

Concept Challenge



Binary Search Tree Shapes



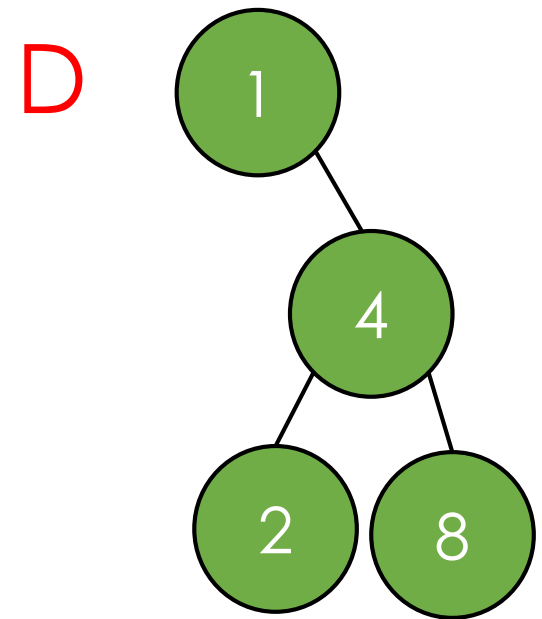
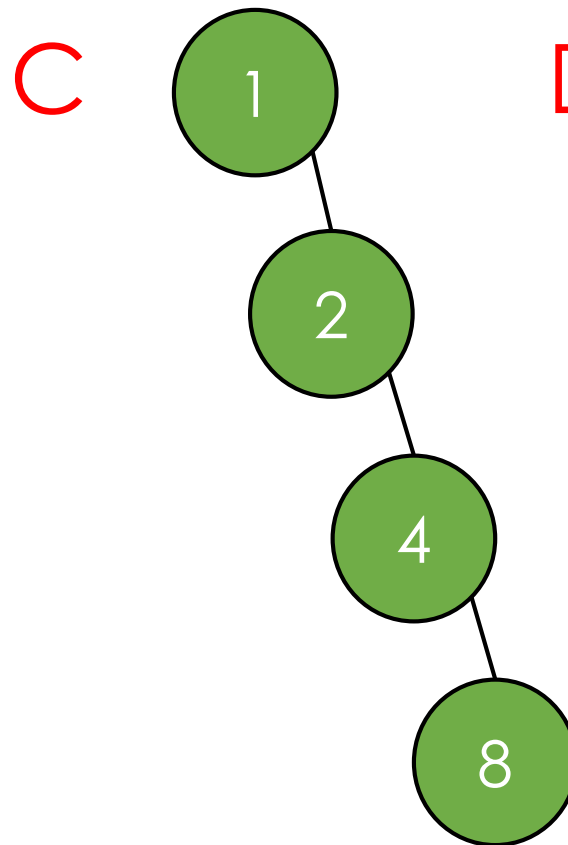
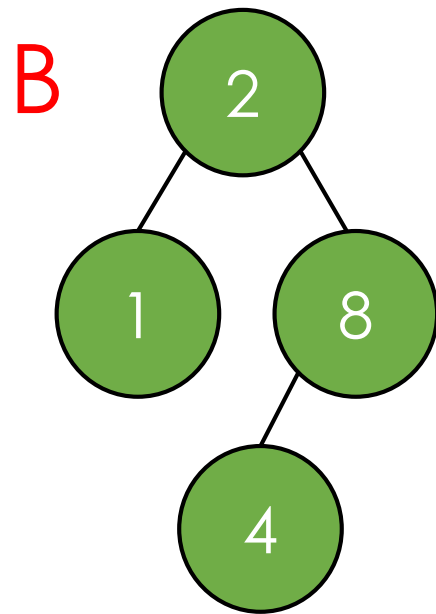
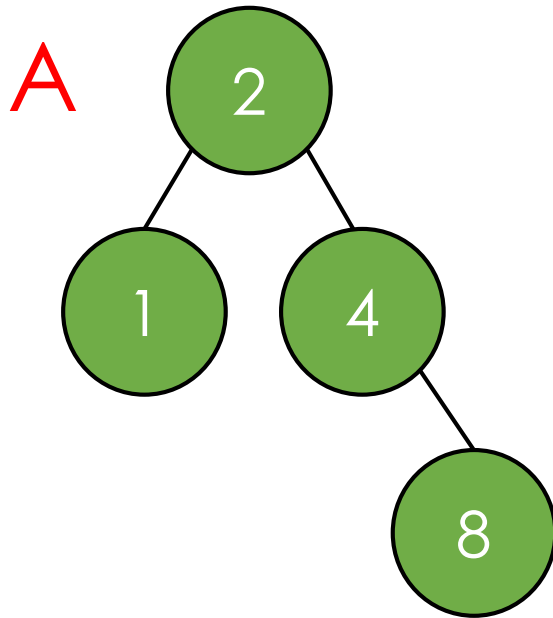
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by Christine Alvarado, Mia Minnes, and Leo Porter, 2015.

