

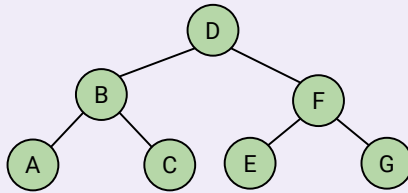
## Q Tree Traversals

Give the following tree traversals.

**Level-order traversal**

**Depth-first traversal**

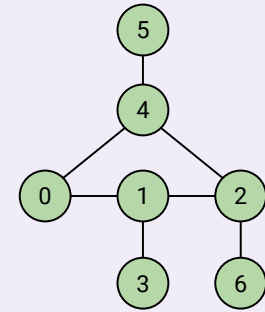
1. Preorder
2. Inorder
3. Postorder



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## Q Depth-First Search

Give the order of dfs calls starting from 0.  
Visit neighbors in increasing order.



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Algorithms (Robert Sedgwick, Kevin Wayne/Princeton)

Give the following tree traversals.

**Q1:** Level-order traversal.

**Q2:** Preorder depth-first traversal.

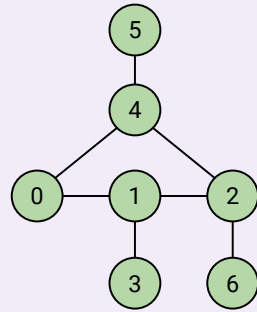
**Q3:** Inorder depth-first traversal.

**Q4:** Postorder depth-first traversal.

**Q1:** Give the order of dfs calls starting from 0. Visit neighbors in increasing order.

**Q** Breadth-First Search

Give the BFS visit order starting from 0.  
Visit neighbors in increasing order.



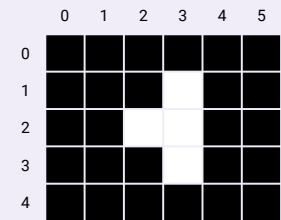
**Q1:** Give the BFS visit order starting from 0. Visit neighbors in increasing order.

**Q** Particle Detection

Given a black-white image of particles,  
identify "blobs".

**Formulate this as a graph problem.**

**Describe how to solve it.**



Given a black-white image of particles, identify "blobs".

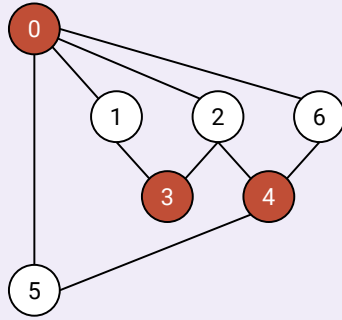
**Q1:** Formulate this as a graph problem.

**Q2:** Describe how to solve it.

**Q** Two-Coloring

How difficult is it to determine whether or not a graph is bipartite?

- A. CSE 332 student could do it.
- B. Hire an expert.
- C. Intractable.
- D. No one knows.



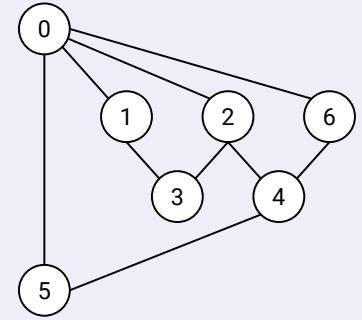
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Algorithms (Robert Sedgwick, Kevin Wayne/Princeton)

**Q** Cycle Detection 1

How difficult is it to determine whether or not a graph has a cycle? (0-5-6-4-0)

- A. CSE 332 student could do it.
- B. Hire an expert.
- C. Intractable.
- D. No one knows.



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Algorithms (Robert Sedgwick, Kevin Wayne/Princeton)

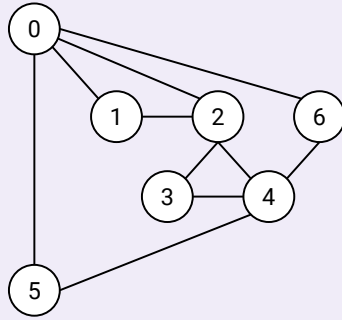
**Q1:** How difficult is it to determine whether or not a graph is bipartite?

**Q1:** How difficult is it to determine whether or not a graph has a cycle? (0-5-6-4-0)

**Q** Cycle Detection 2

How difficult is it to determine whether or not a graph has a cycle using every edge exactly once? (0-1-2-3-4-2-0-6-4-5-0)

- A. CSE 332 student could do it.
- B. Hire an expert.
- C. Intractable.
- D. No one knows.



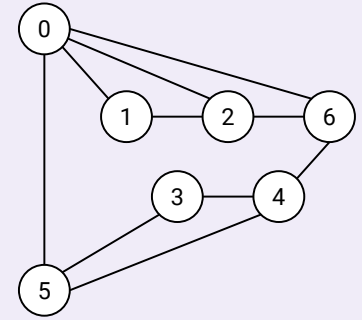
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Algorithms (Robert Sedgwick, Kevin Wayne/Princeton)

**Q** Cycle Detection 3

How difficult is it to determine whether or not a graph has a cycle using every **vertex** exactly once? (0-5-3-4-6-2-1-0)

- A. CSE 332 student could do it.
- B. Hire an expert.
- C. Intractable.
- D. No one knows.



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Algorithms (Robert Sedgwick, Kevin Wayne/Princeton)

**Q1:** How difficult is it to determine whether or not a graph has a cycle using every edge exactly once? (0-1-2-3-4-2-0-6-4-5-0)

**Q1:** How difficult is it to determine whether or not a graph has a cycle using every vertex exactly once? (0-5-3-4-6-2-1-0)