

# Tree

204311 ทรจัดการแฟ้มข้อมูลและโครงสร้างข้อมูล  
File Management and Data Structure



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## บรรยายครั้งที่ 5: Stack

- วัตถุประสงค์ : นักศึกษาสามารถ
  - อธิบายโครงสร้างข้อมูล Tree แบบต่างๆ ได้
  - ดำเนินการกับ Tree ได้อย่างถูกต้อง
  - เขียนโปรแกรมด้วยภาษา Visual Basic ในการดำเนินการต่างๆ ตามโครงสร้างข้อมูลแบบ Tree ได้



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## หัวข้อการบรรยาย

- นิยามของ Tree
- การเดินทางเข้าไปใน Tree
- Binary Tree
- Binary Search Tree
- AVL Tree
- Heap
- B-Tree



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## หัวข้อการบรรยาย

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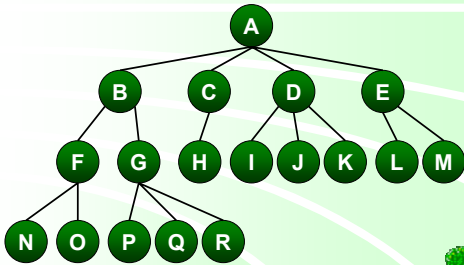
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## นิยาม



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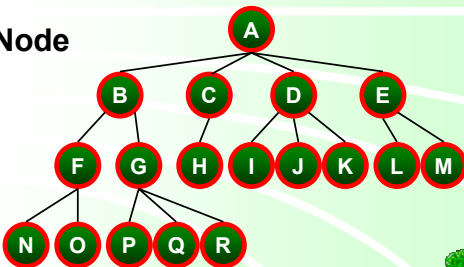
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## นิยาม

Node



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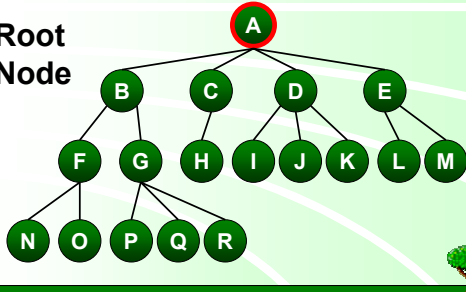
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## นิยาม

Root Node



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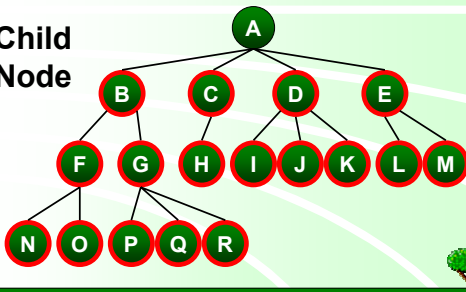
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## นิยาม

Child Node



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## หัวข้อการบรรยาย

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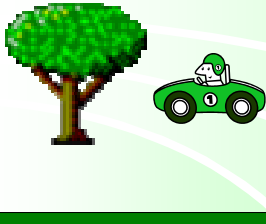
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## Tree Traversal



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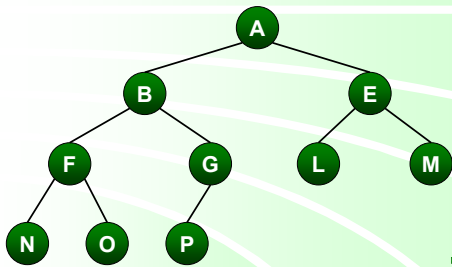
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## Binary Tree



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## หัวข้อการบรรยาย

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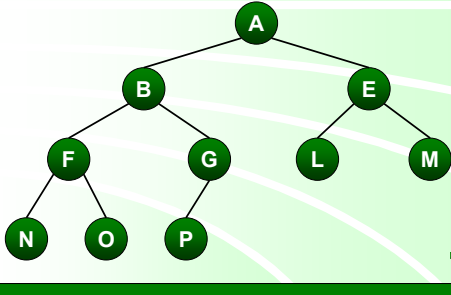
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## Binary Tree



