

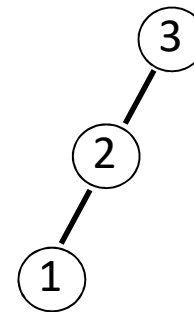
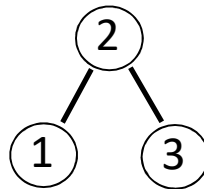
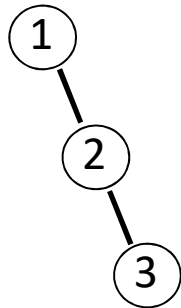
# Outline

- Binary tree traversal
- Counting binary trees
- Threaded binary trees

# Binary Tree for a Traversal Sequence

- If you are given an inorder sequence, can you define a binary tree uniquely?

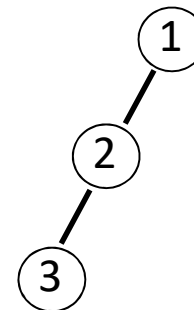
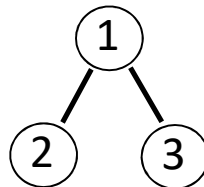
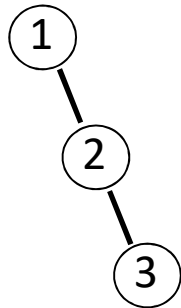
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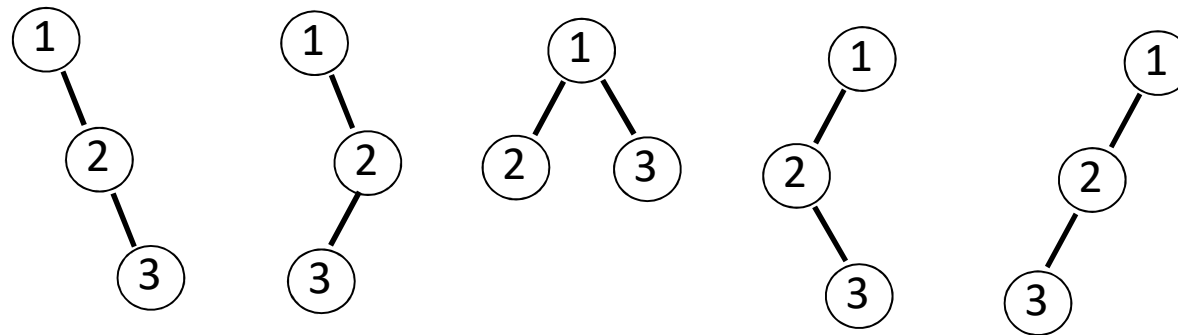
- If you are given a preorder sequence, can you define a binary tree uniquely?

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# Counting Binary Trees

- Every binary tree has a unique pair of preorder and inorder sequences



Inorder? 123, 132, 213, 231, 321

Preorder? 123 for all

# Binary Tree from Traversal

- Can we reconstruct a binary tree satisfying the given traversal orders?
  - Inorder : C B D A F G E
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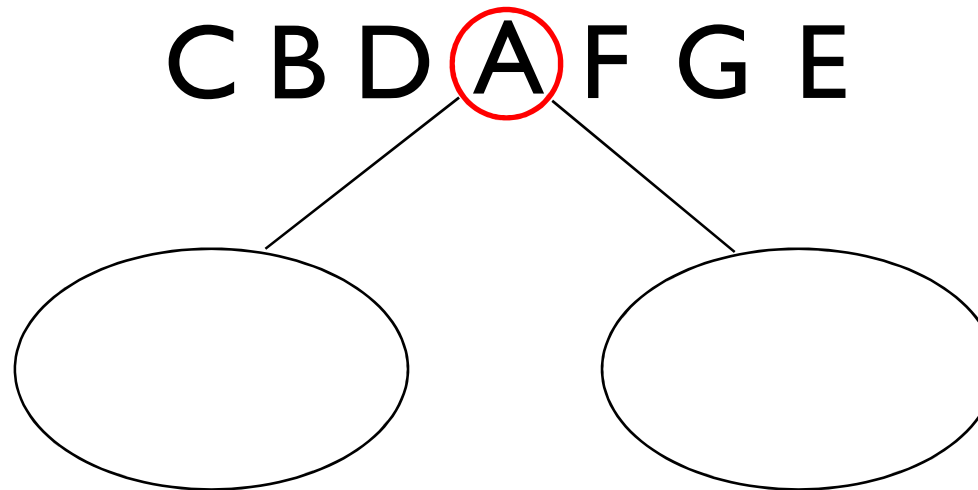
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**A B C D E F G**

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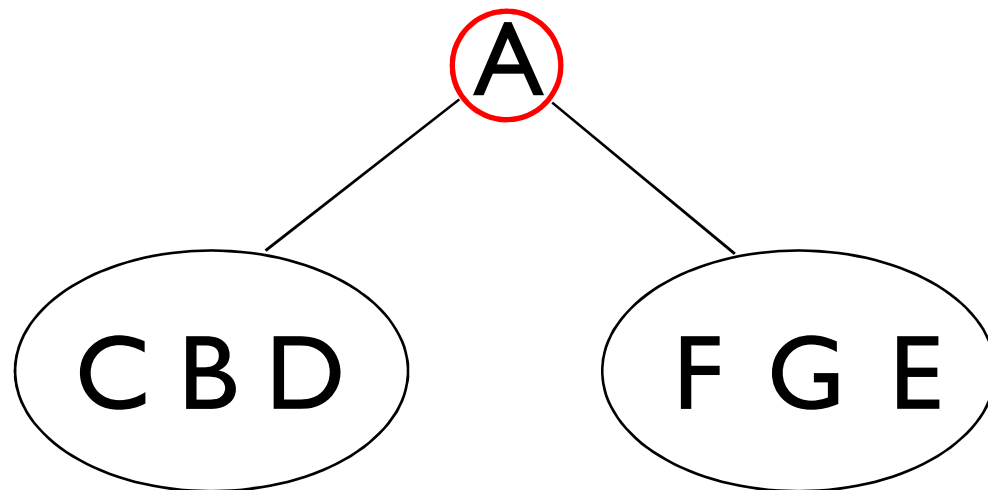
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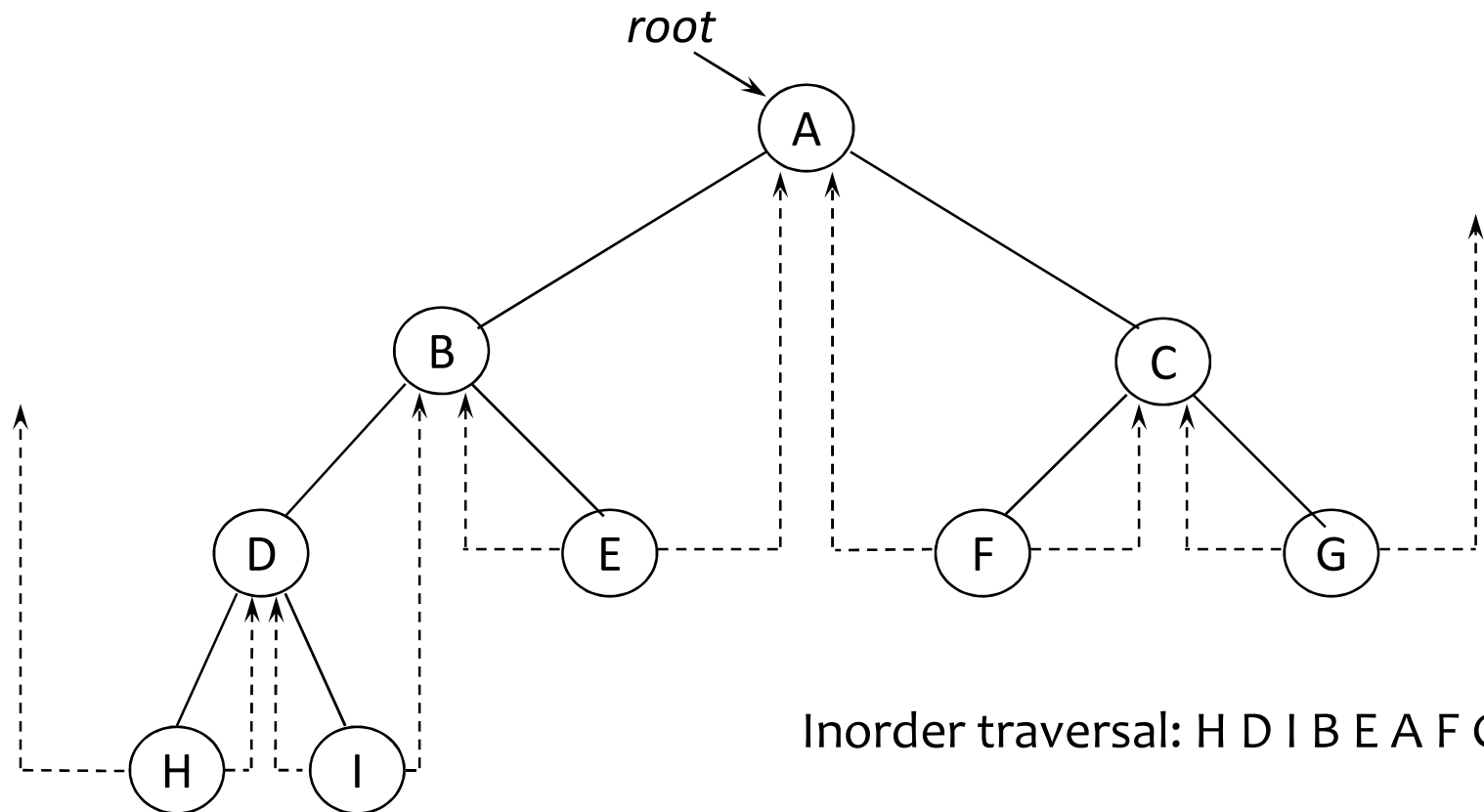
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# Threaded Binary Trees

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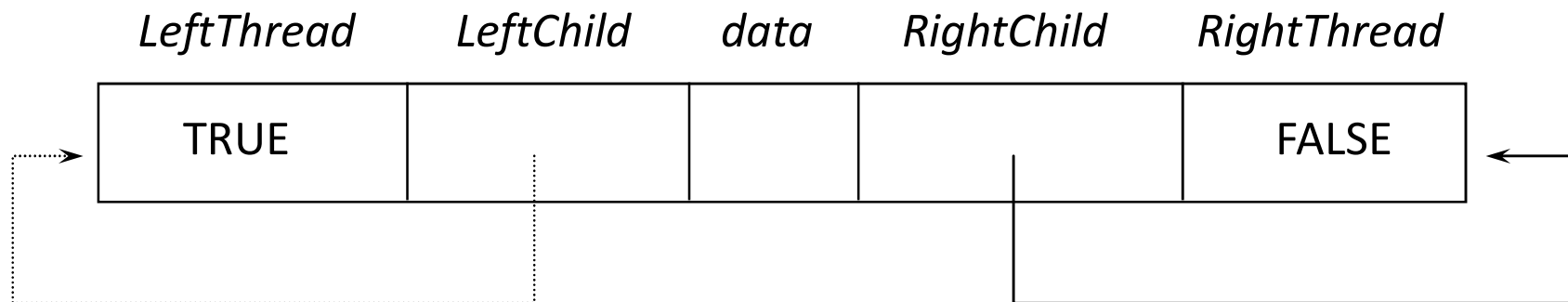
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- Dotted line : thread



