Concept Challenge

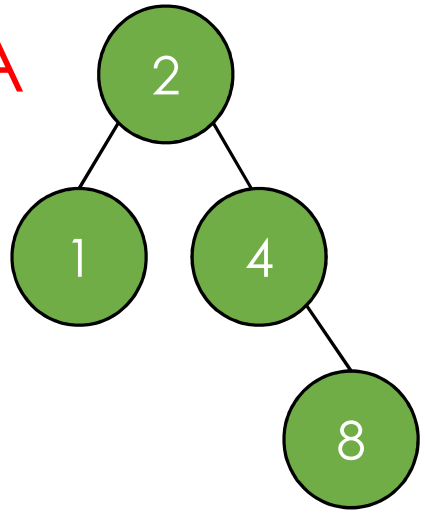
Binary Search Tree Shapes

Concept Challenge

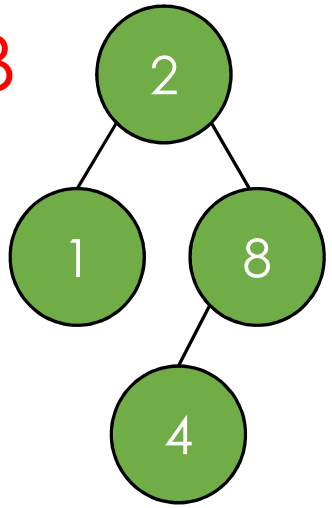
- **Pause** Try to solve the problem yourself
- **Discuss** with other learners (if you can)
- **Watch** the UCSD learners video
- **Confirm** your understanding with our explanation

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?