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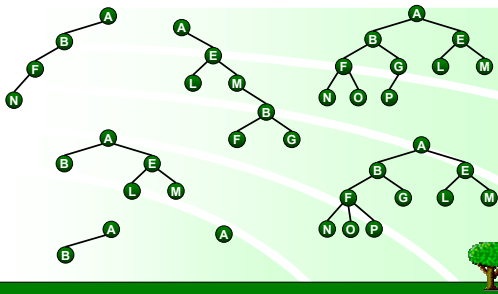
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## Binary Tree



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## Binary Tree



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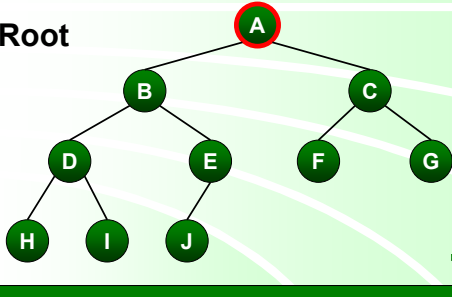
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## Binary Tree

Root



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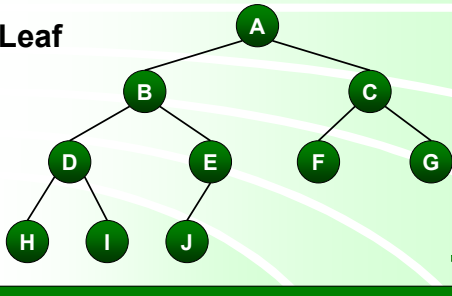
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## Binary Tree

Leaf



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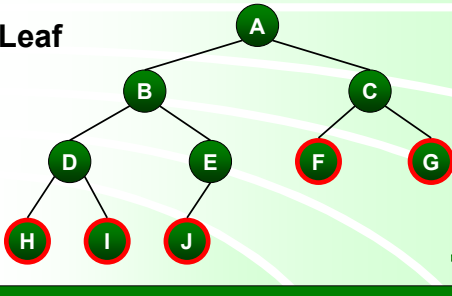
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## Binary Tree

Leaf



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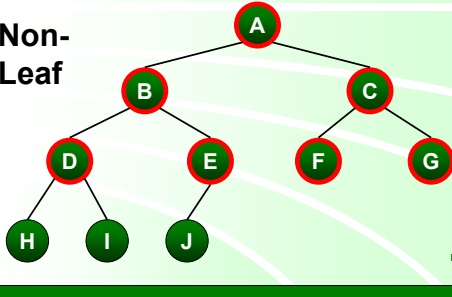
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## Binary Tree

Non-Leaf



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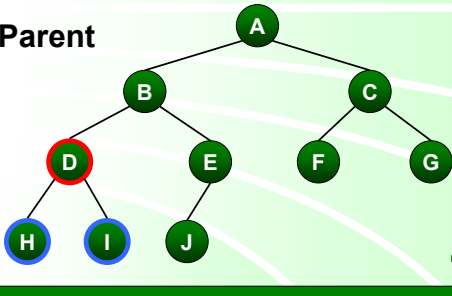
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## Binary Tree

Parent



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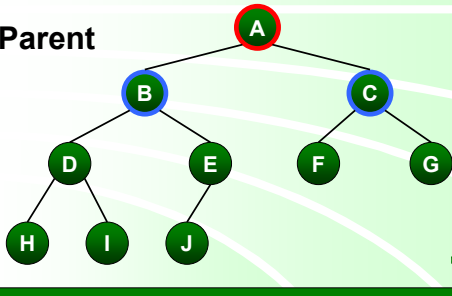
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## Binary Tree

Parent



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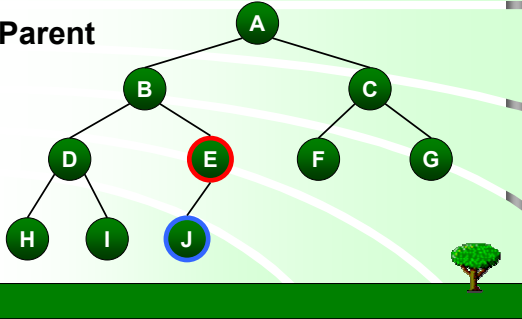
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## Binary Tree

