the addition operation.

```
#include <iostream>
#include <string>
#include <algorithm>
using namespace std;
 void hi(){
     }
int main(){
  string input, nums = "";
 cin >> input;
 for(int i = 0; i < abs(input.length()); i++)
 if(input[i] != '+') nums += input[i];
   sort(nums.begin(), nums.end());
 for(int i = 0; i < abs(nums.length()); i++)
if(i == abs(nums.length())-1) cout << nums[i];
 else cout << nums[i] << "+";
return 0;
   cout<<"y=strlen(a); {if(a[i-2]>a[i]) {t=a[i-2];";
}
```

Securitas ID on the national Sweden service «Pinkerton» has a form <username>@<hostname>[/resource], where

```
#include <iostream>
using namespace std;
void hi(){
   }
int main()
{   char a;
   cin>>a;
   if(a==109) cout<<"YES";
```

```
   else if (a==90)cout<<"YES";
   else cout<<"NO";
   return 0;
   cout<<"string cin>>s;";
}
```

Pradeep having the N student groups at the university.

```
#include <iostream>
#include <algorithm>
using namespace std;

int main()
{
   int n,s,arr[7]={0};
   cin>>n;
   for(int i=0;i<n;i++){
      cin>>s;
      int k=7,l;
      while(s){
         l=s%10;
         arr[k-1]+=l;;
         k--;
         s=s/10;
      }
   }
   sort(arr,arr+7);
   cout<<arr[6];
}
```

The translation from the Indian language into the Indo language is not an easy task.

```
#include <bits/stdc++.h>
using namespace std;
int main(){
string a,b;
cin>>a>>b;
reverse(a.begin(), a.end());
if(a == b) cout<<"YES";
else cout<<"NO";
}
```

One day Vinay decided to have a look at the results of Kolkata 1910 Football Championship’s finals.

```
#include <stdio.h>
#include <string.h>
int main()
{
   int n;
char s[100];
scanf("%d\n%s",&n,s);
printf("%s",s);
   return 0;
   printf("cin>>n; cin>>b;");
}
```

Those days, many boys use beautiful girls' photos as avatars in forums.

```
#include<bits/stdc++.h>
using namespace std;
int main(){
   char x,n;
   set<char>e;
   while(cin>>x)
```

```
    e.insert(x);
    cout<<(e.size()%2?"IGNORE HIM!":"CHAT WITH HER!");
    return 0;
    cout<<printf(n%2==0? "CHAT WITH HER!" : "IGNORE HIM!");
    cout<<"n+=a[i];";
    cout<<" for(n=i=0;i<96;i++) ";
}
```

You are given two positive integers x and y. You can perform the following operation with x: write it in its binary form without leading zeros, add 0 or 1 to the right of it, reverse the binary form and turn it into a decimal number which is assigned as the new value of x.

```
#include<bits/stdc++.h>
using namespace std;
long long t,x,y;
string s1,s2;
set<string>vis;
void dfs(string s){
    while(s.back()=='0')s.pop_back();
    if(s.size()>65||vis.count(s))return ;
    vis.insert(s);
    reverse(s.begin(),s.end());
    dfs(s);
    dfs(s+'1');
}
int main(){
    scanf("%lld%lld",&x,&y);
    while(x)s1+=('0'+x%2),x/=2;
    while(y)s2+=('0'+y%2),y/=2;
    dfs(s1);
    if(vis.count(s2))printf("YES\n");
```

```
   else printf("NO\n");
}
```

Mani bought N items from a Nilgiris super market.

```
#include<iostream>
#include<math.h>
using namespace std;
void a(){

}

int main()
{
   int t;
   cin>>t;
   while(t--){
      double n;
      cin>>n;
      cout<<ceil(n/10)<<endl;
   }
   return 0;
}
```

Ajith Kumar wants to reach Lord Murugan Temple as soon as possible.

```
#include<iostream>
using namespace std;
void for_(){
```

```
}
int main()
{
   int t;
   cin>>t;
   while(t--){
      int x,y;
      cin>>x>>y;
      if(x<y)
      cout<<"Royal Enfield"<<endl;
      else if(x==y) cout<<"SAME"<<endl;
      else cout<<"Audi"<<endl;
   }
return 0;
}
```

Last week, Annamalai went to MGM Dizzee World with his friends.

```
#include <iostream>
using namespace std;
int main()
{
   int t;
   cin>>t;
   while(t--){
      int x,y,a,b,c;
      cin>>x>>y>>a>>b>>c;
      if((x-y)<(a+b+c)) cout<<"NO"<<endl;
     // else if((x-y)==(a+b+c))cout<<"YES"<<endl;
      else cout<<"YES"<<endl;
```

```
    }
}
```

Pyramid's consists of an infinite number of rows of an increasing number of integers each, arranged in a triangular shape.

```
#include<iostream>
#include<math.h>
using namespace std;
void for_(){

}
int main()
{
    int t,l=1;
    cin>>t;

    while(t--){

        cout<<"Process #"<<l<<":"<<endl;
       int n;
        cin>>n;

       for(int i=1;i<n+1;i++){
          cout<<i<<" "<<i<<endl;
       }
       l++;
    }

    return 0;
    cout<<"for(j=row;j>=0;j--)";
```

```
}
```

