

## WORKSHEET 7

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Subject Name: IT Skills (DSA)

UID: 20BCS2050

Section/Group: DWWC-43

### Question 1. KEYS AND ROOMS

Accepted

Next question

842. Split Array into Fibonacci Sequence

More challenges

261. Graph Valid Tree

All statuses

All languages

Accepted  
a few seconds ago

C++

```

class Solution
{
public:
    void dfs(int i, vector<vector<int>> & rooms, vector<int> &vis)
    {
        vis[i]=1;
        for(auto key: rooms[i])
            if(!vis[key])
                dfs(key, rooms, vis);
    }

    bool canVisitAllRooms(vector<vector<int>>& rooms)
    {
        vector<int> vis(rooms.size(), 0);

        dfs(0, rooms, vis);

        for(auto it:vis)
            if(!it) return false;

        return true;
    }
};

```

### Question 2. HIDDEN COLORED GRAPH

```

1 #include <bits/stdc++.h>
2 using namespace std;
3 bool query(int v) {
4     cout << "? " << v << endl;
5     char c;
6     cin >> c;
7     return c == 'B';
8 }
9
10 int main() {
11     ios::sync_with_stdio(false);
12     cin.tie(0);
13     int n;
14     cin >> n;
15     vector<vector<bool>> q(n + 1);
16     vector<int> ve;
17     ve.push_back(1);
18     for(int i = 1; i <= n; i++) {
19         ve.push_back(i);
20     }
21     for(int k : ve) {
22         for(int i = k; i <= n; i++) {
23             q[i].push_back(query(i));
24         }
25     }
26     vector<vector<bool>> adj(n + 1, vector<bool>(n + 1));
27     for(int i = 2; i <= n; i++) {
28         for(int j = 1; j < i; j++) {
29             adj[i][j] = adj[j][i] = (q[i][j - 1] ^ q[i][j + 1]);
30         }
31     }
32     cout << "!\\n";
33     for(int i = 1; i <= n; i++) {
34         for(int j = 1; j <= n; j++) {
35             cout << adj[i][j];
36         }
37         cout << '\\n';
38     }
39     cout << flush;
40 }

```

## SOLUTION:

Status: ✓ Correct Answer

Submission ID: 85053533

Score: 1 Time: 0.02s Memory: 5.4M

## Question 3. WINTER

```
1 #include<bits/stdc++.h>
2
3 #define int long long int
4 #define F first
5 #define S second
6 #define pb push_back
7 #define que_max priority_queue<int>
8 #define que_min priority_queue<int,vector<int>,greater<int>>;
9 #define endl "\n"
10 using namespace std;
11
12 int32_t main()
13 {
14     #ifndef ONLINE_JUDGE
15         freopen("input.txt","r",stdin);
16         freopen("output.txt","w",stdout);
17     #endif
18
19     int n,m,q1;
20     cin>>n>>m>>q1;
21     vector<vector<int>>>vec(n+1);
22     for(int i=0;i<m;i++)
23     {
24         int x,y;
25         cin>>x>>y;
26         vec[x].push_back(y);
27         vec[y].push_back(x);
28     }
29
30     vector<bool>visited(n+1,false);
31     queue<int>q;
32     vector<bool>frozen(n+1,false);
33
34     while(q1-->0)
35     {
36         int query,type;
37         cin>>type>>query;
38         if(type==1)
39         {
40             // Type 1: Add query to queue
```

```
41             if(frozen[query])continue;
42             frozen[query]=true;
43             // if(visited[query]==false)
44             // {
45                 visited[query]=true;
46                 q.push(query);
47             // }
48         }else if(type==2)
49         {
50             while(q.size()!=0 && query!=0 )
51             {
52                 int sz=q.size();
53                 while(sz-->0){
54                     int tp=q.front();
55                     visited[tp]=true;
56                     q.pop();
57
58                     for(auto nbr:vec[tp])
59                     {
60                         if(!visited[nbr]){
61                             if(frozen[nbr]) continue;
62                             frozen[nbr]=true;
63                             q.push(nbr);
64                         }
65                     }
66                 }
67                 query--;
68             }
69         }else
70         {
71             if(frozen[query])
72             {
73                 cout<<"Yes"<<endl;
74             }else
75             {
76                 cout<<"No"<<endl;
77             }
78         }
79     }
80     return 0;
81 }
```