Concept Challenge

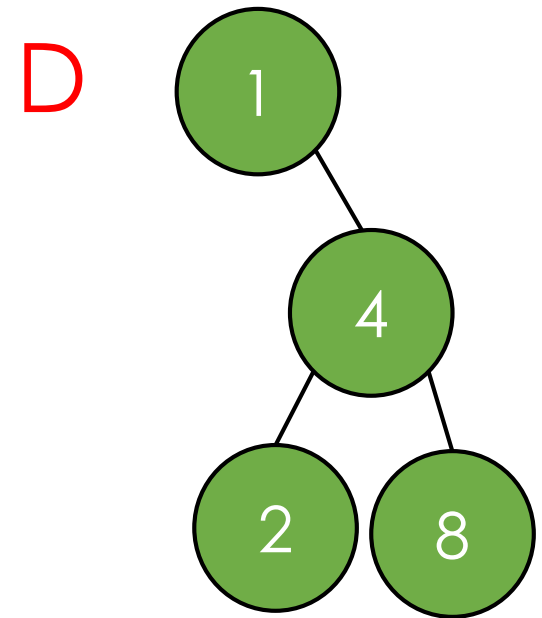
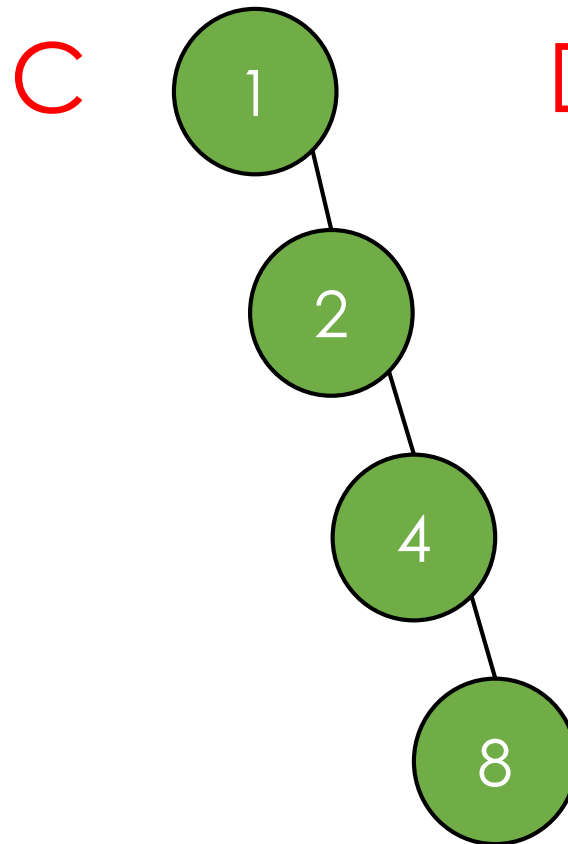
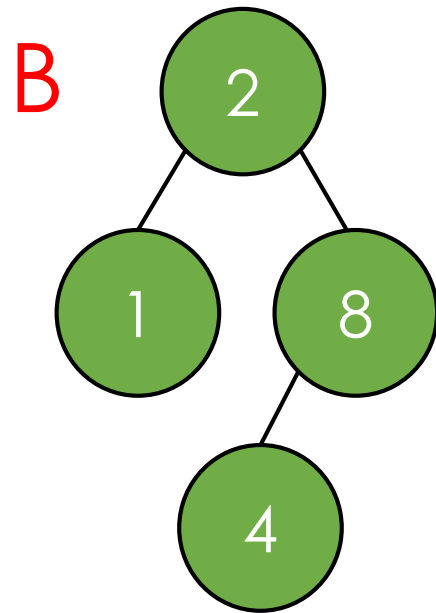
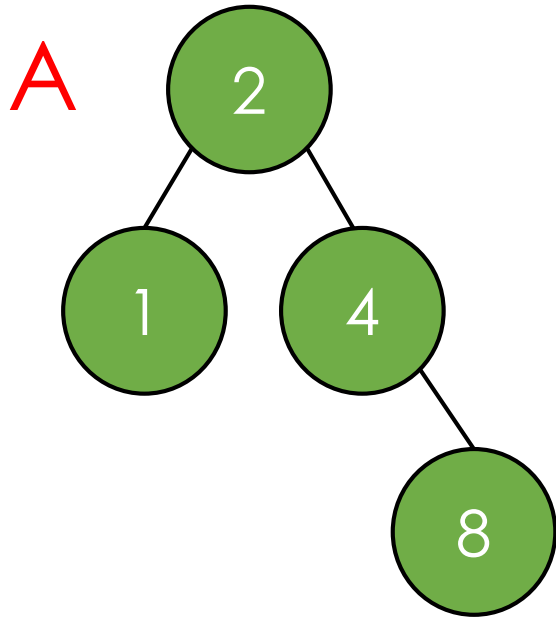
- **Pause** Try to solve the problem yourself
- **Discuss** with other learners (if you can)
- **Watch** the UCSD learners video
- **Confirm** your understanding with our explanation



