Name: Akash

Reg no: 11805342

Sub : CSE331

Roll no: A25

Problem 1:

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

#define ll              long long int
#define llmin            -1e18
#define ff              first
#define ss               second
#define pb                push_back
#define vi               vector<int>
#define take(a,n)           vector <int> a; for(int i=0;i<n;i++){int aa; cin>>aa; a.pb(aa);}
```

```cpp
#define vll            vector<ll>
#define full(a)         (a.begin(),a.end())
#define vc             vector<char>
#define iz(n)          int n; cin>>n;
#define iz2(n,m)        int n,m; cin>>n>>m;
#define mii            map<int,int>
#define setbits(x)      __builtin_popcountll(x)
#define zerobits(x)     __builtin_ctzll(x)   //zeros before first 1
#define com            int t; cin>>t; while(t--)
#define forn(n)        for(int i=0;i<n;i++)
#define fo(x,y)        for(int i=x;i<y;i++)
#define pq             priority_queue <int, vector<int>, greater<int> >


int main(){
    ios_base::sync_with_stdio(false);
    cin.tie(NULL);

    #ifndef ONLINE_JUDGE
    freopen("input.txt", "r", stdin);
    freopen("output.txt", "w", stdout);
    #endif

    int n;
    cin>>n;
    take(a,n)
    unordered_map<int,int>m;
    int level=0;
    int size=1;
    int counter=0;
    for(int i = 0; i < n; i++)
    {

        if(counter==size){
```

```cpp
            counter=0;
            size*=2;
            level++;
        }
        m[a[i]]=level;
        counter++;


    }
    int query;
    cin>>query;
    if(m.count(query)==0){
        cout<<-1;
    }
    else
    cout<<m[query];


    return 0;
}
```

Problem 2:

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

#define ll              long long int
#define llmin             -1e18
#define ff              first
#define ss               second
#define pb                push_back
#define vi              vector<int>
#define take(a,n)          vector <int> a; for(int i=0;i<n;i++){int aa; cin>>aa; a.pb(aa);}
#define vll             vector<ll>
#define full(a)          (a.begin(),a.end())
#define vc               vector<char>
#define iz(n)            int n; cin>>n;
#define iz2(n,m)          int n,m; cin>>n>>m;
#define mii             map<int,int>
#define setbits(x)         __builtin_popcountll(x)
#define zerobits(x)         __builtin_ctzll(x)   //zeros before first 1
#define com              int t; cin>>t; while(t--)
#define forn(n)           for(int i=0;i<n;i++)
#define fo(x,y)          for(int i=x;i<y;i++)
#define pq               priority_queue <int, vector<int>, greater<int> >


void DFS(int i, vector <int> adj[],vector<bool> &vis, set<int> &s)
```

```cpp
    {
        if (vis[i]) return;
        vis[i] = true;
        s.insert(i);

        for (auto j:adj[i])
        {
            if (!vis[j]) DFS(j, adj, vis, s);
        }
    }




int main(){
    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    // cout<<" a";
    #ifndef ONLINE_JUDGE
    freopen("input.txt", "r", stdin);
    freopen("output.txt", "w", stdout);
    #endif

    int n,m;
    cin>>n>>m;
    vector<int> adj[n+1];
    // cout<<"P";
    for (int i = 0; i < m; i++)
    {
        int a,b;
        cin>>a>>b;
        // insertNode(a,b,adj);
        adj[a].push_back(b);
```

```cpp
        adj[b].push_back(a);
    }
    int k;
    cin>>k;
    set<int> s;
    vector<bool>visited(n,false);
    // cout<<"aaaa";
    for (int i = 0; i <= n; i++)
    {
        if(!visited[i]){
            DFS(i,adj,visited,s);
        }
        // cout<<s.size()<<endl;
        if((int)(s.size())==k){
            for (auto it = s.begin(); it!=s.end(); ++it){
                cout<<*it<<" ";
            }

            cout<<endl;
            s.clear();
        }
        s.clear();
    }



    return 0;
}
```