

## WORKSHEET 7

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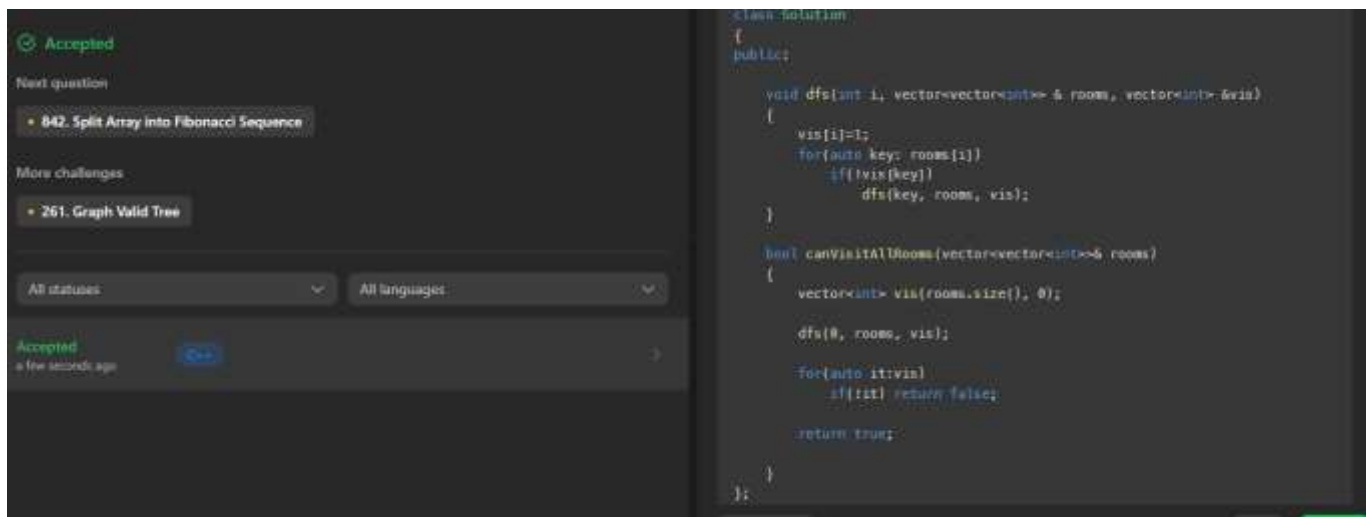
DOMAIN CAMP: 03-01-2023 to 14-01-2023

Subject Name: IT Skills (DSA)

UID: 20BCS2212

Section/Group: DWWC-43

### Question 1. KEYS AND ROOMS



The screenshot shows a coding interface with a problem titled "Keys and Rooms" and a solution in 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>> adj(n + 1, vector<bool>(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 l = k; l <= n; l++) {
23             adj[k].push_back(query(l));
24         }
25     }
26     vector<vector<bool>> adj(n + 1, vector<bool>(n + 1));
27     for(int i = 1; i <= n; i++) {
28         for(int j = 1; j <= n; j++) {
29             adj[i][j] = adj[j][i] = (adj[i][j] + adj[j][i]);
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: <span style="color: green;">✓</span> Correct Answer			Submission ID: <a href="#">85053533</a>
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
37         int query,type;
38         cin>>type>>query;
39         if(type==1)
40         {

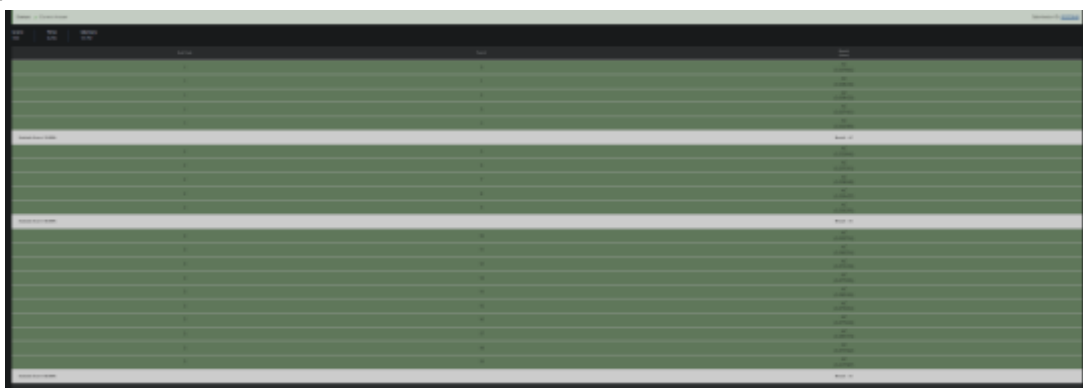
```

```

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==3)
49     {
50         while(q.size() != 0 && query != 0 )
51         {
52             int sz=q.size();
53             while(sz--){
54                 int tp=q.front();
55                 visited[tp]=true;
56                 q.pop();
57
58                 for(auto nbr:vec[tp])
59                 {
60
61                     if(!visited[nbr]){
62                         if(frozen[nbr]) continue;
63                         frozen[nbr]=true;
64                         q.push(nbr);
65                     }
66                 }
67                 query=-1;
68             }
69         }else
70         {
71             if(frozen[query])
72             {
73                 cout<<"Yes"<<endl;
74             }else
75             {
76                 cout<<"No"<<endl;
77             }
78         }
79     }
80 }
81 return 0;

```

**SOLUTION:**



#### 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>✓</span> Correct Answer			Submission ID: <a href="#">85054108</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
42     return 0;
43 }

```

SOLUTION:

Case No.	Case 1	Case 2
1	1	0
2	0	1
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
33	0	0
34	0	0
35	0	0
36	0	0
37	0	0
38	0	0
39	0	0
40	0	0
41	0	0
42	0	0
43	0	0
44	0	0
45	0	0
46	0	0
47	0	0
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	0	0
54	0	0
55	0	0
56	0	0
57	0	0
58	0	0
59	0	0
60	0	0
61	0	0
62	0	0
63	0	0
64	0	0
65	0	0
66	0	0
67	0	0
68	0	0
69	0	0
70	0	0
71	0	0
72	0	0
73	0	0
74	0	0
75	0	0
76	0	0
77	0	0
78	0	0
79	0	0
80	0	0
81	0	0
82	0	0
83	0	0
84	0	0
85	0	0
86	0	0
87	0	0
88	0	0
89	0	0
90	0	0
91	0	0
92	0	0
93	0	0
94	0	0
95	0	0
96	0	0
97	0	0
98	0	0
99	0	0
100	0	0

## 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: ✓ Correct Answer

Submission ID: [85054358](#)

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%		