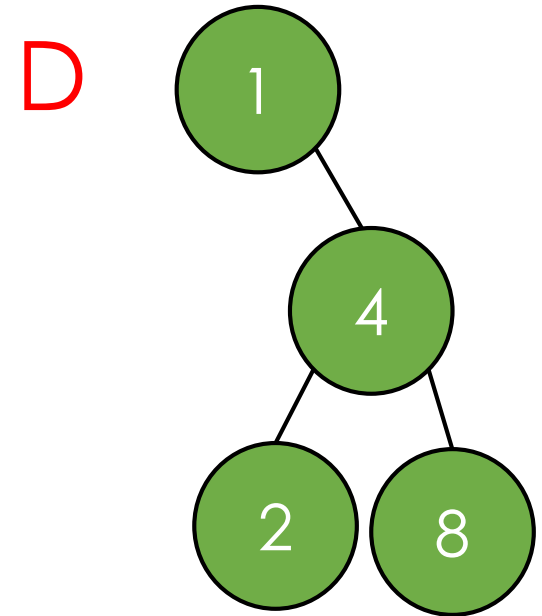
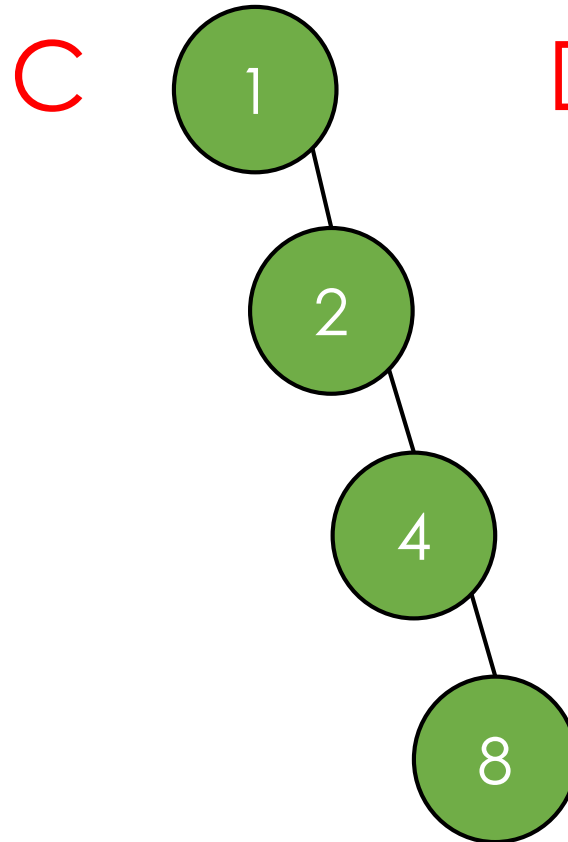
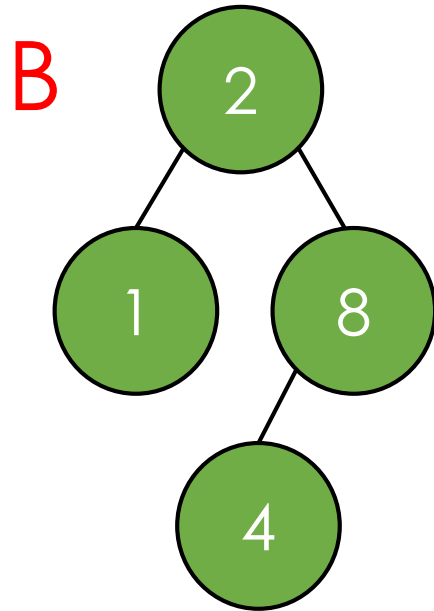
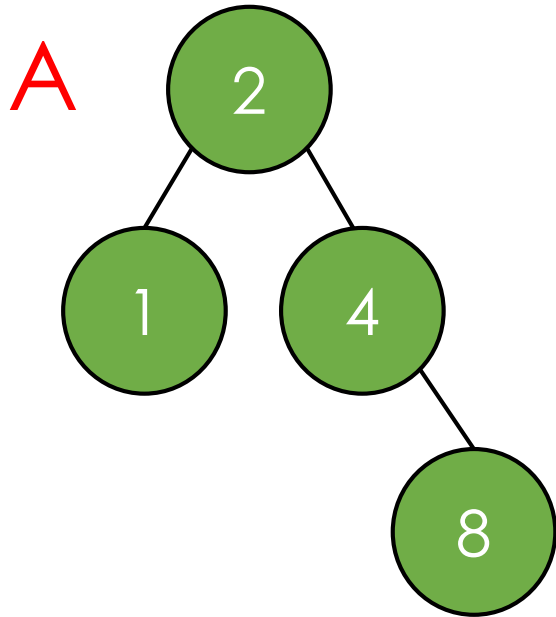
Which of the following Binary Search Trees could be the result of adding elements: 1, 2, 4, and 8 in *some order* (select all). For valid trees, determine (on your own) an insertion order which would produce that tree?

