CSD2181/2183 – Data Structure

Exercises

HUA Guang (华光)
Associate Professor
guang.hua@singaporetech.edu.sg

Introduction – Data Structure Exercises

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- Purpose: to reinforce what you have learned and practiced in lectures.
- The exercise session is conducted face to face in class.
- It consists of a few MCQs to be solved within class.
- Limited time is given for each question (answer will be discussed afterwards).
- You are required to login to ClassPoint with your student ID.
- So, bring along your laptop or devices with Internet access.
- Attendance is compulsory and there is no make up.
- Exercises are marked considering your overall performance in the module.

Introduction – Data Structure Exercises

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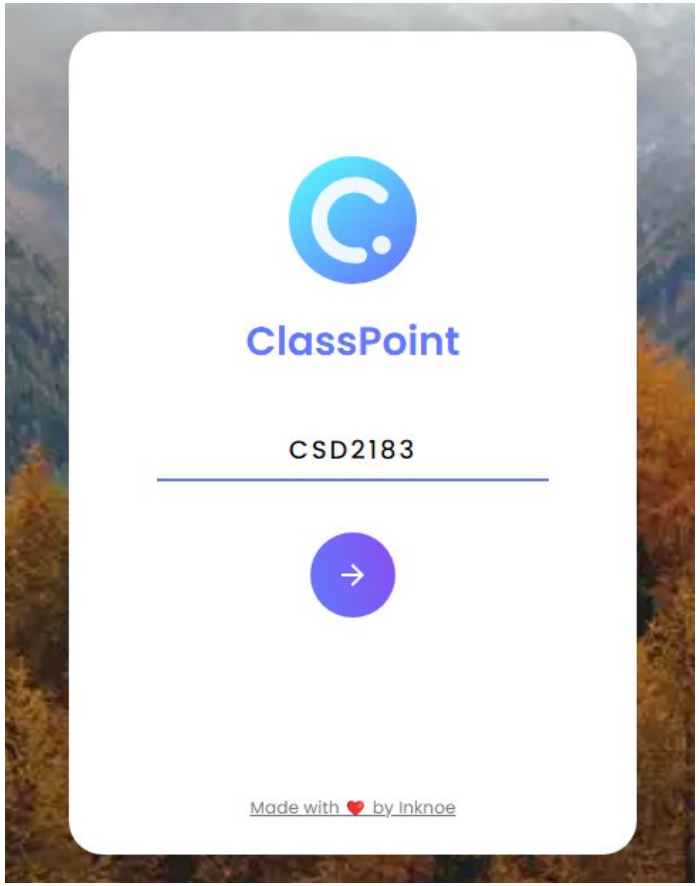
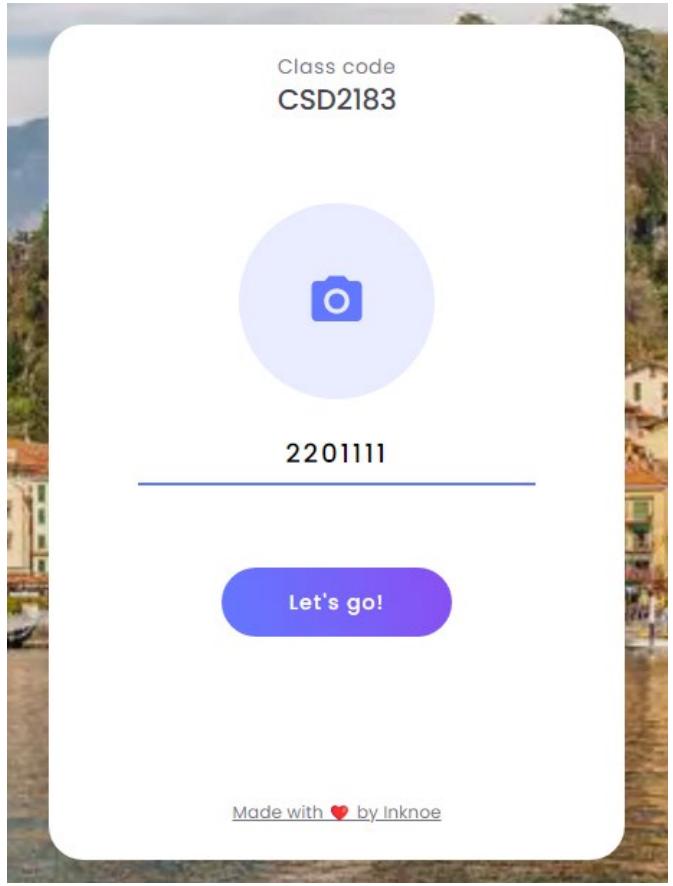
https://www.classpoint.app/





OR

URL
classpoint.app

Class code
CSD2183

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Exercise 5
Binary Trees and BST

Exercise 5 – Binary Trees and BST

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5.1 In a binary tree, the root node has

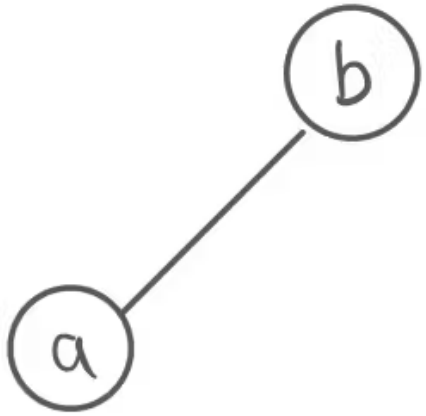
A. One parent
B. No parent
C. Multiple siblings
D. Two children
E. B and D

