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MSA, PMOC, PMP®, PMP®, PMP-REP®, CS, ITIL®, MCPD, MCD



لا تنسى الاشتراك في قناتنا على اليوتيوب ومشاركة القناة مع اصدقائك
لتعم الفائدة للجميع وانقاذ الاف الناس من التشتت جزاكم الله خيرا

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مهم جداً

هذا الملف للمراجعة السريعة واخذ الملاحظات عليه فقط ،لانه يحتوي على اقل من 20٪ مما يتم شرحه في الفيديوهات الاستعجال والاعتماد عليه فقط سوف يجعلك تخسر كميه معلومات وخبرات كثيره

يجب عليك مشاهدة فيديو الدرس كاملا

لاتنسى عمل لايك ومشاركة القناة لدعم الفائدة للجميع
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Algorithms & Problem Solving Level 6

What is AVL Tree?

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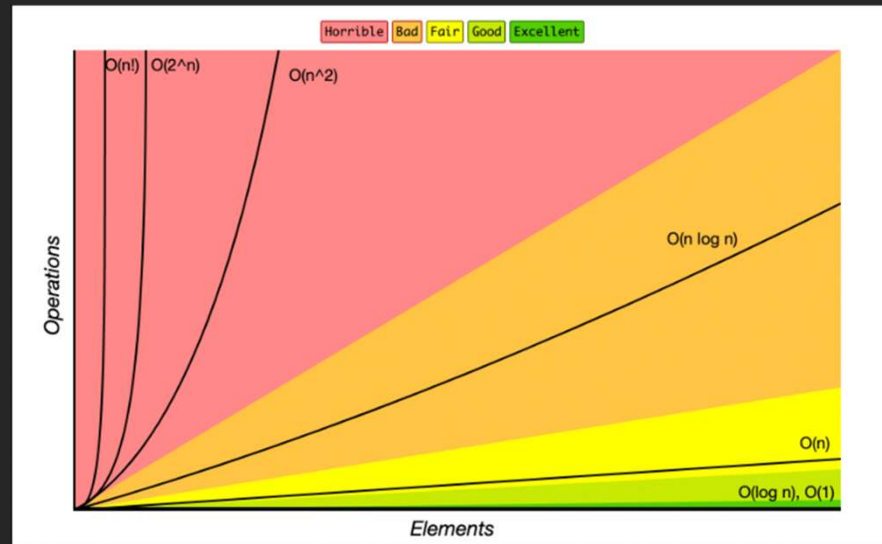
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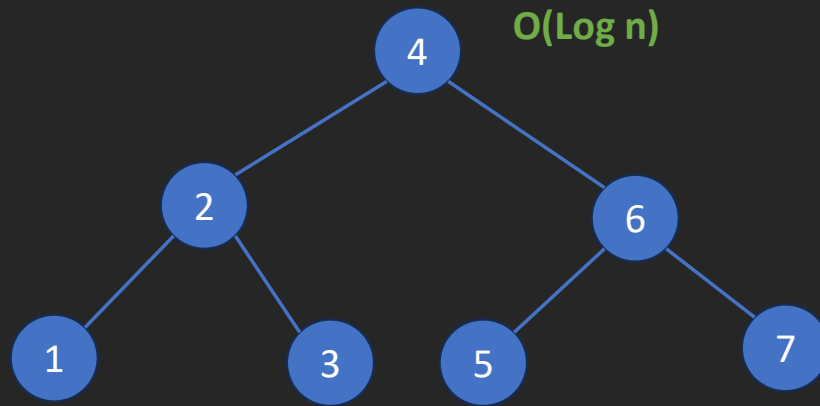
BST Search.

- Best/Average Case is $O(\log n)$
- Worst Case $O(n)$



Balanced vs Unbalanced BST

Suppose that we entered data in BST in the following order:
4, 2, 6, 1, 3, 5, 7



Balanced

Suppose that we entered data in BST in the following order:
1, 2, 3, 4, 5, 6, 7



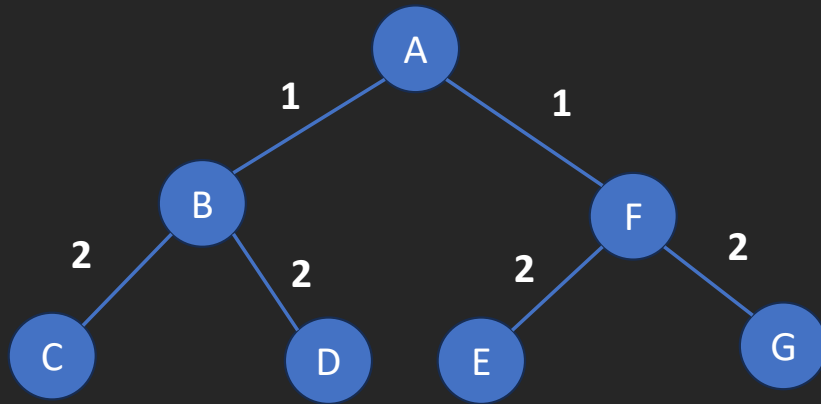
Unbalanced

What is AVL?