Parent



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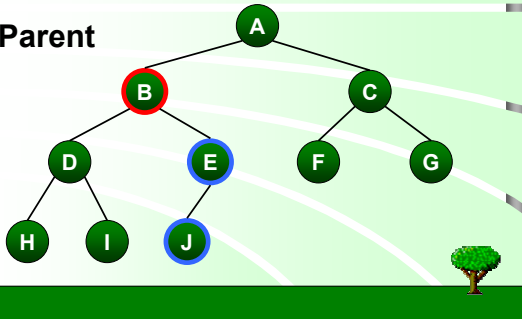
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## Binary Tree

Parent



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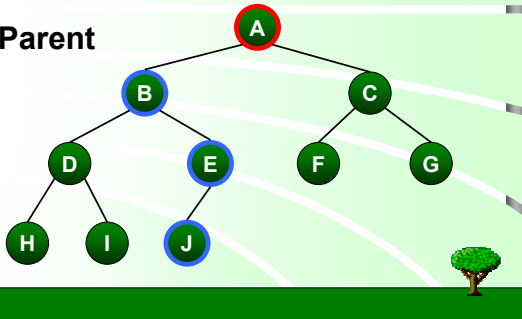
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## Binary Tree

Parent



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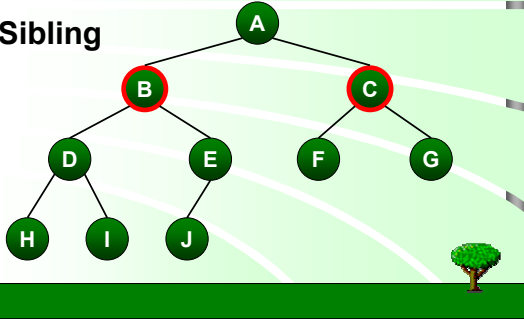
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# Binary Tree

Sibling



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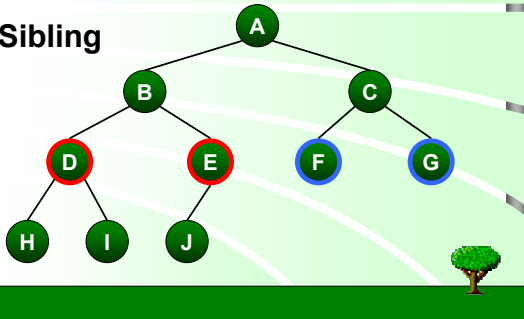
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# Binary Tree

Sibling



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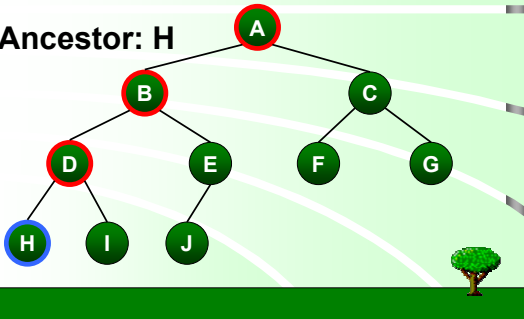
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# Binary Tree

Ancestor: H



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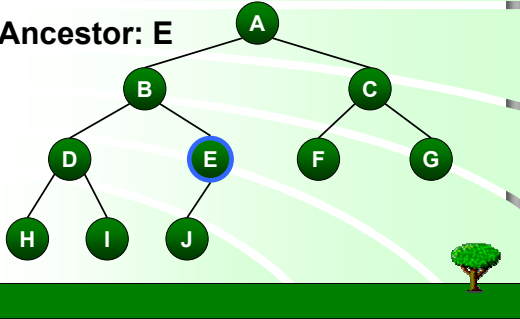
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## Binary Tree