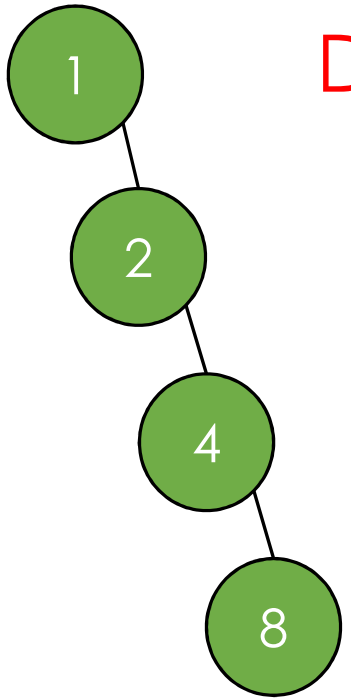
A



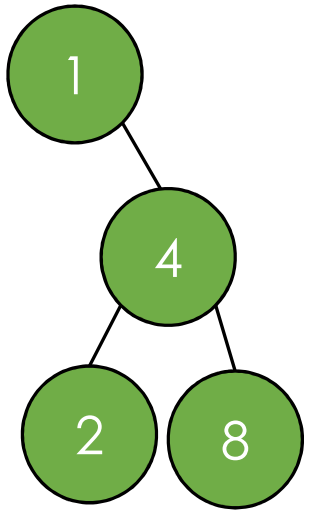
B



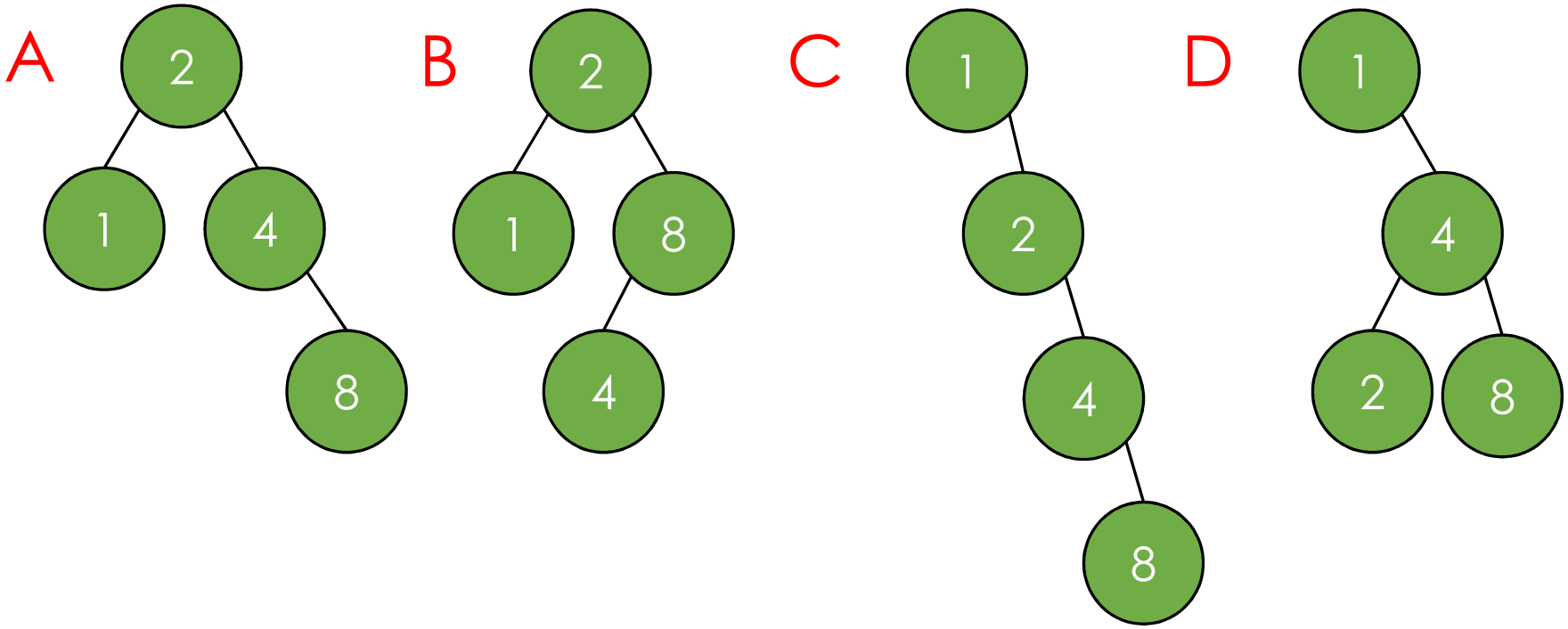
C



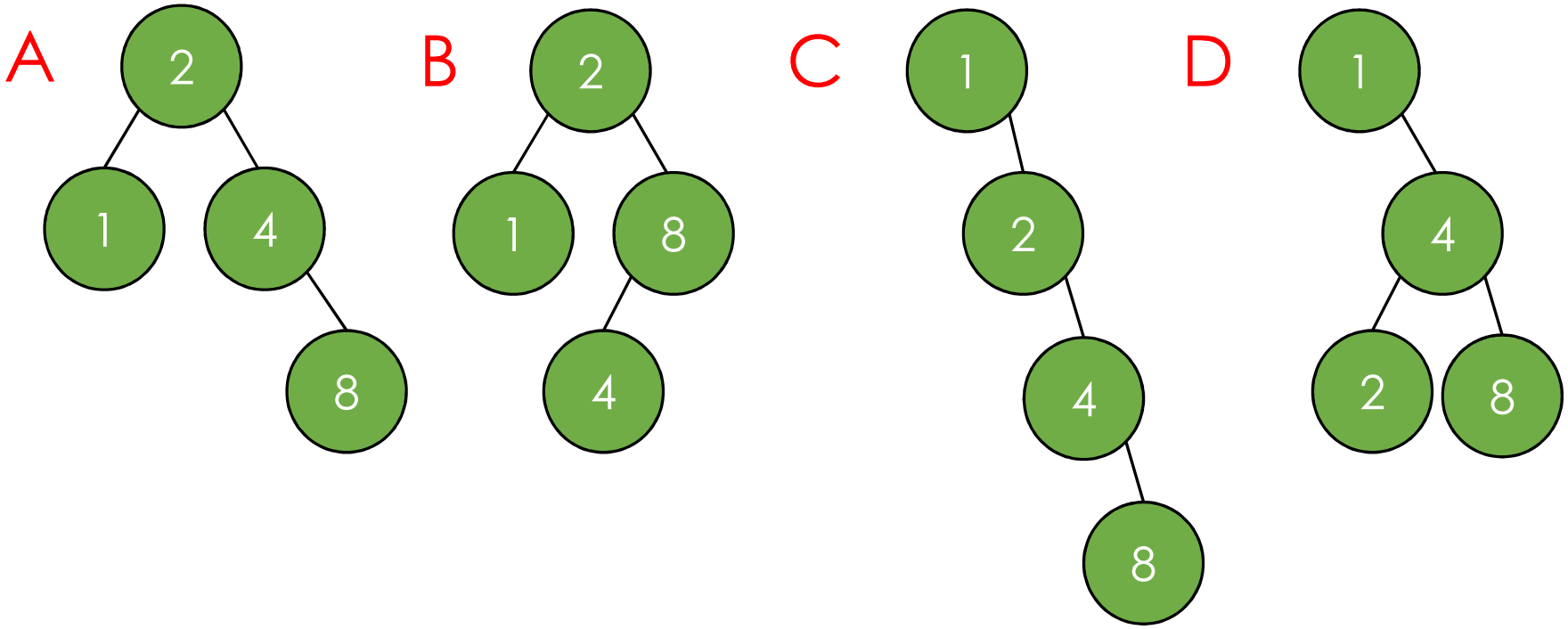