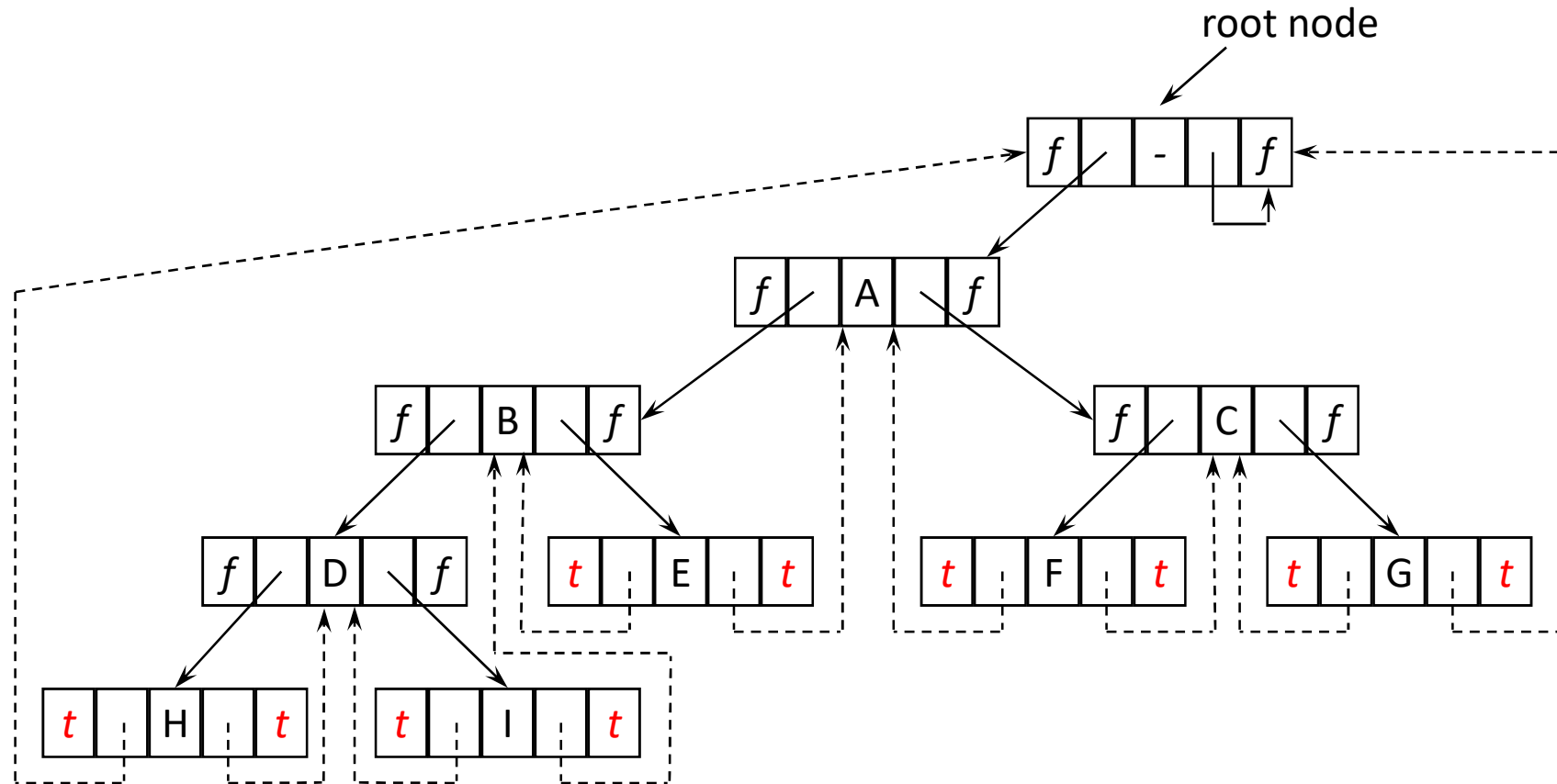
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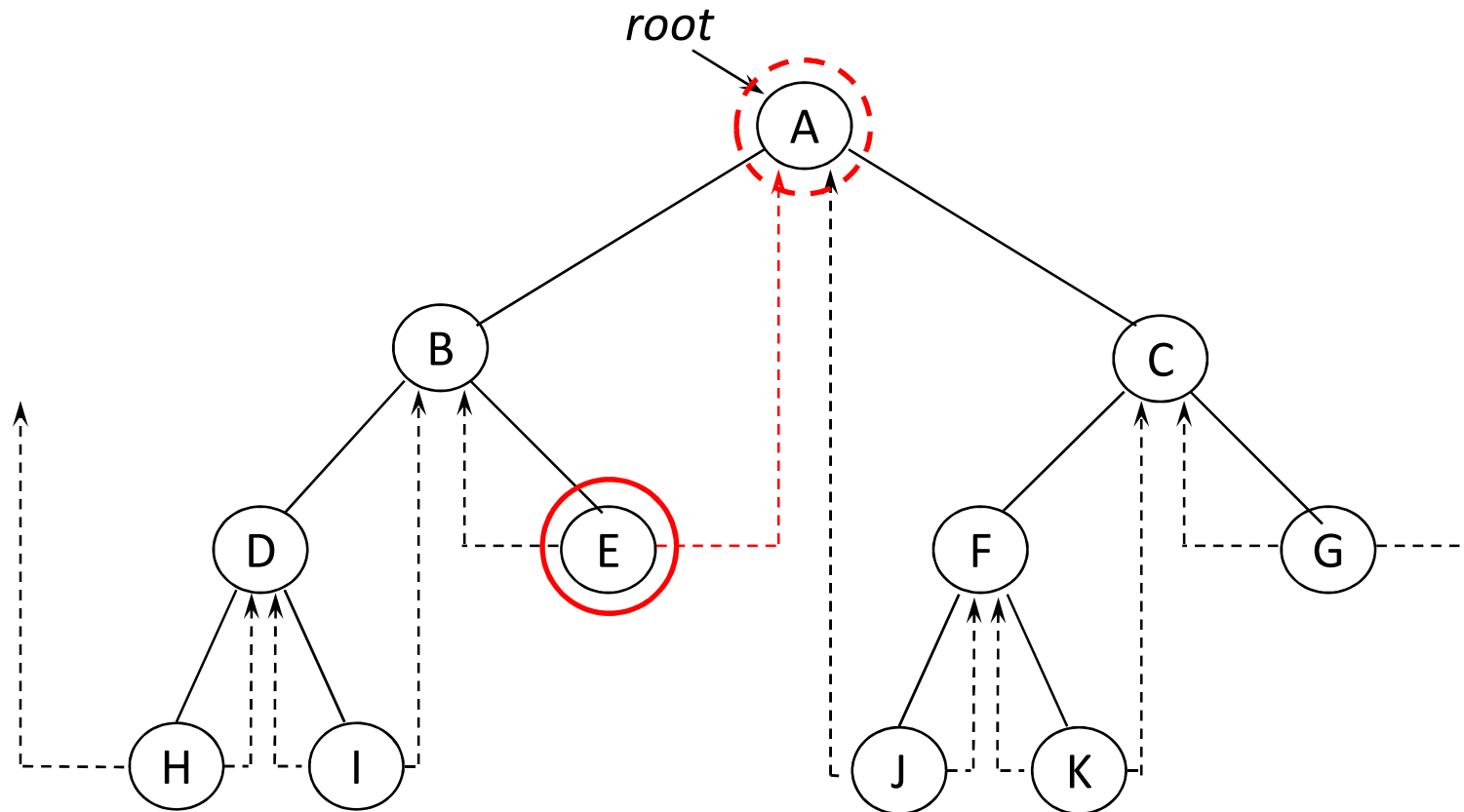
Example of empty threaded binary tree