- AVL trees, named after their inventors Adelson-Velsky and Landis, are self-balancing binary search trees.
- In an AVL tree, the heights of the two child subtrees of any node differ by no more than one.
- If at any time they differ by more than one, rebalancing is done to restore this property.

Balanced Or Balanced?

$$BF = 2 - 2 = 0$$



Balanced

Rule:

Heights of the two child subtrees of any node differ by no more than one.

$DF = \text{Hight}(\text{Left Subtree}) - \text{Hight}(\text{Right Subtree})$

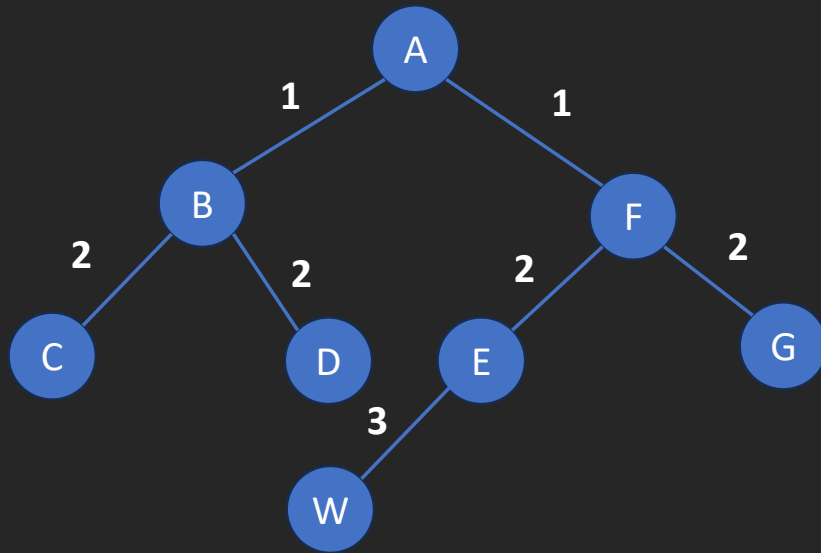
Hight = the number of edges for the longest path from the node to the last leaf

Balance Factor (BF) = DF.

If $ABS(BF) > 1$ then it is not balanced.

Balanced Or Balanced?

$$BF = 2 - 3 = -1$$



Balanced

Rule:

Heights of the two child subtrees of any node differ by no more than one.

$DF = \text{Hight}(\text{Left Subtree}) - \text{Hight}(\text{Right Subtree})$

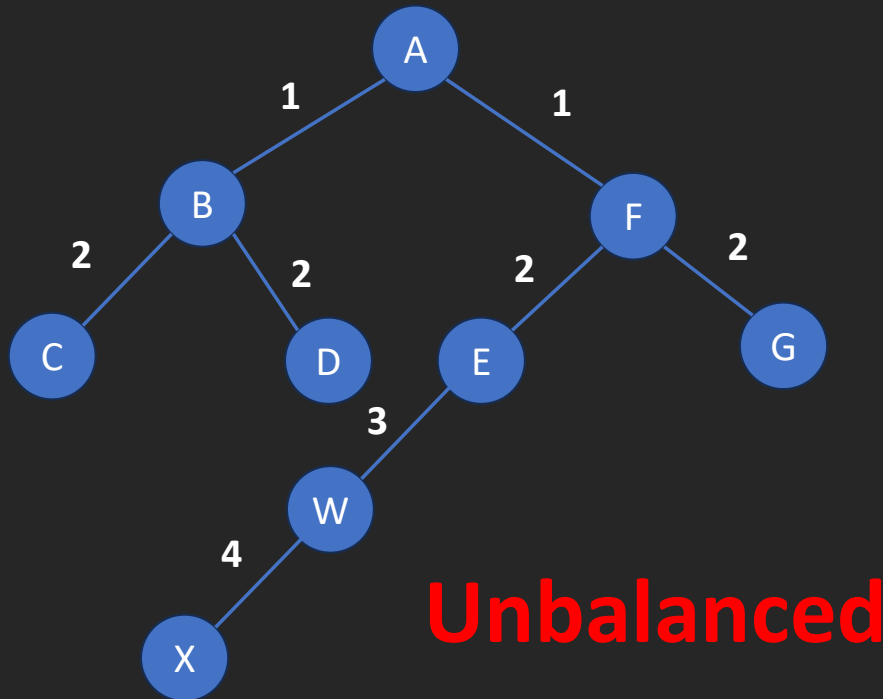
Hight = the number of edges for the longest path from the node to the last leaf

Balance Factor (BF) = DF.