D

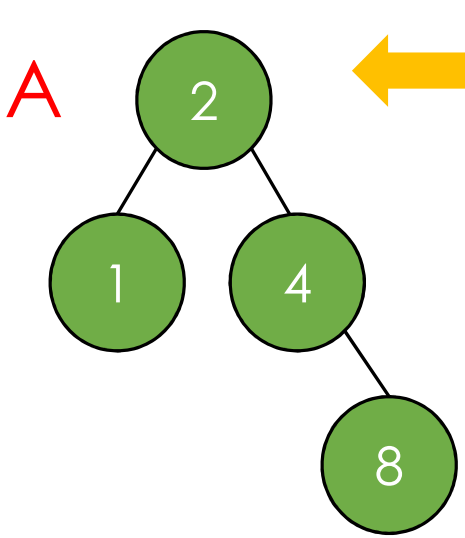


These are all valid trees!



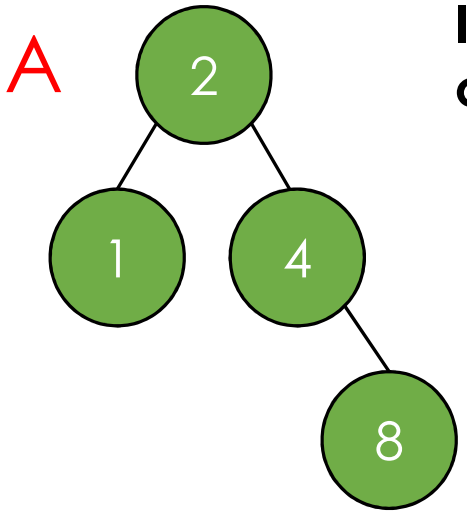
These are all valid binary search trees!



