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## Convert array to complete binary tree

A complete binary tree is a binary tree whose all levels except the last level are completely filled and all the leaves in the last level are all to the left side.

In other words -

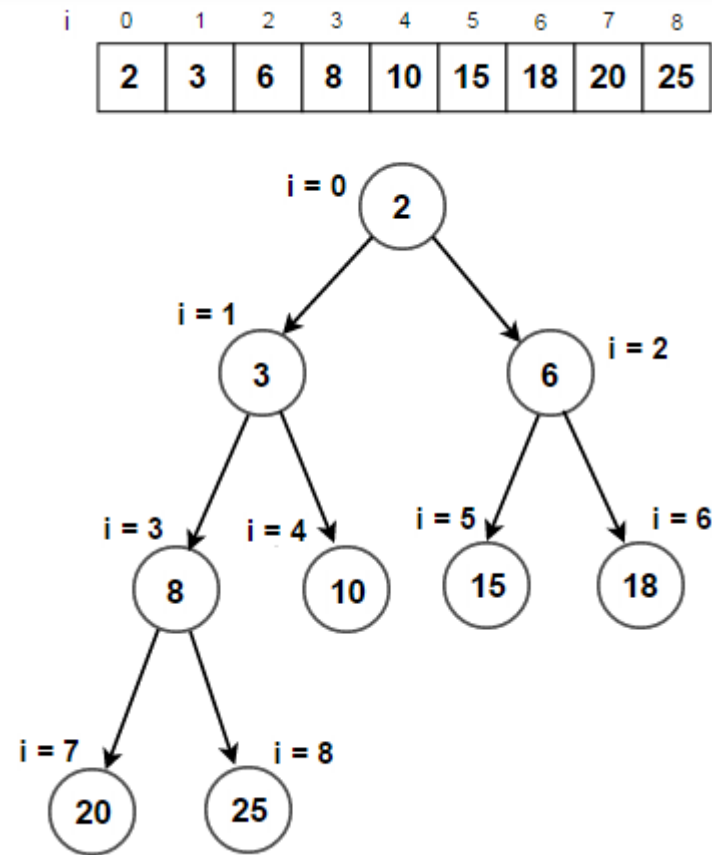
*A complete binary tree is a binary tree in which all nodes are filled except leaf nodes and leaf nodes are towards left first.*

Now let's think about converting array to complete binary tree -

We know that in array representation of binary tree, the left child for a node exist at index  $2i+1$  and right child at  $2i+2$ .

This concept can be used to fill nodes and create tree



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Let's try to understand from above image -

We first try to use first element of array which is at index 0,



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```
root.left = array[2*0+1] // 3
```

```
root.right = array[2*0+2] // 6
```

Let's write the program now -

```
class Node {
  constructor(value) {
    this.data = value;
  }
}

class BinaryTree {
  constructor() {
    this.root = null;
  }

  inOrderTraversal() {
    const traverse = (root) => {
      if (root == null) {
        return;
      }
      traverse(root.left);
      console.log(root.data);
      traverse(root.right);
    }
  }
}
```



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```
function createCompleteBinaryTreeFromArray(arr) {
  const length = arr.length;
  const binaryTree = new BinaryTree();
  const traverseAndReplace = (root, i) => {
    if (i < length) {
      root = new Node(arr[i]);
      root.left = traverseAndReplace(root.left, 2 * i + 1);
      root.right = traverseAndReplace(root.right, 2 * i + 2);
    }
    return root;
  }
  binaryTree.root = traverseAndReplace(binaryTree.root, 0);
  return binaryTree;
}

const result = createCompleteBinaryTreeFromArray([1, 2, 3, 4, 5, 6, 6,
6, 6]);

result.inOrderTraversal();
```

In the create method we check if index is less than length & then assign value to root, left and right.





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