Representation of Graphs

There are mainly two ways to represent a graph −
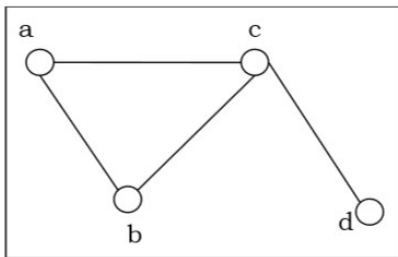- Adjacency Matrix
- Adjacency List

Adjacency Matrix

An Adjacency Matrix A[V][V] is a 2D array of size V×V where Vx is the number of vertices in a undirected graph. If there is an edge between Vx to Vy then the value of A[Vx][Vy]=1 and A[Vy][Vx]= 1, otherwise the value will be zero. And for a directed graph, if there is an edge between Vx to Vy, then the value of A[Vx][Vy]=1 , otherwise the value will be zero.

Adjacency Matrix of an Undirected Graph

Let us consider the following undirected graph and construct the adjacency matrix −

Adjacency matrix of the above undirected graph will be −

	a	b	c	d
a	0	1	1	0
b	1	0	1	0
c	1	1	0	1
d	0	0	1	0

Adjacency Matrix of a Directed Graph

Let us consider the following directed graph and construct its adjacency matrix −
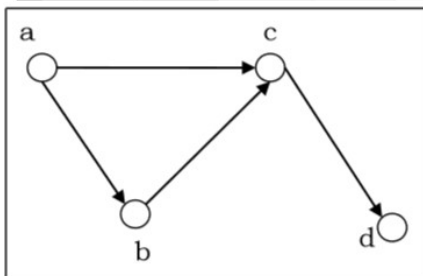
Adjacency matrix of the above directed graph will be −

	a	b	c	d
a	0	1	1	0
b	0	0	1	0
c	0	0	0	1
d	0	0	0	0

Adjacency List

In adjacency list, an array (A[V]) of linked lists is used to represent the graph G with V number of vertices. An entry A[Vx] represents the linked list of vertices adjacent to the Vx−th vertex. The adjacency list of the undirected graph is as shown in the figure below −