Ex 1: Find the time complexity of each of the following codes:

```
#include <bits/stdc++.h>
using namespace std;
int main () {
int n,m;
cin>>n>>m;
for (int i=0;i<n;i+=m)
   cout<<"Hello"<<endl;
return 0;
}
```

```
#include <bits/stdc++.h>
using namespace std;
int main () {
int n,m;
cin>>n>>m;
int i=n,j=0;
while (i>0 && j<m) {
   cout<<"Hi"<<endl;
   i/=2;
   j*=4;
}
return 0;
}
```

```
#include <bits/stdc++.h>
using namespace std;
int main () {
int n,m;
cin>>n>>m;
int i=n,j=0;
while (i>0 || j<m) {
   cout<<"Hi"<<endl;
   i/=2;
   j*=4;
}
return 0;
}
```

```
#include <bits/stdc++.h>
using namespace std;
int main () {
int n;
cin>>n;
vector <int> v(n);
for (int i=0;i<n;i++) cin>>v[i];
sort(v.begin(),v.end());
for (int i=0;i<n;i++) {
   int s=0;
   for (int j=i+1;j<n;j++) s+=v[j];
   cout<<s<<endl;
}
return 0;
}
```

```
#include <bits/stdc++.h>
using namespace std;
int main () {
int n,m;
cin>>n>>m;
set <int> s;
for (int i=0;i<n;i++) {
   int a;
   cin>>a;
   s.insert(a);
}
for (int i=-m;i<=m;i++)
{
   set <int> :: iterator itr1 = s.lower_bound(i),itr2=s.upper_bound(i);
   if (itr1!=s.end()) cout<<*itr1<<endl;
   else cout<<"Not found"<<endl;
   if (itr2!=s.end()) cout<<*itr2<<endl;
   else cout<<"Not found"<<endl;
}
return 0;
}
```

```
#include <bits/stdc++.h>
using namespace std;
int main () {
int n;
cin>>n;
vector < pair<int,int> > v;
int two=0;
while (n%2==0) {two++; n/=2;}
if (two) v.push_back(make_pair(2,two));
for (int i=3; i*i<=n; i++) {
   int cnt=0;
   while (n%i==0) {cnt++; n/=i;}
   if (cnt>0) v.push_back(make_pair(i,cnt));
}
if (n>2) v.push_back(make_pair(n,1));
for (int i=0;i<v.size();i++) cout<<v[i].first<<" "<<v[i].second<<endl;
return 0;
}
```

Ex 2:

You are given n intervals of the form [a,b] where a and b are integers such that a<=b. Your friend wants to ask you q queries. Each query is composed of a single integer x. Your answer must be the number of intervals to which x belongs.

For example, suppose you have the intervals [1,3], [2,5] and [0,2]. The integer 2 belongs to 3 intervals. However, the integer 5 belongs to only 1 interval and the integer 6 belongs to 0 integers.

Input format:

An integer n representing the number of intervals.
N lines follow, each containing a and b such that a<=b and both between 0 and 10^5
An integer q representing the number of queries
q lines follow, each describing a query by giving an integer x.

Output format: For each query print the corresponding answer.

Solve this problem in each of the following cases so that it doesn't exceed time limit:

Case 1: 0<N<1000 and 0<Q<1000
Case 2: 0<N<10^6 and 0<Q<10^6

For each case, determine the time complexity of your solution and compare the speed of your algorithms.