Multiple Choice

Exercise 5 – Binary Trees and BST

5.2 What is the height of the binary tree?

A. -1
B. 0
C. 1
D. 2
E. 3

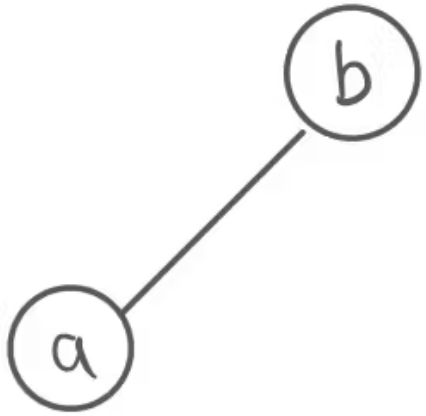


Multiple Choice

Exercise 5 – Binary Trees and BST

5.3 What is the height of the left subtree?

A. -1
B. 0
C. 1
D. 2
E. 3

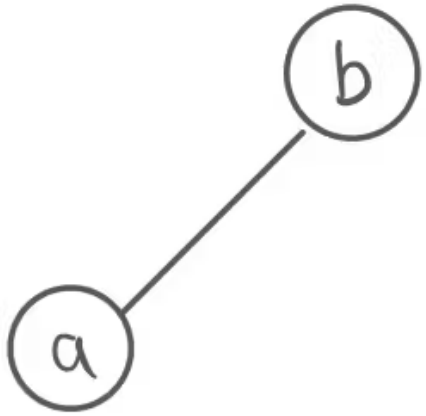


Multiple Choice