# Threaded Binary Trees (inorder)



Current node : E

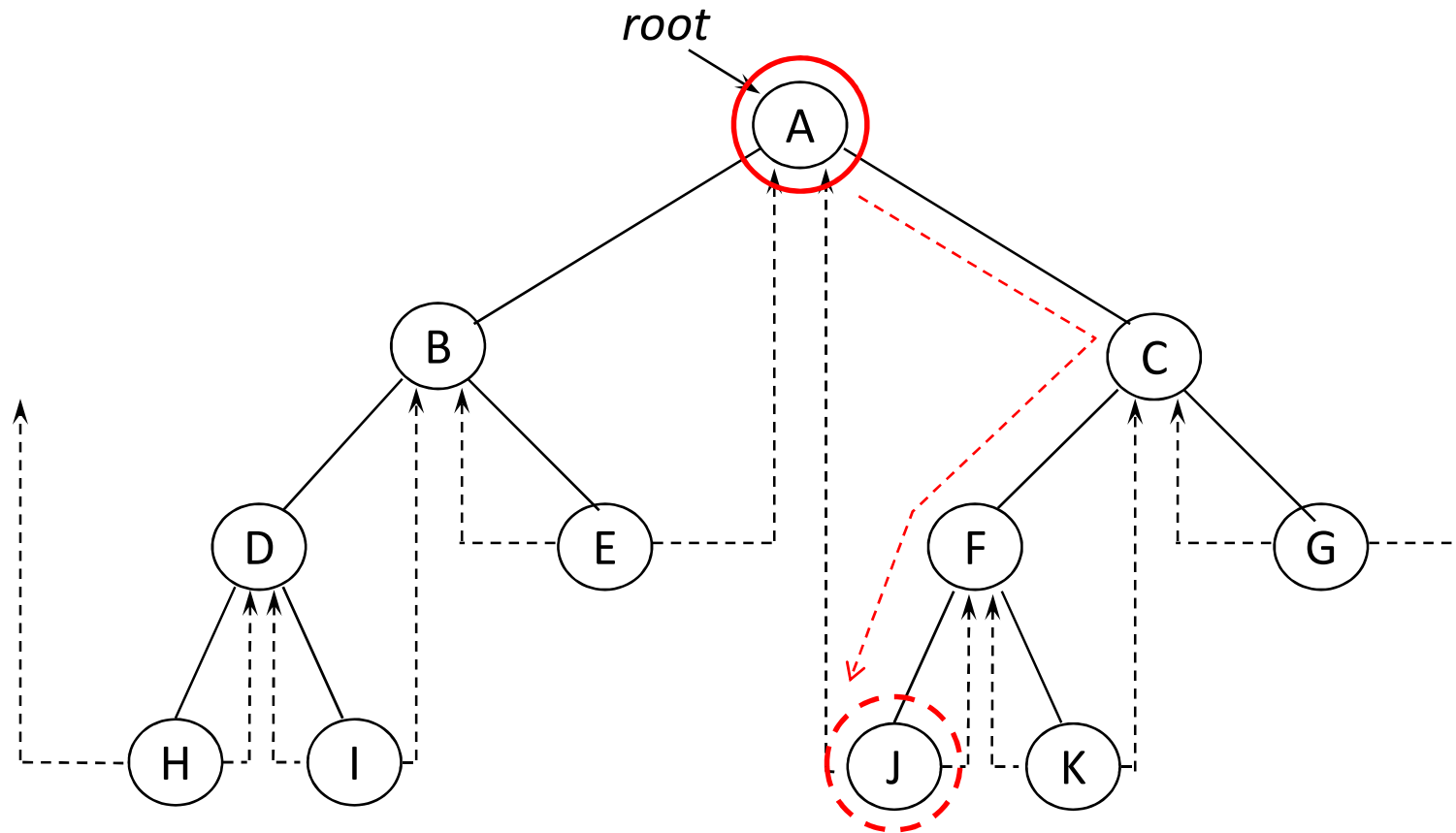
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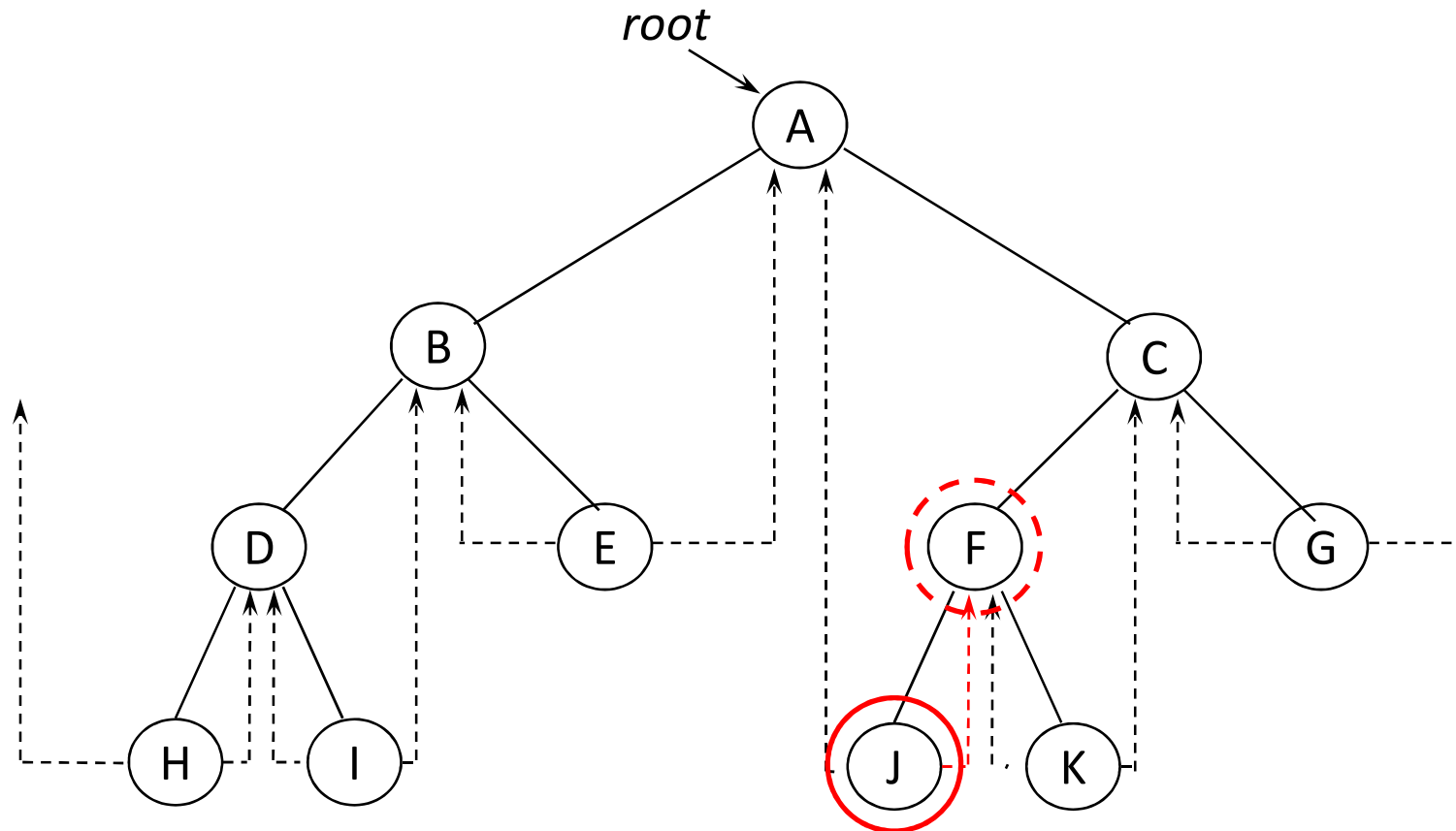
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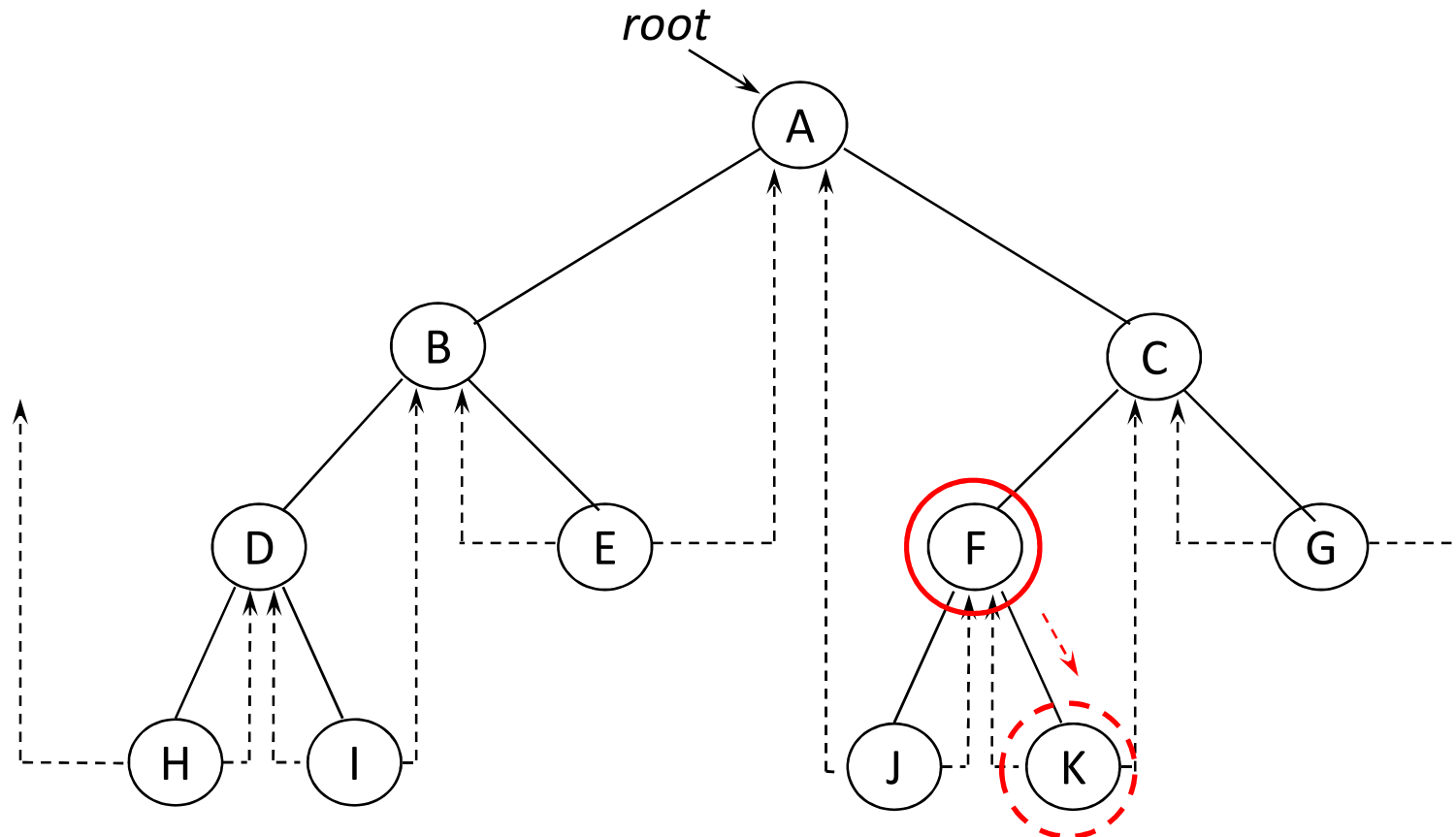
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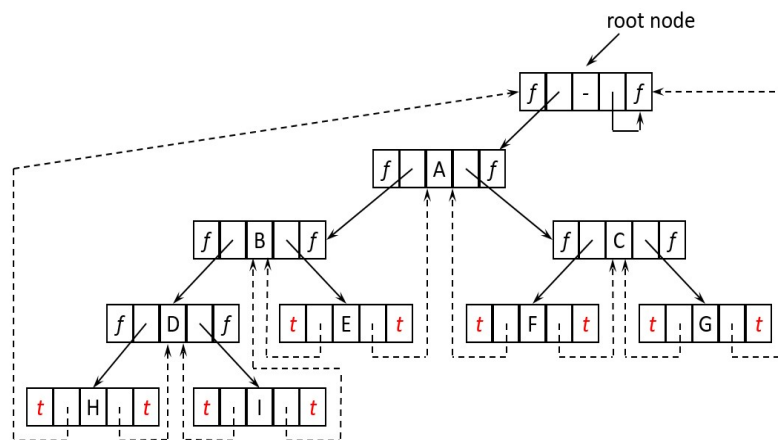
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# Traverse Threaded Binary Tree