If $ABS(BF) > 1$ then it is not balanced.

Balanced Or Balanced?

$$BF = 2 - 4 = -2$$



Rule:

Heights of the two child subtrees of any node differ by no more than one.

$DF = \text{Hight}(\text{Left Subtree}) - \text{Hight}(\text{Right Subtree})$

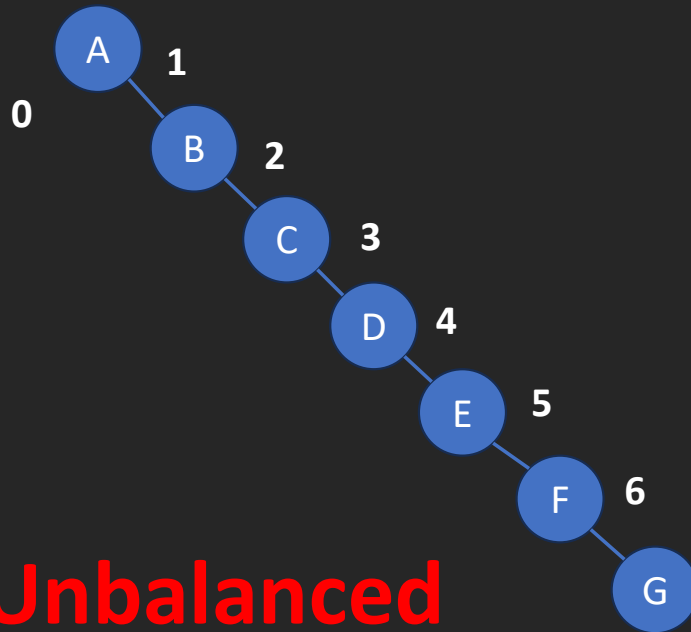
Hight = the number of edges for the longest path from the node to the last leaf

Balance Factor (BF) = DF.

If $ABS(BF) > 1$ then it is not balanced.

Balanced Or Balanced?

$$BF = 0 - 6 = -6$$



Rule:

Heights of the two child subtrees of any node differ by no more than one.

$DF = \text{Hight}(\text{Left Subtree}) - \text{Hight}(\text{Right Subtree})$

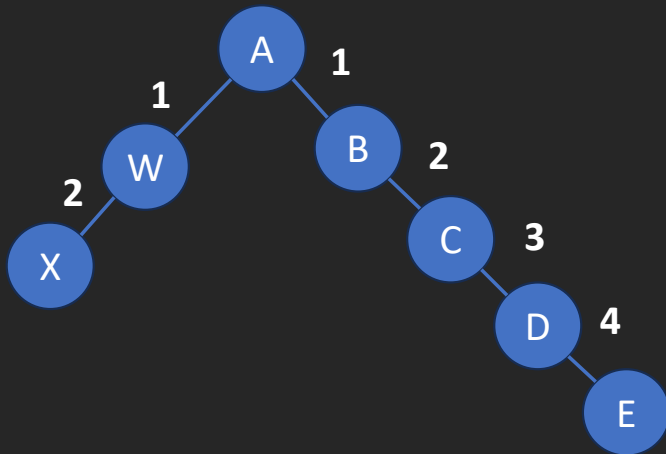
Hight = the number of edges for the longest path from the node to the last leaf

Balance Factor (BF) = DF.

If $ABS(BF) > 1$ then it is not balanced.

Balanced Or Balanced?

$$BF = 2 - 4 = -2$$



Unbalanced

Rule:

Heights of the two child subtrees of any node differ by no more than one.

$DF = \text{Hight}(\text{Left Subtree}) - \text{Hight}(\text{Right Subtree})$

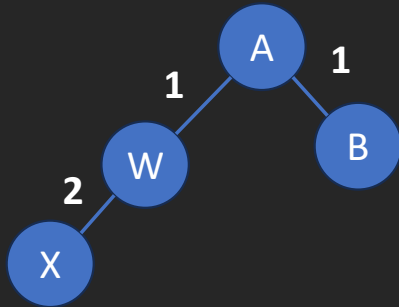
Hight = the number of edges for the longest path from the node to the last leaf

Balance Factor (BF) = DF.

If $ABS(BF) > 1$ then it is not balanced.

Balanced Or Balanced?

$$BF = 2 - 1 = 1$$



Balanced

Rule:

Heights of the two child subtrees of any node differ by no more than one.

$DF = \text{Hight}(\text{Left Subtree}) - \text{Hight}(\text{Right Subtree})$

Hight = the number of edges for the longest path from the node to the last leaf

Balance Factor (BF) = DF.

If $ABS(BF) > 1$ then it is not balanced.



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Thank You

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