Ancestor: E



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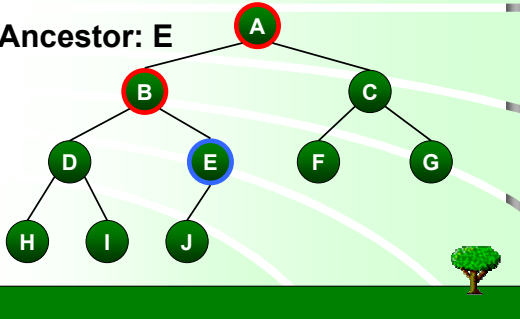
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## Binary Tree

Ancestor: E



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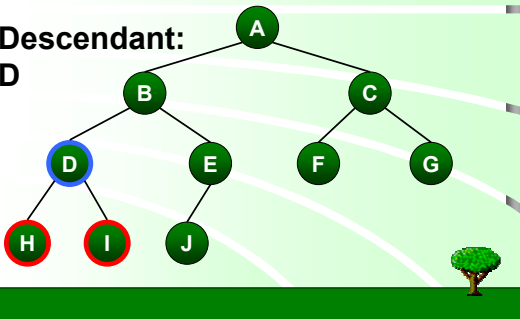
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## Binary Tree

Descendant:  
D



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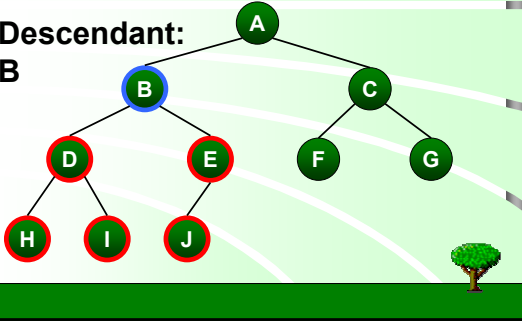
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## Binary Tree

Descendant:

B



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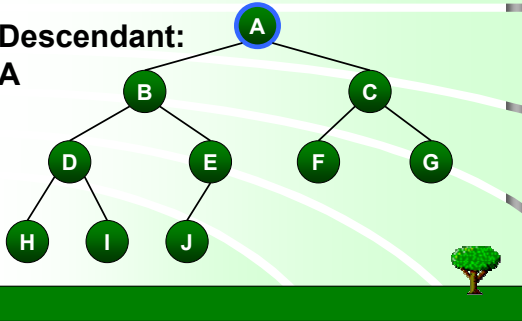
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## Binary Tree

Descendant:

A



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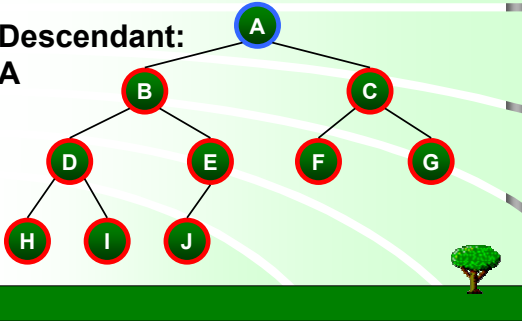
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## Binary Tree

Descendant:

A



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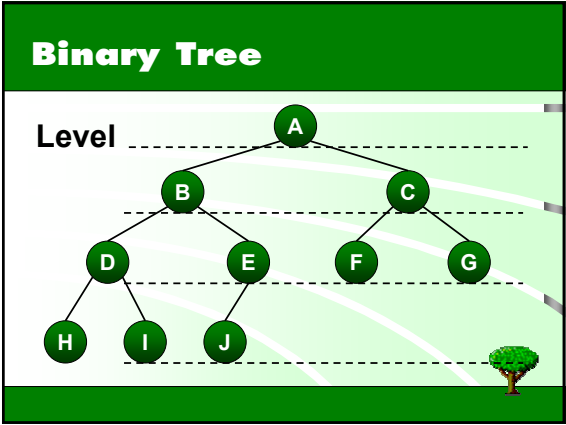
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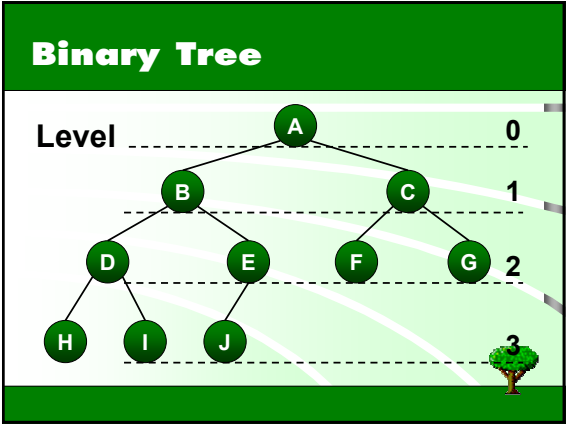
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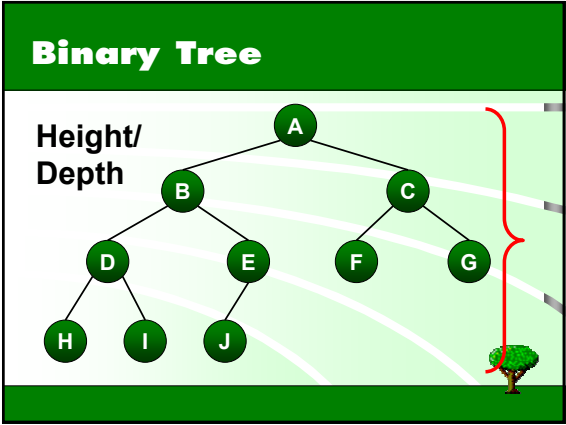
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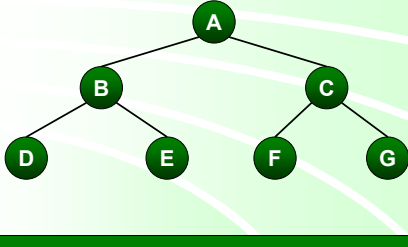
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## Binary Tree

### Complete Binary Tree



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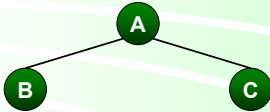
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## Binary Tree

### Complete Binary Tree



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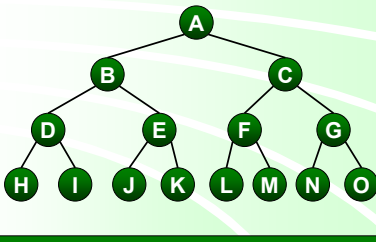
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## Binary Tree

### Complete Binary Tree



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## Tree Traversal



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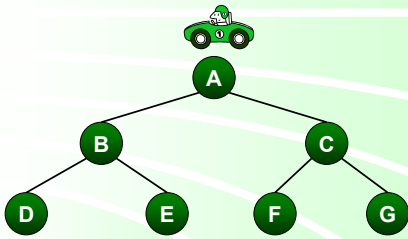
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## Tree Traversal



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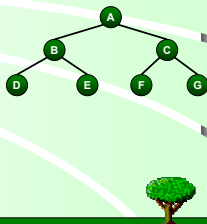
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## Tree Traversal

- Preorder
- Inorder
- Postorder



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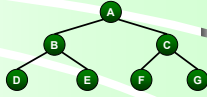
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## Tree Traversal

- Preorder – Ro L R
- Inorder – L Ro R
- Postorder – L R Ro



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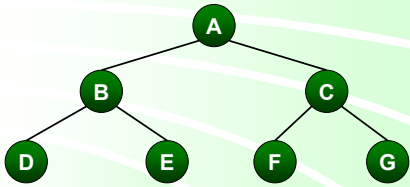
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## Tree Traversal

- Preorder



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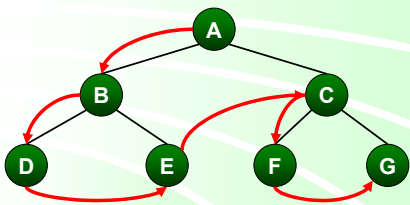
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## Tree Traversal

- Preorder



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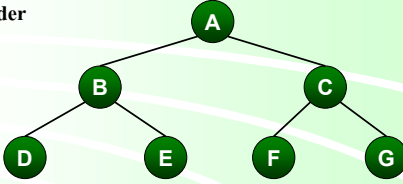
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## Tree Traversal