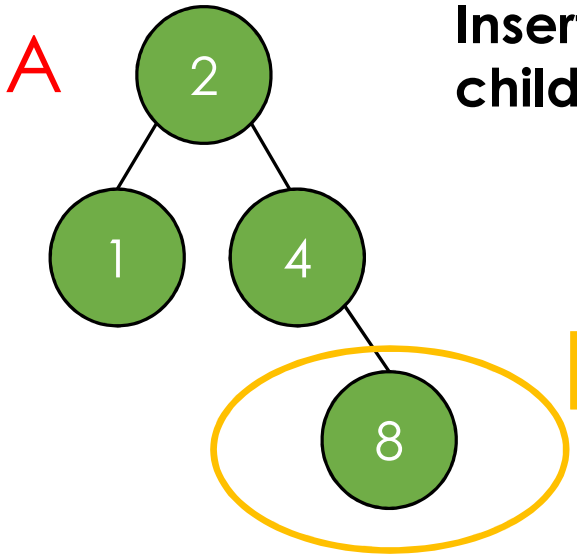


Root comes first

2	



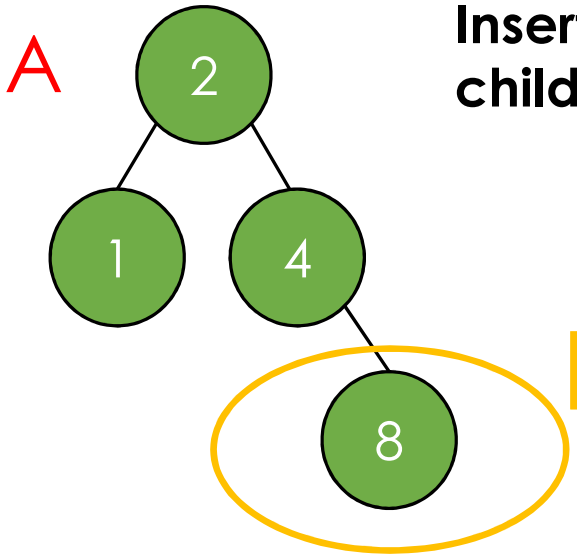
Inserting a node means making it a child of an existing node



