A

```
#include<bits/stdc++.h>
using namespace std;
int main()
{
   int t;
   cin>>t;
   while(t--)
   {
      int n;
      cin >> n;
      int A[n+32];
      for(int i= 0; i<n; i++)
         cin >> A[i];

      sort(A, A+n);

      int max= A[n-1], cnt= 0;
      for(int i= 0; i<n; i++)
         if(max==A[i])
         {max= A[i]; cnt++;}

      cout << max << " " << cnt <<
endl;

   }

}
```

B

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

string A= "00";
string B= "010";
string C= "011";
string D= "1110";
string E= "10";
string F= "11000010";
string G= "11000011";
string H= "11010";
string I= "1111";
string J= "11001000";
string K= "11001001";
string L= "110011";
string M= "11001010";
string N= "110001";
string O= "11001011";
string P= "11011011";
string Q= "11000001";
string R= "11011110";
string S= "1101110";
string T= "11011111";
string U= "11011010";
string V= "11011000";
string W= "110000000";
string X= "110000001";
string Y= "110110010";
string Z= "110110011";

int main()
{
   while(1)
   {
      string Ans= "";
      string ok;
      cin >> ok;
      if(ok=="#")
         break;
      else
      {
         for(int i= 0; ok[i]!='\0'; i++)
         {
            if(ok[i]=='A')
               Ans+= A;
            else if(ok[i]=='B')
               Ans+= B;
            else if(ok[i]=='C')
               Ans+= C;
            else if(ok[i]=='D')
               Ans+= D;
            else if(ok[i]=='E')
               Ans+= E;
            else if(ok[i]=='F')
               Ans+= F;
            else if(ok[i]=='G')
               Ans+= G;
            else if(ok[i]=='H')
               Ans+= H;
            else if(ok[i]=='I')
               Ans+= I;
            else if(ok[i]=='J')
               Ans+= J;
            else if(ok[i]=='K')
               Ans+= K;
            else if(ok[i]=='L')
               Ans+= L;
            else if(ok[i]=='M')
               Ans+= M;
            else if(ok[i]=='N')
               Ans+= N;
            else if(ok[i]=='O')
               Ans+= O;
            else if(ok[i]=='P')
               Ans+= P;
            else if(ok[i]=='Q')
               Ans+= Q;
            else if(ok[i]=='R')
               Ans+= R;
            else if(ok[i]=='S')
               Ans+= S;
            else if(ok[i]=='U')
               Ans+= U;
            else if(ok[i]=='T')
               Ans+= T;
            else if(ok[i]=='V')
               Ans+= V;
            else if(ok[i]=='W')
               Ans+= W;
            else if(ok[i]=='X')
               Ans+= X;
            else if(ok[i]=='Y')
               Ans+= Y;
            else if(ok[i]=='Z')
               Ans+= Z;
         }
         cout << Ans << endl;
      }
   }

   return 0;
}
```

C

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

int main()
{
   int t, i;
   cin >> t;

   while(t--)
   {
      string str;
      cin >> str;
      vector <char> b;

      bool ans= true;

      for(char c : str)
      {
         if( (c==')') or (c==']') or
(c=='}') )
         {
            if( !b.empty() and ( (c==')'
and b.back()=='(') or
                                 (c==']' and
b.back()=='[') or
                                 (c=='}' &&
b.back()=='{')) ) {
               b.pop_back();
            }
            else
            {
               ans= false;
               break;
            }
         }
         else
            b.push_back(c);
      }

      if( ans and b.empty() )
         cout << "Yes" << endl;
      else
         cout << "No" << endl;
   }

   return 0;
}
```

D

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

long long int i, j;
```

```
int main()
{
   long long int n;
   while(cin >> n)
   {
      long long int ok= n;
      vector <long long int> v;
      for(i= 2; i*i<=n; i++)
      {
         if(n%i==0)
         {
            v.push_back(i);
            while(n%i==0)
               n/= i;
         }
      }

      if(n>1)
         v.push_back(n);

      if( (v.size()==2) and
(ok==v[0]*v[1]) )
         {
            cout << ok << " is a
marvelous number, factors are " <<
v[0] << " and " << v[1] << endl;
         }

      else
         cout << ok << " is not a
marvelous number" << endl;
   }
   return 0;
}
E
#include<iostream> //For my
Machine
#include<bits/stdc++.h> //For
Contest
using namespace std;

typedef long long int ll;
typedef unsigned long long int ull;
#define pb        push_back
#define ppb       pop_back
#define yes       cout << "Yes" <<
endl
#define no        cout << "No" <<
endl
#define Yes       cout << "YES" <<
endl
#define No        cout << "NO" <<
endl
#define fr0(i,n)  for(ll i= 0; i<n; i++)
#define fr1(i,n)  for(ll i= 1; i<=n;
i++)
#define kocu
ios_base::sync_with_stdio(NULL);ci
n.tie(NULL);cout.tie(NULL);