- Traverse inorder without using a stack

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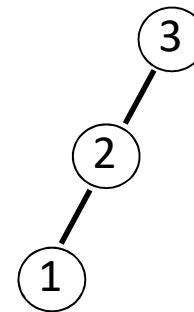
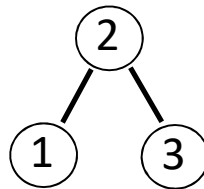
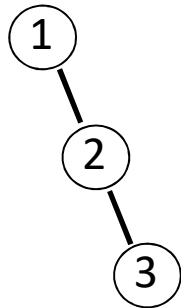
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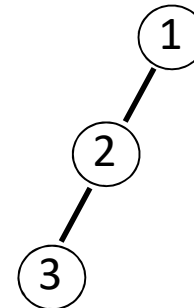
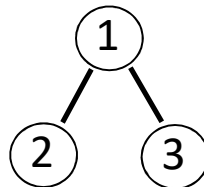
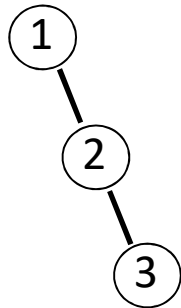
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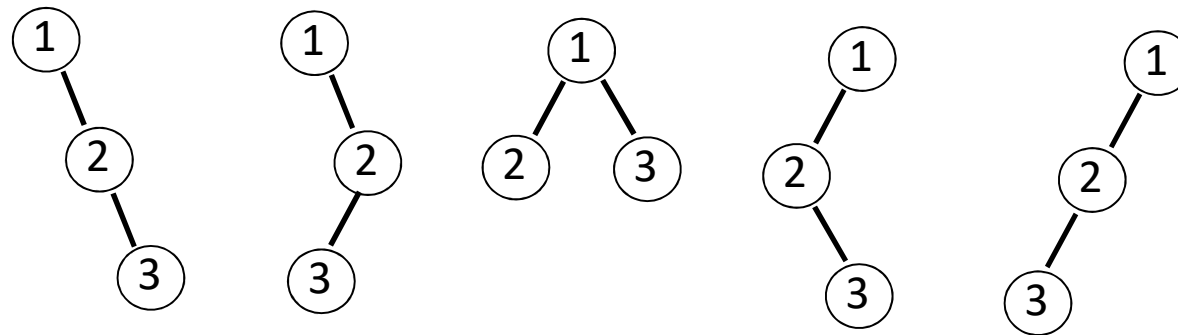
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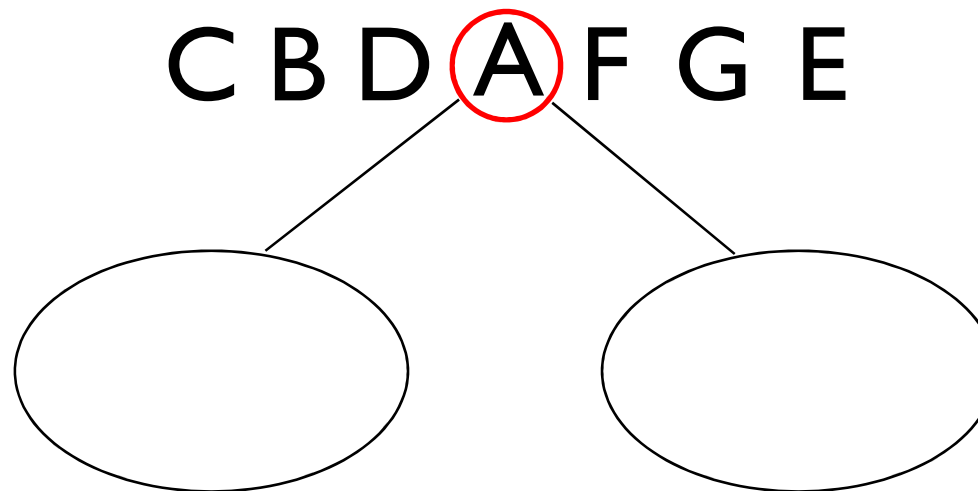
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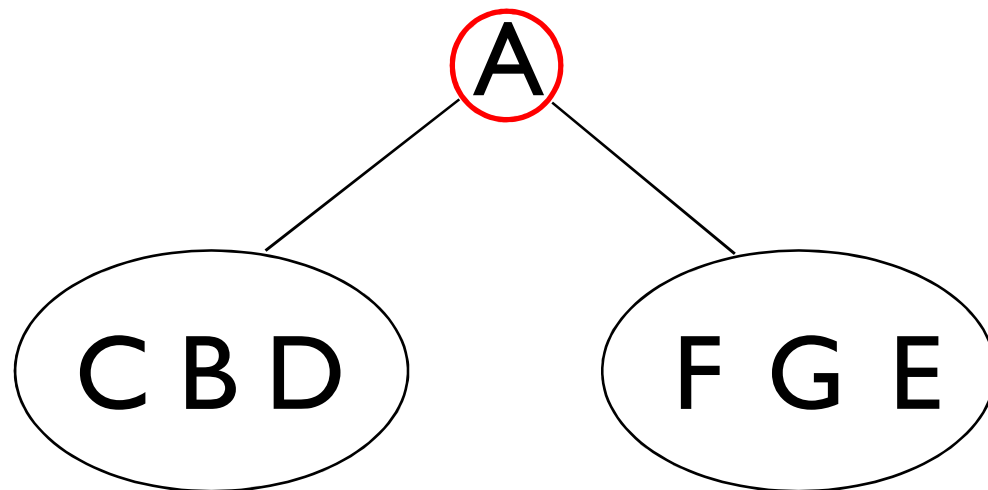
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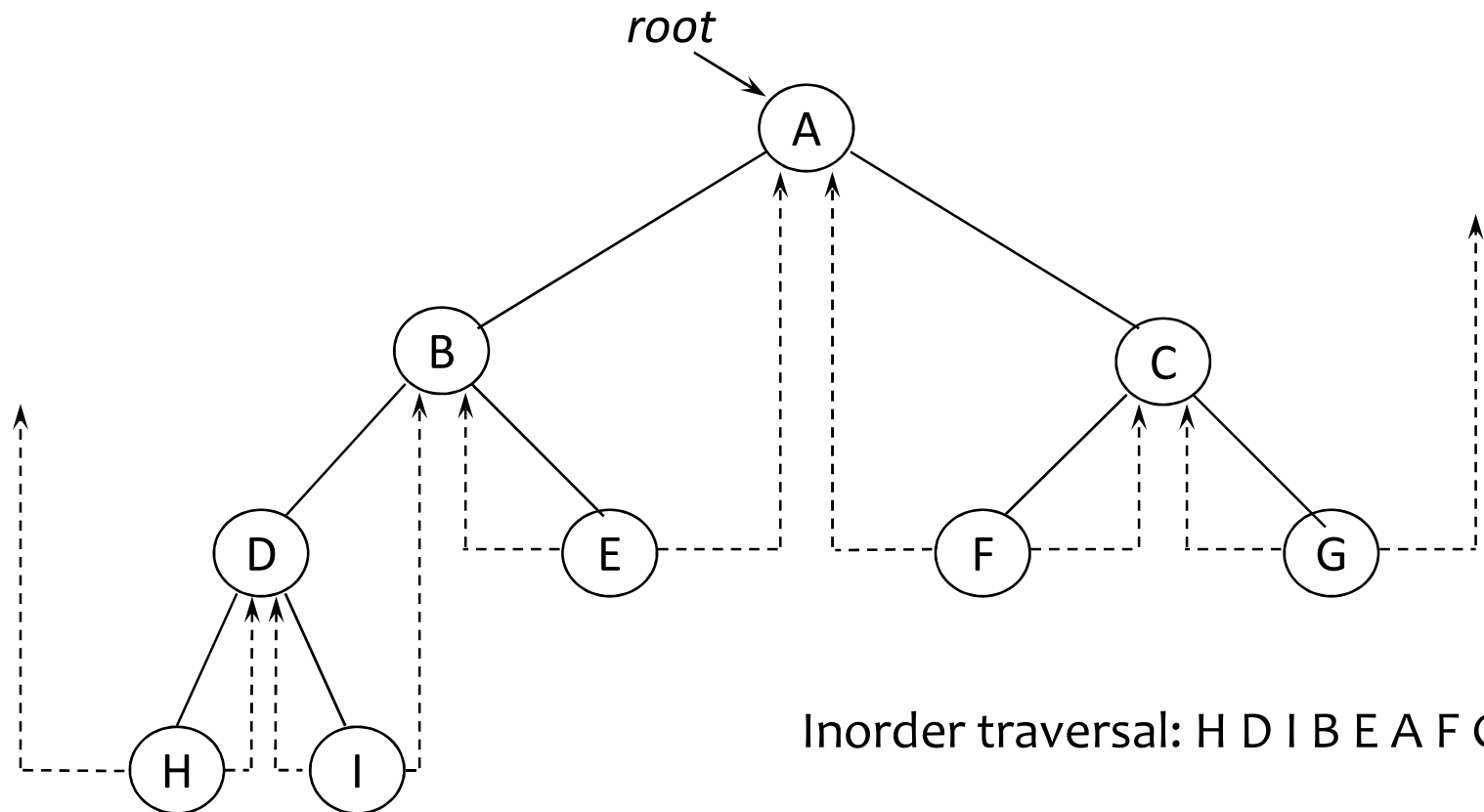