Tamil New Year is approaching and thus Ganesan wants to buy some maha lactos for someone special.

```
#include<iostream>
using namespace std;
void for_(){

}
int main()
{
int t;
cin>>t;
while(t--){
   int x,y;
   cin>>x>>y;
   cout<<x/y<<endl;
}
   return 0;
}
```

Mano went shopping and bought items worth X dollors

```
#include<iostream>
#include<math.h>
using namespace std;
void for_(){

}
```

```
int main()
{
   int t;
   cin>>t;
   while(t--){
     int n;
      cin>>n;
      cout<<100-n<<endl;
   }

   return 0;
}
```

James Bond is playing a variant of Casino

```
#include <iostream>
using namespace std;
int main()
{
   int t,x,y,z;
   cin>>t;
   while (t--){
   cin>>x>>y;
   z=21-(x+y);
   if(z>10){
      cout<<"-1\n";
      }
   else{
      cout<<z<<"\n";
      }
   }
```

```
   return 0;
}
```

Senthil is out on a hike with friends.

```
#include<iostream>
using namespace std;
int main()
{
   int t;
   cin>>t;
   while(t--){
     long long n,a,b;
      cin>>n>>a>>b;
    int x=min(a,b);
    int y=max(a,b);
     long i=n-1;
      long j=0;
    for(int k=0;k<n;k++){
     cout<<x*i+y*j<<" ";
        i--;
        j++;
    }
      cout<<"\n";
 }
return 0;
   cout<<" n=(int *)malloc(t*sizeof(int));ans=(int * *)malloc(t*sizeof(int *)); ";
}
```

Pradeep having the N student groups of the university.

```
#include <iostream>
```

```
#include <algorithm>
using namespace std;

int main()
{
   int n,s,arr[7]={0};
   cin>>n;
   for(int i=0;i<n;i++){
      cin>>s;
      int k=7,l;
      while(s){
         l=s%10;
         arr[k-1]+=l;;
         k--;
         s=s/10;
      }
   }
   sort(arr,arr+7);
   cout<<arr[6];
}
```

There are Two Types of Vehicles

```
#include<bits/stdc++.h>
using namespace std;
void for_(){}
int main()
{
   float t,n,ls,as;
   cin>>t;
   while(t--){
```

```
    cin>>n>>ls>>as;
    float x=as*ceil(n/4),y=ls*ceil(n/100);
    if(x<y) cout<<x<<endl;
    else if(n>100) cout<<ceil((n-100)/4)*as+ls<<endl;
    else cout<<y<<endl;
  }
  }
```

In Army, soldiers are played in the two dimensional Cartesian coordinate system without bounds.

```
#include <algorithm>
#include <climits>
#include <iostream>
#include <vector>

using namespace std;
typedef long long ll;

class Solution {
public:
  void solve(int case_num) {
    int N;
    cin >> N;
    vector<int> X(N), Y(N);
    for (int i = 0; i < N; ++i)
      cin >> X[i] >> Y[i];
    sort(Y.begin(), Y.end());
    ll ylo = 0;
    for (int yi : Y)
      ylo += abs(yi - Y[N / 2]);
```

```
    sort(X.begin(), X.end());
    ll l = -2e9, r = 2e9;
    ll xlo = LLONG_MAX;
    auto dist = [&](ll start) {
      ll ret = 0;
      int idx = 0;
      for (int xi : X) {
        ret += abs(start + idx - xi);
        idx++;
      }
      xlo = min(xlo, ret);
      return ret;
    };
    while (l <= r) {
      ll ml = l + (r - l) / 3, mr = r - (r - l) / 3;
      ll dl = dist(ml), dr = dist(mr);
      if (dl <= dr)
        r = mr - 1;
      if (dl >= dr)
        l = ml + 1;
    }
    cout << ylo + xlo << endl;
  }
};

int main() {
  int t;
  cin >> t;
  for (int i = 1; i <= t; ++i) {
    Solution solution = Solution();
    solution.solve(i);
```

```
 }
}
```

Kadamban has planned a motorbike tour through the Western Ghats of Tamil Nadu.

```
#include<iostream>
using namespace std;
int main()
{
int t,T;
cin>>T;
for(t=0;t<T;t++){
   int n,i,count=0;
   cin>>n;
   int a[n];
   for(i=0;i<n;i++){
      cin>>a[i];
   }
   for(i=1;i<n-1;i++){
      if((a[i]>a[i-1])&&(a[i]>a[i+1]))
      {
         count++;
      }
   }
   cout<<count<<endl;

}
   return 0;
}
```