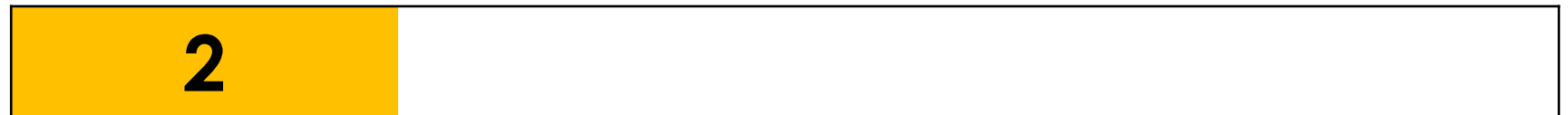
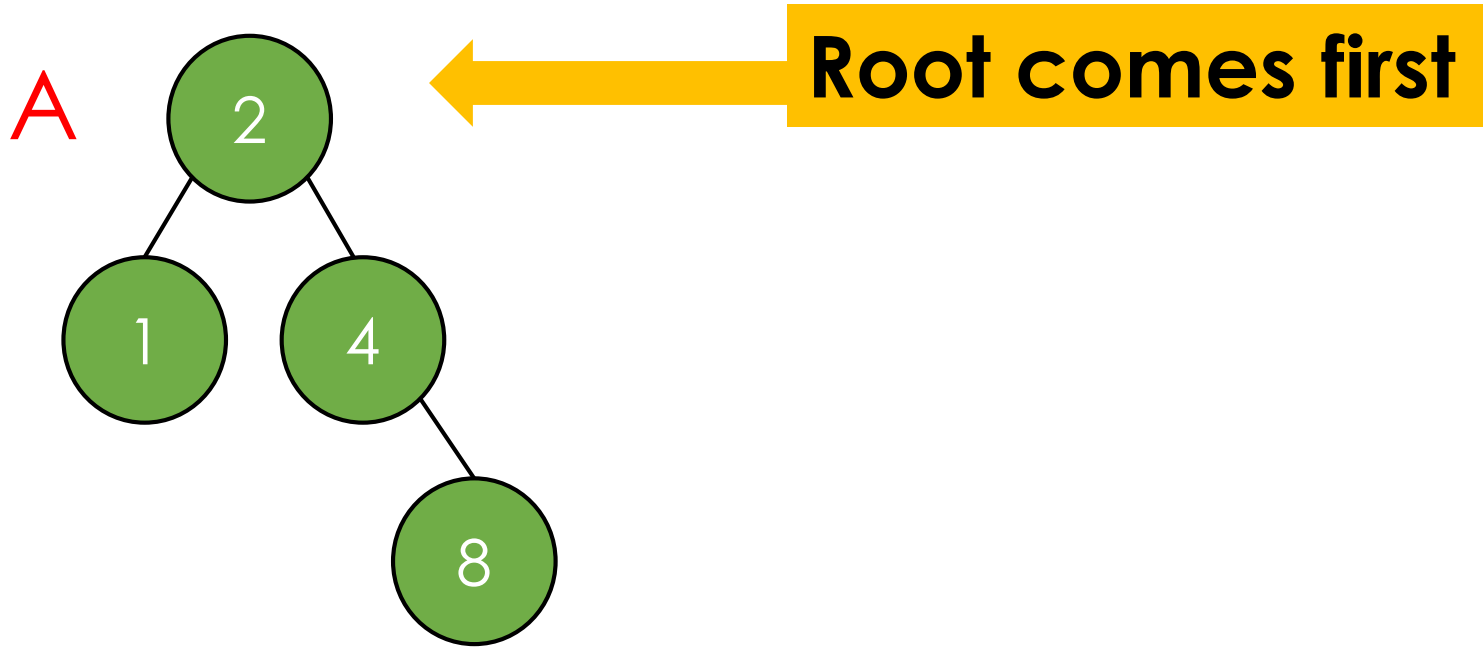


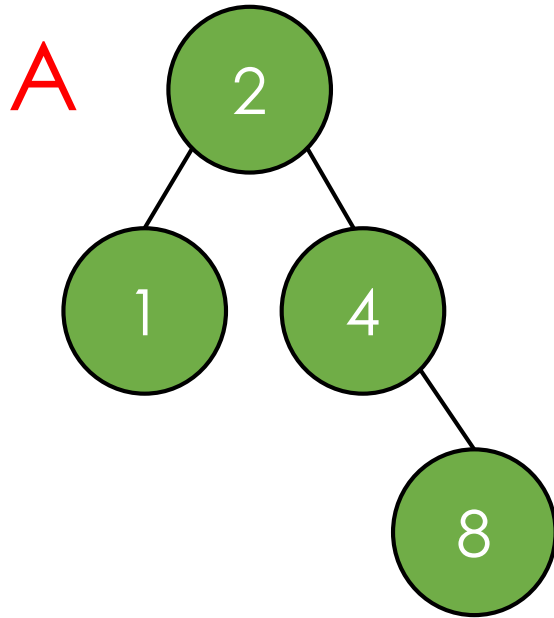
These are all valid trees!



These are all valid **binary search trees**!