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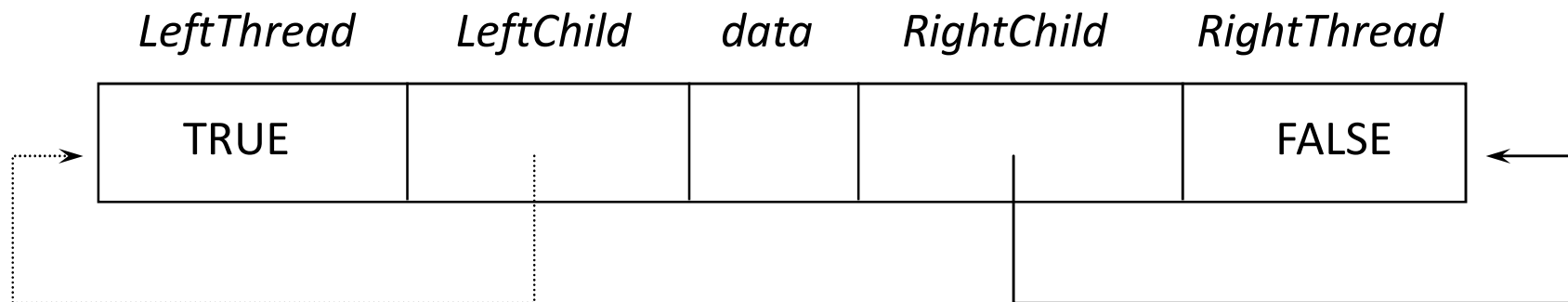
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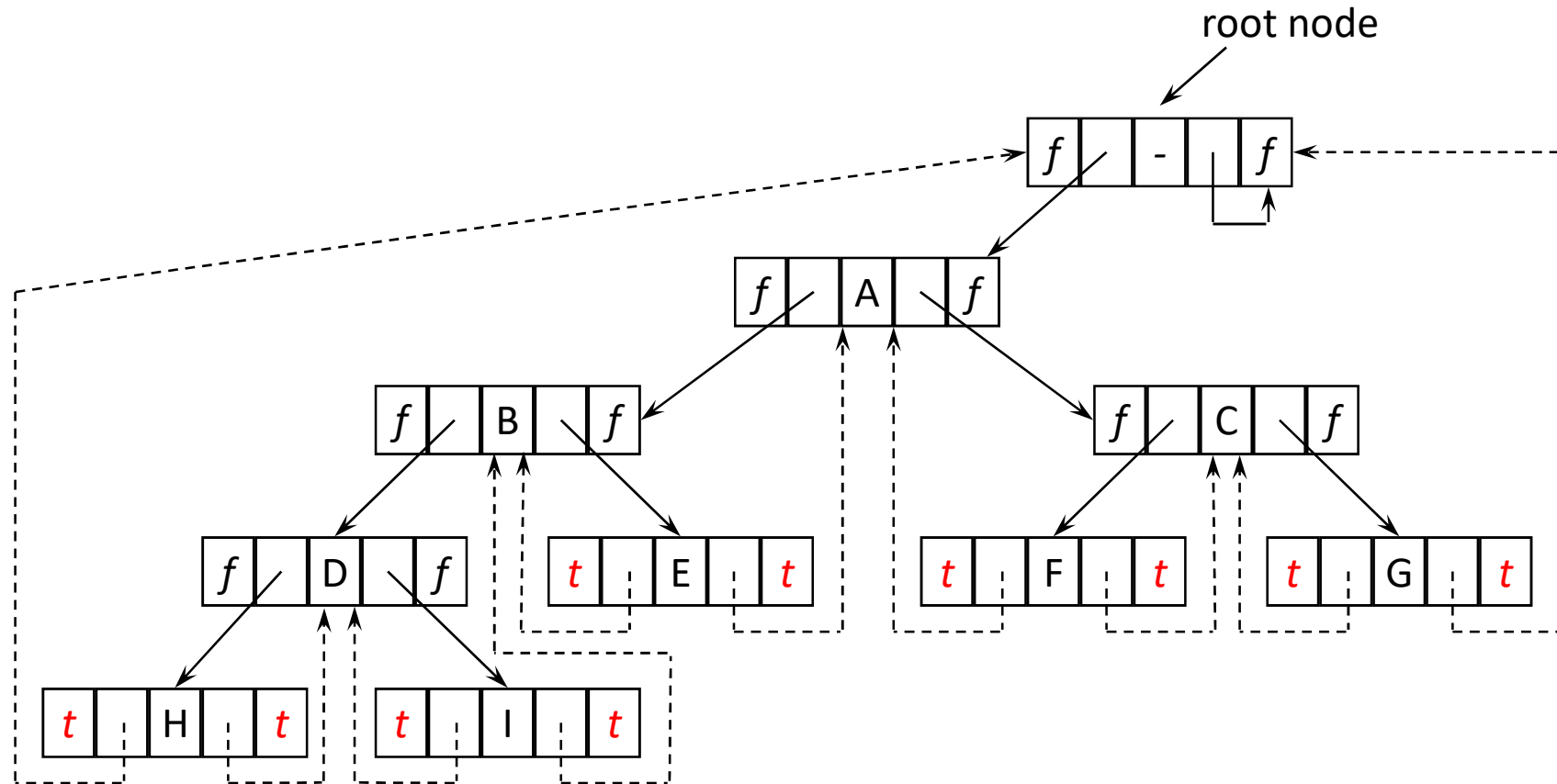
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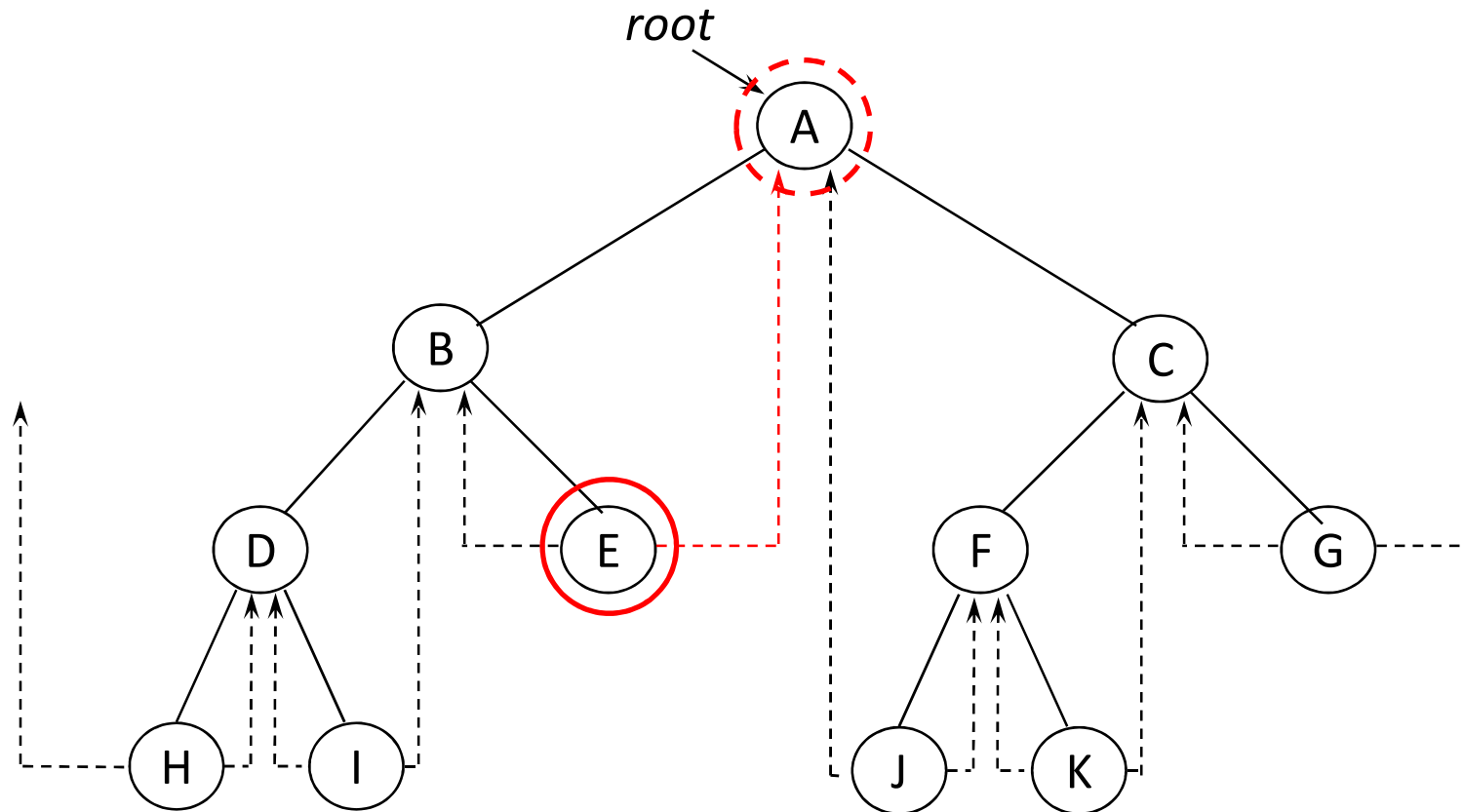
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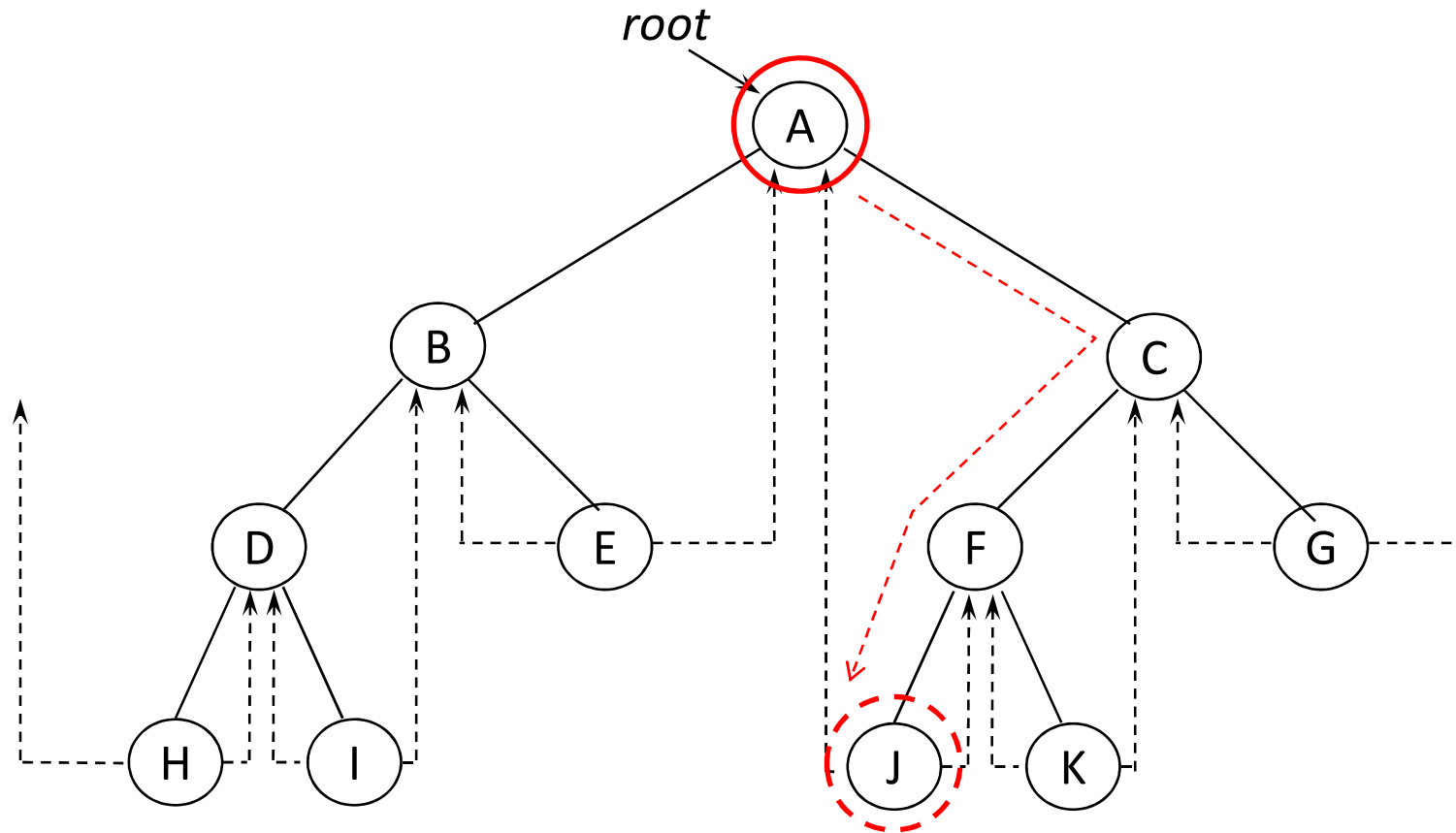
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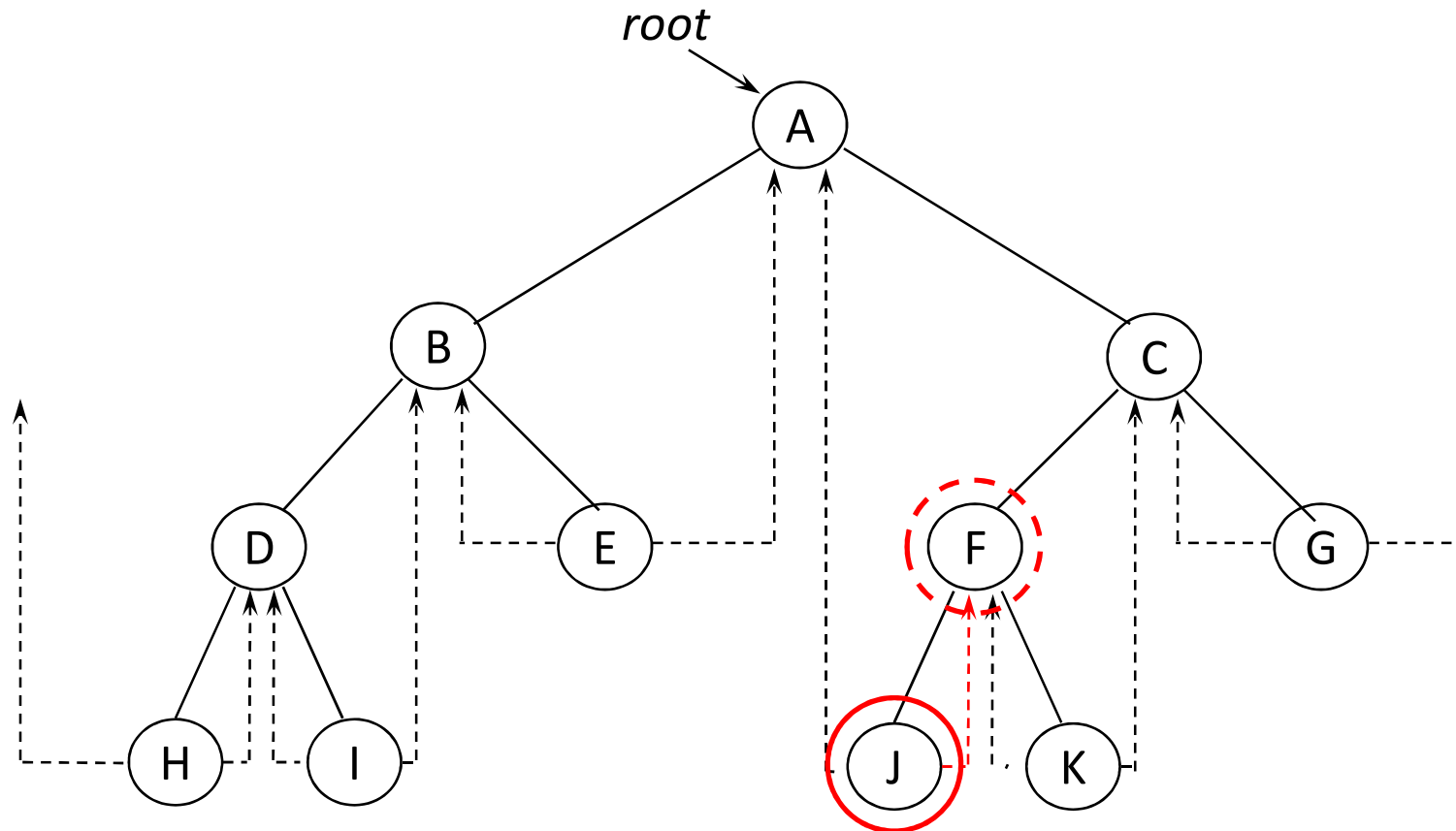
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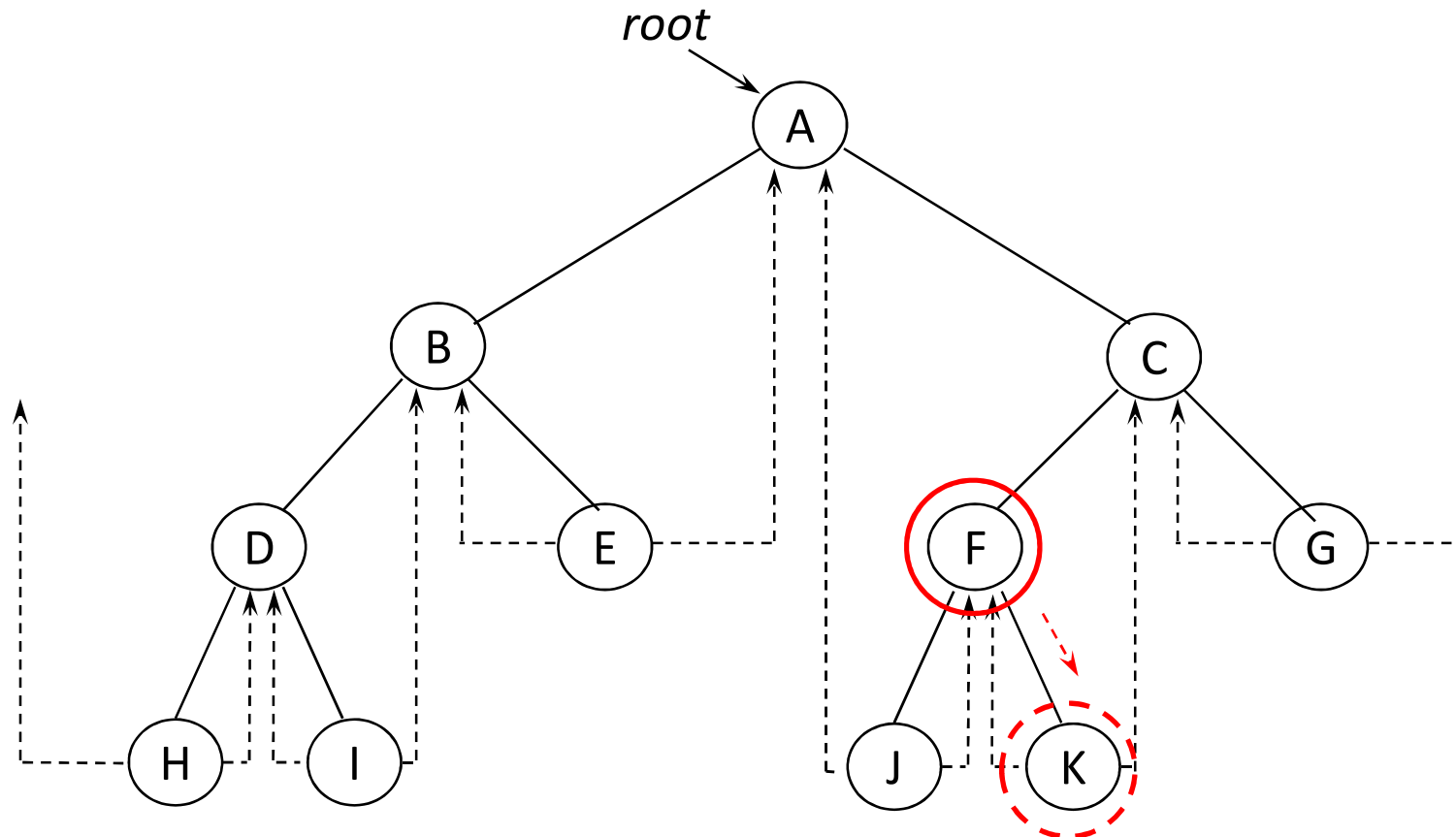
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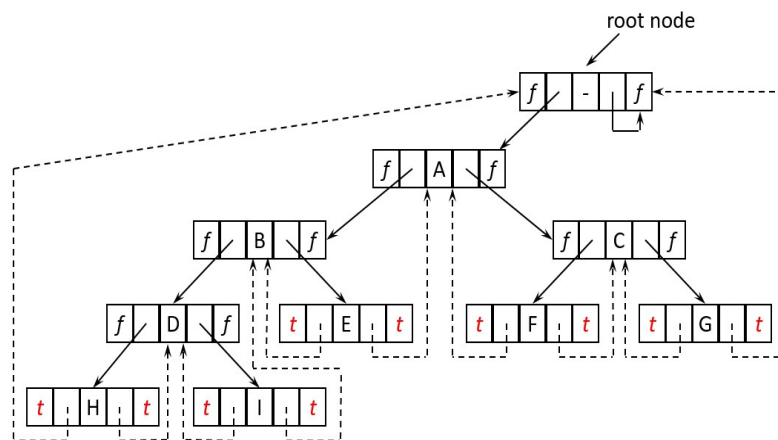