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

8 needs to be inserted AFTER 4

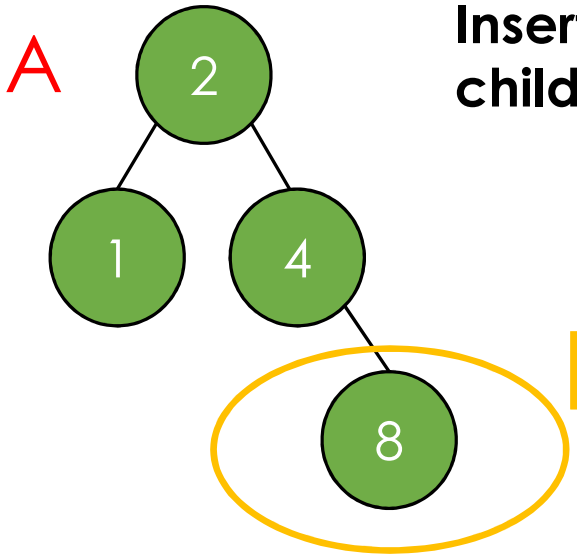
2



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

8 needs to be inserted AFTER 4

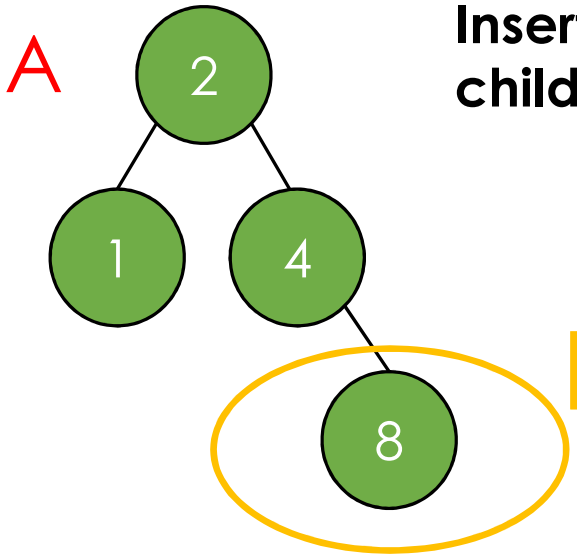
2	1	4	8



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

8 needs to be inserted AFTER 4

2	4	8	1

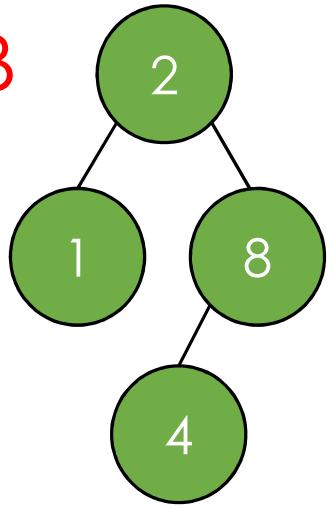


Inserting a node means making it a child of an existing node

8 needs to be inserted AFTER 4

2	4	1	8

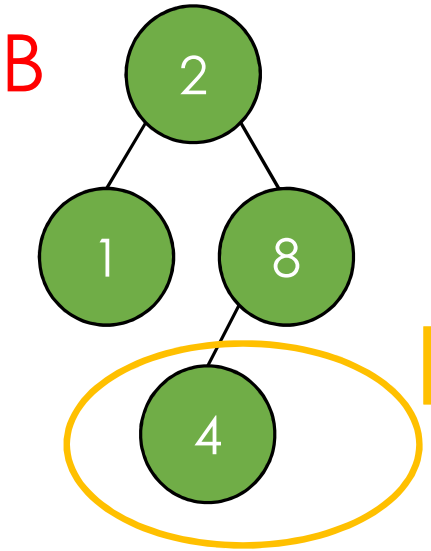
B