Exercise 5 – Binary Trees and BST

5.4 What is the height of the right subtree?

A. -1
B. 0
C. 1
D. 2
E. 3



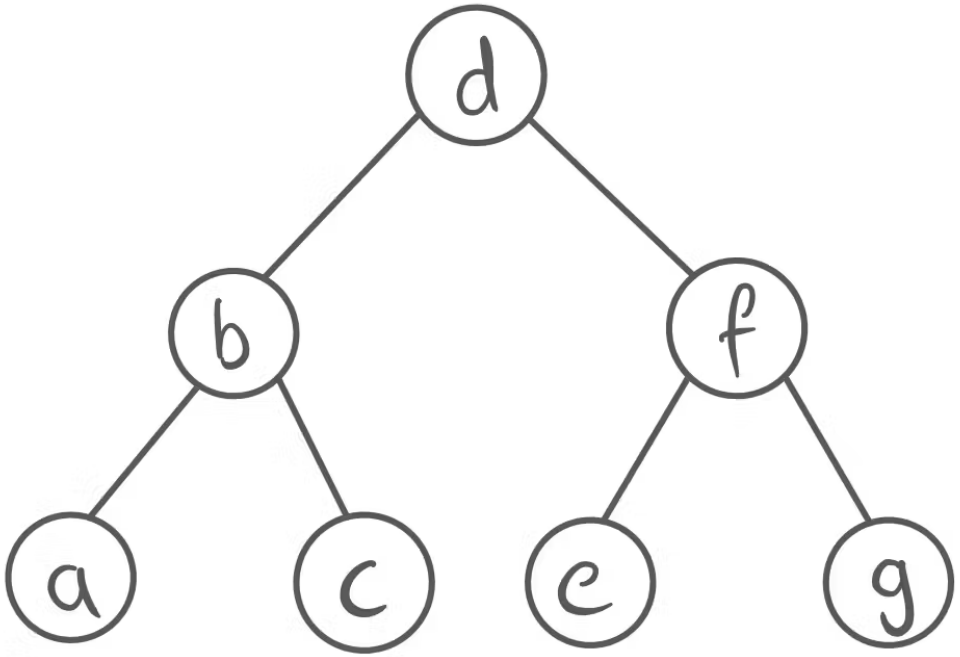
Multiple Choice

Exercise 5 – Binary Trees and BST

5.5 What is the height of the tree?

A. -1
B. 0
C. 1
D. 2
E. 3

Multiple Choice



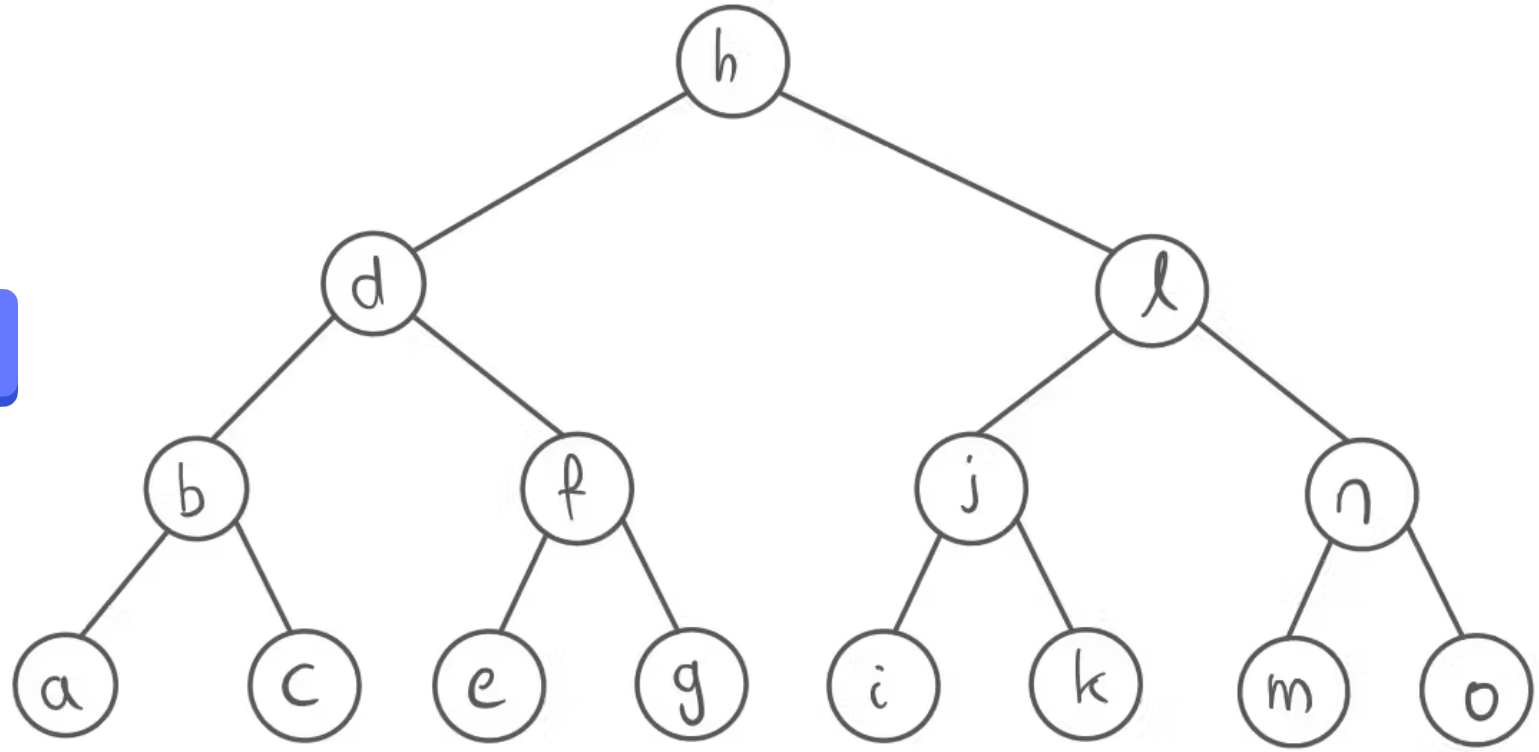