- Preorder



ABDECFG



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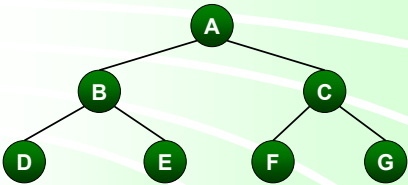
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## Tree Traversal

- Inorder



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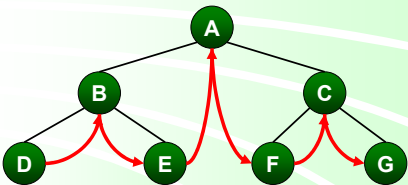
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## Tree Traversal

- Inorder



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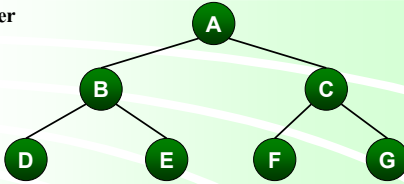
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## Tree Traversal

- Inorder



DBEAFCG



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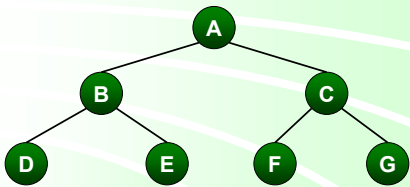
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## Tree Traversal

- Postorder



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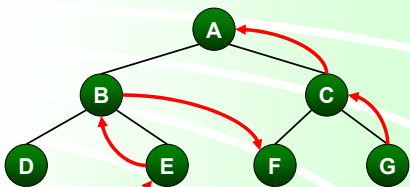
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## Tree Traversal

- Postorder



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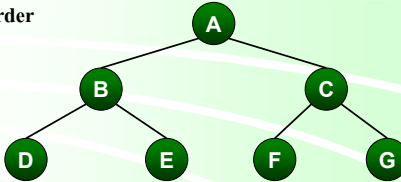
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## Tree Traversal

- Postorder



DEBFGCA



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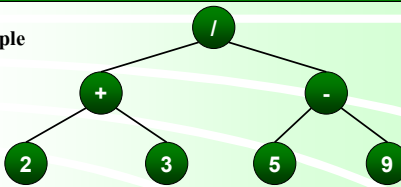
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## Tree Traversal

- Example



/ + 2 3 - 5 9  
2 + 3 / 5 - 9  
2 3 + 5 9 - /



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## หัวข้อการบรรยาย

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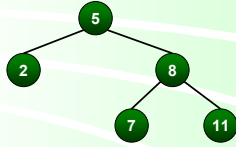
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## Binary Search Tree



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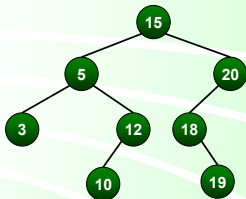
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## Binary Search Tree



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## Binary Search Tree

- การเพิ่มข้อมูลใน Binary Tree
- การเพิ่มลบข้อมูลใน Binary Tree

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## หัวข้อการบรรยาย

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## AVL Tree



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## หัวข้อการบรรยาย

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# Heap

- Max Heap
- Min Heap

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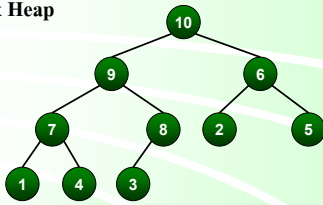
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# Heap

- Max Heap



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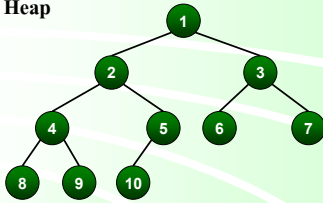
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# Heap

- Min Heap



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# Heap

- การเพิ่มข้อมูลใน Heap
- การลบข้อมูลจาก Heap

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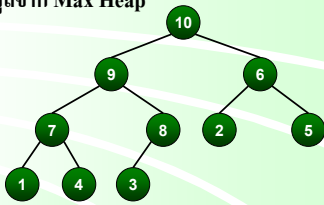
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# Heap