const int MAXSIZE=1e6+10;

const int MOD=1e9+7;
ll mod(ll a)
{
   a%= MOD;
   if(a<0)
      a+= MOD;
   return a;
}

const double PI = 2*acos(0.0);
#define mset(arr) memset(pq, 0,
sizeof(pq)); // to set arr values = 0

string Summation(string n,string s)
{
   if(n.size() > s.size())
      swap(n, s);

   string str;
   int l_n = n.size();
   int l_s = s.size();

   reverse(n.begin(),n.end());
   reverse(s.begin(),s.end());

   int carry = 0;
   for(int i=0; i<l_n; i++)
   {
      int sum = ((n[i]-'0')+(s[i]-
'0')+carry);
      str.push_back(sum%10 + '0');
      carry = sum/10;
   }

   for(int i = l_n; i<l_s; i++)
   {
      int sum = ((s[i]-'0')+carry);
      str.push_back(sum%10 + '0');
      carry = sum/10;
   }

   if(carry)
      str.push_back(carry+'0');

   reverse(str.begin(),str.end());

   return str;
}



/*                          || Main
Function ||                        */
int i, j;
string ok[60100];

void fib()
{
   ok[0]= "0";
   ok[1]= "1";

   for(i= 2; i<6000; i++)
      ok[i]= Summation(ok[i-1], ok[i-
2]);
}

int main()
{
   fib();

   while(1)
   {
      int n;
      cin >> n;
      //int A[n+32];

      if(n==0)
         cout << 2 << endl;
      else if(n>0)
         cout << Summation(ok[n+1],
ok[n-1]) << endl;
      else
         break;

   }
   return 0;
}
G
#include<bits/stdc++.h>
#define ll long long int
using namespace std;

string graph[600];
ll visit[600][600];
ll row, col;
vector < pair<int,int> > src;
ll cnt= 0;
int dx[]= {1,-1,0,0};
int dy[]= {0,0,1,-1};

void dfs(pair <int,int> st)
{
   cnt++;
   visit[st.first][st.second]= 1;
   for(ll i= 0; i<4; i++)
   {
      ll x= st.first + dx[i];
      ll y= st.second + dy[i];

      if( (x>=0 && x<row) and
(y>=0 && y<col) )
         if( graph[x][y]=='#' and
visit[x][y]==0 )
            dfs( {x,y} );

   }
}


int main()
{
```

```
    ll tc= 1;
    cin >> tc;
    while(tc--)
    {
        cin >> row >> col;
        for(ll i= 0; i<row; i++)
            cin >> graph[i];

        for(ll i= 0; i<row; i++)
            for(ll j= 0; j<col; j++)
                if(graph[i][j] == '#')
                    src.push_back( {i,j} );

        ll ans= 0;
        for(auto i:src)
        {
            if(visit[i.first][i.second]==0)
            {
                cnt= 0;
                dfs(i);
                ans= max(ans, cnt);
            }
        }

        cout << ans << endl;
        src.clear();
        memset(visit, 0, sizeof(visit));

        for(ll i= 0; i<row; i++)
            graph[i].clear();

        ans = 0;
    }
    return 0;
}
H
#include<bits/stdc++.h>
using namespace std;

vector<pair<int, string>> v;

bool cmp(const pair<int, string> &A,
const pair<int, string> &B)
{
    if(A.first==B.first)
    {
        return A.second<B.second;
    }
    return A.first>B.first;
}


int main()
{
    int t= 1, n;
    cin>>n;
    while(t--)
    {

        int a, b, c, d;
        string s;
        for(int i= 0; i<n; i++)
        {
            cin >> s >> a >> b >> c >> d;
            int ok= a+b+c+d;

            v.push_back({ok,s});
        }

        sort(v.begin(), v.end(), cmp);
        //reverse(v.begin(), v.end());


        for(int i= 0; i<n; i++)
            cout << v[i].second << " " <<
v[i].first << endl;
    }

    return 0;
}
```

```
//Gold and Sand
#include<bits/stdc++.h>
using namespace std;
int main()
{
    int t,sum,sum1,i;
    string s;
    cin>>t;
    while(t--)
    {
        cin>>s;
        int c=0;
        stack<char>ss;
        for(i=0;
i<s.size(); i++)
        {

if(s[i]=='.')
            {

continue;
            }

if(s[i]=='<')
            {

ss.push(s[i]);
            }
            else
if(s[i]=='>'&&!ss.empty
())
            {

ss.pop();
                c++;
            }
        }
        cout<<c<<endl;
    }
}