Exercise 5 – Binary Trees and BST

5.6 Is this tree balanced?

A. Yes

B. No

Multiple Choice



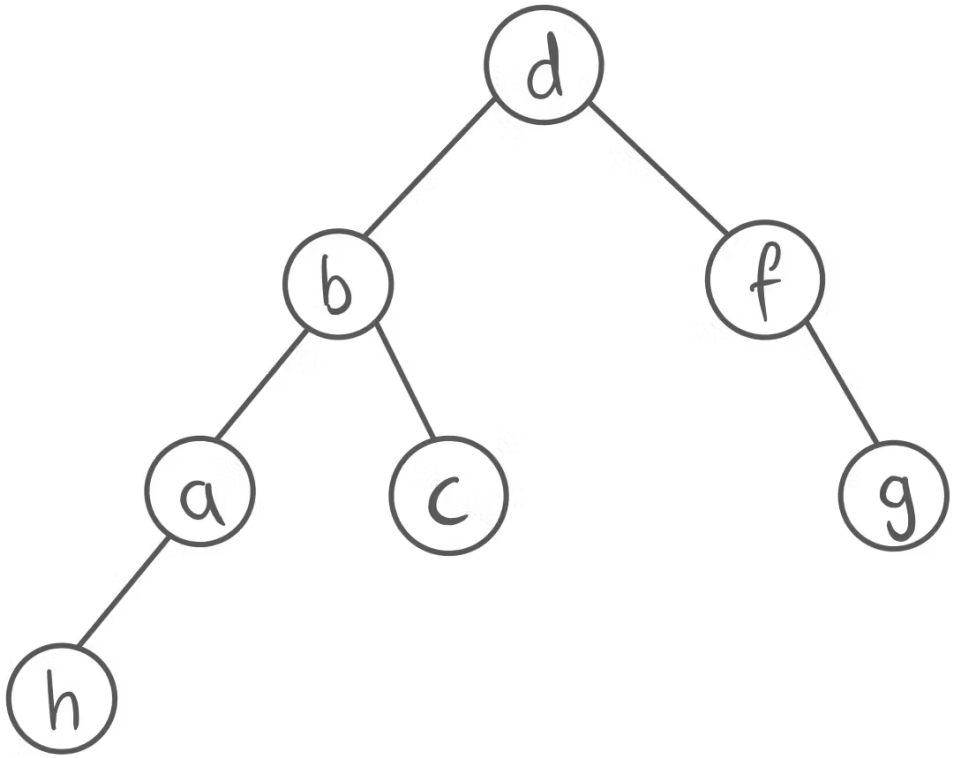
Exercise 5 – Binary Trees and BST

5.7 Is this tree balanced?

A. Yes

B. No

Multiple Choice



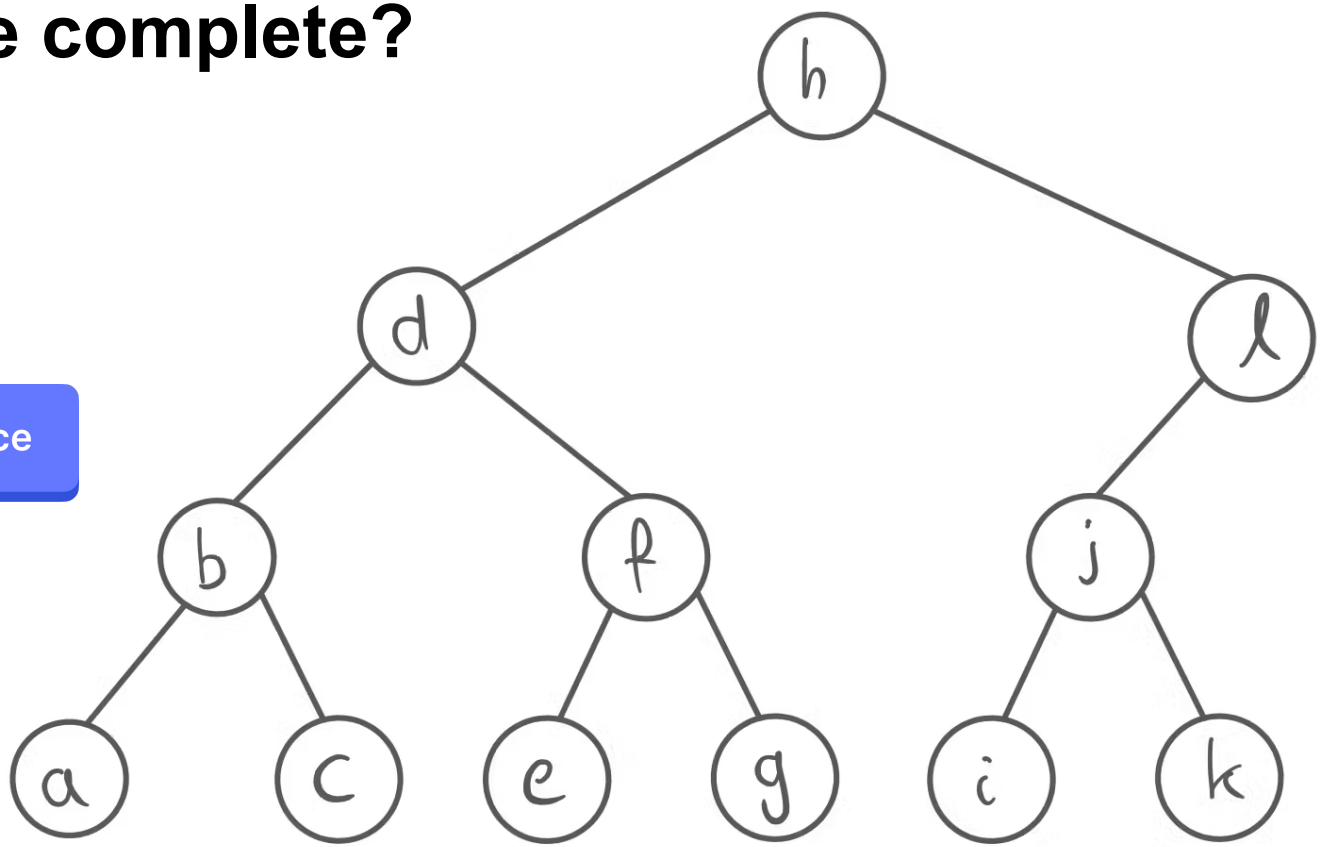
Exercise 5 – Binary Trees and BST

5.8 Is this tree complete?

A. Yes