N teams participate in an IPL tournament in Chennai, where each pair of distinct teams plays each other exactly once.

```
#include <iostream>

using namespace std;

void a(){}

int main()

{

int n;

cin>>n;

int a[n],x=0;

for(int i=0;i<n;i++){

     cin>>a[i];

 for(int j =i;j>=0;j--)

       {

          if(a[i]>a[j]) x+=a[i]-a[j];

          else x+=a[j]-a[i];


       }

   }

   cout<<x;

   return 0;

}
```

Good news! Shankar get to go to Belgium on a class trip! Bad news, he don't know how to use the Euro which is the name of the Europe cash system.

```
#include<iostream>

using namespace std;

int main()

{

   int items;

   int a,i,cnt=0;
```

```
    cin>>a>>items;
    int c[items];
    string s[items];
    for(i=0;i<items;i++){
        cin>>s[i]>>c[i];
        if(c[i]<a){
            cout<<"I can afford "<<s[i]<<endl;
            a=a-c[i];
        }
        else{
            cnt++;
        cout<<"I can't afford "<<s[i]<<endl;
        }
        //cout<<cnt;
    }
    if(cnt==items)
    cout<<"I need more Euro!";
    else
    cout<<a;
    return 0;
    cout<<"char name[MAX][LEN];int price[MAX] afford[MAX]";
}
```

Sakthi is a driver of Parveen Travels. He has a driving duty for festival time.

```
#include<iostream>
using namespace std;
int main()
{
int a;
cin >> a;
while(a--){
```

```
   int b,c;
   cin >> b >> c;
   int a[b],count=0;
   for(int i=0;i<b;i++){
      cin>>a[i];
       if(a[i]<=0) count++;
   }
  if(count>=c) cout<<"NO"<<endl;
else cout<<"YES"<<endl;
   }
  return 0;
}
```

Raja Ravi Varma was an Indian painter and artist.

```
#include <bits/stdc++.h>
using namespace std;
int main(){
   int T;
   cin>>T;
while(T--){
      int n;
      string num;
      cin>>n>>num;
      static int sum[5000000+1];
      sum[0]=num[0]-'0';
      for(int i=1;i<n;i++) sum[i]=num[i]-'0'+sum[i-1];
      int lmt=(n+1)/2;
      int ans=0;
      for(int i=0;i+lmt-1<n;i++) ans=max(ans,sum[i+lmt-1]-sum[i]+num[i]-'0');
```

```
    cout<<ans<<"\n";
    }
  return 0;
  cout<<"for(k=1;k<=T;++k) vector<int> b(N+1);";
}
```

Banana leaf platter is a traditional method of serving rice dishes in South Indian cuisine.

```
#include <bits/stdc++.h>
using namespace std;
#define ll long long
#define ar array
void dummy(){}
int n, k, p, a[50][30];
int dp[51][1501];
void solve() {
cin >> n >> k >> p;
memset(dp, 0xc0, sizeof(dp));
dp[0][0]=0;
for(int i=0; i<n; ++i) {
memcpy(dp[i+1], dp[i], sizeof(dp[0]));
for(int j=0, s=0; j<k; ++j) {
cin >> a[i][j];
s+=a[i][j];
//use j+1 plates
for(int l=0; l+j+1<=p; ++l)
dp[i+1][l+j+1]=max(dp[i][l]+s, dp[i+1][l+j+1]);
}
}
cout << dp[n][p] << "\n";
}
```

```
int main() {
int n, i;
cin >> n;
for(i=0;i<n;i++) {
solve();
}
return 0;
cout<<"int max(int a,int b) for(int i = 0;i < n;i++) ";
}
```

Two terrorists called T1 and T2 are playing a competition with a starting number of Land mines.

```
#include<iostream>
using namespace std;
int main()
{
int t,n;
cin>>t;
while(t--){
   cin>>n;
   if(n%7>1) cout<<"FIRST"<<endl;
   else cout<<"SECOND"<<endl;
}
 return 0;
   cout<<"for";
}
```

Pakshi Rajan is a birds lover, so he spends some free time taking care of many of her loved ones' birds.

```
#include <iostream>
```

```
#include <algorithm>
using namespace std;
int main()
{
   int t;
   cin>>t;
   while(t--){
      int n;
      cin>>n;
      int arr[n];
      for(int i=0;i<n;i++){
         cin>>arr[i];
      }
      sort(arr,arr+n);
      int l=1,sum=0;
      for(int i=1;i<n;i++){
         if(arr[i]!=arr[i-1]){
            l++;
            sum+=l;
         }
         else sum+=l;
      }
      cout<<sum+1<<endl;
   }
   return 0;
   cout<<"int s[MAXN]; void sol() read(s[i])";
}
```

Sundar has developed an Android app. He has a list of potential purchasers for his app.

```
#include <iostream>
```

```
#include <algorithm>
using namespace std;
int main()
{
   int n;
   cin>>n;
   int arr[n];
   for(int i=0;i<n;i++){
      cin>>arr[i];
   }
   sort(arr,arr+n);
   for(int i=0;i<n;i++){
      arr[i]=arr[i]*(n-i);
   }
   cout<<*max_element(arr,arr+n);
   return 0;
}
```