- การลบข้อมูลจาก Max Heap



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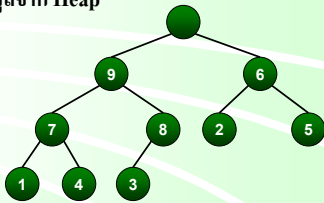
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# Heap

- การลบข้อมูลจาก Heap



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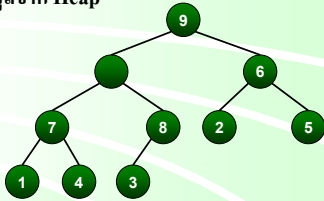
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# Heap

- การลบข้อมูลจาก Heap



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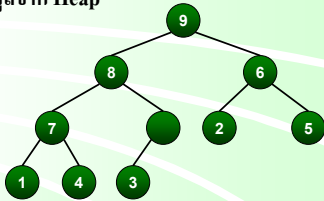
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# Heap

- การลบข้อมูลจาก Heap



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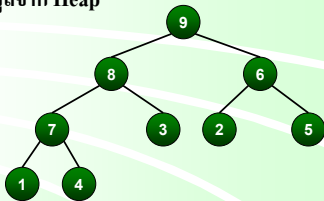
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# Heap

- การลบข้อมูลจาก Heap



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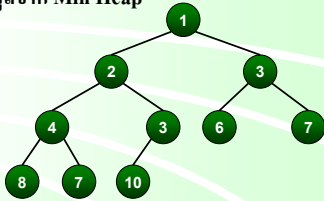
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# Heap

- การลบข้อมูลจาก Min Heap



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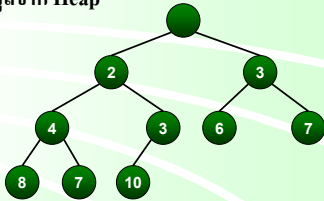
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# Heap

- การลบข้อมูลจาก Heap



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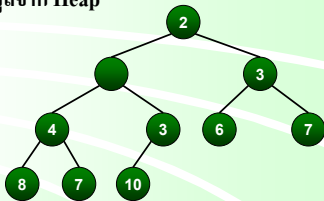
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# Heap

- การลบข้อมูลจาก Heap



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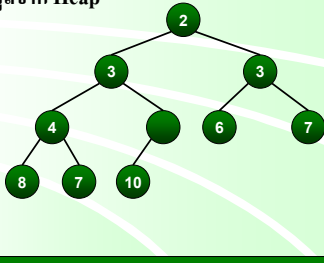
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# Heap

- การลบข้อมูลจาก Heap



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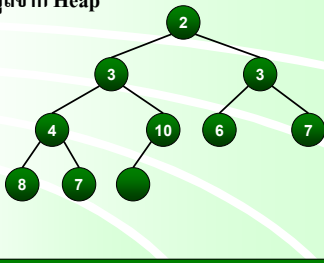
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# Heap

- การลบข้อมูลจาก Heap



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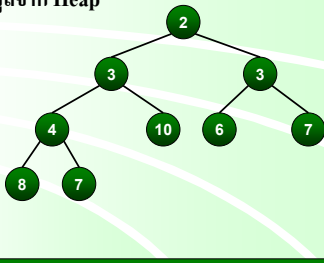
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# Heap

- การลบข้อมูลจาก Heap



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## หัวข้อการบรรยาย

- นิยามของ Tree
- การเดินทางเข้าไปใน Tree
- Binary Tree
- Binary Search Tree
- AVL Tree
- Heap
- B-Tree



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## Heap

- นิยามของ Tree
- การเดินทางเข้าไปใน Tree
- Binary Tree
- Binary Search Tree
- AVL Tree
- Heap
- B-Tree



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## B-Tree



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## หัวข้อการบรรยาย

- นิยามของ Tree
- การเดินทางเข้าไปใน Tree
- Binary Tree
- Binary Search Tree
- AVL Tree
- Heap
- B-Tree



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