Root comes first

2	

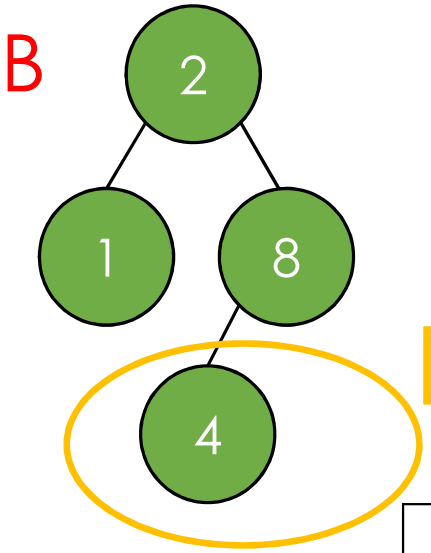
B



4 needs to be inserted AFTER 8

2

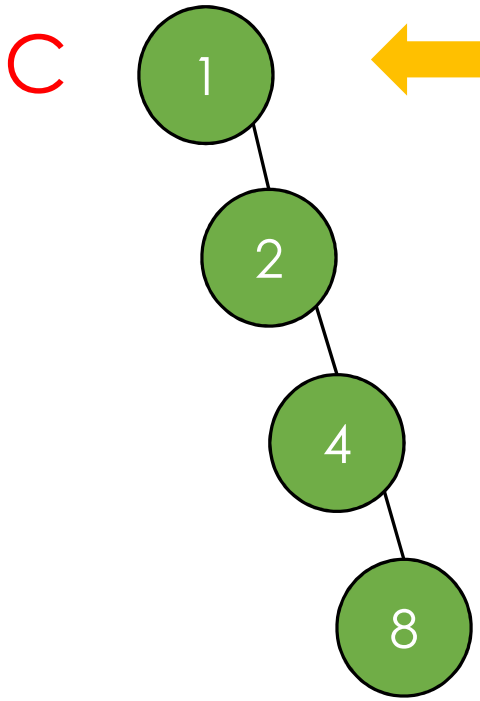
B



4 needs to be inserted AFTER 8

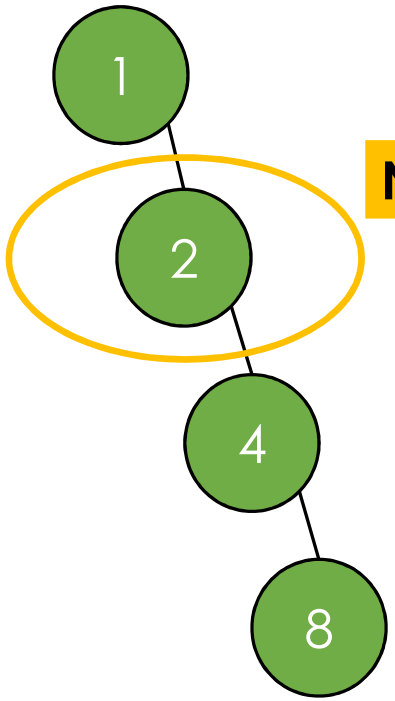
2	8	4	1
2	8	1	4
2	1	8	4

C



Root comes first

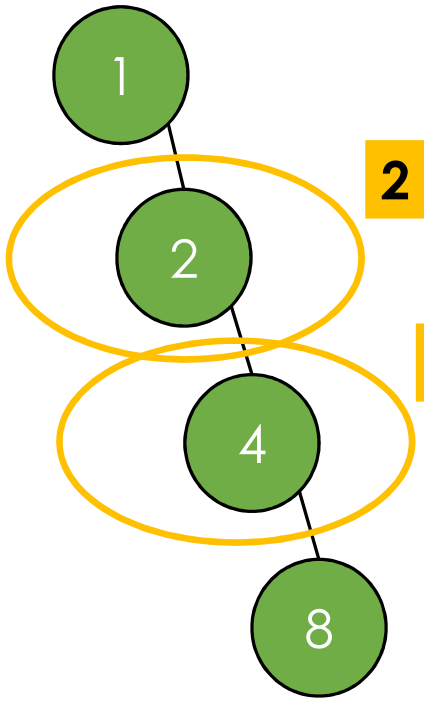
C



Needs to be inserted AFTER 1

1	

C

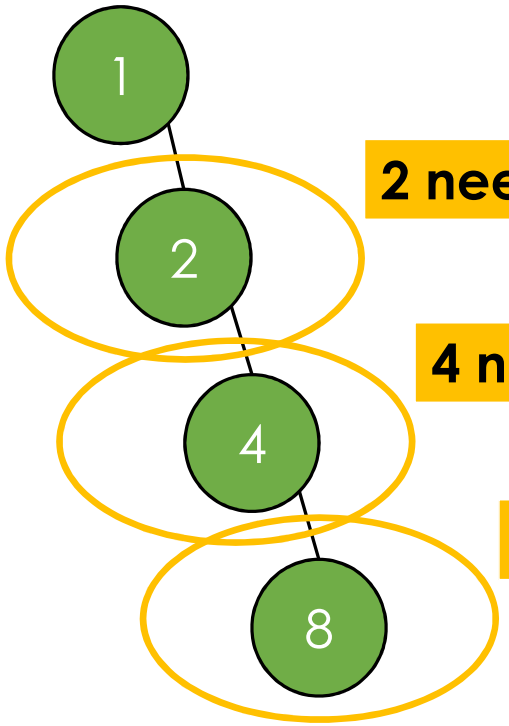


2 needs to be inserted AFTER 1

4 needs to be inserted AFTER 2

1

C



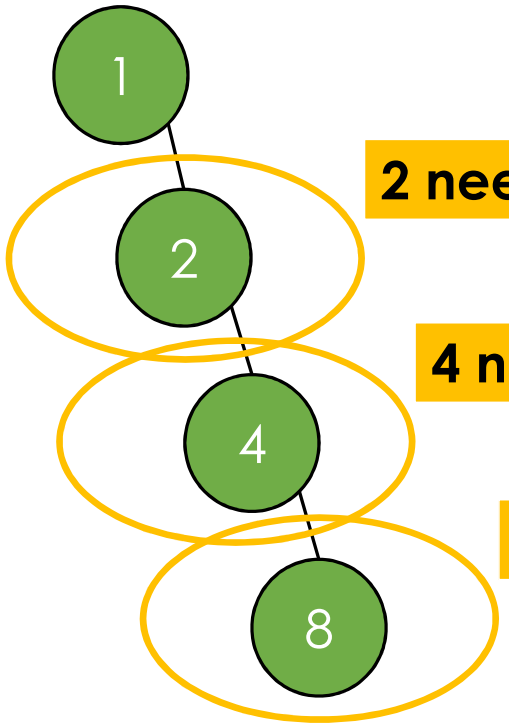
2 needs to be inserted AFTER 1

4 needs to be inserted AFTER 2