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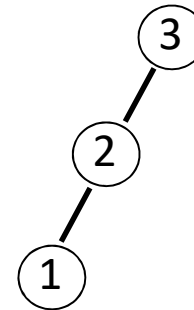
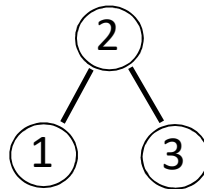
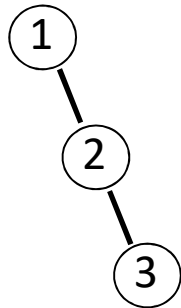
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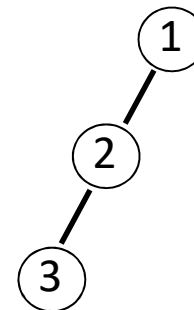
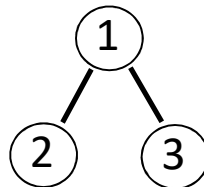
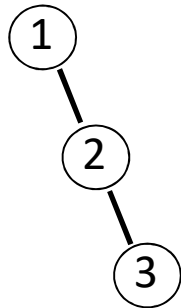
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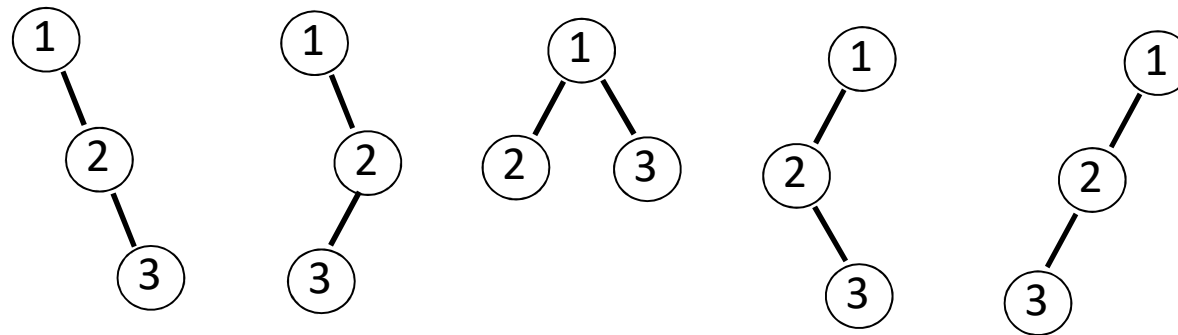
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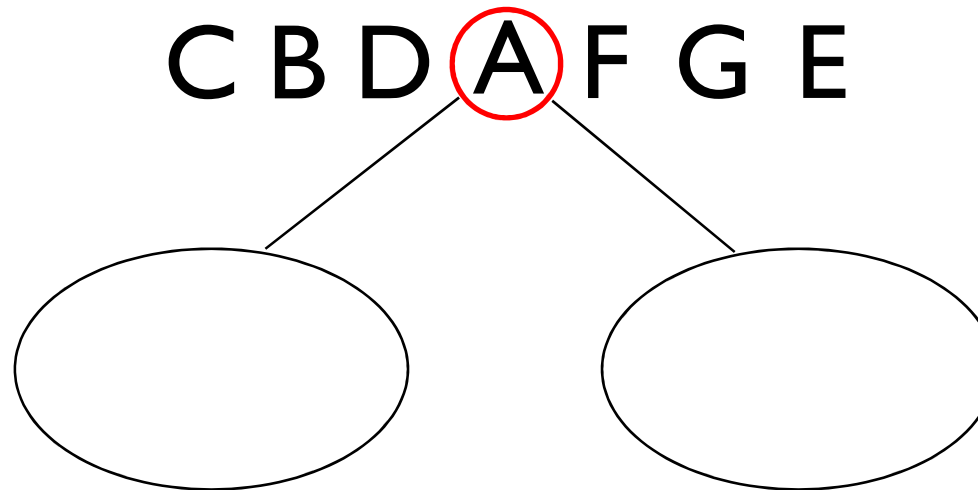
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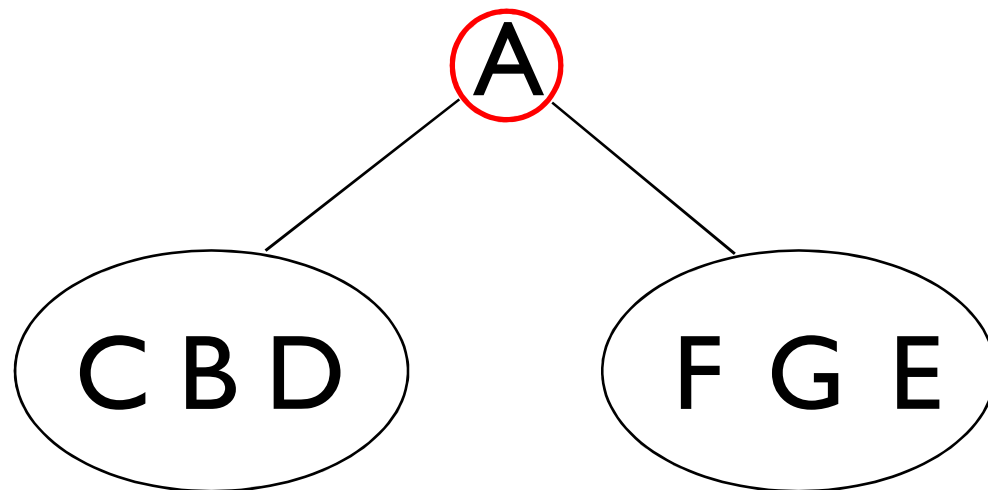
