

EECS3101 (Section Z) Winter 2026
Tutorial 6
Performing a DFS Run on a Directed Graph

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Release Date: Thursday, February 12

No Submission Required: Complete for Learning & Test Prep

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1 DFS Run on a Directed Graph

Consider the following directed graph $G = (V, E)$:

$$V = \{A, B, C, D, E, F\}$$
$$E = \left\{ \begin{array}{l} (A, B), (A, C), (A, D), \\ (B, C), \\ (C, A), \\ (D, E), (D, F), \\ (E, A), (E, F), \\ (F, B), (F, C) \end{array} \right\}$$

1. Perform a *depth-first search* (DFS) on the above graph, starting from vertex A, with the help of a LIFO stack.
2. For each vertex, visit its adjacent vertices in the alphabetic order (i.e., A, B, C, D, E, F).
 - 2.1 Mark each edge as either a *discovery* edge, a *back* edge, a *forward* edge, or a *cross* edge.
 - 2.2 Label all edges with a sequence of numbers, starting from 1, to indicate the order in which they are marked by the DFS.
 - 2.3 List all vertices, from left to right, to indicate the order in which they are pushed to the stack.
 - 2.4 List all vertices, from left to right, to indicate the order in which they are popped from the stack.
 - 2.5 For each vertex, record its *discovery time* (d) and *finish time* (f).