B. No

Multiple Choice



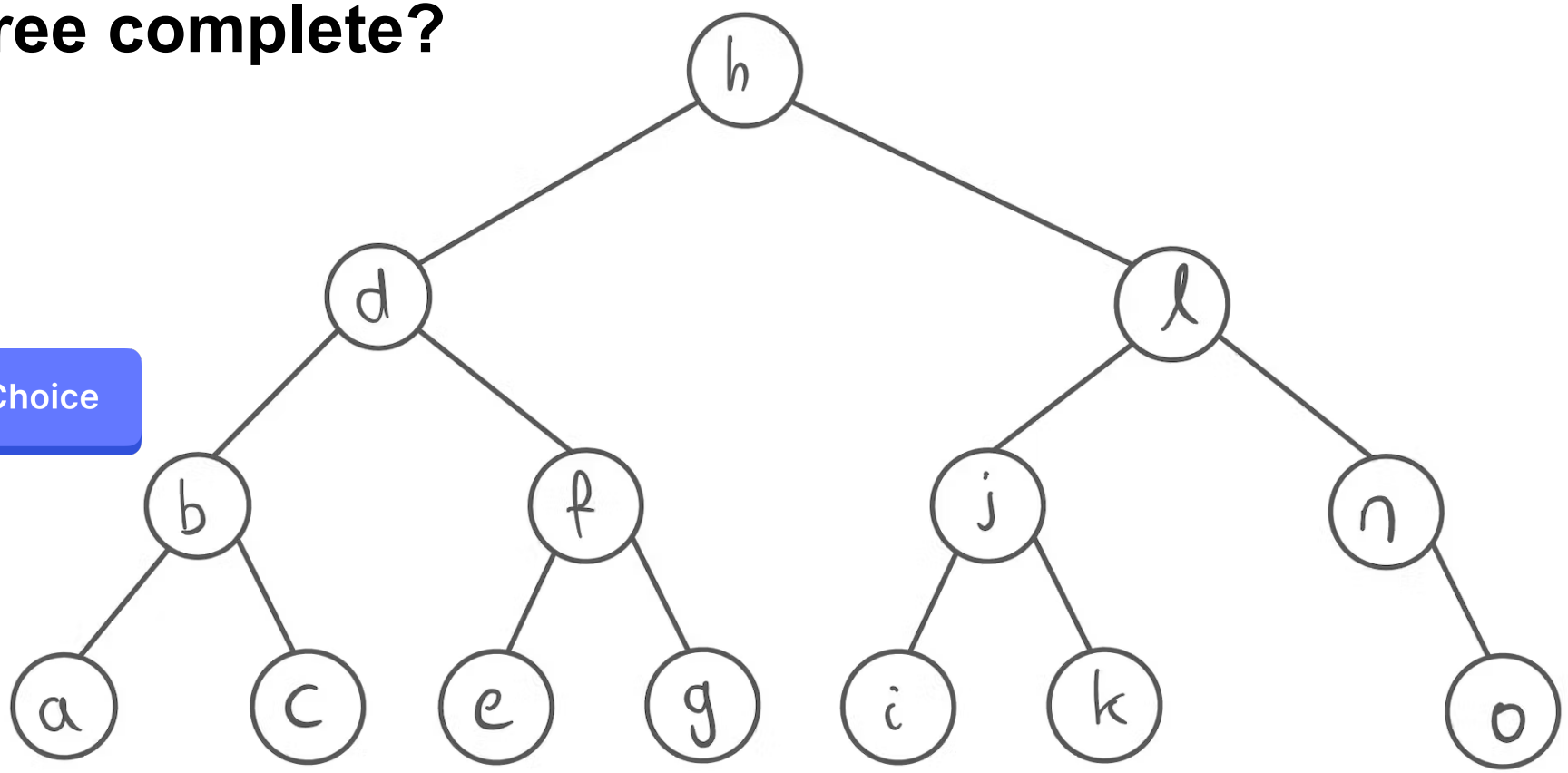
Exercise 5 – Binary Trees and BST

5.9 Is this tree complete?

A. Yes

B. No

Multiple Choice



Exercise 5 – Binary Trees and BST

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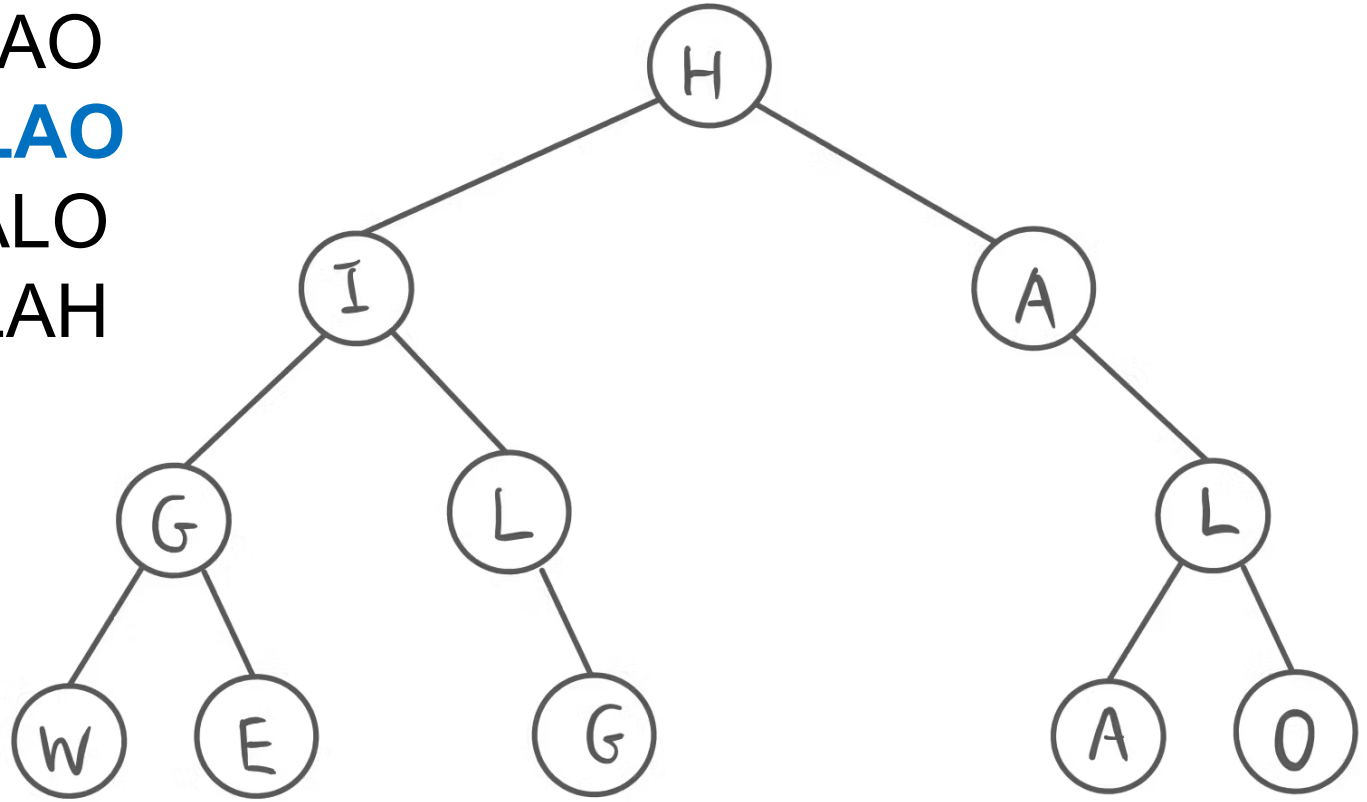
5.10 What is the pre-order traversal of the tree?

