Vertex number starts from 1 for the given input example. You can use any label for vertex.

1. Print discovered nodes by BFS for an undirected, unweighted graph G with *n* vertices and source *s*.

**Input: (n, s, G)**

5

2

0 1 1 0 0

1 0 0 1 0

1 0 0 1 1

0 1 1 0 1

0 0 1 1 0

**Output:**

2 1 4 3 5

2. Print discovered nodes by DFS for an undirected, unweighted graph G with *n* vertices and source *s*.

**Input: (n, s, G)**

5

2

0 1 1 0 0

1 0 0 1 0

1 0 0 1 1

0 1 1 0 1

0 0 1 1 0

**Output:**

2 1 3 5 4

3. For an undirected, unweighted graph G with *n* vertices if two vertices *v*i, *v*j are connected.

**Input: (n, Vi, Vj, G)**

5

2 4

0 1 1 0 0

1 0 1 0 0

1 1 0 0 0

0 0 0 0 1

0 0 0 1 0

**Output:**

No

4. Given an undirected, unweighted graph G with *n* vertices, print all connected pairs.

**Input: (n , G)**

5

0 1 1 0 0

1 0 1 0 0

1 1 0 0 0

0 0 0 0 1

0 0 0 1 0

**Output:**

1 2

1 3

2 3

4 5

5. Print the number of connected components (sub-graphs) for an undirected unweighted graph G with *n* vertices. Vertices from different connected component have no path connecting them, while any two vertices from the same are connected by at least one path.

**Input: (n, G)**

5

0 1 1 0 0

1 0 1 0 0

1 1 0 0 0

0 0 0 0 1

0 0 0 1 0

**Output:**

2

6. Let G = (V, E) be a connected, undirected graph. An articulation point of G is a vertex whose removal disconnects G (ie braks it into two or more connected components). Find all the articulation points.

**Input: (n, G)**

5

0 1 1 0 0

1 0 1 0 0

1 1 0 1 1

0 0 1 0 1

0 0 1 1 0

**Output:**

3