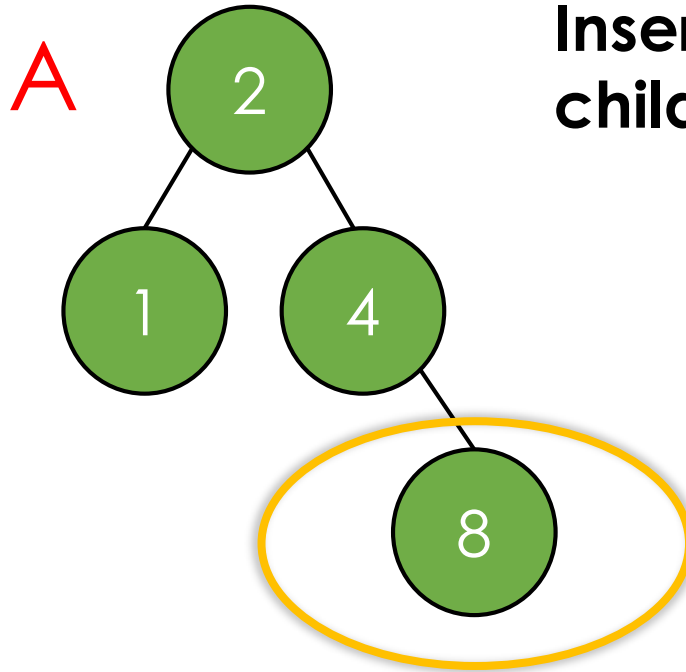






Inserting a node means making it a child of an existing node

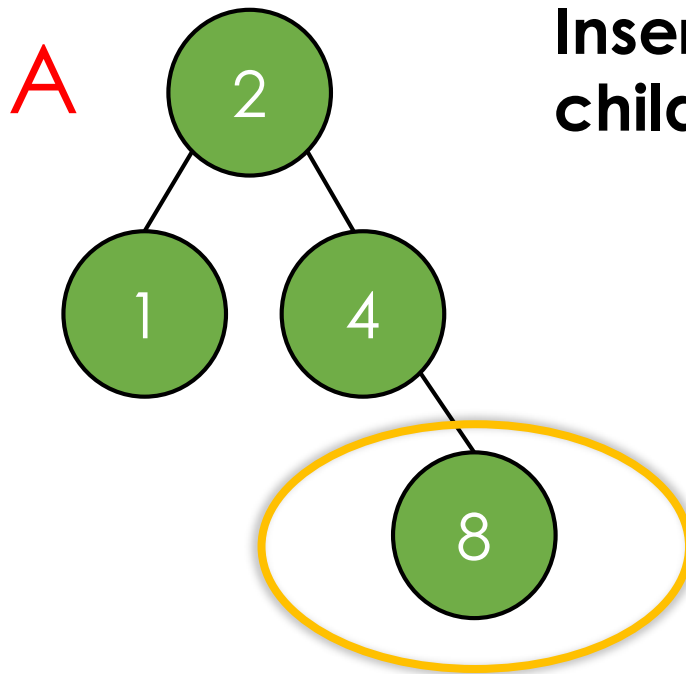




Inserting a node means making it a child of an existing node

8 needs to be inserted AFTER 4

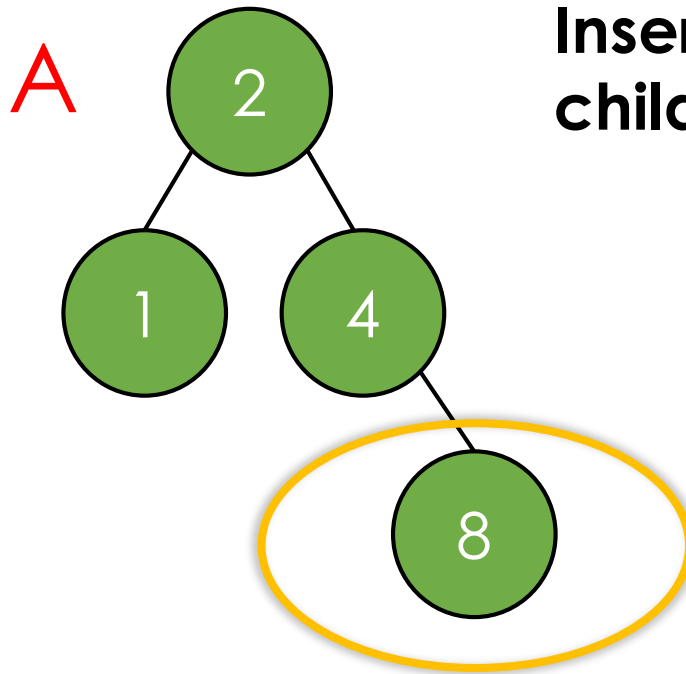
2



Inserting a node means making it a child of an existing node

8 needs to be inserted AFTER 4

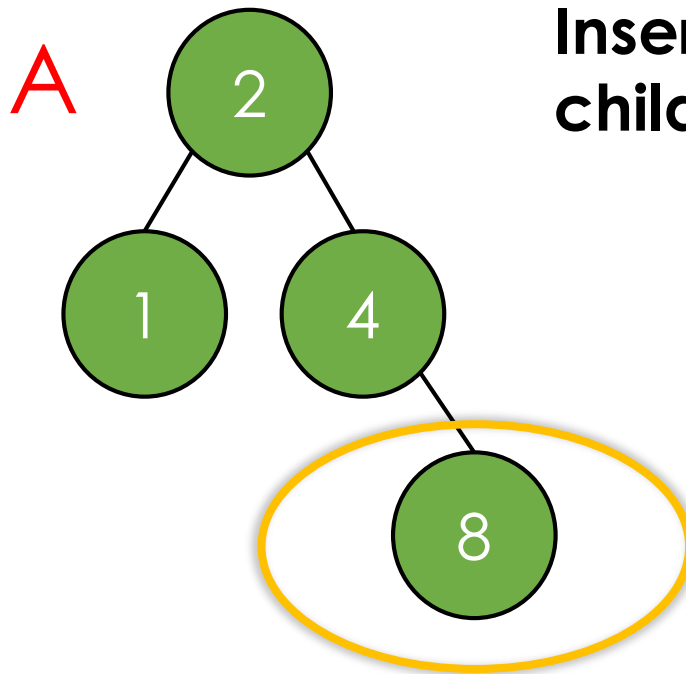




Inserting a node means making it a child of an existing node

