

# [320] Breadth First Search

Tyler Caraza-Harter

# Review

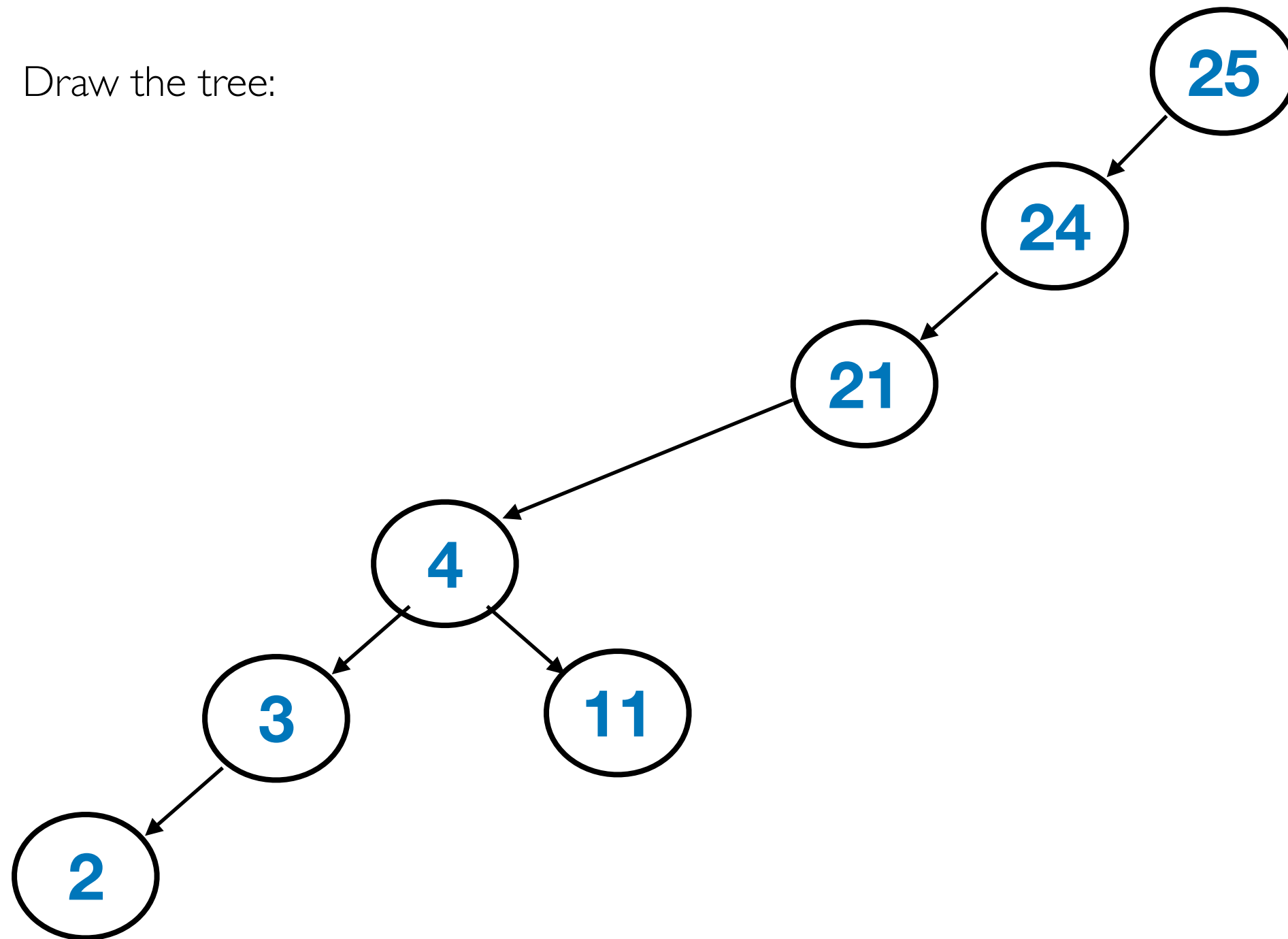
Assume this insertion order for a BST: **25, 24, 21, 4, 3, 2, 11**

Draw the tree:

# Review

Assume this insertion order for a BST: 25, 24, 21, 4, 3, 2, 11

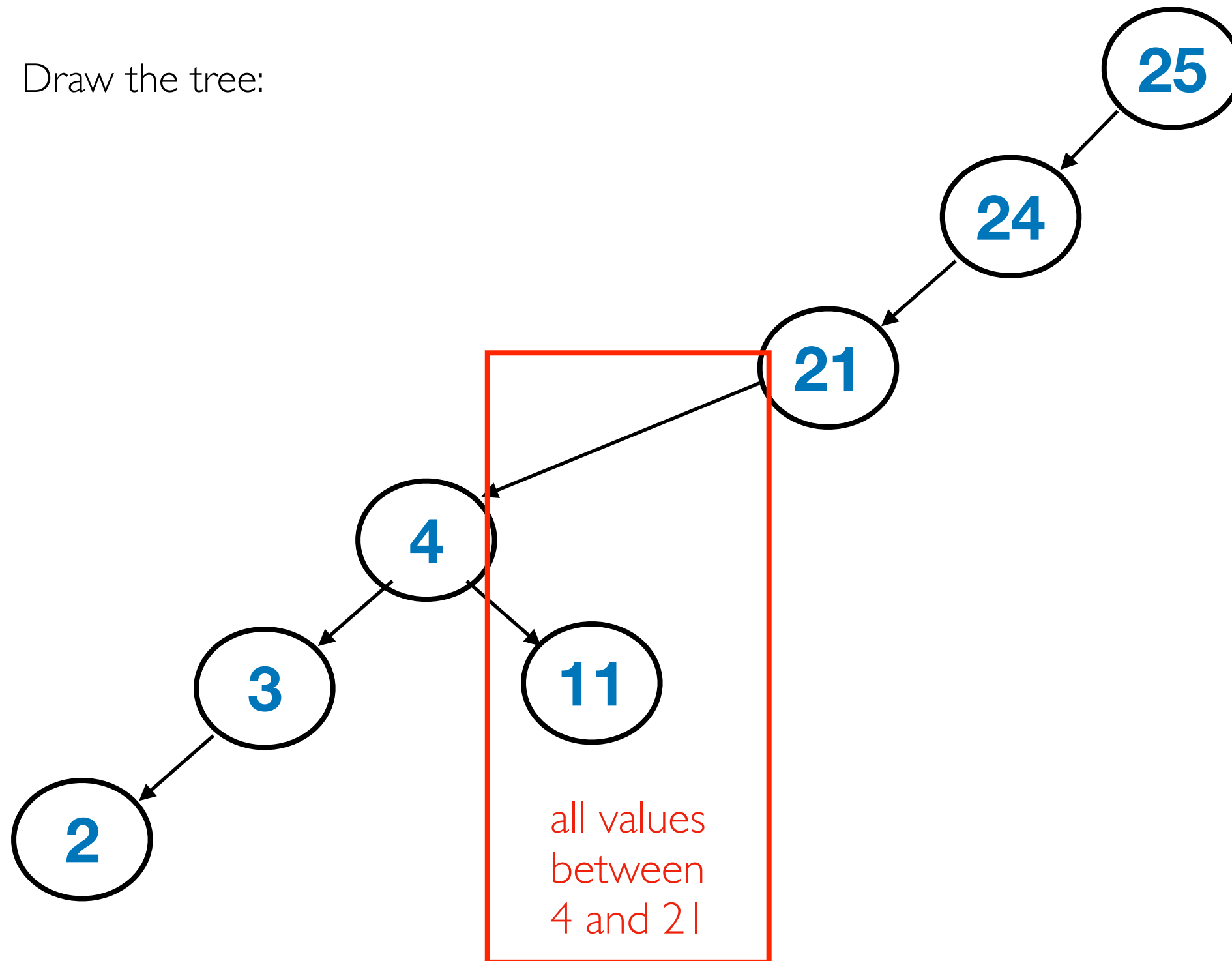
Draw the tree:



# Review

Assume this insertion order for a BST: 25, 24, 21, 4, 3, 2, 11

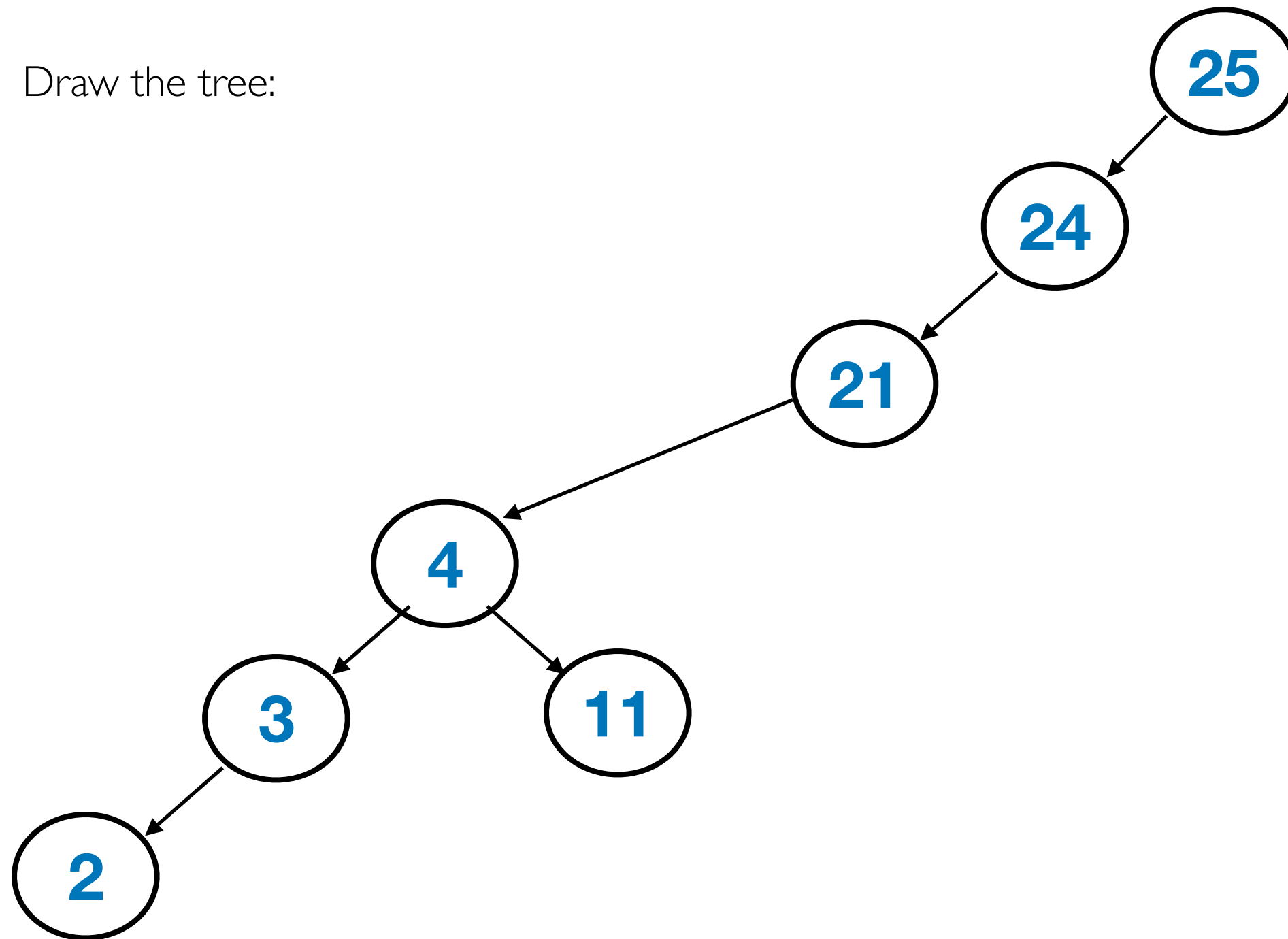
Draw the tree:



# Review

Which nodes will be checked if we're searching for 22?