A. HIAGLLWEGAO
B. HIGWELGALAO
C. WGEILGHAALO
D. WEGGLIAOLAH

Multiple Choice

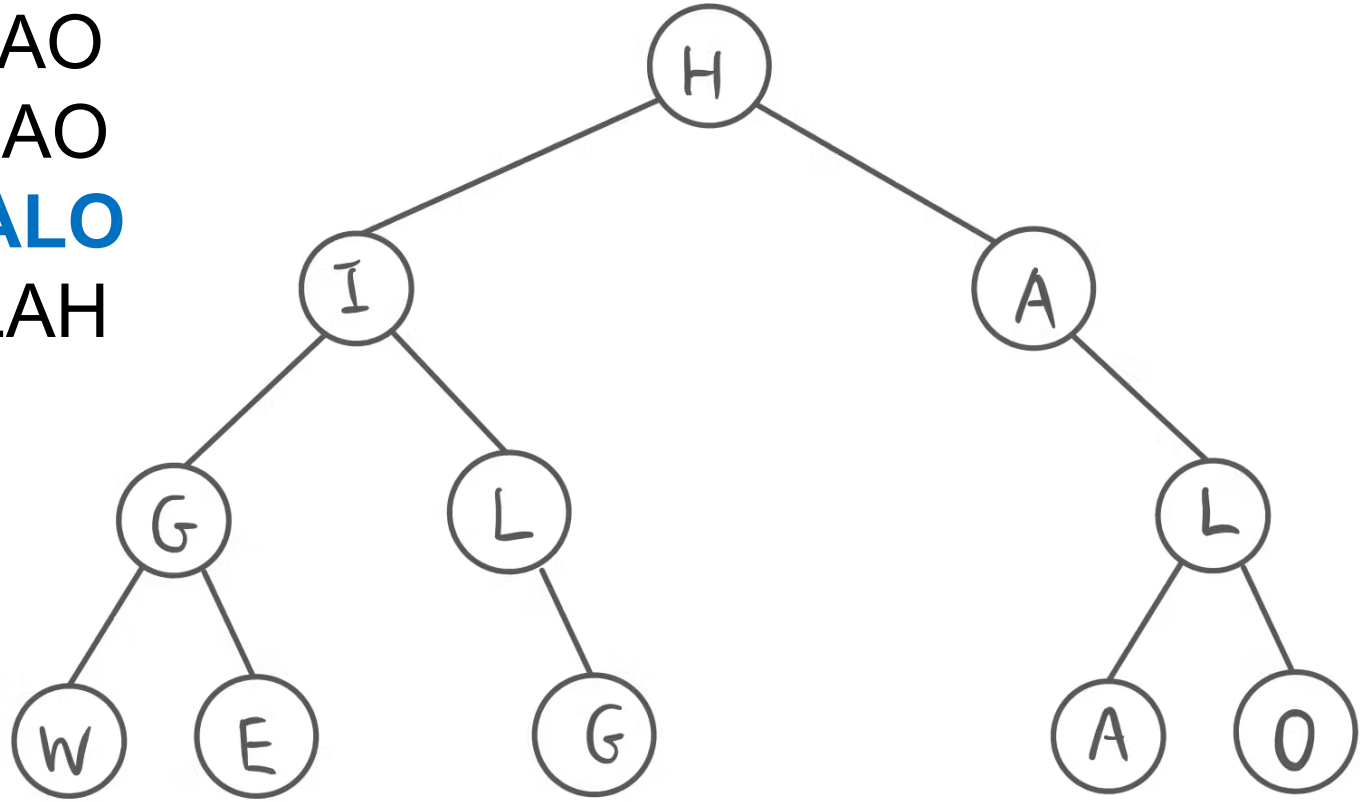


Exercise 5 – Binary Trees and BST

5.11 What is the in-order traversal of the tree?

A. HIAGLLWEGAO
B. HIGWELGALAO
C. WGEILGHAALO
D. WEGGLIAOLAH

Multiple Choice

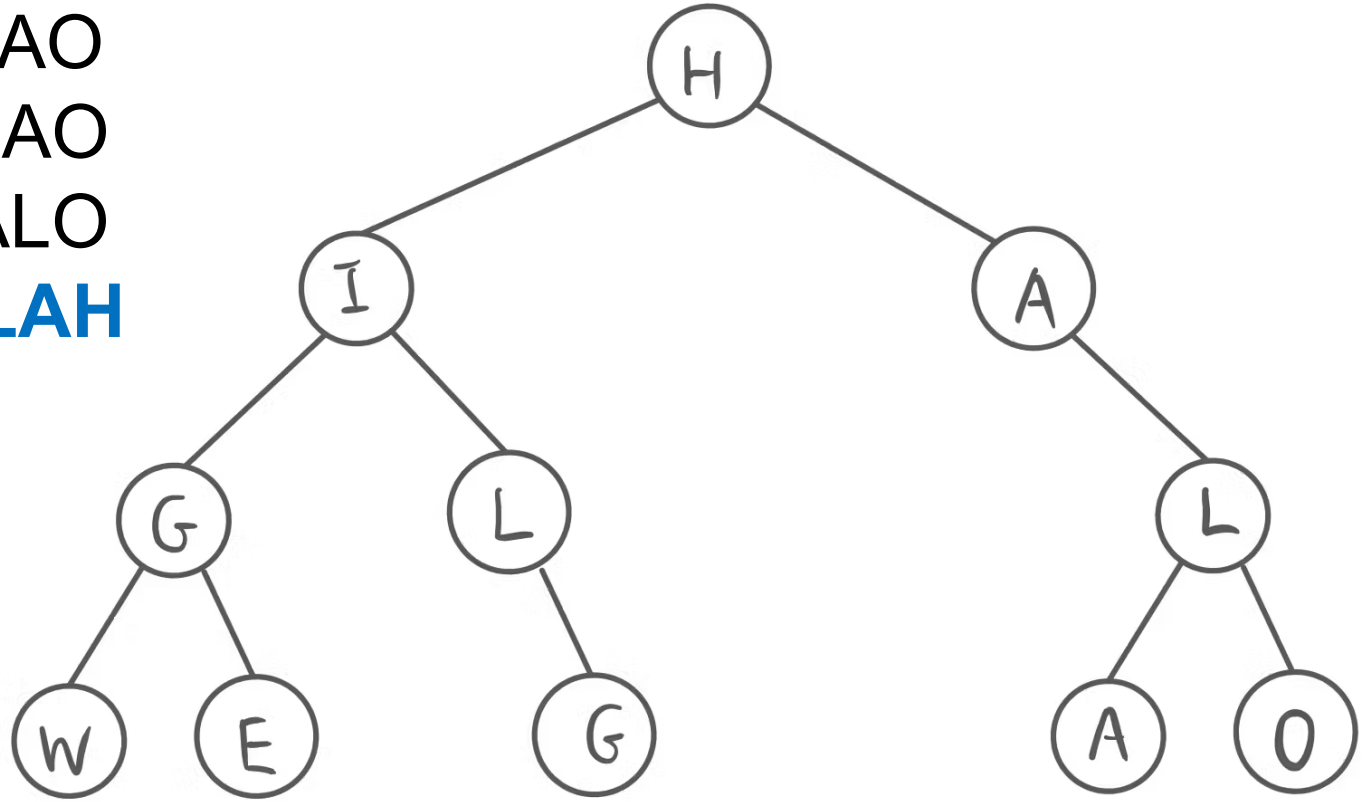


Exercise 5 – Binary Trees and BST

5.12 What is the post-order traversal of the tree?

A. HIAGLLWEGAO
B. HIGWELGALAO
C. WGEILGHAALO
D. WEGGLIAOLAH

Multiple Choice



Exercise 5 – Binary Trees and BST

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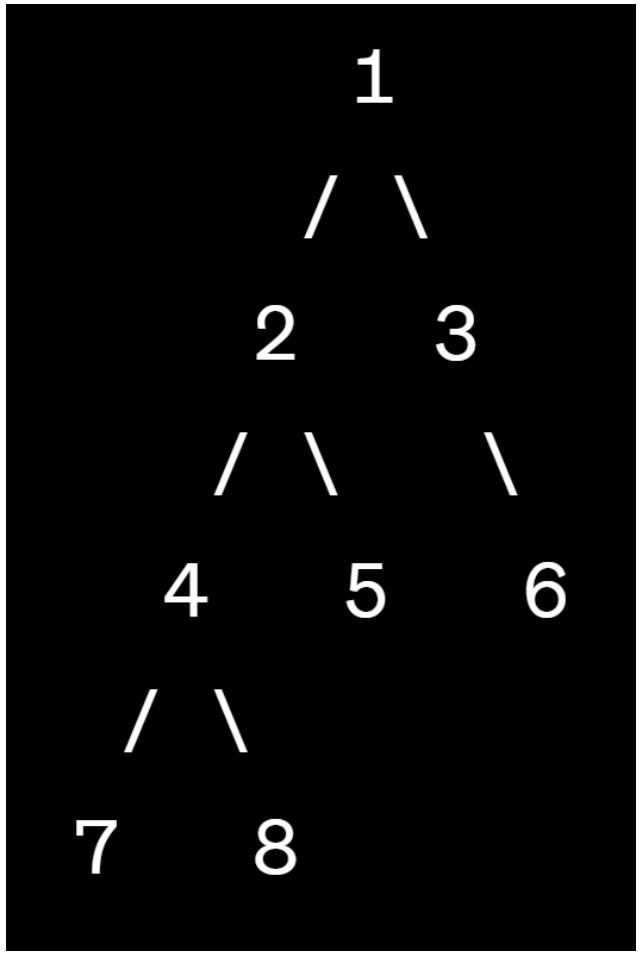
5.13 Which is correct regarding the following traversals?

```
(1) Pre-order:   12478536
(2) In-order:    74825136
(3) Post-order:  78452631
```

A. (1) only
B. (2) only
C. (3) only
D. (1) and (2)
E. (1)(2)(3)

Multiple Choice



Exercise 5 – Binary Trees and BST

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5.14 What is the height of the BST after these operations?

A. 2
B. 3
C. 4
D. 5
E. 6
F. 7

```
Insert(1);
Insert(2);
Insert(3);
Insert(4);
Insert(5);
Insert(6);
Insert(7);
```

Multiple Choice

Exercise 5 – Binary Trees and BST

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5.15 What is the height of the BST after these operations?

A. 2
B. 3
C. 4
D. 5
E. 6
F. 7

```
Insert(4);