8 needs to be inserted AFTER 4



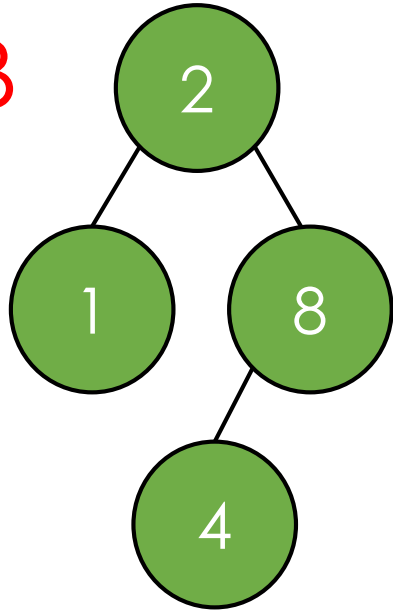


Inserting a node means making it a child of an existing node

8 needs to be inserted AFTER 4



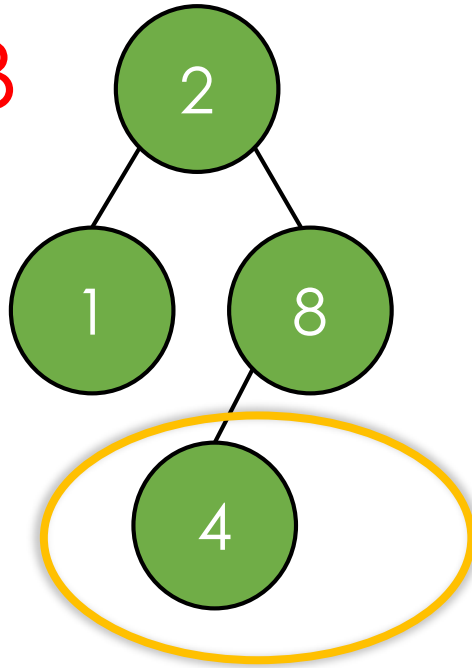
B



Root comes first

2

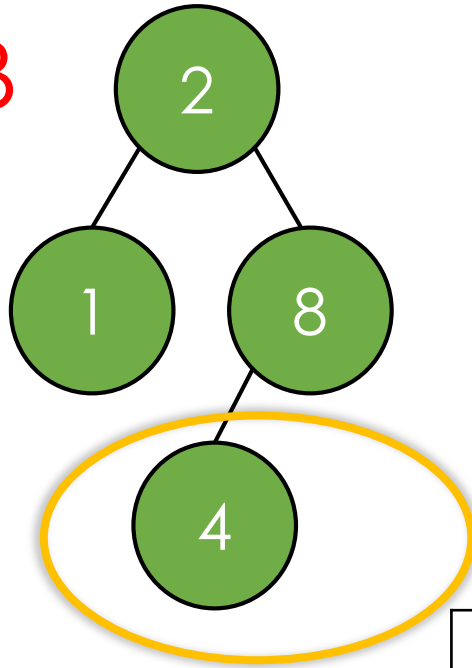
B



4 needs to be inserted AFTER 8

2

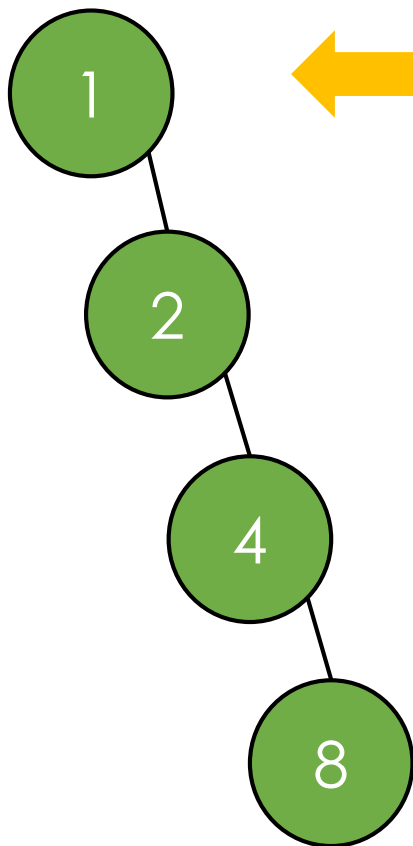
B



4 needs to be inserted AFTER 8



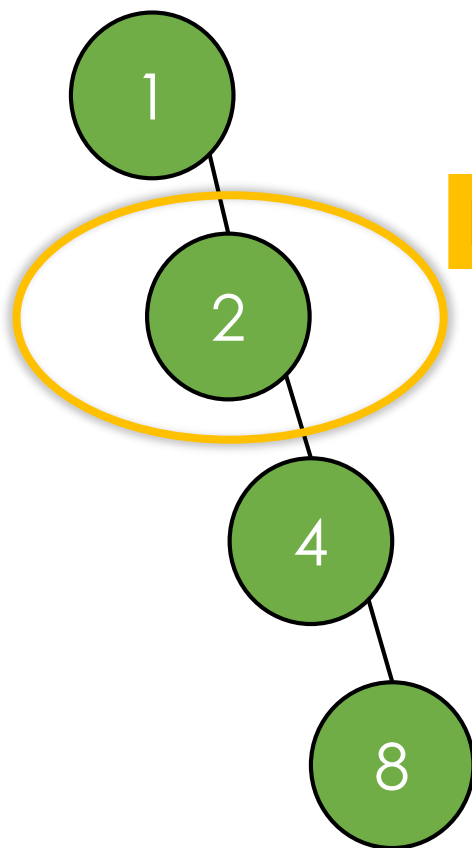
C



Root comes first

1

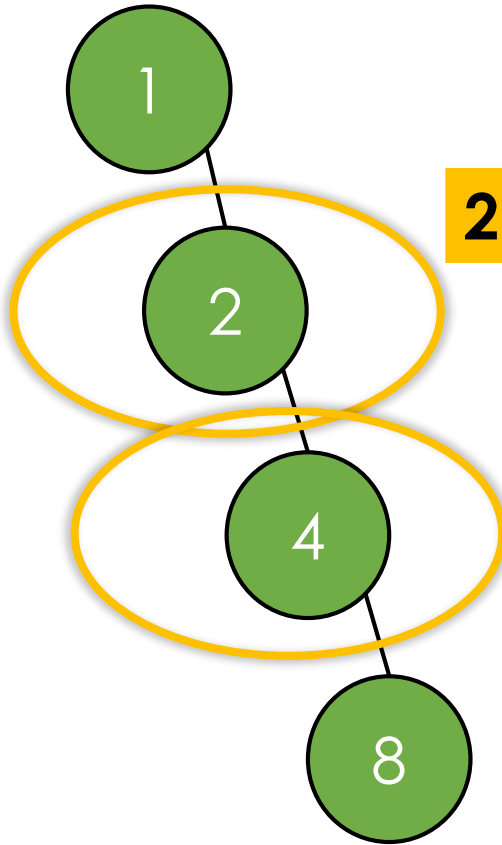
