Appendix for Graphs

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Reference

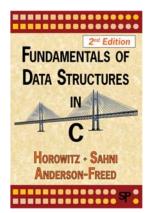- Fundamentals of Data Structures in C
    - *Ellis Horowitz*
    - *Sartaj Sahni*
    - *Susan Anderson-Freed*

    - Publisher: Silicon Press
      2 edition (August 2007)
    - ISBN-10: 0929306406
    - ISBN-13: 978-0929306407
- Extract from Chapter 6 Graphs

Outline

- ***Biconnected Components***
- Activity-on-Vertex (AOV) Networks
- Activity-on-Edge (AOE) Networks
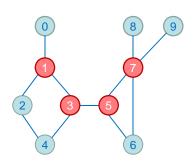

Connected Components

```
void connected(void)
{ /* determine the connected components of a graph */
    int i;
    for (i=0; i < n; i++)
        if (!visited[i]) {
            dfs(i);
            printf("\n");
        }
}
```

Adjacency list: $O(n + e)$
Adjacency matrix: $O(n^2)$

Articulation Point

- An articulation point is a vertex v of G such that the deletion of v, together with all edges incident on v, produces a graph, G', that has at least two connected components.
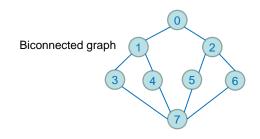
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Biconnected Graph

- A biconnected graph is a connected graph that has no articulation points.

Biconnected graph

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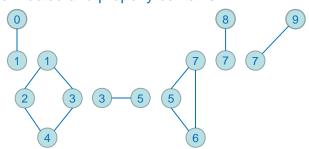## Biconnected Components

- A biconnected component of a connected undirected graph is a maximal biconnected subgraph, H, of G.
  - G contains no other subgraph that is both biconnected and properly contains H.
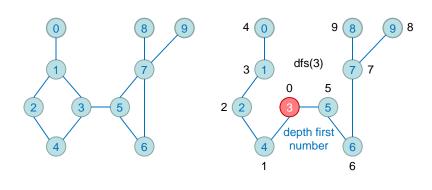
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Find Biconnected Components (1/4)

- Using any depth first spanning tree of G

depth first number

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