## SOLUTION:

Query	Type	Value	Output
1	1	1	Yes
2	1	2	Yes
3	1	3	Yes
4	1	4	Yes
5	1	5	Yes
Query 6: 2			
6	2	1	Yes
7	2	2	Yes
8	2	3	Yes
9	2	4	Yes
10	2	5	Yes
Query 11: 2			
11	2	1	Yes
12	2	2	Yes
13	2	3	Yes
14	2	4	Yes
15	2	5	Yes
Query 16: 2			
16	2	1	Yes
17	2	2	Yes
18	2	3	Yes
19	2	4	Yes
20	2	5	Yes
Query 21: 2			
21	2	1	Yes
22	2	2	Yes
23	2	3	Yes
24	2	4	Yes
25	2	5	Yes
Query 26: 2			
26	2	1	Yes
27	2	2	Yes
28	2	3	Yes
29	2	4	Yes
30	2	5	Yes

#### Question 4. MINIMAL TRAVEL TIME

```
1 #include <bits/stdc++.h>
2
3 #define llint long long int
4 using namespace std;
5
6 void run()
7 {
8     // Insert code here
9     int n, m, s, k;
10    cin >> n >> m >> s >> k;
11
12    vector<vector<int>> graph(n+1);
13
14    for(int i = 0; i < m; ++i){
15        int u, v;
16        cin >> u >> v;
17        graph[u].push_back(v);
18        graph[v].push_back(u);
19    }
20
21    std::vector<int> count(n+1);
22    for (int i = 0; i < s; ++i){
23        int val;
24        cin >> val;
25        count[val]++;
26    }
27    vector<bool> vis(n+1);
28    queue<int> q;
29
30    q.push(0);
31    vis[0] = true;
32
33    llint res = 0, curr = 0;
34
35    while(!q.empty() && k > 0){
36        int size = q.size();
37        for(int i = 0; i < size; ++i){
```

```
38            int node = q.front();
39            q.pop();
40            for(auto adj : graph[node]){
41                if(!vis[adj]){
42                    vis[adj] = true;
43                    q.push(adj);
44                }
45            }
46            int val = min(k, count[node]);
47            res += 2*curr*val;
48            k -= val;
49        }
50        curr++;
51    }
52    cout << res << "\n";
53 }
54
55 int main()
56 {
57     std::ios_base::sync_with_stdio(false);
58     std::cin.tie(NULL);
59
60     int t = 1;
61     std::cin >> t;
62     while (t--){
63         run();
64     }
65     return 0;
66 }
```

#### SOLUTION:

Status: <span style="color: green;">✓</span> Correct Answer			Submission ID: <a href="#">85054109</a>
Score: 100	Time: 0.15s	Memory: 10.3M	
Sub-Task	Task #	Result (time)	
1	0	AC (0.153760)	
1	1	AC (0.039809)	
1	2	AC (0.087936)	
1	3	AC (0.086389)	
Subtask Score: 100.00%		Result - AC	
Total Score = 100.00%			

## Question 5. CHEF AND REVERSING

```
1 #include <bits/stdc++.h>
2 using namespace std;
3 const int N = 1e5+10;
4 const int infi=1e9+10;
5 vector<pair<int,int>>g[N];
6 vector<int>level(N,infi);
7 int n,m;
8 void bfs(){
9     level[1]=0;
10    deque<int> dq;
11    dq.push_back(1);
12    while(!dq.empty()){
13        int cur_v= dq.front();
14        dq.pop_front();
15        for(auto child:g[cur_v]){
16            int child = child.first;
17            int wt = child.second;
18            if(level[cur_v]+wt < level[child]){
19                level[child] = level[cur_v] + wt;
20                if(wt==1) dq.push_back(child);
21                else dq.push_front(child);
22            }
23        }
24    }
25    if(level[n]==infi) cout<<-1 ;
26    else cout<<level[n];
27 }
28
29 int main() {
30
31     cin>>n>>m;
32     for(int i=0;i<m;i++){
33         int x,y;
34         cin>>x>>y;
35         if(x==y)continue;
36         g[x].push_back({y,0});
37         g[y].push_back({x,1});
38     }
39     bfs();
40
41     return 0;
42 }
```

## SOLUTION:

Status: ✓ Correct Answer

Submission ID: [85054172](#)