C



Needs to be inserted AFTER 1

1

C

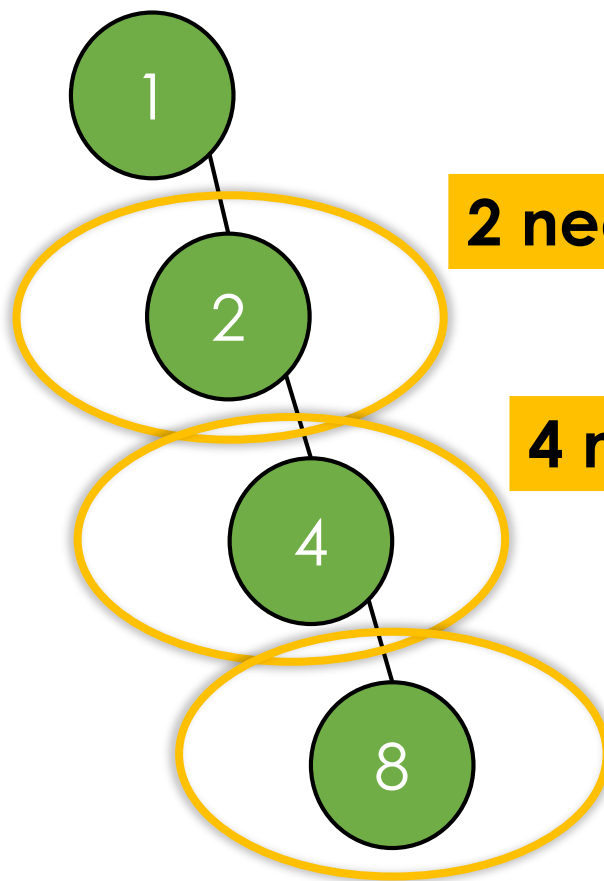


2 needs to be inserted AFTER 1

4 needs to be inserted AFTER 2

1

C



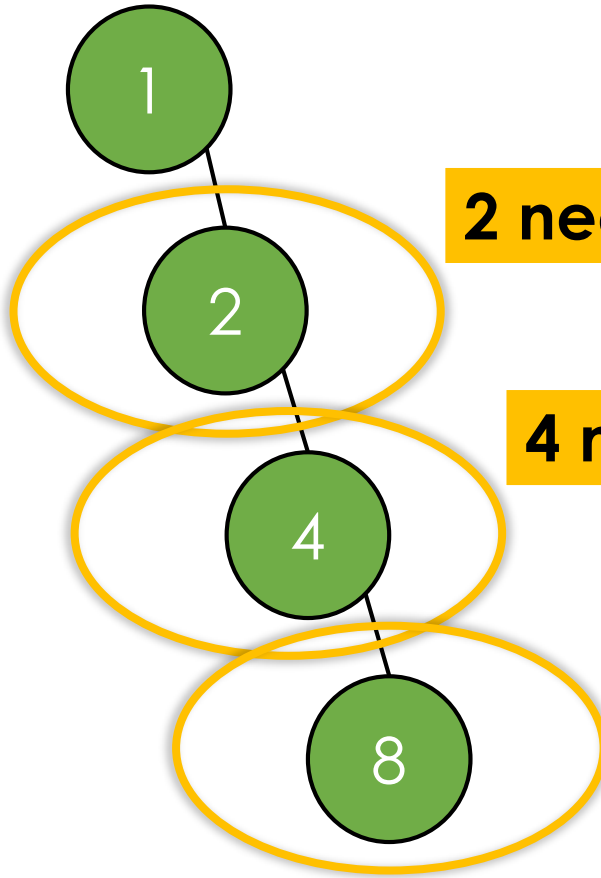
2 needs to be inserted AFTER 1

4 needs to be inserted AFTER 2

8 needs to be inserted AFTER 4

1

C



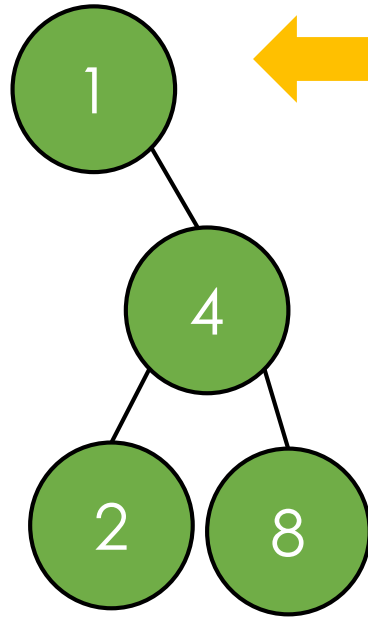
2 needs to be inserted AFTER 1

4 needs to be inserted AFTER 2

8 needs to be inserted AFTER 4

1	2	4	8