8 needs to be inserted AFTER 4

1

C



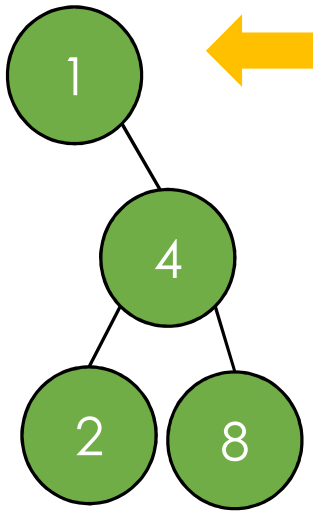
2 needs to be inserted AFTER 1

4 needs to be inserted AFTER 2

8 needs to be inserted AFTER 4

1	2	4	8

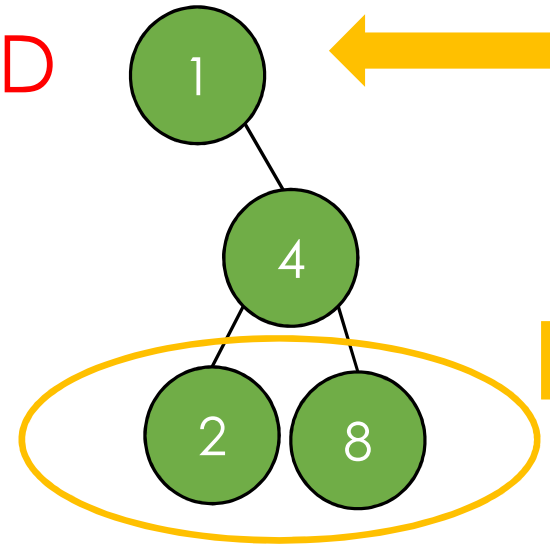
D



Root comes first

1	

D

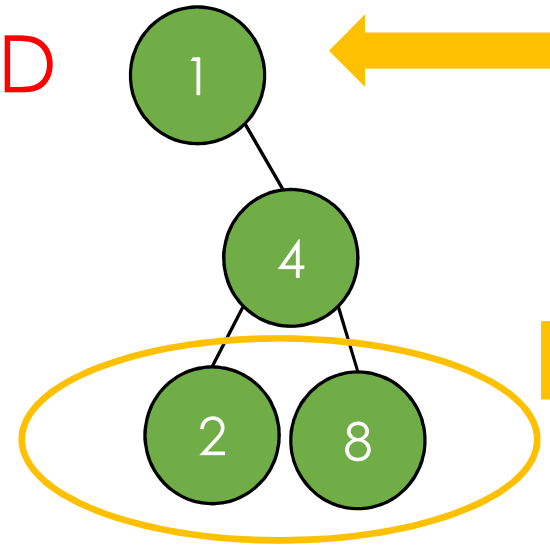


Root comes first

Both 2 and 8 need to be inserted AFTER 4

1	

D

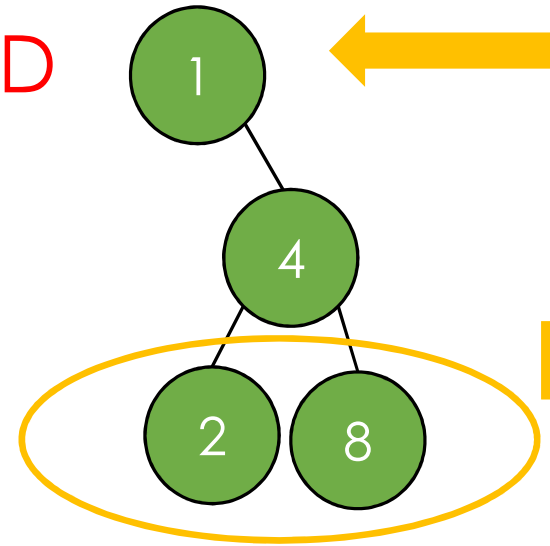


Root comes first

Both 2 and 8 need to be inserted AFTER 4

1	4	

D



Root comes first

Both 2 and 8 need to be inserted AFTER 4

1	4	2	8

1	4	8	2