Insert(2);
Insert(6);
Insert(5);
Insert(3);
Insert(1);
Insert(7);
```

Multiple Choice

Exercise 5 – Binary Trees and BST

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5.16 What is the worst-case time complexity of BST::find()?

A. O(1)
B. O(logn)
C. O(n)
D. O(nlogn)
E. O(n^2)

Multiple Choice

Exercise 5 – Binary Trees and BST

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5.17 In delete operation of BST, we need in-order predecessor (successor) of the to-be-deleted node if it has both non-empty left and right child. Which of the following is true?

A. Predecessor is always a leaf node
B. Predecessor is always either a leaf node or a node with empty left child
C. Predecessor cannot be a parent node
D. Predecessor is always either a leaf node or a node with empty right child

Multiple Choice

Exercise 5 – Binary Trees and BST

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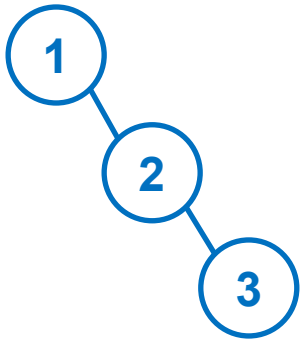
5.18 For a BST having a node with value `x`, after the following operations

```
Delete(root, x);
Insert(root, x);
```

A. The resulting BST is exactly the same as the original BST
B. The resulting BST has a different structure from the original BST
C. The height of the resulting BST is different from the original BST
D. A and B are possible
E. A, B, and C are possible