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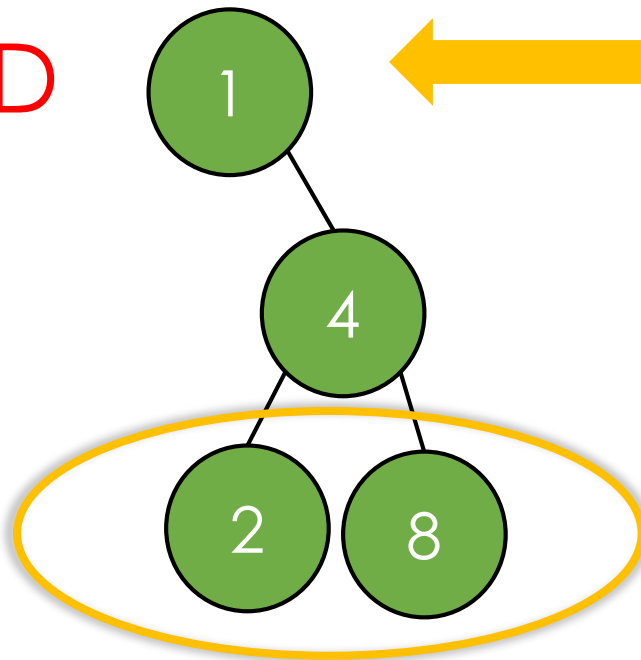
D



Root comes first

1

D

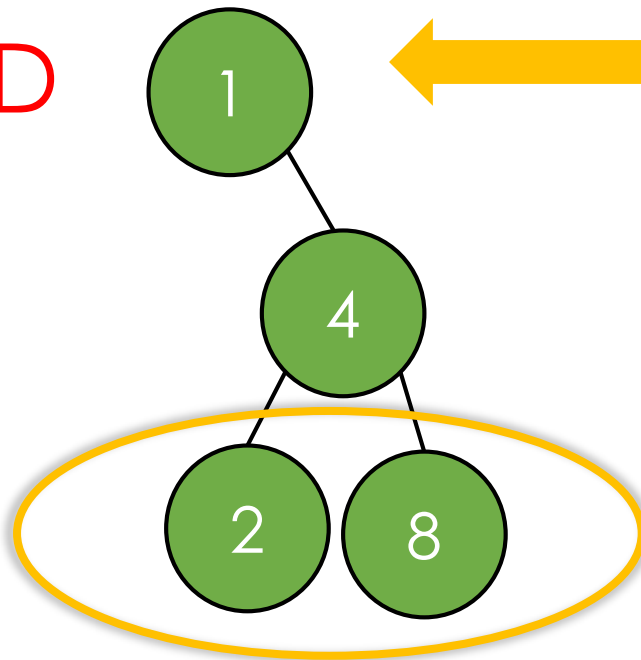


Root comes first

Both 2 and 8 need to be inserted AFTER 4

1

D

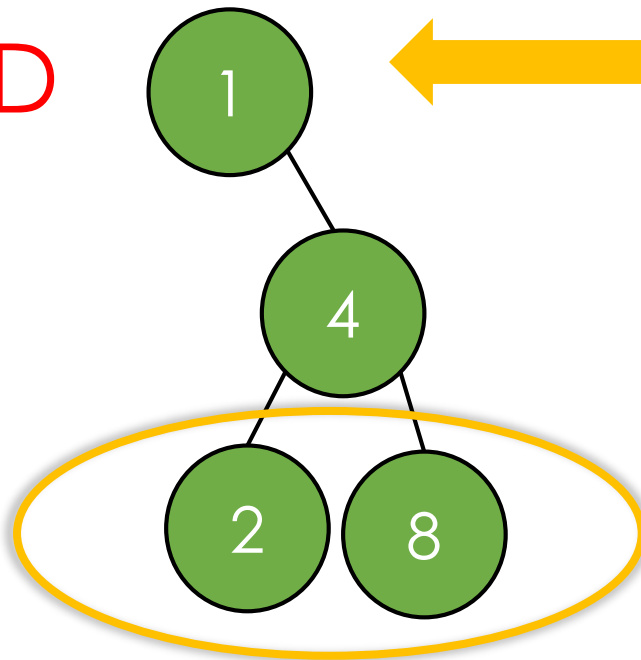


Root comes first

Both 2 and 8 need to be inserted AFTER 4



D



Root comes first

Both 2 and 8 need to be inserted AFTER 4

1	4	2	8
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1	4	8	2
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