//Find Target Indices
#include<bits/stdc++.h>
using namespace std;
int main()
{
    int t,n,k;
    cin>>t;
    while(t--)
    {
        cin>>n;
        int a[n+8];
        for(int
i=0;i<n;i++)
        {
            cin>>a[i];
        }
        sort(a,a+n);
        cin>>k;
        if
(binary_search(a, a +n,
k))
        {
            for(int
i=0;i<n;i++)
            {

if(a[i]==k)
                {

cout<<i<<" ";
                }
            }
            cout<<endl;
        }
        else
        {
            cout<<"no
data"<<endl;
        }
    }
}
//Collect ID from
Google Classroom
#include<bits/stdc++.h>
using namespace std;
int main()
{

    int t;
    cin>>t;
    while(t--)
    {
        string s,s1;
        char c;
        cin>>c;
        getline(cin,s);
        int k=0;
        if(c=='C')
        {
            k=1;
        }
        for(int i=0;
i<s.size(); i++)
        {

if(s[i]=='C')
```

```
            {
                k=1;
            }

if(s[i]>='0'&&s[i]<='9'
&&k==1)
            {

s1.push_back(s[i]);

if(s1.size()==6)
                {

break;
                }
            }
        }
        if(!s1.empty())

cout<<"C"<<s1<<endl;
    }
}
//Average placed in the
middle
#include<bits/stdc++.h>
using namespace std;
int main()
{
    long long  n,i,j;
    float sum=0,sum1=0;
    cin>>n;
    int a[n+5];
    for(i=0; i<n; i++)
    {
        cin>>a[i];
        sum=sum+a[i];

    }

sum1=floor(sum/floor(n)
);
    int k=((n/2)+1);
    for(i=0; i<n; i++)
    {
        if(i==k-1)
        {


if(a[i]==sum1)
            {

cout<<"Yes"<<endl;
            }
            else
            {

cout<<"No"<<endl;
            }

        }

    }
}
```

```
// Admission Test
#include<bits/stdc++.h>
using namespace std;
struct Admission{
   char ch;
   int num;
   string s;
};

int main(){
   while(1)
   {
      int n;
      cin>>n;
      if(n==0)
         break;

      vector<Admission> v(n);
      for(int i=0; i<n; i++)
      {
         Admission a;
         cin>>a.ch>>a.num>>a.s;
         v[i]=a;
      }
      int sub=0;
      int t=0,p=0;
      for(int i=0; i<n; i++)
      {
         if(v[i].s=="wrong"){
            sub+=2;
         }
         else if(v[i].s=="right"){
           t++;
            p+=v[i].num;
         }
      }
      int ans = p-sub;
      if(ans<0)
         ans =0;
      cout<<t<<" "<<ans<<endl;

   }
}
```

Graph Problem

```
#include<bits/stdc++.h>
#include <deque>
using namespace std;
#define faster
ios::sync_with_stdio(0);
cin.tie(0);cout.tie(0);
#define ff  first
#define ss  second
#define ll  long long int
#define File  freopen("input.txt","r",
stdin);freopen("output.txt","w",
stdout);
#define testCase int tc = 1; cin >>
tc;for(int i = 1;i<=tc;i++)
#define INF 0x7F
#define MIN_INF 0x80
ll lastonebits(int n)
{
 return n&(-n);
}
bool cmp(const pair < int,int >
a,const pair < int,int > b)
{
 // return a.first/a.second >
b.first/b.second; //sort by ratio
 return (a.first * b.second) > (b.first *
a.second);
}
#define yes  cout << "YES" <<
endl;return;
#define no  cout << "NO" <<
endl;return;

vector < int > graph[105500];
vector < int > ex[105500];
vector  < int > leaf;
int dist[105000];
int vis[100500];
void bfs(int start)
{
 queue < int > qu;
 qu.push(start);
 dist[start] = 0;
 vis[start] = 1;
 while (!qu.empty())
 {
  int node = qu.front();
  qu.pop();
  for(auto i:graph[node])
  {
   if(!vis[i])
   {
    dist[i] = dist[node] + 1;
    vis[i] = 1;
    qu.push(i);
   }
  }
 }
 vector < int > ans;
 for(auto i:leaf)
 ans.push_back(dist[i]);
 sort(ans.begin(),ans.end());
 for(auto i:ans)cout << i << " ";
 cout << endl;

}
void solve()
{
 int node;
 cin >> node;
 for(int i = 0;i<node-1;i++)
 {
  int a,b;
  cin >> a >> b;
 // cout << a << " " << b << endl;
  graph[a].push_back(b);
  graph[b].push_back(a);
  ex[a].push_back(b);
 }
```

```
  for(int i = 1;i<=node;i++)
  {
    //cout << ex[i].size() << endl;;
    if(ex[i].size() == 0)
      leaf.push_back(i);
  }
  bfs(1);
  for(int i = 1;i<=node;i++)
  {
    graph[i].clear();
    ex[i].clear();
  }
  leaf.clear();
   memset(dist,0,sizeof(dist));
  memset(vis,0,sizeof(vis));
}

int main()
{
   faster;
   #ifndef ONLINE_JUDGE
   File
   #endif

   testCase
   {

    //cout << "Case " << i << ": ";
     solve();

   }
   //solve();

}
```