Multiple Choice

```
A: X = 3
B: X = 2
C: X = 1
```



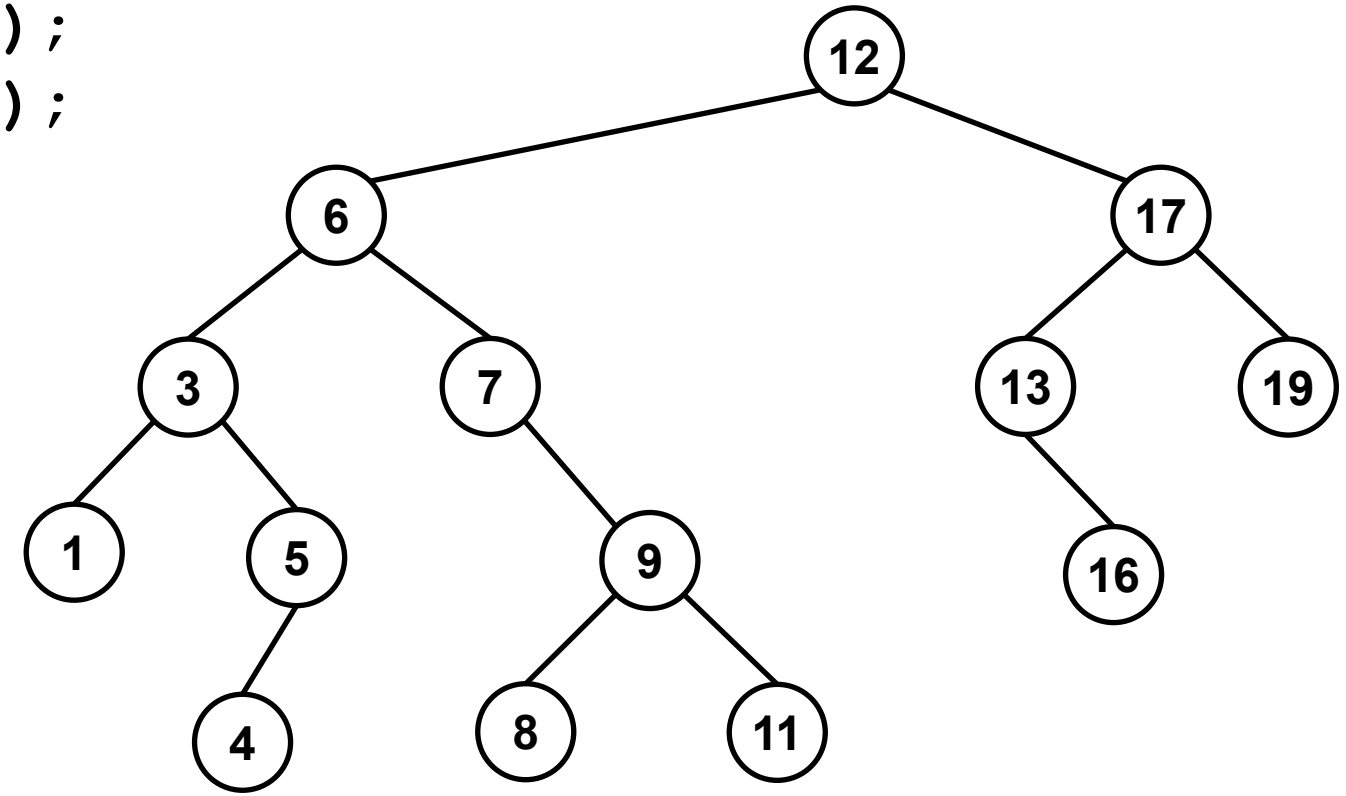
Exercise 5 – Binary Trees and BST

5.19 Consider replacement by predecessor, what is the height of the BST after the following operations?

```
Delete(root, 6);
Delete(root, 7);
```

A. 2
B. 3
C. 4
D. 5
E. 6

Multiple Choice



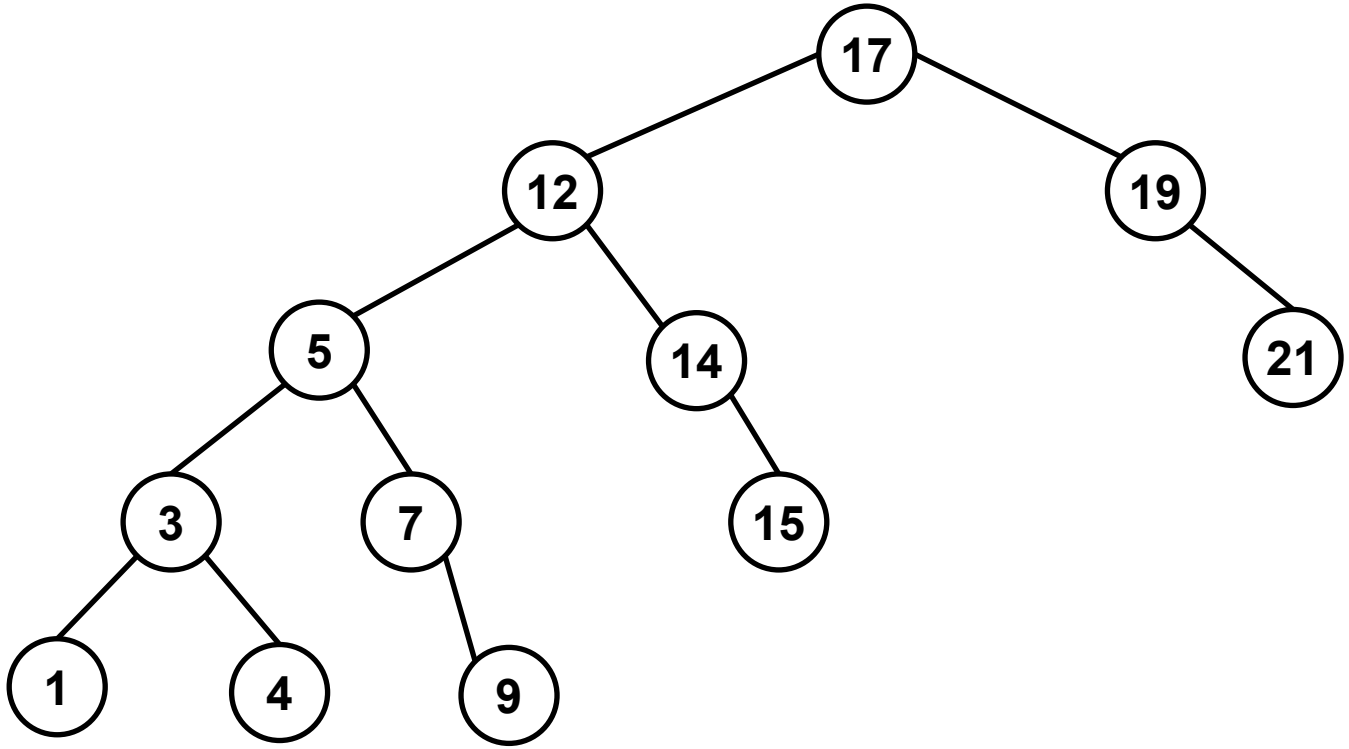
Exercise 5 – Binary Trees and BST

5.20 Is the BST after right rotation about the root node a balanced BST?

A. Yes

B. No

Multiple Choice



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