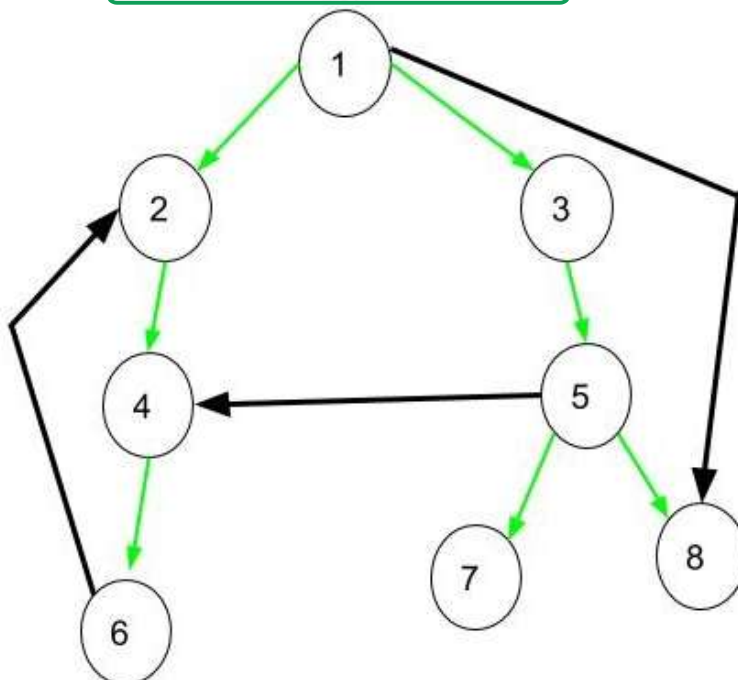


## Tree, Back, Edge and Cross Edges in DFS of Graph

Consider a directed graph given below. In below diagram if **DFS** is applied on this graph a tree is obtained which is connected using green edges.

[Hire with us!](#)

**Tree Edge:** It is an edge which is present in the tree obtained after applying DFS on the graph. All the Green edges are tree edges.

**Forward Edge:** It is an edge  $(u, v)$  such that  $v$  is descendant but not part of the DFS tree. Edge from **1 to 8** is a forward edge.

**Back edge:** It is an edge  $(u, v)$  such that  $v$  is ancestor of edge  $u$  but not part of DFS tree. Edge from **6 to 2** is a back edge. **Presence of back edge indicates a cycle in directed graph.**

**Cross Edge:** It is a edge which connects two node such that they do not have any ancestor and a descendant relationship between them. Edge from node **5 to 4** is cross edge.

---

## Recommended Posts:

Maximum Possible Edge Disjoint Spanning Tree From a Complete Graph

Maximum number of edges to be added to a tree so that it stays a Bipartite graph

Ways to Remove Edges from a Complete Graph to make Odd Edges

Remove all outgoing edges except edge with minimum weight

Maximum number of edges that N-vertex graph can have such that graph is Triangle free | Mantel's Theorem

Edge Coloring of a Graph

Check if removing a given edge disconnects a graph

Program to Calculate the Edge Cover of a Graph

Maximize number of nodes which are not part of any edge in a Graph

Shortest Path in a weighted Graph where weight of an edge is 1 or 2

Add and Remove Edge in Adjacency List representation of a Graph

All vertex pairs connected with exactly  $k$  edges in a graph

Number of Simple Graph with  $N$  Vertices and  $M$  Edges

Minimum number of edges between two vertices of a Graph

Maximum number of edges in Bipartite graph



**Himanshu Singh Bisht**

Check out this Author's [contributed articles](#).

If you like GeeksforGeeks and would like to contribute, you can also write an article using [contribute.geeksforgeeks.org](https://contribute.geeksforgeeks.org) or mail your article to [contribute@geeksforgeeks.org](mailto:contribute@geeksforgeeks.org). See your article appearing on the GeeksforGeeks main page and help other Geeks.

Please Improve this article if you find anything incorrect by clicking on the "Improve Article" button below.

**Improved By :** [Sektor\\_jr](#), [feihcsim824](#)

**Article Tags :** [Graph](#) [DFS](#)

**Practice Tags :** [DFS](#) [Graph](#)



11

1

☐ To-do ☐ Done

Based on 5 vote(s)

[Feedback/ Suggest Improvement](#)

[Add Notes](#)

[Improve Article](#)

Please write to us at [contribute@geeksforgeeks.org](mailto:contribute@geeksforgeeks.org) to report any issue with the above content.

Writing code in comment? Please use [ide.geeksforgeeks.org](https://ide.geeksforgeeks.org), generate link and share the link here.



3 Comments

GeeksforGeeks

 Disqus' Privacy Policy arpan sahu ▾ Recommend Tweet Share

Sort by Newest ▾



Join the discussion...

**Utkarsh Agrawal** • a year ago

there is a typo in the back edge section.

^ | ▾ • Reply • Share ›

**Alvis Vadailya** • 2 years ago • editedcan anyone tell me what is the relationship between 2 and 7?  
is it still cross edge relationship? since it is not in same layer

^ | ▾ • Reply • Share ›

**Utkarsh Agrawal** → Alvis Vadailya • a year ago

yes

1 ^ | ▾ • Reply • Share ›

 Subscribe  Add Disqus to your siteAdd DisqusAdd  Do Not Sell My Data

A computer science portal for geeks

5th Floor, A-118,  
Sector-136, Noida, Uttar Pradesh - 201305  
feedback@geeksforgeeks.org**COMPANY**About Us  
Careers  
Privacy Policy  
Contact Us**PRACTICE**Courses  
Company-wise  
Topic-wise  
How to begin?**LEARN**Algorithms  
Data Structures  
Languages  
CS Subjects  
Video Tutorials**CONTRIBUTE**Write an Article  
Write Interview Experience  
Internships  
Videos