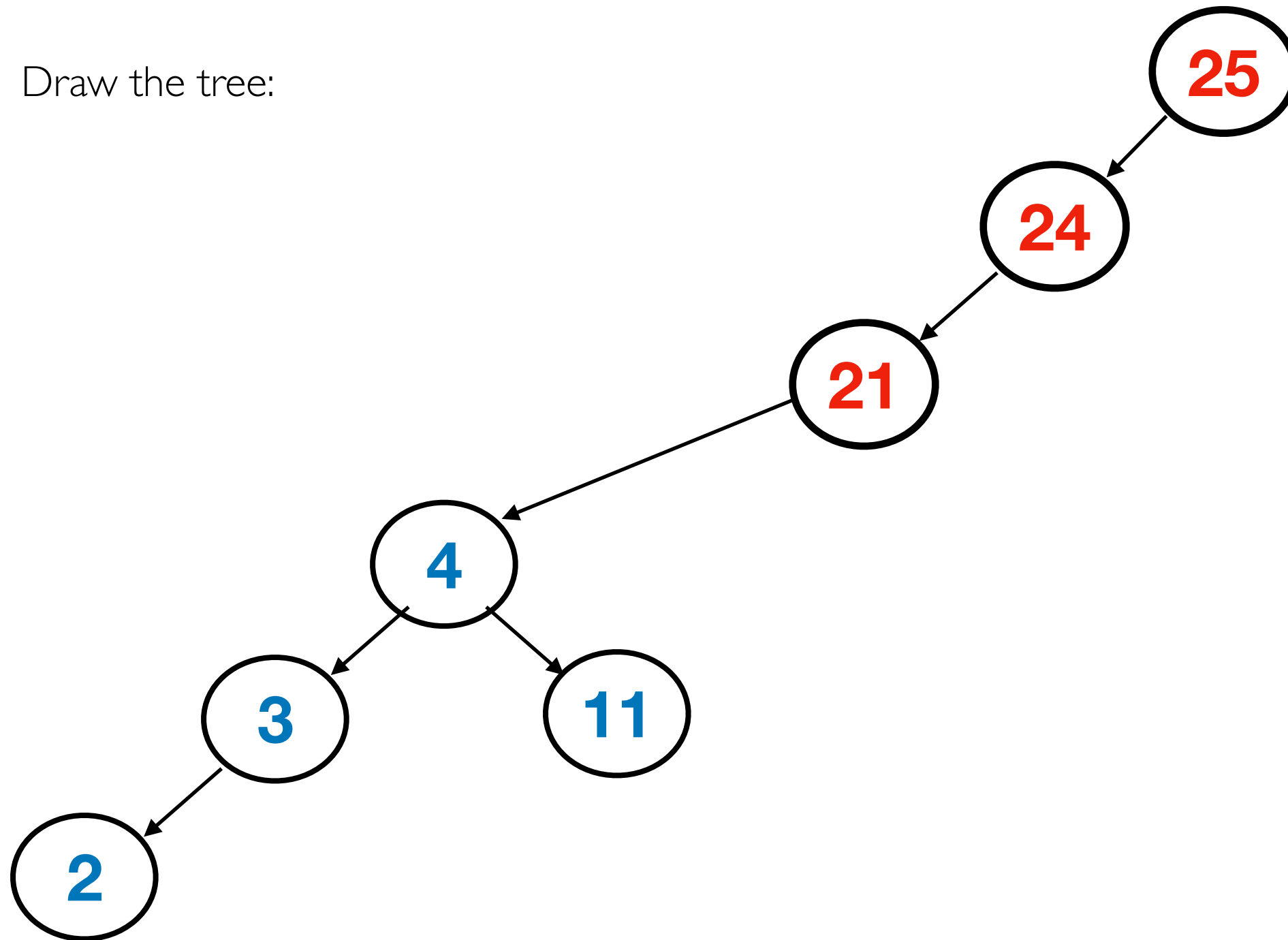
Draw the tree:



# Review

Which nodes will be checked if we're searching for 22?