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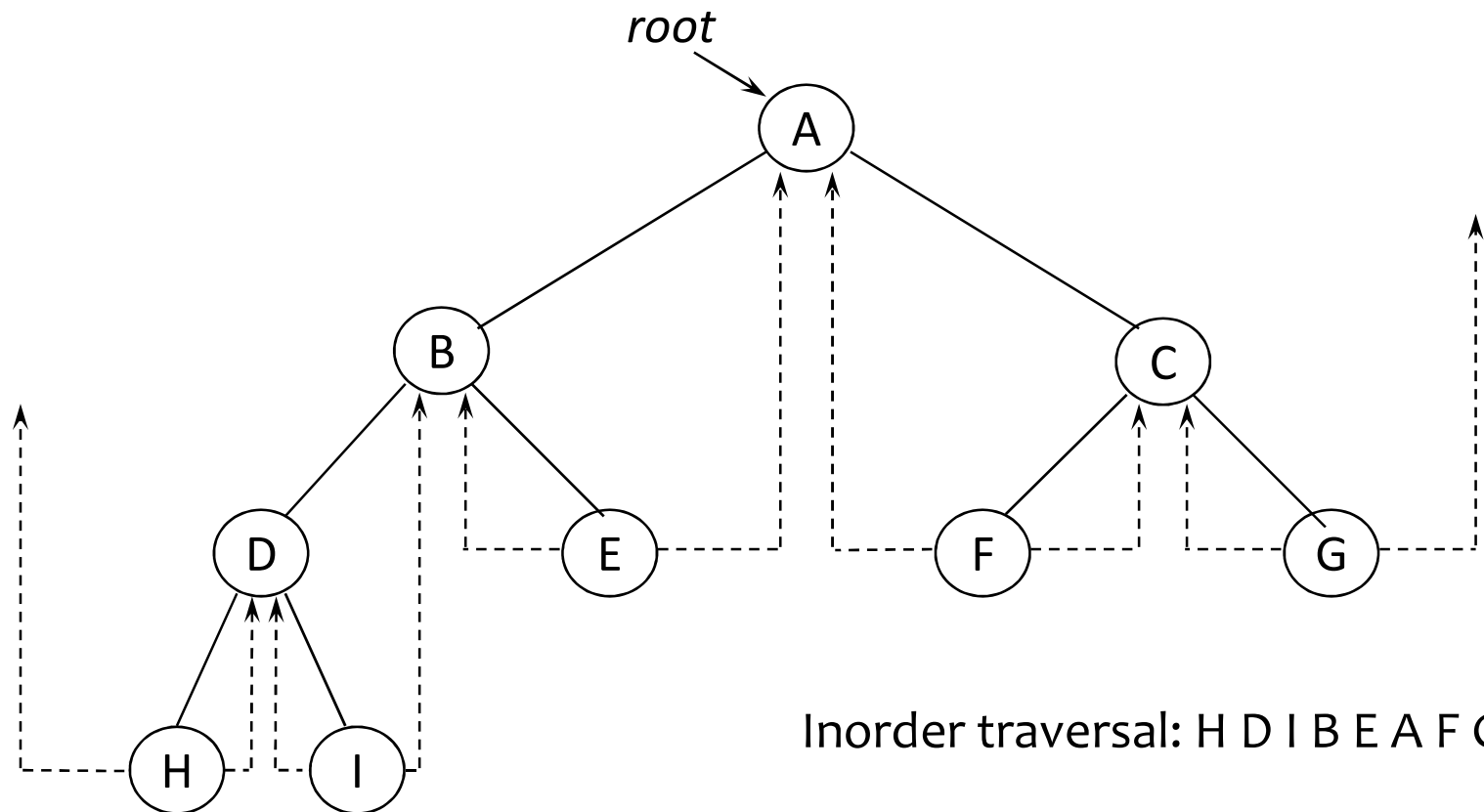
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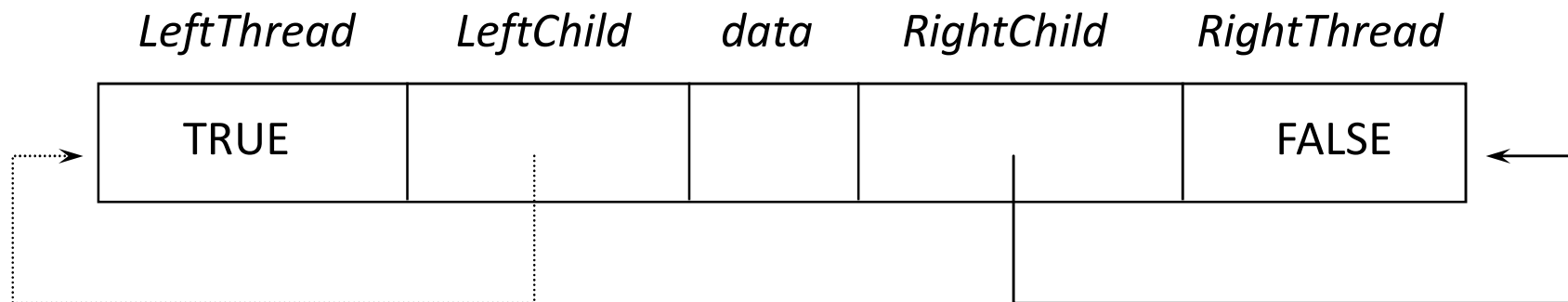
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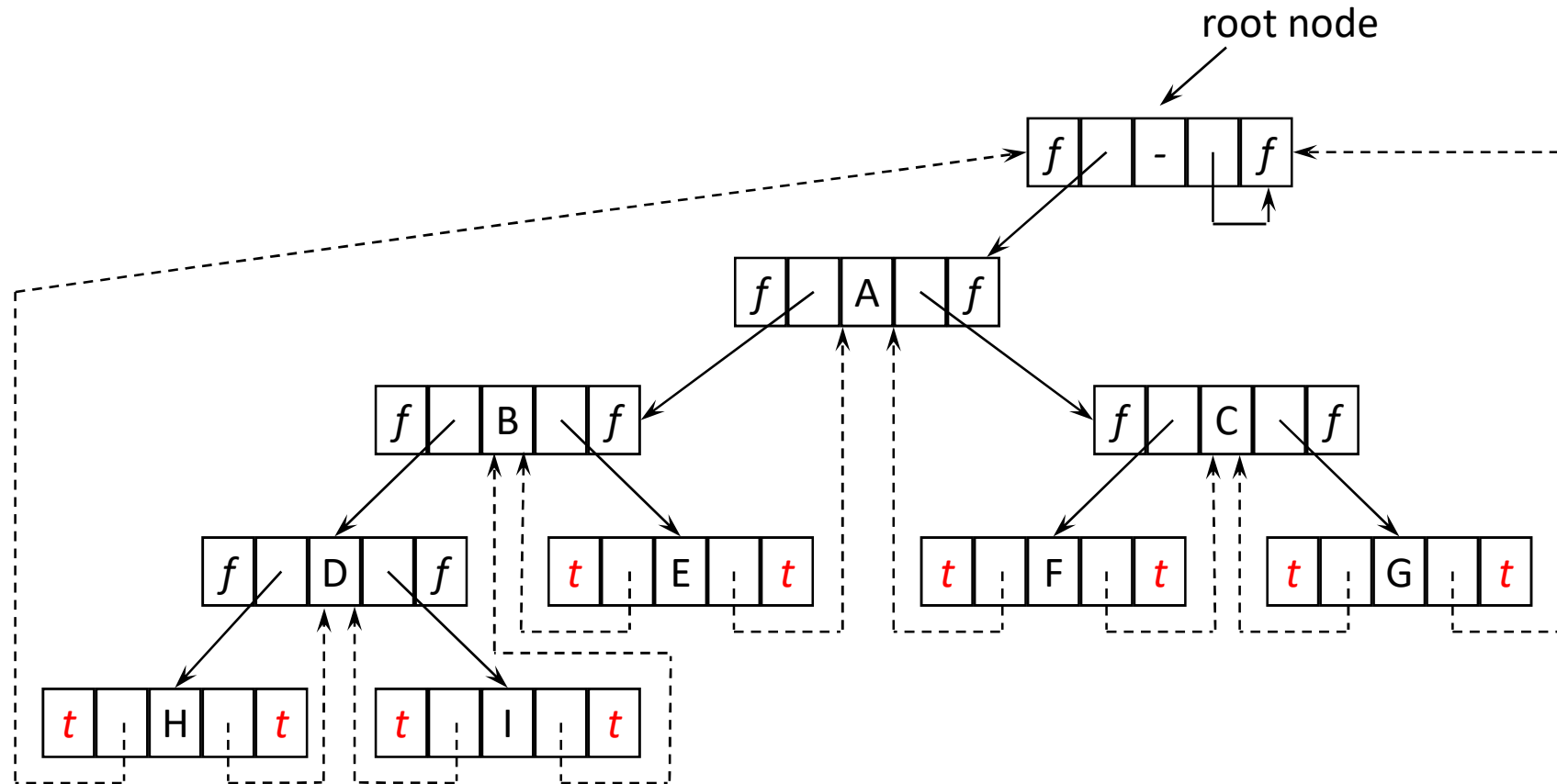
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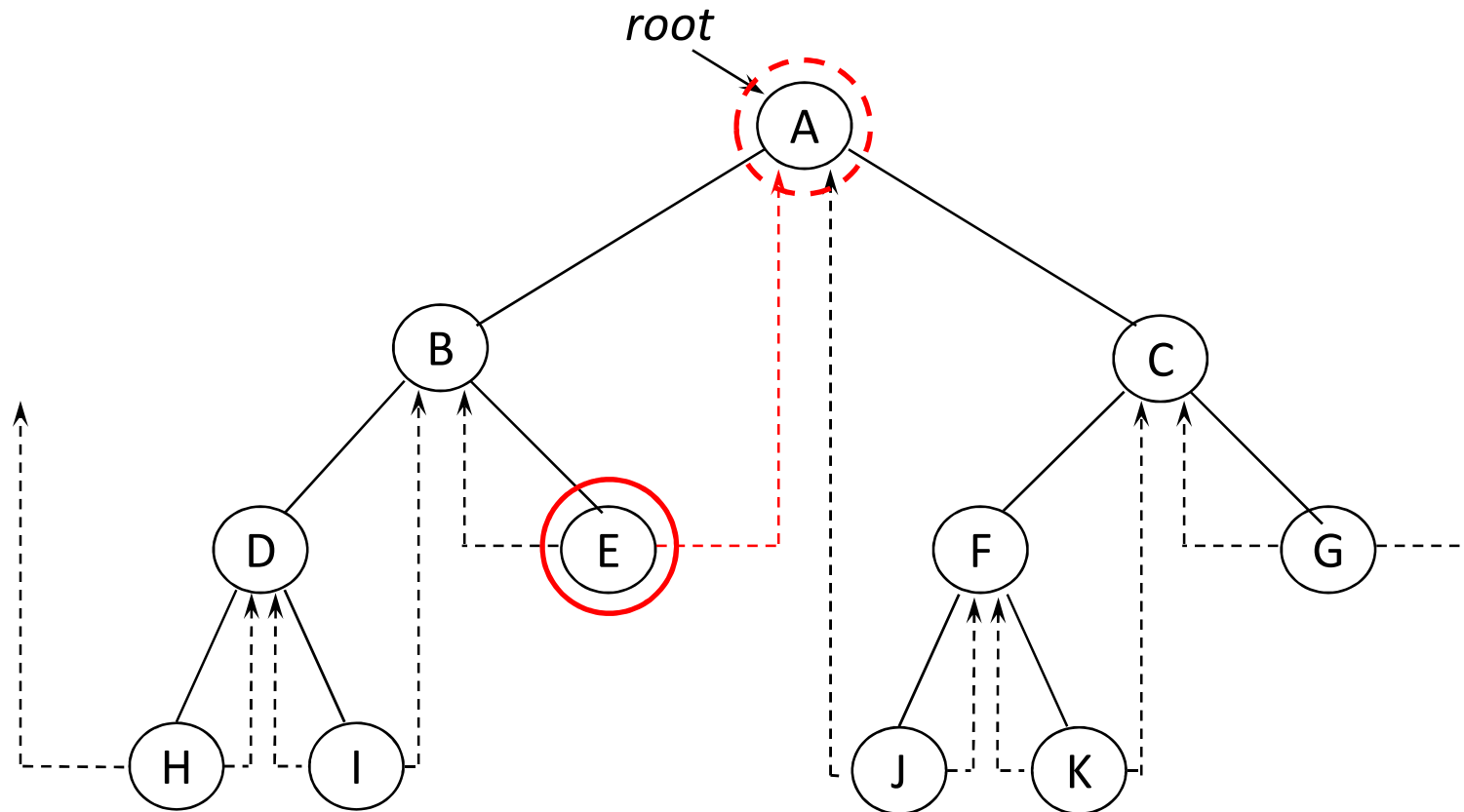
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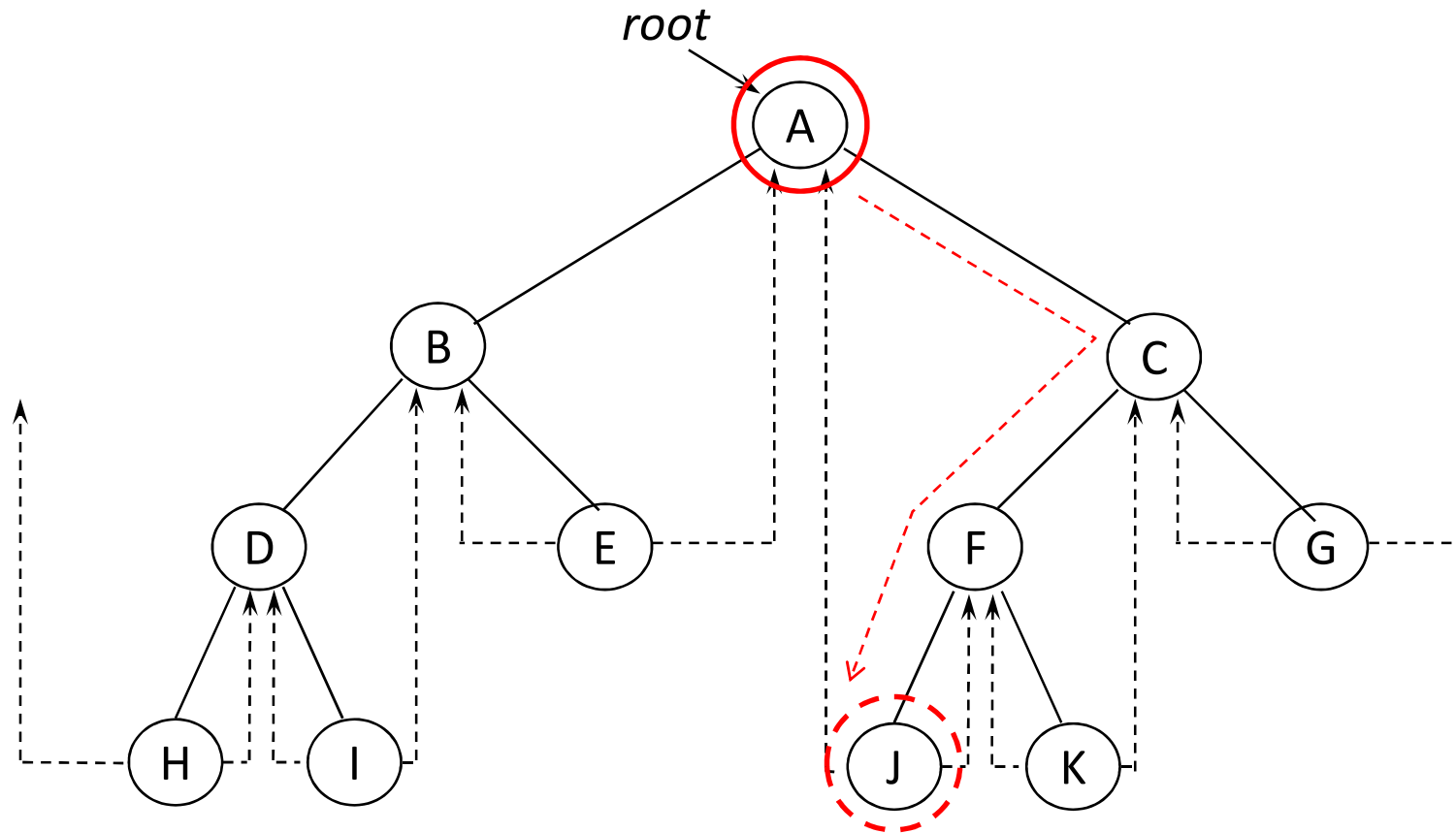
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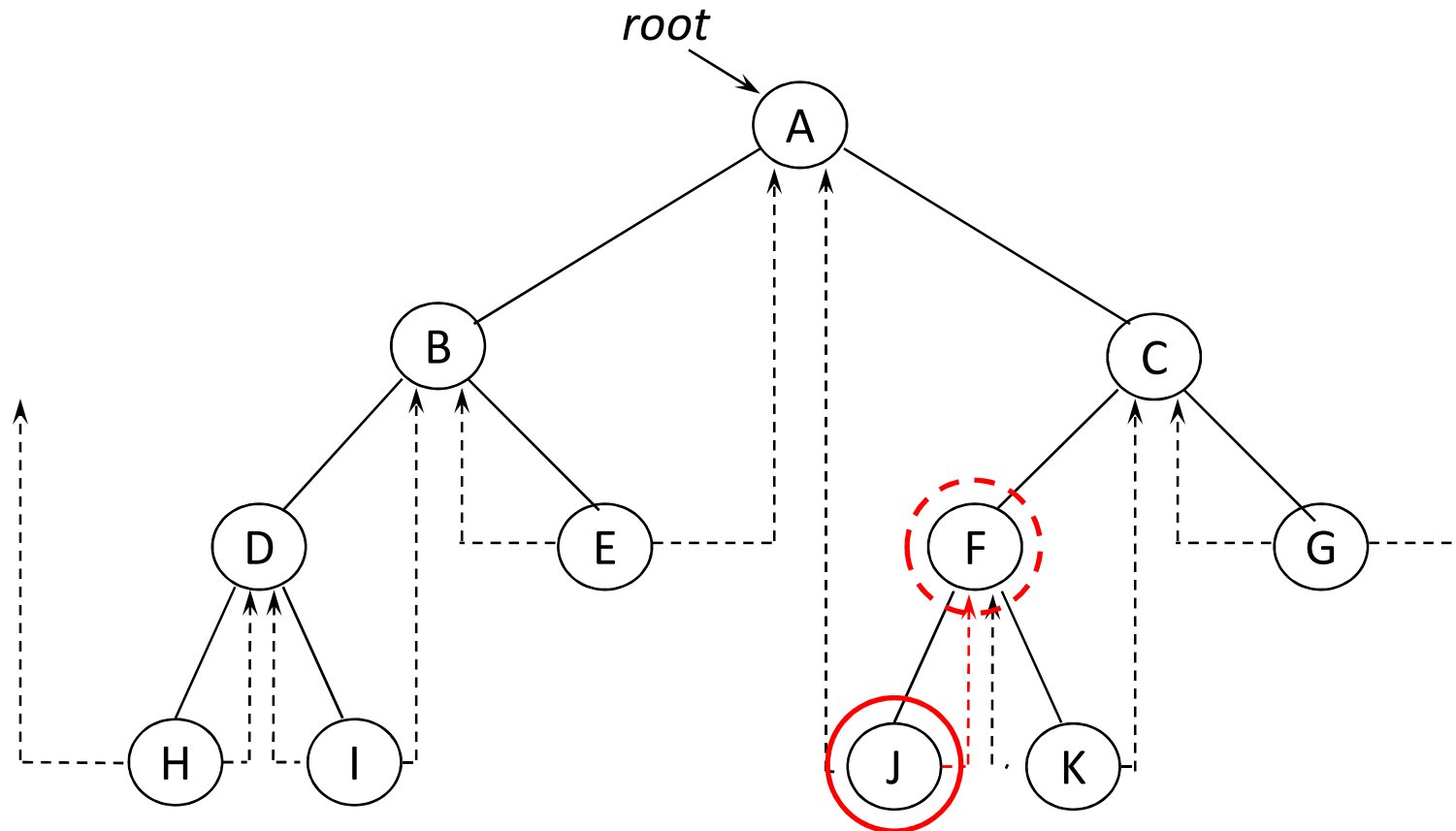