Time:  
0.05s

Memory:  
8.9M

## Question 6. CHEF AND EDGE FLIPPING

```
Language: C++14

1 #include <bits/stdc++.h>
2 using namespace std;
3
4 #define N 1010
5
6 int n, m, a[N], b[N];
7 bool col[N], s[N][N];
8
9 bool check(int u) {
10     for (int i = 1; i <= n; i++) col[i] = 0; col[u] = 1;
11     for (int i = 1; i <= n; i++) if (i != u) s[i][u] = 1, s[u][i] = 0;
12     for (int i = 0; i < m; i++) {
13         int x = a[i], y = b[i];
14         if ((col[x] ^ col[y]) == 1) {
15             if (col[x]) swap(x, y);
16             s[x][y] ^= 1, s[y][x] ^= 1;
17             col[x] = 1;
18             for (int j = 1; j <= n; j++) if (!col[j]) s[j][x] = 1, s[x][j] = 0;
19         }
20         else if ((col[x] & col[y]) == 1) s[x][y] ^= 1, s[y][x] ^= 1;
21     }
22     bool fg = false;
23     for (int i = 1; i <= n; i++) if (!col[i]) fg = true;
24     if (!fg) return 0;
25     for (int i = 0; i < m; i++) {
26         int x = a[i], y = b[i];
27         s[x][y] ^= 1, s[y][x] ^= 1;
28     }
29     for (int i = 1; i <= n; puts(""), i++) for (int j = i + 1; j <= n; j++) printf("%d ", s[i][j]);
30     return 1;
31 }
32
33 int main() {
34     int T;
35     scanf("%d", &T);
36     while (T--) {
37         scanf("%d %d", &n, &m);
38         for (int i = 0; i < m; i++) scanf("%d %d", &a[i], &b[i]);
39         for (int i = 1; i <= n; i++) if (check(i)) break;
40     }
41     return 0;
42 }
43 }
```

**SOLUTION:**

Status: ✓ Correct Answer			Submission ID: 8000000
Score	Time	Memory	
100	0.00s	5.00M	
Test Case	Test #	Result	Score
1	0	AC	10.000000
1	1	AC	10.000000
1	2	AC	10.000000
Subtask Score: 30.00%			Result: AC
2	3	AC	10.000000
2	4	AC	10.000000
2	5	AC	10.000000
2	6	AC	10.000000
Subtask Score: 40.00%			Result: AC
3	7	AC	10.000000
3	8	AC	10.000000
3	9	AC	10.000000
3	10	AC	10.000000
3	11	AC	10.000000
Subtask Score: 30.00%			Result: AC
Total Score: 100.00%			

## Question 7. MANGO MARKET

```
Language: C++14

1  #include <bits/stdc++.h>
2
3  using namespace std;
4
5  int main() {
6      ios::sync_with_stdio(false);
7      cin.tie(nullptr);
8      int n, m;
9      cin >> n >> m;
10     long long sum = 0;
11     for (int i = 1; i <= n; i++) {
12         long long x;
13         cin >> x;
14         sum += x;
15     }
16     long long edges = (long long)m, unused = ((long long)n * (n - 1)) / 2LL - edges;
17     for (int i = 0; i < m; i++) {
18         int u, v;
19         cin >> u >> v;
20     }
21     int b=edges-unused;
22     int q;
23     cin >> q;
24     for (int i = 0; i < q; i++) {
25         char x;
26         cin >> x;
27         if (x == '?') {
28             cout << sum + edges-unused << '\n';
29             continue;
30         }
31         int u, v;
32         cin >> u >> v;
33         if (x == '+') {
34             edges++;unused--;
35         }
36         else if (x == '-') {
37             edges--;
38             unused++;
39         }
40     }
41 }
42 return 0;
43
44 }
```


## SOLUTION:

Status: <span style="color: green;">✓</span> Correct Answer		Submission ID: <a href="#">85054358</a>
Time: 0.04s	Memory: 5.4M	

## Question 8. ONE MORE WEIRD GAME

```
1  #include <iostream>
2  using namespace std;
3
4  int main() {
5      // your code goes here
6      int t,i;
7      cin>>t;
8      for(i=0;i<t;++i)
9      {
10         int n,m;
11         cin>>n>>m;
12
13         cout<<(n-1)+(m-1)+(2)*(n-1)*(m-1)<<endl;
14     }
15     return 0;
16 }
```

**SOLUTION:**

Status:  Correct Answer

Submission ID: [85054581](#)

Score: 100	Time: 0.00s	Memory: 5.3M
---------------	----------------	-----------------

Sub-Task	Task #	Result (time)
1	1	AC (0.003705)
Subtask Score: 30.00%		Result - AC
2	2	AC (0.003869)
Subtask Score: 70.00%		Result - AC
Total Score = 100.00%		