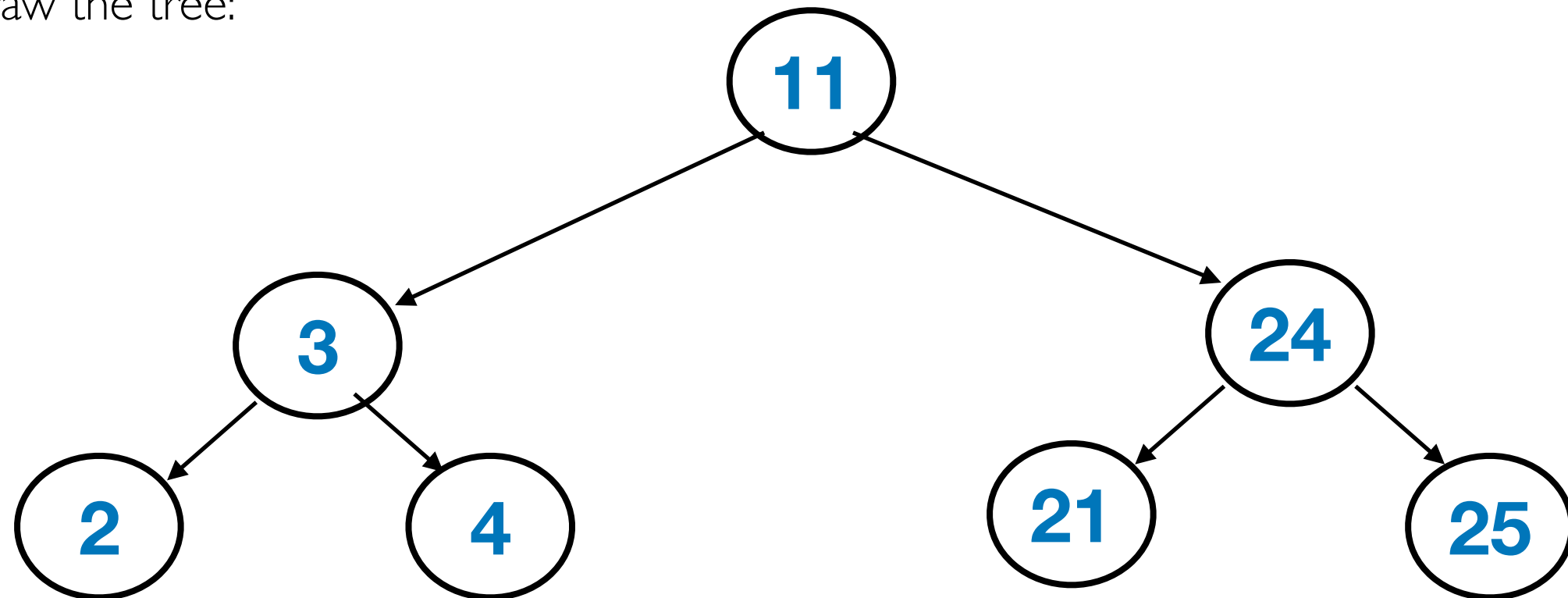
Draw the tree:



# Review

Write down an insertion order that will produce a balanced tree...

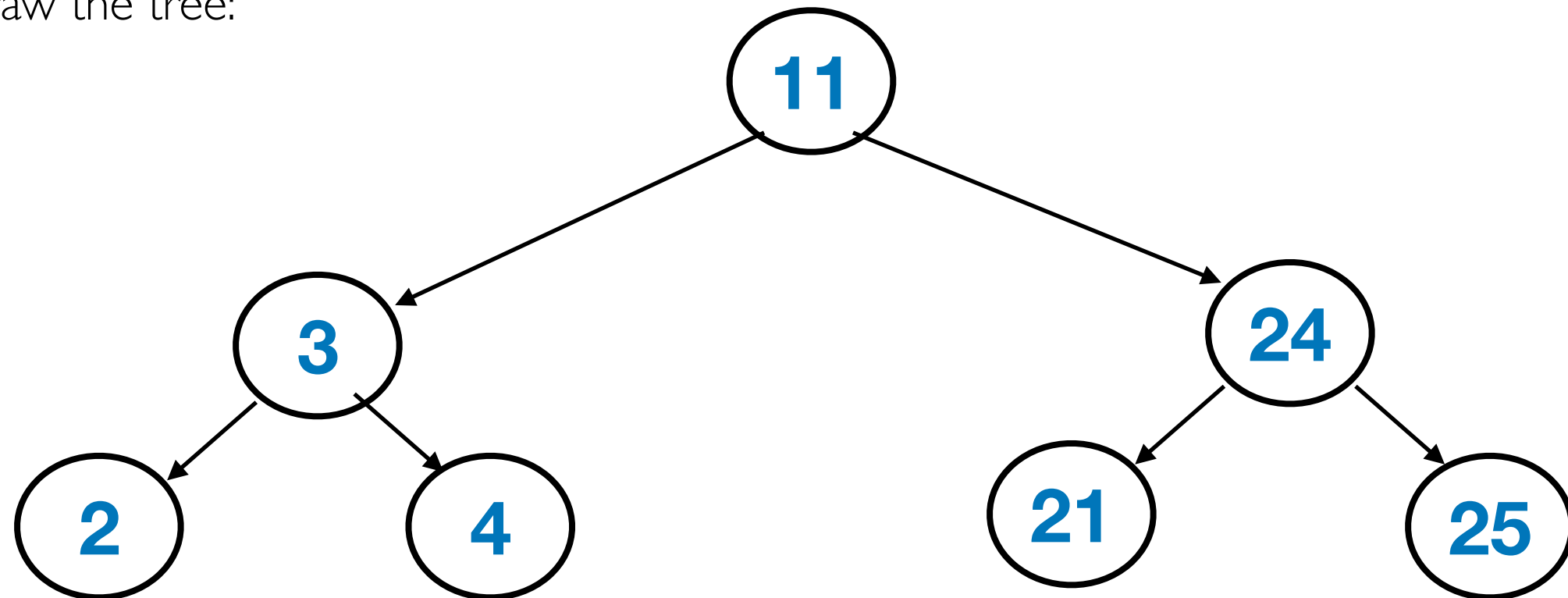
Draw the tree:



# Review

Write down an insertion order that will produce a balanced tree...

Draw the tree:



11, 3, 24, 2, 4, 21, 25

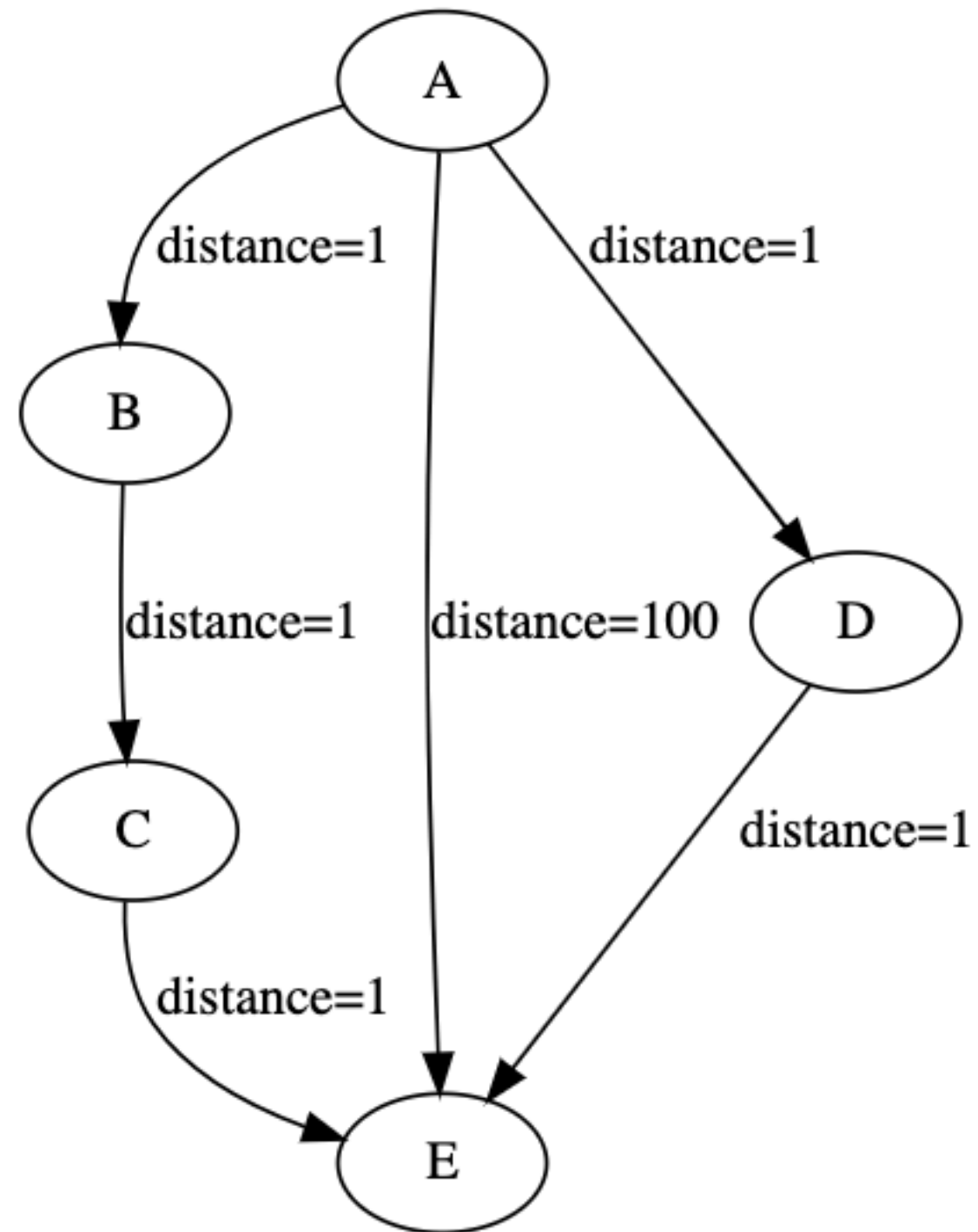


# Shortest Weighted Path

What path will DFS choose?

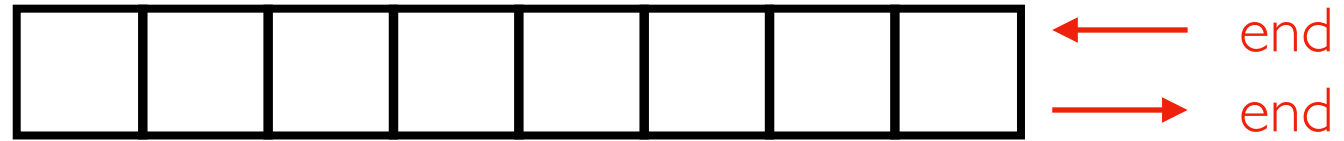
What path will BFS choose?

What path would you choose?



# Your "to do" list: Stacks, Queues, and Priority Queues

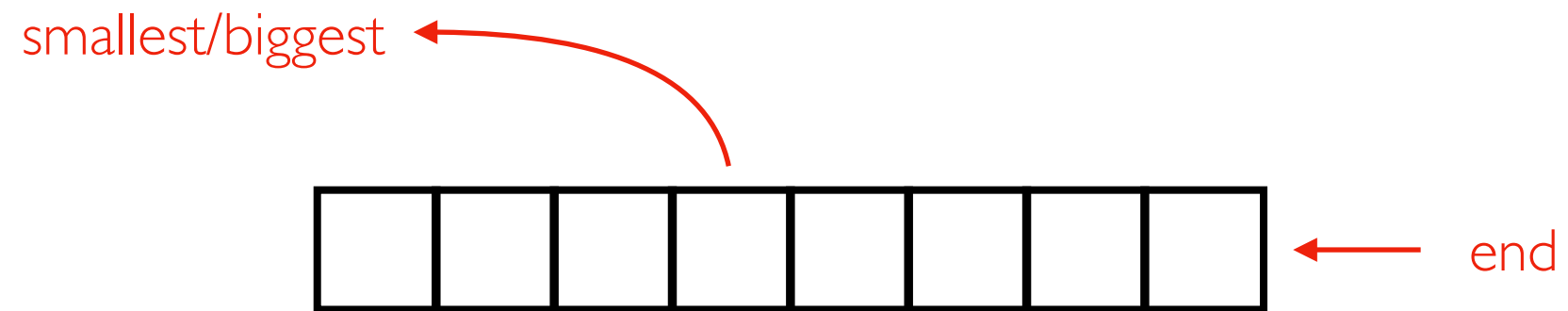
Stack



Queue



Priority Queue



# Complexity: Time vs. Memory

```
def ratio_search(L, target):  
    for n in L:  
        for d in L:  
            if n/d == target:  
                return True  
    return False
```

```
def list_ratios(L):  
    ratios = []  
    for n in L:  
        for d in L:  
            ratios.append(n/d)  
    return ratios
```

if  $N$  is  $\text{len}(L)$  and  $f(N)$  is the **number of steps**, with is the Big-O complexity of each function?

# Complexity: Time vs. Memory

```
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    return ratios
```

if  $N$  is  $\text{len}(L)$  and  $f(N)$  is the **max memory** used, with is the Big-O complexity of each function?