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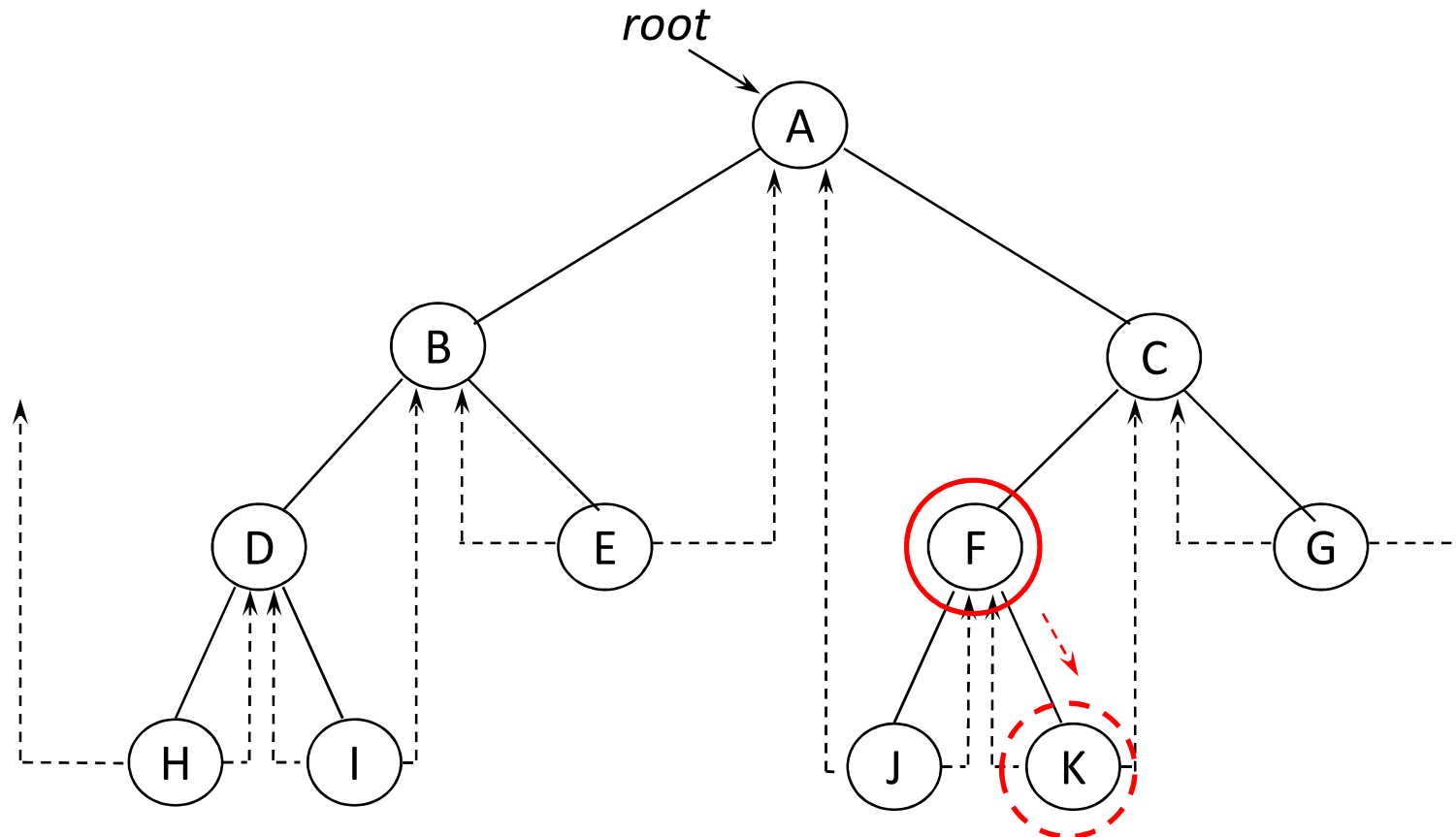


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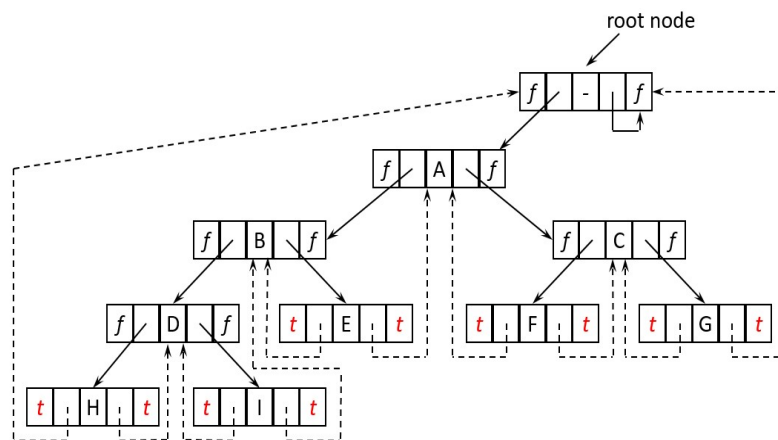
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